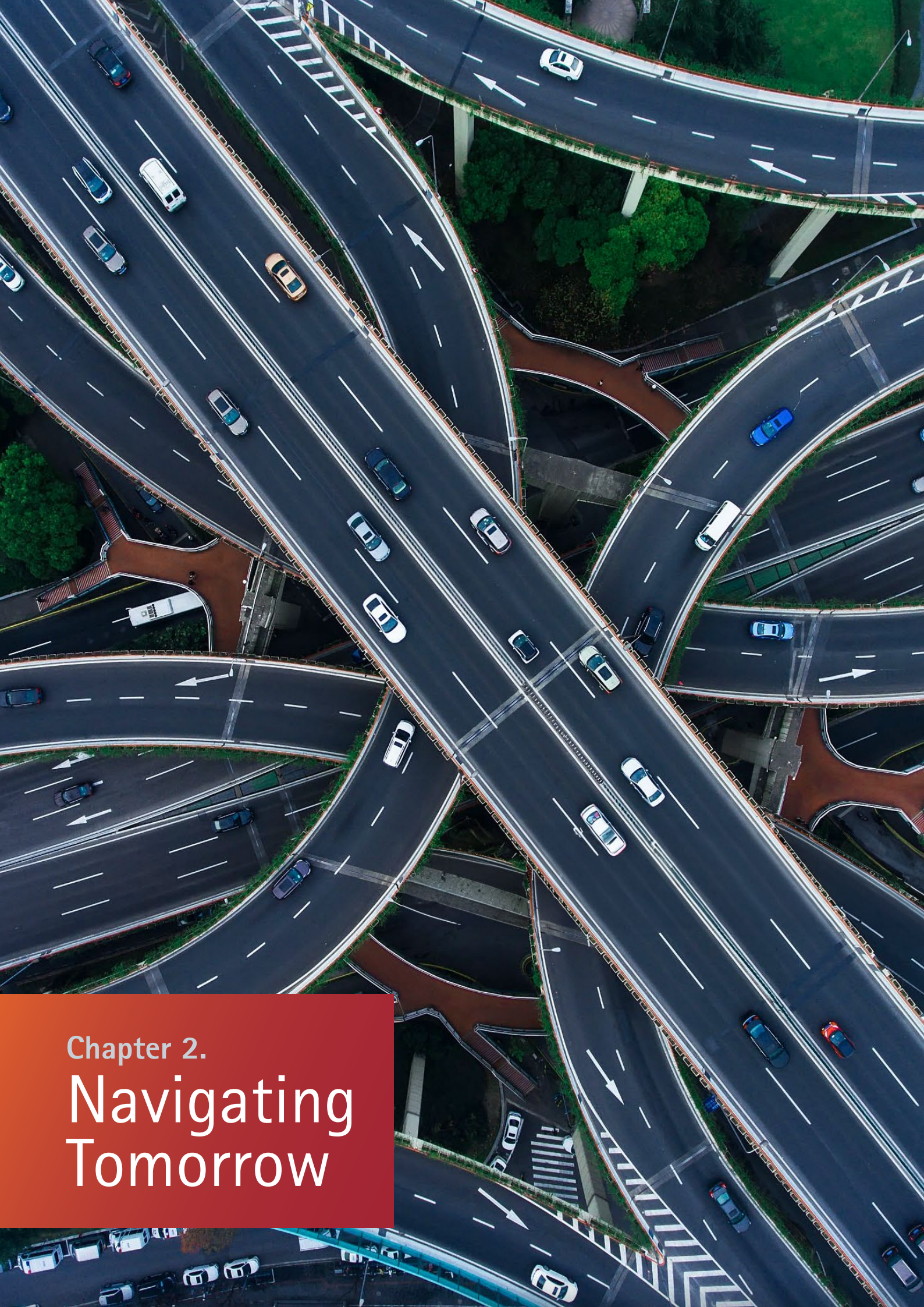


Chapter 2.

Navigating Tomorrow

Highlights

- The ASEAN+3 region has achieved immense economic progress in the past two decades. Collectively, ASEAN+3 economies have now become the biggest driver of global growth. However, the various tailwinds that facilitated remarkable growth are dissipating while headwinds are rising, and the speed of the region's catch-up with high-income peers has been moderating since the global financial crisis of 2008–2009. More critically, the region is experiencing this slowdown in an environment increasingly beset by challenges from key secular trends, including aging, a global trade reconfiguration, and rapid technological change.

- Aging is happening faster in ASEAN+3 than in many parts of the world. Its total working-age population is projected to shrink in the second half of this decade, which carries negative implications for the region's growth potential, macroeconomic stability, and the sustainability of public finances. However, these consequences are not predetermined and can be mitigated somewhat—especially if the population is allowed, and able, to age productively. When considering healthier life expectancies in the ASEAN+3 region, policies that support and promote healthy longevity could see about 200 million workers reenter the region's labor force by 2050.

- The ongoing reconfiguration in global trade carries key implications for the region's time-tested export strategies. Geopolitical dynamics are increasingly realigning trade relationships globally and have unveiled new trade opportunities for ASEAN+3 economies that have been able to swiftly leverage their comparative advantage. At the same time, the region's trade has become concentrated into fewer trading partners and—in a world economy faced with higher uncertainty—this could translate into lower economic security. On the other hand, harnessing cross-border services trade, especially modern and digitally deliverable services, offers significant opportunities for growth and diversification.

- Technology will unlock many solutions that the ASEAN+3 region can use to navigate the ongoing demographic transition and global trade reconfiguration. Tech-enabled advances in medicine, automation, and work and learning platforms are crucial for productive aging. Advanced production technologies and smart logistics will be instrumental in making regional supply chains highly agile against sudden shocks. Yet, technology is also a harbinger of change. Rapid advancements in artificial intelligence, for example—especially in generative artificial intelligence or Gen AI—are raising legitimate concerns about the future of work. A realistic, qualified, and balanced approach to Gen AI's capabilities would be a sensible approach at the current juncture.

- This chapter provides context for AMRO's future in-depth research work and to help steer policy discussion on these issues. While the optimal policy mix—and timing—will differ across the region's economies, well-designed domestic policies that (1) emphasize quality infrastructure, (2) encourage innovation, and (3) promote inclusivity, would enable each economy to transform the challenges from these secular trends into growth opportunities.

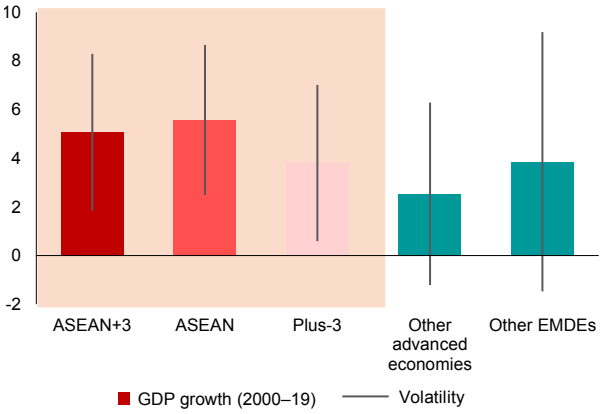
- Aging, trade reconfiguration, and rapid technological change are common long-term challenges that cut across borders. Effective responses to these common challenges—such as diversification, infrastructure upgrading, technology diffusion, and labor mobility—require enhanced and inclusive dialogue within ASEAN+3 economies and their key economic partners. Leveraging the strength of collective action will make for robust and resilient long-term growth in ASEAN+3—regardless of how the global economic order unfolds.

I. Introduction

The ASEAN+3 region has experienced immense economic progress in the past two decades. With relatively stronger and more stable growth compared to other parts of the world, the ASEAN+3 region has become the largest economic region in the world, accounting for more than a quarter of world GDP in 2022, at market exchange rates (Hinojales, Kho, and Tan 2023). Between 2000 and 2019—barring the years of the global financial crisis—the regional economy expanded at an average of 5 percent a year, double the growth in advanced economies and about 30 percent higher than that of other emerging market and developing peers (Figure 2.1). This rapid growth was also less volatile than for other peers. It was underpinned by various factors: active participation in global value chains (GVCs), which helped the boom in ASEAN+3 exports; favorable domestic policies that attracted large foreign direct investments (FDI); and brisk improvements in the quality of the labor force, alongside strong involvement in global and regional initiatives that signaled that the ASEAN+3 region was "open for business" (AMRO 2021). With the strong and stable growth in national incomes, all the region's economies have transitioned to middle-income status, with China and Malaysia well-positioned to reach high-income status by the end of this decade (Figure 2.2).

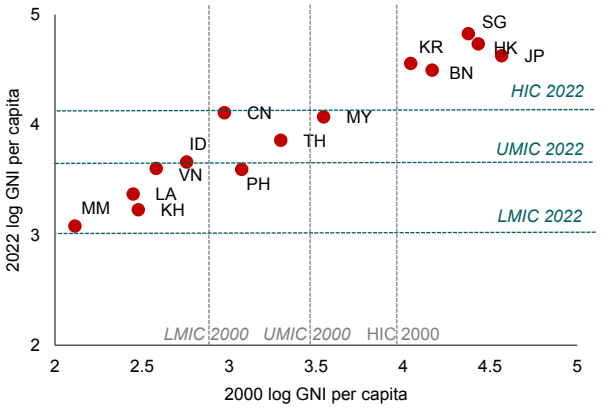
Economic transformation across the region's economies is occurring at varying degrees and speeds. Industrialization is pushing forward in most economies but is stalling for others. Most ASEAN-5 economies, in particular, continue to see the share of their manufacturing sectors lower than their historical peaks (Figure 2.3). Singapore, which experienced peak manufacturing the earliest, was able to shift economic activity rapidly toward services, especially high value-added ones related to information and communication technology (ICT), finance, and other business services. In contrast, the other ASEAN-5 economies have developed more traditional services, such as travel and tourism, transport, as well as goods-related services. Elsewhere across the ASEAN+3 region, industrialization continues. The growth of Vietnam's manufacturing sector is notable in the CLMV group, having increased its share to total output and employment at a brisk pace (Figure 2.4).[1] In the Plus-3, Korea and China are experiencing advanced industrialization, with the share of manufacturing to total value-added output still growing, although at a more moderate pace than during the past decade. Nevertheless, its relatively stable share of total employment indicates that manufacturing activity is mostly toward high-productivity and high-value added processes. In addition, the share of modern services in these economies is also gaining traction.

Figure 2.1. ASEAN+3: 2000–19 GDP Growth and Growth Volatility
(Percent, year-on-year)



Source: Penn World Tables; AMRO staff calculations.
Note: EMDE = emerging market and developing economies. The calculation of average annual GDP growth rate exclude 2008 and 2009; whiskers show average standard deviation. "Advanced economies" and "Other EMDEs" follow the International Monetary Fund's classification.

Figure 2.2. ASEAN+3: Gross National Income per Capita, 2000 versus 2022

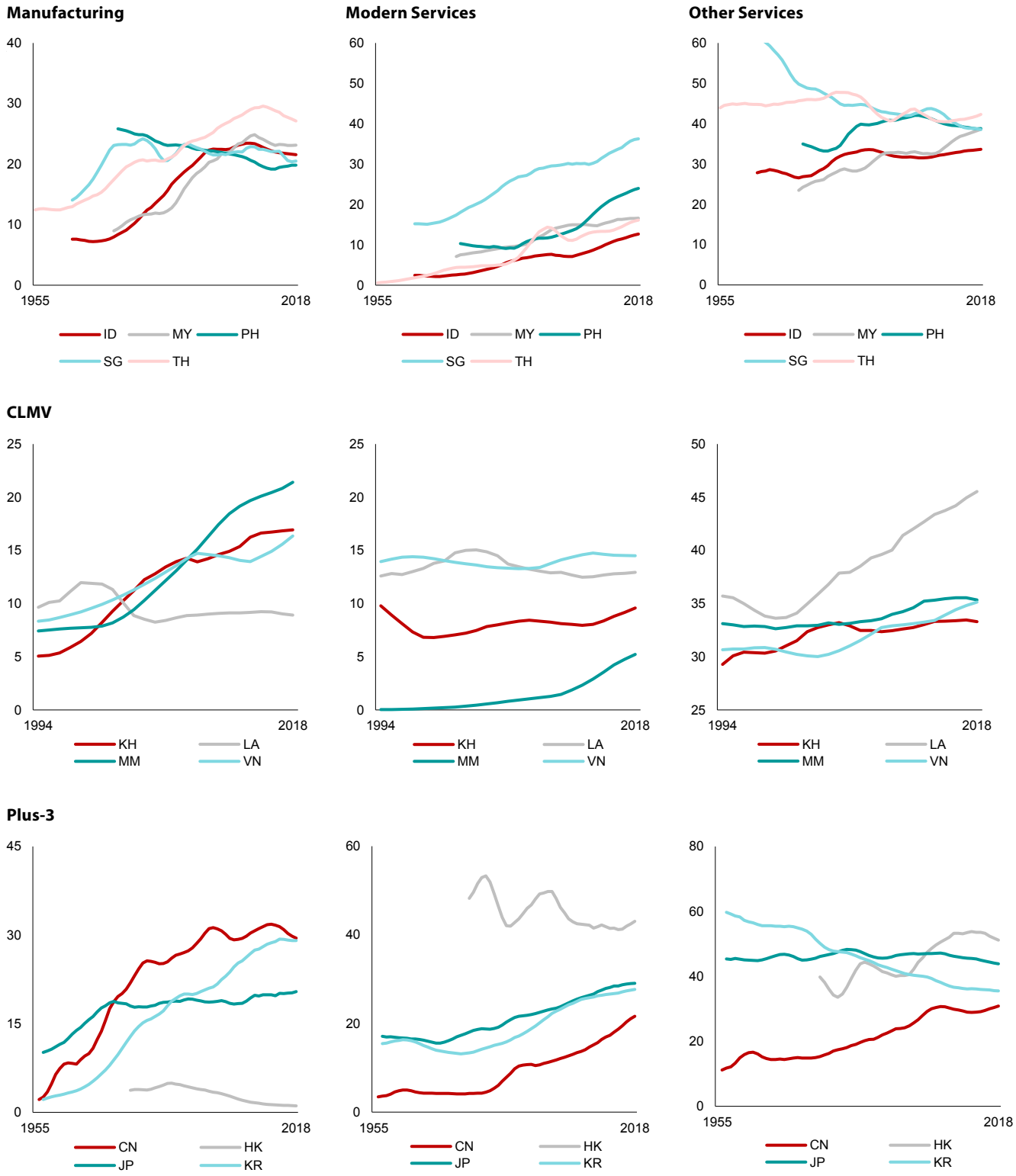


Source: World Bank via Haver Analytics; AMRO staff calculations.
Note: BN = Brunei; CN = China; HIC = high-income class; ID = Indonesia; JP = Japan; KH = Cambodia; HK = Hong Kong; KR = Korea; LA = Lao PDR; LMIC = lower middle-income class; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; UMIC = upper middle-income class; VN = Vietnam. Thresholds for the gross national income (GNI) follow the World Bank's country classifications as of 2022.

The authors of this chapter are Marthe M. Hinojales (lead) and Allen Ng, with contributions from Megan Wen Xi Chong, Yin Fai Ho, Seung Hyun (Luke) Hong, Jae Young Lee, Dek Joe Sum, Fan Zhai, and Hongyan Zhao.

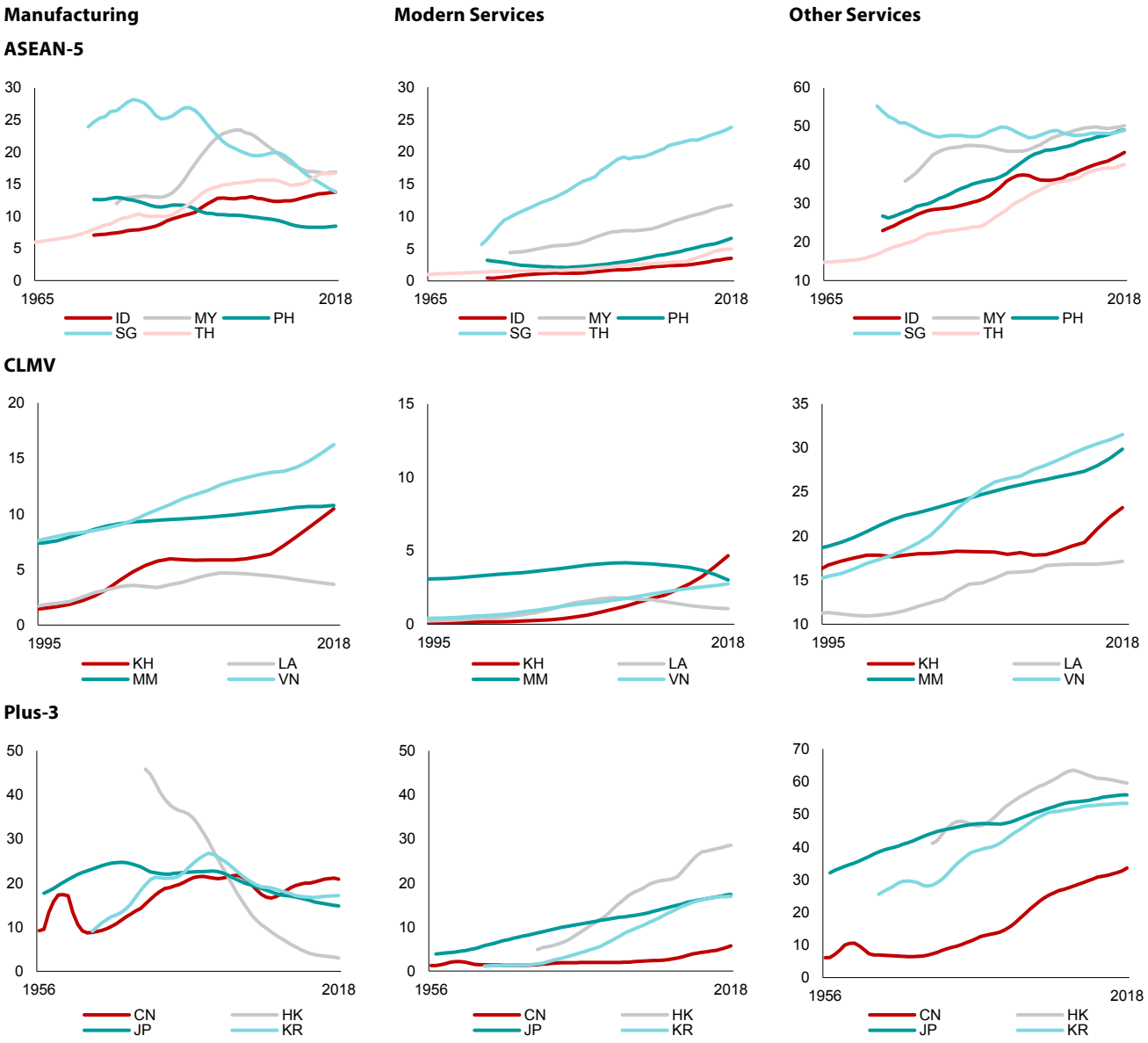
1/ Lao PDR is an exception to the overall trend in the CLMV. While industrialization has stalled, the economy has witnessed growing shares in the construction and non-modern services instead.

Figure 2.3. Selected ASEAN+3: Share in Total Value-Added, by Sector
(Percent, five-year moving average)



Source: GGDC/UNU-WIDER Economic Transformation Database; GGDC10-sector database; AMRO staff calculations.
Note: CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Share in total value added is calculated based on constant 2015 prices. Modern services include business, financial, and real estate services. Data not available for Brunei.

Figure 2.4. Selected ASEAN+3: Share in Total Employment, by Sector
(Percent, five-year moving average)

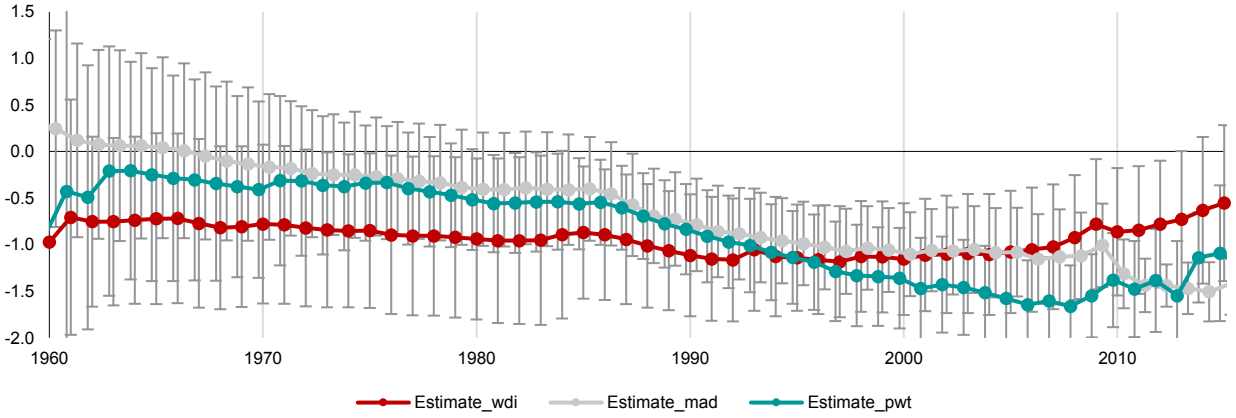


Source: GGDC/UNU-WIDER Economic Transformation Database; GGDC10-sector database; AMRO staff calculations.
Note: CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Modern services includes business, financial, and real estate services. Data not available for Brunei.

However, the pace of growth and productivity improvements in the ASEAN+3 region—especially after the global financial crisis—is slowing. The region's income "catch-up" with more advanced and richer peers was especially evident in mid-1980s—driven by ASEAN-4—as well as in the 2000s, with the addition of China (Figure 2.5).[2] However, this "convergence effect" began to weaken in the years following the global financial crisis, as global growth slowed (Patel, Sandefur, and Subramaniam 2021). Further, productivity gaps remain wide between many in the region and the productivity frontier (proxied by the United States), despite significant progress achieved in the past two decades. In some economies, the total factor productivity (TFP) gap from the frontier has even widened (Figure 2.6). Compared to previous decades, TFP growth has decelerated across the region since 2010, except for Vietnam (Figure 2.7). Nevertheless, this slowdown is not unique to the ASEAN+3 region: the post-crisis decline was widespread, affecting all emerging market and developing economies and about 70 percent of advanced economies (Dieppe 2021). A confluence of factors underpinned this global phenomenon, including a deceleration in working-age population growth, stalled momentum in GVC expansion, a slower pace of structural transformation for developing economies, and slower economic growth in major advanced economies following the global financial crisis and the sovereign debt crisis in Europe.

2/ Convergence, following the Solow-Swan (1956) model, hypothesizes that "poorer economies' per capita incomes will tend to grow at faster rates than richer economies." This is because growth is driven by the accumulation of physical capital until an optimum level of capital per worker is reached. Developing economies have the potential to grow at a faster rate than developed economies because diminishing returns (in particular, to capital) are not as strong as in capital-rich countries, and all economies should eventually converge in terms of per capita income. That economic development is a result of capital accumulation is also posited by the Lewis Theory of Development (1954). In this theory, an unlimited supply of labor is available at a subsistence wage rate in underdeveloped economies. Growth results from the withdrawal of the surplus labor from the *subsistence* or traditional agricultural sector toward the *capitalist* or modern industrial sector, where it is more productive.

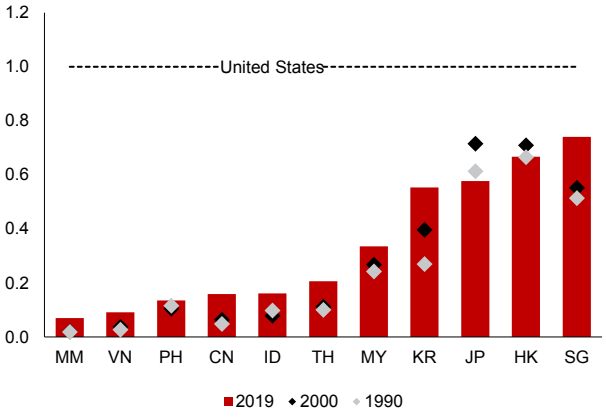
Figure 2.5. ASEAN+3: β-coefficient of Unconditional Convergence



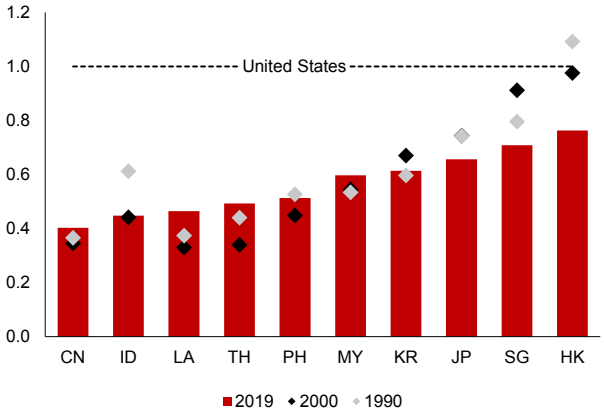
Source: World Bank; Penn World Table; Maddison Project Database; AMRO staff calculations.
Note: Each point represents the coefficient from a separate, bivariate, rolling (reverse recursive) regression. For each year, the dependent variable is the real GDP per capita growth rate from that year until the most recent data. The independent variable is the log of real GDP per capita in the base year. The more negative the beta (β)-coefficient, the faster the speed of convergence or catch-up.

Figure 2.6. Selected ASEAN+3: Selected Productivity Measures, 1990 versus 2019
(Index, distance to productivity frontier)

Labor Productivity

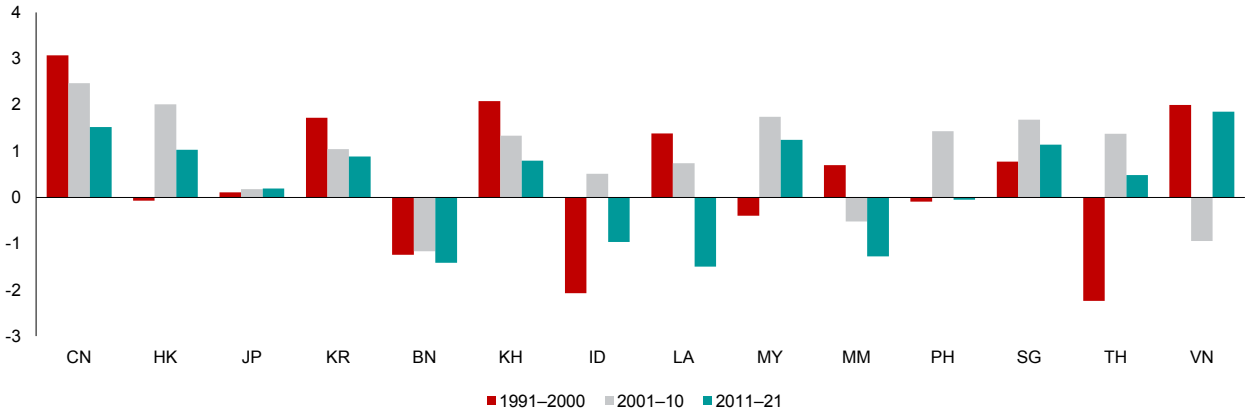


Total Factor Productivity



Source: Penn World Tables; AMRO staff calculations.
Note: CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; HK = Hong Kong; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Labor productivity is measured as total output per hours worked. Other ASEAN+3 economies not included due to data unavailability.

Figure 2.7. ASEAN+3: Growth in Total Factor Productivity
(Percent)



Source: APO Productivity Database; AMRO staff calculations.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Bars refer to the average growth in total factor productivity over the period.

More crucially, the ASEAN+3 region is experiencing this slowdown in an environment increasingly beset by longer-term challenges to growth and stability. While the ASEAN+3 region will remain a major driver of global growth in the next decade, it also faces a multitude of structural challenges. An October 2023 survey by AMRO on the region's monetary and fiscal policymakers identified the ongoing reconfiguration in global trade and FDI as the most pressing risk to the long-term growth of ASEAN+3 economies, especially if it leads to a protracted global economic slowdown (Figure 2.8). This was followed by climate change, rapid technological transformation, and population aging—all affecting ASEAN+3 economies, although to varying degrees. Nevertheless, the macrostability implications of these secular risks will be contingent on each economy's ability to adapt to these challenges, and the extent with which they utilize technology-enabled solutions, among others, especially given unique country circumstances—including the depth of its scarring from the COVID-19 pandemic (Section V of Chapter 1).

Figure 2.8. ASEAN+3 October 2023 Survey: Most Pressing Challenges to Long-Term Growth
(Score, most pressing = 5)

Source: AMRO staff.
Note: The survey questions were "How would you rank the following challenges in relation to the long-term growth of your economy?" followed by "What do you think are the top three risks to your economy from [risk]?" Numbers represent the weighted average of all responses, where a higher "score" indicates that the challenge is more pertinent. Under "Others," the quality of human capital, as well as poverty and inequality, were cited by responding members.

ASEAN+3: Long-term Economic Prospects Amid Major Secular Shifts

Without commensurate policy responses, these secular trends could undermine ASEAN+3's long-term growth prospects and macro-financial stability. These developments are not unique to ASEAN+3, and their consequences are of concern to policymakers worldwide. Specific to the region, however, navigating these long-term issues—and their interactions—could become even more challenging, given their strong and extensive linkages with the rest of the global economy. The demographic transition across several ASEAN+3 economies is also occurring at relatively lower levels of development, which could further derail their ability to reach the per capita incomes of advanced economies. Critically, member economies are confronting these dynamics with varied degrees of economic scarring from the COVID-19 pandemic, and, in some cases, compressed policy space.

In this context, this year's thematic chapter explores how the region can potentially manage these secular shifts to secure sustainable, resilient, and inclusive growth for the future. The chapter follows up on the 2023 *ASEAN+3 Regional Economic Outlook* (AREO), which looked at the long-term growth implications of climate change mitigation and the transition to net zero (AMRO 2023). The rest of this chapter will focus on the following three trends:

- ***Aging.*** In the next decade, several ASEAN+3 economies are projected to become "super-aged"—or societies with more than 20 percent of the population above the age of 65. A shrinking working-age population not only impacts the economy's growth potential but also carries implications for the region's long-term inflation dynamics, fiscal sustainability, and the strength of the domestic financial system. However, these macroeconomic consequences are not predetermined.

- ***Global trade reconfiguration.*** Global trade is undergoing several changes—trade relationships are being increasingly influenced by geopolitics while at the same time becoming less diversified. The face of globalization is also gradually shifting: amid the weaker momentum in global goods trade, global services trade is rising in importance. How these forces interact carries significant policy implications for ASEAN+3's long-tested export strategies.

- ***Technological change.*** Technology has long enhanced productivity and underlying long-term growth potential of ASEAN+3 economies, and it will continue to power many solutions that they can use to successfully navigate the demographic transition and global trade reconfiguration. However, the speed of technological advancements, such as artificial intelligence and automation, are fueling concerns on the future of entire industries and jobs in the ASEAN+3 region.

This thematic chapter aims to provide a background on each of these secular trends and put forward several options for the region's policymakers. Each section first sets the current landscape as it relates to the ASEAN+3 region and analyzes the diverse impacts across the region's economies—recognizing that while each of these long-term challenges pose various risks, they also create opportunities for innovation, productivity gains, as well as new sources of growth. The chapter aims to set the context for future in-depth AMRO research on how the region can navigate demographic change, shifting global trade and investment patterns, and rapid technological changes.

II. Navigating Aging

The ASEAN+3 region currently stands on the cusp of significant demographic shifts. Large demographic dividends—arising from the rapid expansion of the working-age population—have been important in supporting economic growth across many of the region's economies in the past several decades. However, these gains are slowly dwindling as nearly all member economies are now aging, albeit at different speeds. Except for two, all others in the ASEAN+3 region will be technically considered "aging societies" by the end of this decade. Within the next decade, the region's working population will start to decline, and the age profile of the labor force will be gradually dominated by older workers. As aging influences the trajectory of economic growth, concerns are rising that the ongoing demographic transition will impede ASEAN+3's ability to sustain its long-term growth trajectory. This arises from a *chronological* view of aging: as the economy grows older, it is moving toward a situation where more people are consuming goods and services while fewer people are producing them (Scott 2023).

However, the ongoing demographic transition has another dimension: while the region—and the world as a whole—is aging, from a *biological* point of view it is aging more slowly. Life expectancy globally, including in the ASEAN+3, has increased by over 20 years since the 1980s—thanks to significant progress in medicine, health care, technology, education, and economic development. With rising longevity and more years of capable work, the demographic dividend can give way to a "longevity dividend" (Olshanky and others 2006).[3] Longer lives, and thus an older yet healthier workforce, can be sources of economic growth. However, proactive and urgent policy responses will be essential to maximize this potential. By implementing appropriate, well-designed, and well-targeted policies—such as by employing smart technologies, encouraging more women to join the labor force, and reforming social protection systems—there can be positive gains to growth from an aging population.

This section looks at current demographic trends in ASEAN+3 economies, mapping out its various macroeconomic implications, while at the same time reframing the issue of aging. Ultimately, policies that capitalize on the longevity dividend will become as crucial as policies that mitigate the economic burden of population aging.

Aging in ASEAN+3

"By 2050, one in four people in Asia and the Pacific will be over 60 years old."

United Nations World Population Prospects, 2022

ASEAN+3's population is expected to peak in 10 years and start to decline by the 2030s. With 2.2 billion people in 2021, the ASEAN+3 region is home to a third of the world's population and nearly half of Asia's (Figure 2.9). However, this share has fallen over time, as population growth in other parts of the world has been consistently faster since the 1990s. From 2000 to 2020, ASEAN+3's population grew by an annual average of 0.75 percent, half its pace in 1980–2000. This speed is expected to further decelerate in the next 20 years to about 0.11 percent, with the population peaking at 2.3 billion by the mid-2030s.[4] Since the turn of the century, ASEAN+3 has had the second-slowest population growth among key regions, but it could take Europe's spot as the slowest by the 2050s if current trends continue (Figure 2.10). Nearly all Plus-3 economies have seen their populations peak, led by Japan in 2010, while China reached its peak in 2021. Thailand will be the first in ASEAN to reach its population peak—projected around 2030—while economies like Lao PDR and the Philippines are not expected to see their populations decline in the next 40 years (Table 2.1).

Some ASEAN+3 economies are in the advanced to late stages of the demographic transition. While many developing economies tend to have younger populations than developed economies, the issue of aging is "a reality for all economies across all income levels" (NAM 2022). Following the methodology by Amaglobeli and others (2019), ASEAN+3 economies can be grouped by where they are in the demographic transition: late, advanced, early, or pre-transition.[5] With declining fertility and mortality rates, all ASEAN+3 economies have moved beyond the

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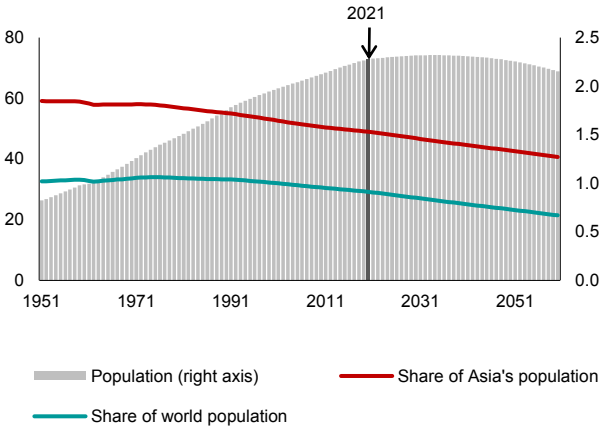
3/ Olshanky and others (2006) defined this dividend as "the economic and health benefits that would accrue to individuals and societies if we extend healthy life by slowing the biological processes of aging … [by] shifting our emphasis from disease management to delay[ing] aging."

4/ The population projections cited in this section relies on UN Population Division's World Population Prospects (2022), using the medium-fertility variant. It is important to note that long-term projections are strongly influenced by underlying assumptions regarding future fertility rates, mortality rates, and migration flows, among others. As such, caution must be exercised when utilizing these data, given the large degree of uncertainty surrounding population projections.

5/ Similar to the original study by Amaglobeli and others (2019), "*k*-means" clustering was used to create these four groups of economies. This method finds similar "traits" within the data set, and clusters them into k number of groups. For this exercise, AMRO used the following variables for clustering: average annual population growths; annual child and old-age dependency ratios; and the number of years before (or after) the lower level of total dependency ratio is reached. Data ranged from 2010 to 2021.

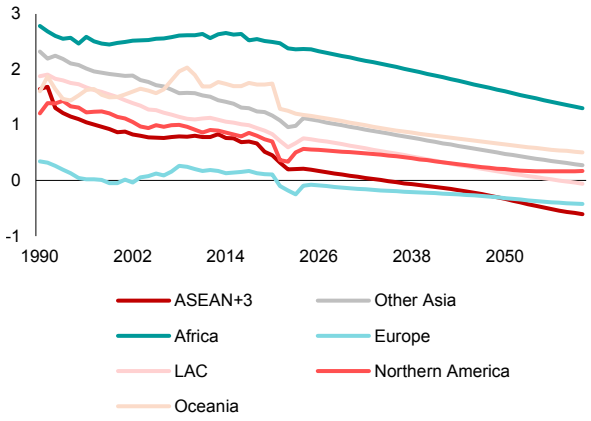
pre-transition stage—where most economies in Africa are (Figure 2.11). Four economies—Cambodia, Indonesia, Lao PDR, and the Philippines—are in "early transition", with fertility rates still high (although declining). Half of the region's economies are considered "advanced transition": those in this group have been able to largely reap the demographic dividend and have seen the share of their working populations peak in the past 20 years (Table 2.1). Hong Kong, Japan, and Korea are considered to be in "late transition", where their working age-populations have long declined and old-age dependency ratios have risen rapidly. In general, most advanced economies are in this stage—including Canada, Germany, United Kingdom, and the United States (Figure 2.11).

Figure 2.9. ASEAN+3: Total Population
(Percent; billions of people)



Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: Figures after 2021 are UN estimates (medium variant).

Figure 2.10. World: Population Growth, by Region
(Percent)



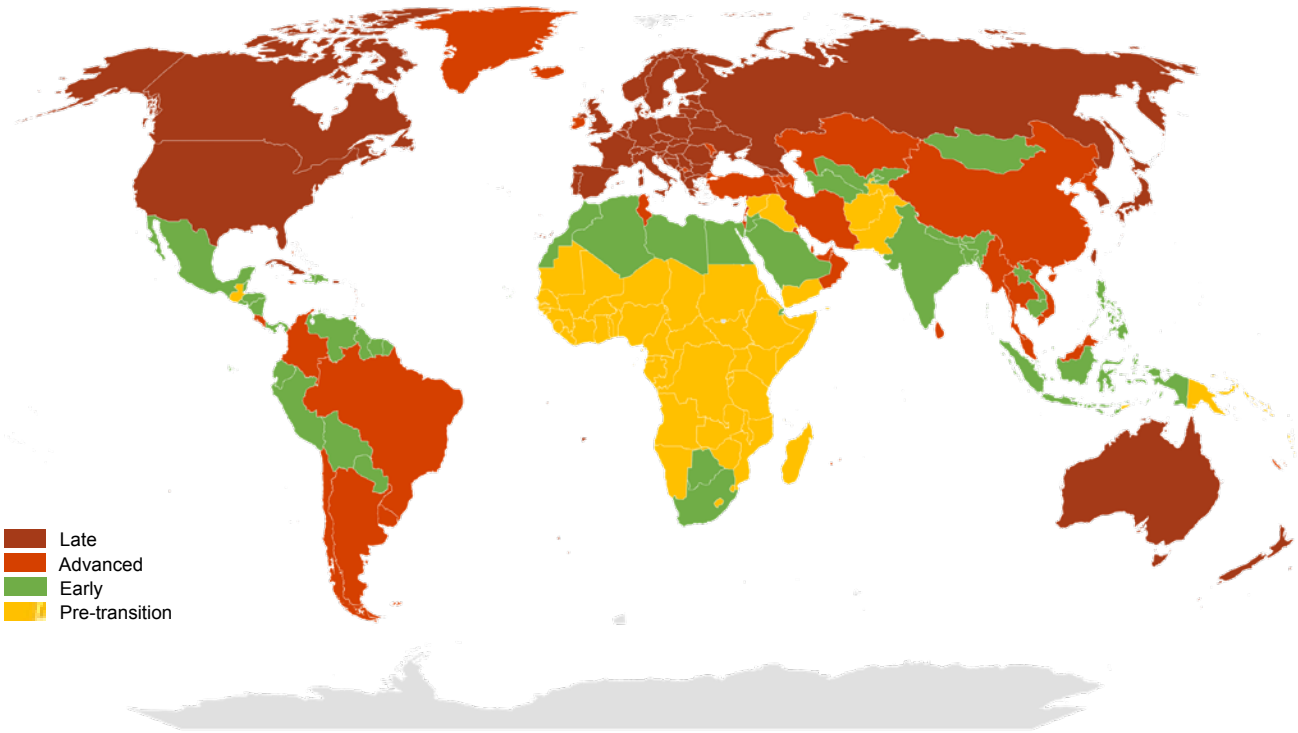
Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: LAC = Latin America and the Caribbean.

Table 2.1. ASEAN+3: Selected Demographic Indicators, 2021

Economy	Total Population		Median Age	Working-Age Population		Fertility Rate	Life Expectancy, Years		Old Age	
	Average growth (percent)	*Peak year (level)*	*Years*	*Average growth (percent)*	*Peak year (level)*	*Live births per woman*	*At birth*	*At 65 years*	*Share of population (percent)*	*Dependency ratio*
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Plus-3										
China	0.56	**2021**	37.9	0.65	**2009**	1.16	78.2	17.7	13.1	19.0
Hong Kong	0.51	*2026*	44.9	0.34	**2011**	0.75	85.5	22.6	19.6	28.7
Japan	-0.09	**2009**	48.4	-0.77	**1991**	1.30	84.8	22.4	29.8	51.0
Korea	0.48	**2020**	43.4	0.46	**2015**	0.88	83.7	21.5	16.7	23.3
ASEAN										
Brunei	1.37	*2049*	31.8	2.01	**2018**	1.78	74.6	15.6	5.8	8.1
Cambodia	1.49	*2067*	26.5	2.24	*2044*	2.34	69.6	14.2	5.5	8.5
Indonesia	1.16	*2060*	29.4	1.45	*2029*	2.18	67.6	12.1	6.8	10.0
Lao PDR	1.49	*2072*	23.8	2.39	*2045*	2.50	68.1	13.1	4.4	6.7
Malaysia	1.81	*2066*	29.9	2.41	**2022**	1.80	74.9	15.3	7.3	10.4
Myanmar	0.80	*2052*	29.0	1.21	*2025*	2.15	65.7	12.5	6.6	9.7
Philippines	1.80	*2092*	24.5	2.27	*2051*	2.75	69.3	12.6	5.3	8.3
Singapore	1.79	*2041*	41.8	1.84	**2010**	1.02	82.8	20.2	14.1	19.1
Thailand	0.60	*2029*	39.3	0.64	**2012**	1.33	78.7	20.2	14.5	20.8
Vietnam	1.00	*2051*	32.0	1.52	**2013**	1.94	73.6	16.4	8.8	12.7

Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: Average growths (columns 1 and 4) are calculated over 2000–21. Numbers in gray italics (columns 2 and 5) are based on projections from the UN World Population Prospects (2022). Peak year refers to the year when the total population/share of working population reached (or is projected to reach) their highest level. Old age (columns 9–10) is defined as ages 65 and above. The old-age dependency ratio is calculated as the old-age population divided by the working-age population (defined as those of ages 15 to 64). For columns 1 and 4, the redder the color, the slower the growth; for columns 3, and 9–10, the redder the color, the older the population; for columns 6–8, the redder the color, the lower the indicator.

Figure 2.11. World: Stages in the Demographic Transition



Source: AMRO staff calculations following Amaglobeli and others (2019).

This reflects declining fertility rates across the ASEAN+3 region, with women having only one child each on average. Six in the region are among those with the lowest birth rates in the world (Figure 2.12). ASEAN+3 aggregate fertility rate (measured by live births per woman in 2021 stood at 1.4, well below the present replacement fertility rate of 2.1 births per woman.[6] Individual-economy birth rates have also fallen rapidly: while some advanced economies took more than 50 years to see fertility rates fall from 4.0 births per woman to subreplacement levels, many in ASEAN+3 experienced this in less than half that time (Figure 2.13). In Asia, economic and social modernization over the years—including gains in living standards, the spread of education, increased female labor participation, as well as breakthroughs in health and family planning—have led to lower fertility (Westley, Choe, and Retherford 2010).[7] More recently, COVID-19 also intensified the decline in fertility rates in ASEAN+3 economies—especially those in advanced transition—prompting policymakers to urgently announce policies to boost marriage and birth rates (AMRO 2022) (Figure 2.14). Within the next decade, nearly all of ASEAN+3 could have subreplacement fertility rates, in turn accelerating population aging and pointing to smaller young cohorts joining the future labor force.

Longer life expectancies compound the effect of falling birth rates on ASEAN+3 population dynamics. By 2050, about 44 percent of the world's centenarians are likely to be from ASEAN+3, mostly in China, Japan, Thailand, and Korea. The region's average life expectancy has increased by about 10 years since 1980, with most of the gains happening in the past 20 years. Widespread improvements in health care, hygiene, and living standards have pushed life expectancy by 13 years longer in late-transition ASEAN+3 economies, and about 10 years longer for those in the advanced and early stages (Figure 2.15). The largest increases in life expectancy since the 1980s are in Cambodia and Lao PDR, in part due to the drastic reduction in infant mortality rates.[8] While the COVID-19 pandemic halted the region's decade-long increase in life expectancy, most economies are estimated to have returned to pre-pandemic trends as of 2023, and by 2050, the average person is likely to live five years longer than in 2021. By then, half of the region's economies would have life expectancy of between 80–90 years, with Japan and Hong Kong at the higher end.

6/ The replacement fertility rate refers to the rate at which a population exactly replaces itself from one generation to the next.

7/ Some socioeconomic circumstances—such as inflexible work situations, limited support during and after maternity while in employment, and the imperative for dual-income households—has also led to many Asian women postponing childbearing (Boydell and others 2023).

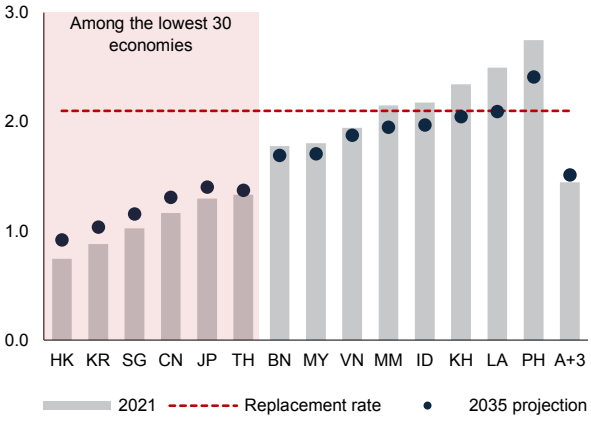
8/ In Lao PDR, infant mortality has fallen to 34 per 1,000 births in 2021, from 137 in 1980; this has dropped to 22 from 83 per 1,000 births for Cambodia over the same period.

With declining fertility rates and increasing life expectancies, nearly half of the region's economies will be considered "super-aged" by 2040. As of 2023, eight of the region's economies are considered "aging" societies, with people aged 65 and above comprising 7 percent to 14 percent of the total population. Japan was the first to become an aging society in 1969, while Malaysia the most recent in 2020. In the next decade, six are likely to be "super-aged", with 21 percent of the population over the age of 65 (Figure 2.16). In Japan, the shift from aging to super-aged took about 37 years—twice as fast as New Zealand, and four times faster than Australia and the United Kingdom. Others in the region—Singapore, Korea, Thailand, and Brunei—could take less than 30 years to transition to super-aged status (Figure 2.17). At this rate, they will also move faster than other aging emerging market economies like India, Mexico, and South Africa. In contrast, the shares of elderly people in Myanmar and the Philippines are unlikely to reach the super-age threshold until close to the end of the century (Figure 2.16).

Consequently, ASEAN+3's median age is projected to remain higher than the global median in the coming decades. The global average median age was about 30 years in 2021—that is, half of the world's population was younger than 30 years old, and the other half older. Japan had the third-highest median age globally with 48.4 years, with Hong Kong placed 12th and Korea 22nd. The ASEAN+3 region's median age will exceed the global median by 10 years in 2050—from only 6 years in 2021—given its relatively faster pace of aging. The Plus-3 economies, as well as Singapore and Thailand, will see the highest median ages across the region, each with over 50 years. The pace of increase will ease thereafter, in line with the projected decline in the ASEAN+3's overall population.

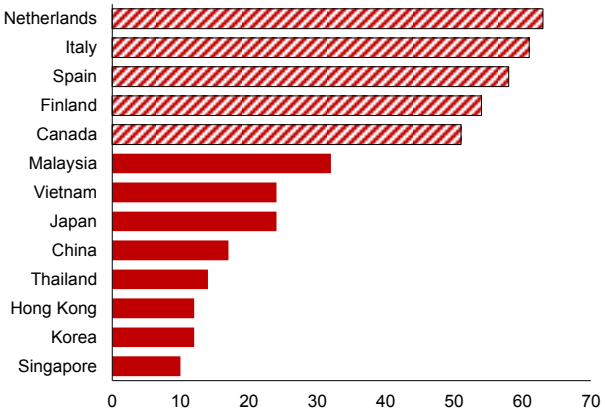
Several ASEAN+3 economies are growing old before becoming rich. Rapid aging is triggering fiscal concerns due to the potential rise in health care costs and pension liabilities, on top of the needed infrastructure spending that is required to sustain growth. When Singapore transitioned to an "aging" society, its GDP per capita (at constant 2015 prices) was about USD 40,000 (Figure 2.18). By the time it became an "aged" society three years ago—where 14–21 percent of its population is 65 years old and above—its per capita income had increased to about USD 60,000. A similar increase in per capita incomes was evident for Hong Kong, Japan, and Korea. Generally, late-transition economies in the ASEAN+3 were able to age at relatively high incomes. However, several advanced-transition economies in the region could be entering their super-aged status with per capita incomes less than USD 10,000 (Figure 2.18).[9] Within this group, there also are significant variations: Thailand, for example, became an "aged" society at a per capita income of USD 6,000 in 2021—an increase of USD 2,000 from when it first became an "aging" society in 2004 (Figure 2.19). China's transition from "aging" to an "aged" society, on the other hand, was accompanied by an increase of nearly USD 10,000. Early-transition economies in the ASEAN+3 are approaching the aging status with per capita incomes of less than USD 4,000.

Figure 2.12. ASEAN+3: Fertility Rates, 2021 and 2035
(Live births per woman)



Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Figures for 2035 are UN estimates (medium variant). The ASEAN+3 regional aggregate is a population-weighted average.

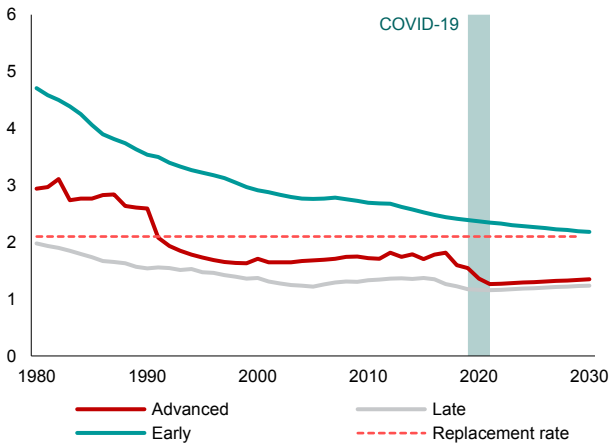
Figure 2.13. Selected Economies: Years Taken for Fertility Rates to Fall Below Replacement Level
(Number)



Source: United Nations Department of Economic and Social Affairs, Population Division; Asian Development Bank; AMRO staff calculations.
Note: The starting point is a fertility rate of 4.0 live births per woman; and the replacement level is 2.1.

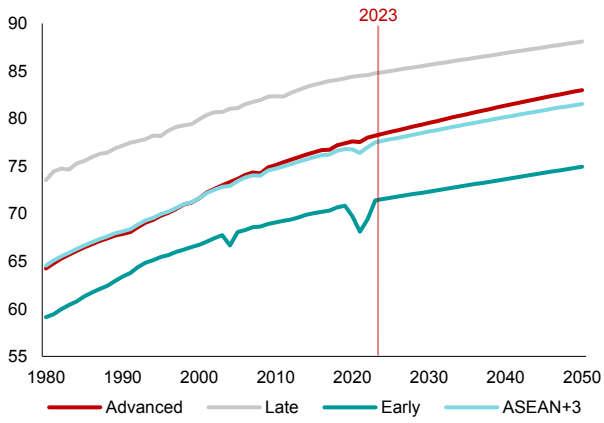
9/ This situation can contribute to the risk of falling into the middle-income trap problem, which many emerging and developing economies are worried about.

Figure 2.14. ASEAN+3: Fertility Rates, by Demographic Group
(Live births per woman)



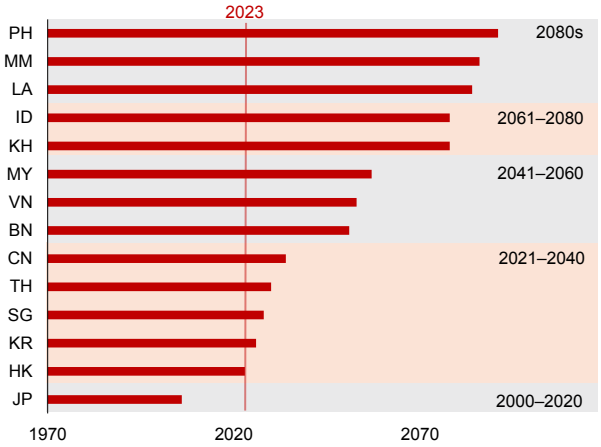
Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: Figures after 2021 use UN estimates (medium variant) and are population-weighted averages for each group.

Figure 2.15. ASEAN+3: Life Expectancy, by Demographic Group
(Number of years)



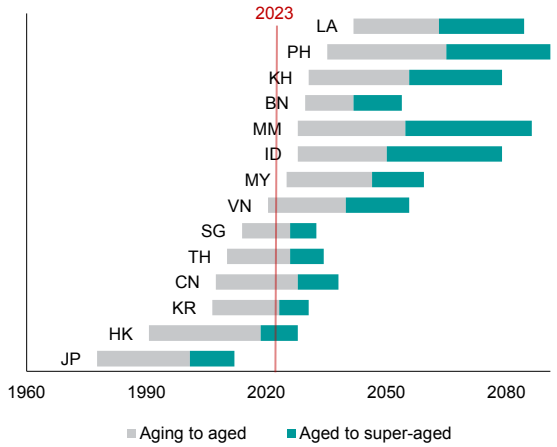
Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: Figures after 2021 use UN estimates (medium variant) and are population-weighted averages for each group.

Figure 2.16. ASEAN+3: Projected Period to Super-Aging



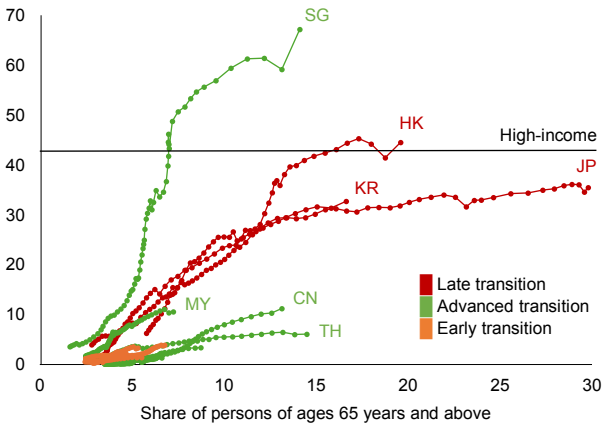
Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Figures after 2021 use UN estimates (medium variant). Super-aged/super-aging is defined as when the share of people of ages 65 years and above comprises at least 21 percent of the total population.

Figure 2.17. ASEAN+3: Speed of Aging



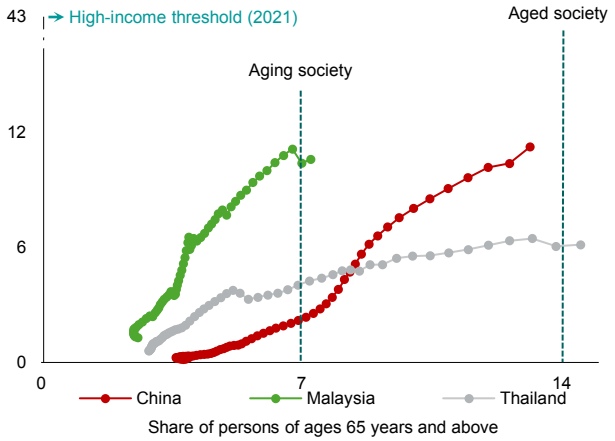
Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Figures after 2021 use UN estimates (medium variant). Economies become "aging societies" when people of ages 65 years and above comprise 7 percent of the total population, "aged" when the share increases to 14 percent, and "super-aged" when the share increases to above 21 percent.

Figure 2.18. ASEAN+3: Income Levels versus Share of Old Persons, 1960–2021
(GDP per capita in thousands of constant 2015 US dollars)



Source: United Nations Department of Economic and Social Affairs, Population Division; World Development Indicators, World Bank; AMRO staff calculations.
Note: CN = China; HK = Hong Kong; JP = Japan; KR = Korea; MY = Malaysia; SG = Singapore; TH = Thailand.

Figure 2.19. China, Malaysia, and Thailand: Income Levels versus Share of Old Persons, 1960–2021
(GDP per capita in thousands of constant 2015 US dollars)



Source: United Nations Department of Economic and Social Affairs, Population Division; World Development Indicators, World Bank; AMRO staff calculations.

The ASEAN+3 region's working-age population—typically defined as those between 15 and 64 years of age—will start to shrink in the second half of this decade. Slowing population growth is also seen from the muted expansion in the region's working-age population, which is projected to peak within the next five years (Figure 2.20). Its share of the total population has declined since 2010, alongside the rapid rise in the share of the old-age population and the subdued expansion in the young cohorts. By 2050, ASEAN+3's working-age population will be 12 percent smaller than it was in 2021—equivalent to about 190 million workers exiting the workforce. Economies in the late stages of the demographic transition will experience the biggest declines in the working-age population, while those in early transition should still see their working-age populations expand until the 2050s (Figure 2.21). These dynamics mean that ASEAN+3's population pyramid will eventually reshape into one with a narrower base, as the size of the portions from the middle and/or toward the apex gradually widens (Figure 2.22). China's base by 2050, in particular, is projected to be narrower than the rest of the region's.

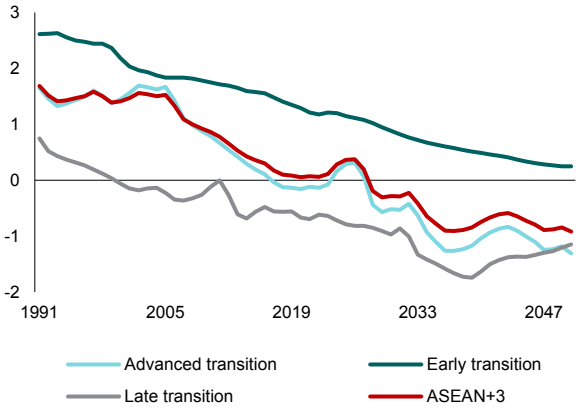
In addition, ASEAN+3's working-age population will progressively become older. ASEAN+3 economies in the advanced to late stages of the demographic transition typically have a larger share of individuals aged 55 and above in their total working-age populations. For Japan, Korea, and Hong Kong, this group corresponds to nearly one-fifth of their total working population in 2021, compared to less than 10 percent in the Philippines and Lao PDR. Generally, workforce aging is quite common (ADB 2019). In 2021, the average age of the ASEAN+3 workforce was 39 years—about six years higher than in the 1980s—and this is anticipated to increase to 41 years by 2050 (Figure 2.23). Half of the region's economies are projected to see the average age of their working cohorts increase by about two to three years relative to 2021. The upward trend will be most stark for Lao PDR and Malaysia, both adding four years to their average working ages (Figure 2.24).

Old-age dependency ratios are projected to rise rapidly, along with the decline in potential support ratios across the ASEAN+3. Higher old-age dependency ratios (OADRs)—defined as the ratio of those aged 65 and above to the total working-age population—imply a greater burden to the overall economy. With the rise in non-working (non-earning) individuals, the working (earning) population could be subject to higher taxes and/or social security payments to compensate for the larger number of dependents that would need government support.[10] OADRs are thus higher for ASEAN+3 economies in late transition: more than twice the ratio of the advanced transition group, and over 4.5 times the ratio of the early transition group in 2021 (Figure 2.25). Unsurprisingly, Japan has the highest dependency ratio—at over 50 percent—followed by Hong Kong, Korea, Thailand, Singapore, and China. Except for Japan and the Philippines, all could see their OADRs double by 2050, with the increase most pronounced in Korea, Hong Kong, Thailand, and Singapore (Figure 2.26). Correspondingly, potential support ratios (i.e., the inverse of OADR) are projected to decline across the board, highlighting the shrinking base in the ASEAN+3 that older persons can depend on for support (Figure 2.27). In Brunei, for example, there were 12 potential workers to support 1 elderly person in 2021, but this is projected to decline to 4 workers by 2050 (Figure 2.28).

Figure 2.20. ASEAN+3: Working-Age Population
(Billions of people; percent)

Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: Figures after 2021 use UN estimates (medium variant).

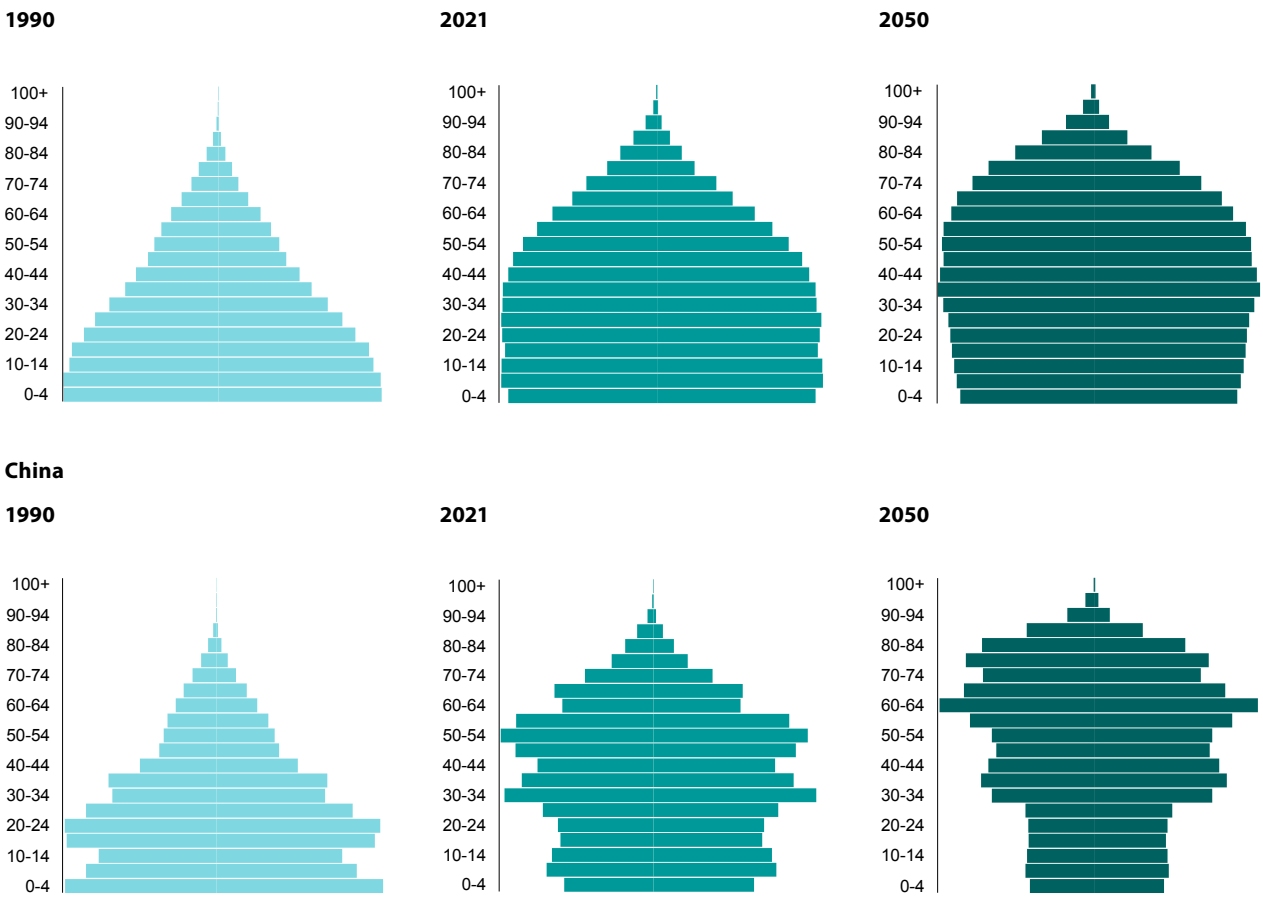
Figure 2.21. ASEAN+3: Growth in Working-Age Populations
(Percent, year-on-year)



Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: Figures after 2021 use UN estimates (medium variant).

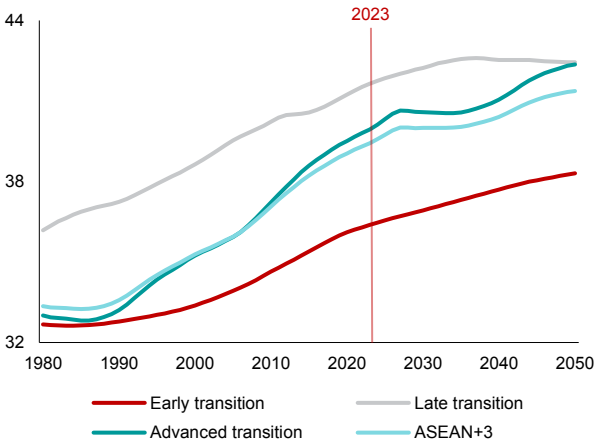
[10] The magnitude of the additional tax or social security burden on the working population would also depend on various country-specific circumstances; for example, the tax structure, which would determine the share of the working population as a tax base (relative to retirees).

Figure 2.22. ASEAN+3: Population Pyramids
(Percent share of total population)



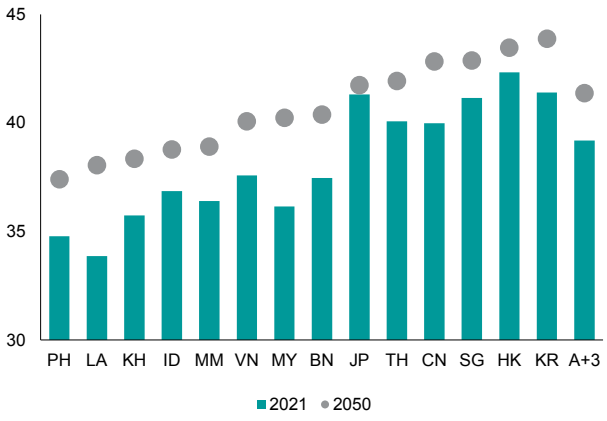
Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: Figures after 2021 use UN estimates (medium variant).

Figure 2.23. ASEAN+3: Average Working Age
(Years)



Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: Figures after 2021 use UN estimates (medium variant) and are weighted averages.

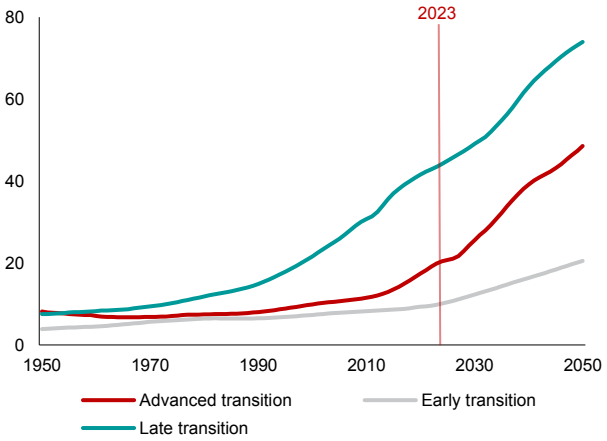
Figure 2.24. ASEAN+3: Projected Average Working Age in 2050, by Economy
(Years)



Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: A+3 = ASEAN+3; BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Figures after 2021 use UN estimates (medium variant) and are weighted averages.

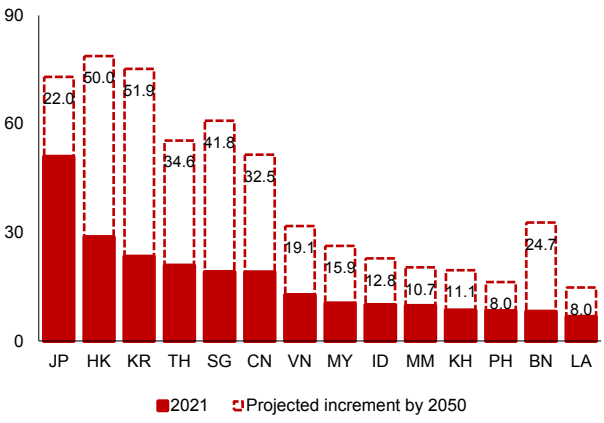
Compared to the many parts of the world, old-age labor force participation rates in the ASEAN+3 are generally higher. Labor force participation rates (LFPRs) of workers of senior ages tend to be higher in developing economies, in part, due to the lack of early retirement benefits or other related financial support for those who are no longer economically active (Samorodov 1999). LFPRs in Asia for those of ages 65 and above have remained high—second only to Africa—and relatively steady over the years (Figure 2.29). In most ASEAN+3 economies, LFPRs even exceeded both the global and Asia regional averages (Figure 2.30). If including participation rates of individuals aged within 10 years of a retirement age of 65, LFPRs rise to as high as above 70 percent in Korea, Singapore, Cambodia, and Japan. Kikkawa and Gaspar (2021) suggest that majority of seniors who remain active at work—including in Indonesia, the Philippines, Thailand, and Vietnam—are mostly self-employed and are engaged in informal work. Mostly in rural areas, these workers tend to work predominantly in agriculture, due to its attractive advantages to older workers.[11]

Figure 2.25. ASEAN+3: Old-Age Dependency Ratios
(Percent)



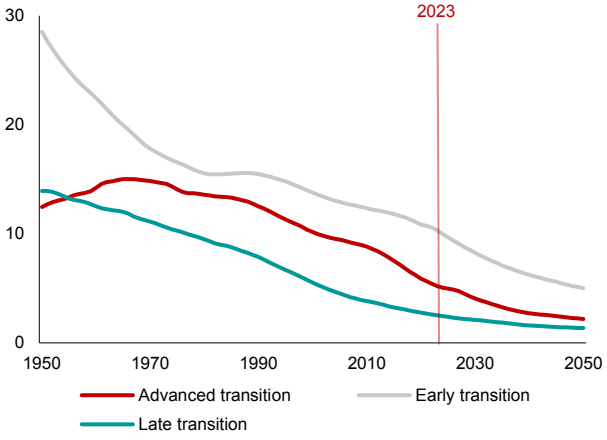
Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: Figures after 2021 use UN estimates (medium variant). Old-age dependency ratio is calculated as the ratio of the population of ages 65 years and above to the working-age population (15 to 64 years).

Figure 2.26. ASEAN+3: Projected Old-Age Dependency Ratios in 2050, by Economy
(Percent)



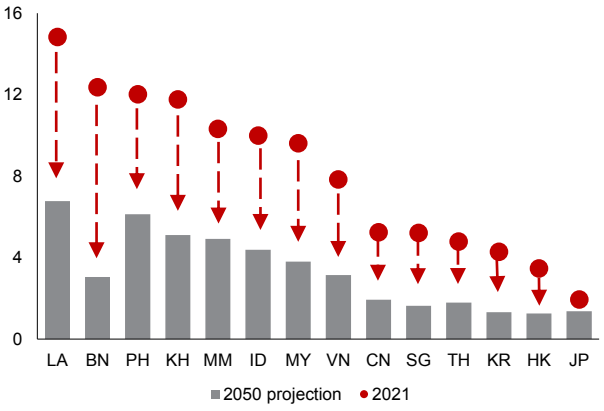
Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Figures after 2021 use UN estimates (medium variant). Old-age dependency ratio is calculated as the ratio of the population of ages 65 years and above to the working-age population (15 to 64 years).

Figure 2.27. ASEAN+3: Potential Support Ratios
(Percent)



Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: Figures after 2021 use UN estimates (medium variant). Potential support ratio is calculated as the ratio of the working-age population (ages 15 to 64 years) to the old-age population (ages 65 and above).

Figure 2.28. ASEAN+3: Projected Potential Support Ratios in 2050, by Economy
(Working-age people per one elderly person)



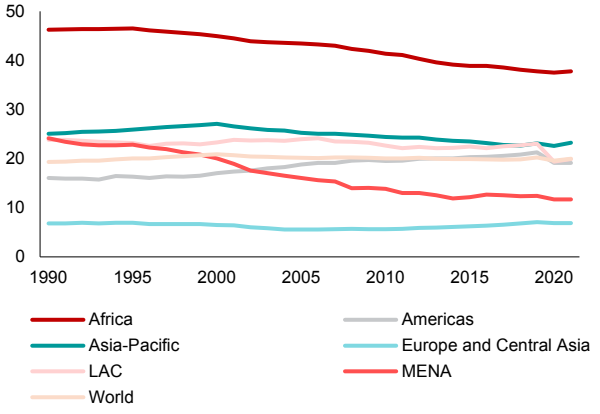
Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Figures after 2021 use UN estimates (medium variant). Potential support ratio is calculated as the ratio of the working-age population (ages 15 to 64 years) to the old-age population (ages 65 and above).

[11] ADB (2019) suggests that this is due to the agricultural sector not imposing "strict" retirement ages, and that it offers more flexibility in working hours, especially in family-run or family-owned farms. Further, machines are increasingly being used for the more laborious part of agricultural work. Note, however, that the degree of agricultural mechanization varies widely in the ASEAN+3 region and tends to be lower in economies where small- and medium-scale farming dominate.

However, LFPRs for elderly women lag elderly men in the ASEAN+3 region—and by a wide margin. Unequal distribution of household tasks based on gender norms as well as limited economic opportunities help explain the disparity (Kikkawa and Gaspar 2021). In general, LFPRs of women of ages 65 and above in the ASEAN+3 are about half that of men, with no marked differences between ASEAN and Plus-3 economies. Nevertheless, the gap is narrowest in Vietnam and Brunei, where the ratio of male-to-female seniors in the workforce is about 1.3:1 in 2021, and widest in Myanmar and Malaysia, at about 3.4:1 (Figure 2.31). The slightly higher female LFPR in the preretirement cohort (ages 55 to 64) supports the observation that women begin to gradually exit the labor force from their fifties to take a more active role in family-related responsibilities such as raising grandchildren (Ko and Hank 2014). Nevertheless, labor force participation among older females has generally risen at a faster rate across the ASEAN+3 region than for males, in part due to the lower base and the rollout of policies aimed at encouraging more women to work (Figure 2.32).

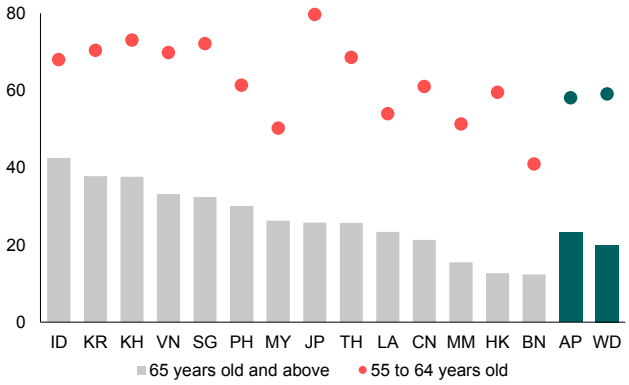
Net migration will be increasingly important for ASEAN+3 economies that are further ahead in the demographic transition. Aging populations across the world create incentives for migration. On aggregate, migration still accounts for a small portion of population change in the ASEAN+3 region, when compared to the latter's natural increase, as expressed by births less deaths (Figure 2.33, left panel). However, variations across economies exist. For late transition economies, net migration has exceeded the balance of births over deaths since the 2010s (Figure 2.33, center panel). In fact, migration will be the sole driver of population growth for this group in the next few decades, as the number of deaths will progressively exceed the number of births. In contrast, population changes in early transition economies will continue to be driven by higher births (relative to deaths) rather than by migration, given still-high fertility rates in this group (Figure 2.33, right panel). Some advanced transition economies—such as Singapore and Thailand—are projected to follow the same trend as those in late transition. Others—like Malaysia and Vietnam—will rely less on net migration as a driver of population change, the same pattern as their early transition peers.

Figure 2.29. World: Old-Age Labor Force Participation Rates
(Percent)



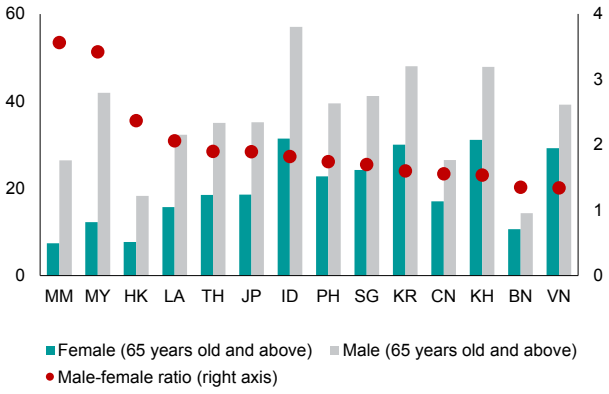
Source: International Labour Organization.
Note: LAC = Latin America and the Caribbean; MENA = Middle East and North Africa. Old age is defined as ages 65 years and above.

Figure 2.30. Selected Economies: Old-Age Labor Force Participation Rates, 2021
(Percent)



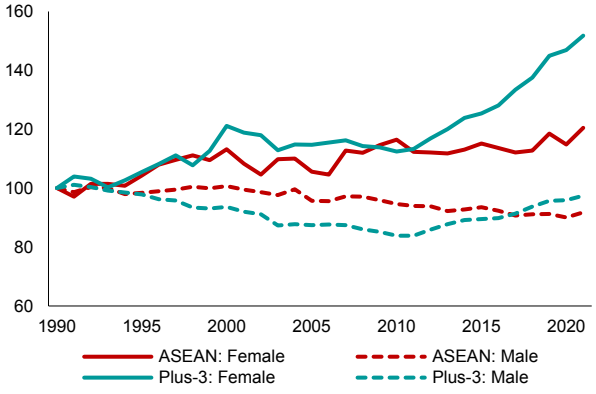
Source: International Labour Organization.
Note: AP = Asia and the Pacific; BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam; WD = World.

Figure 2.31. ASEAN+3: Old-Age Labor Force Participation Rates in 2021, by Economy
(Percent; ratio)



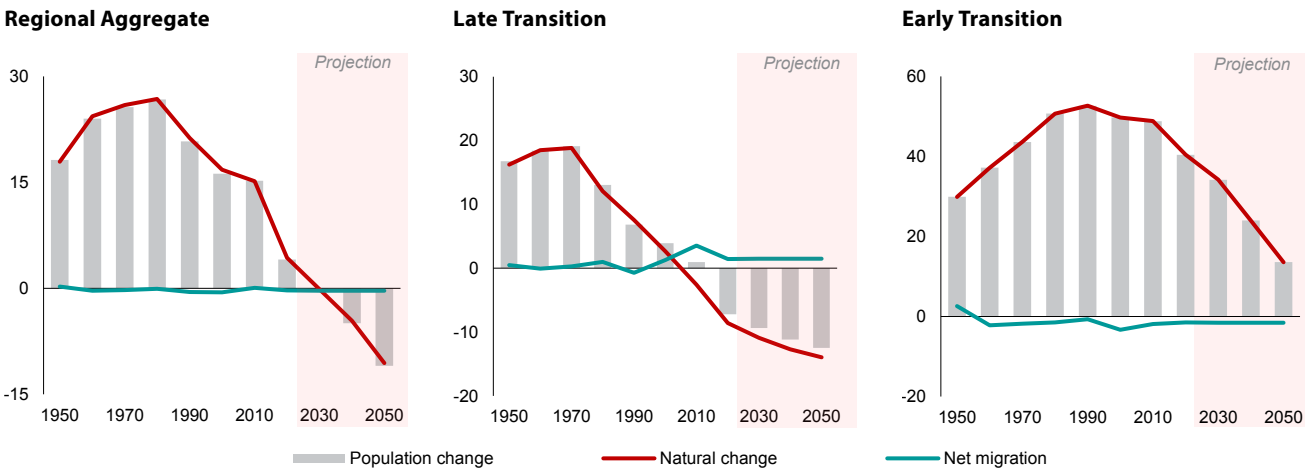
Source: International Labour Organization; AMRO staff calculations.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Figure 2.32. ASEAN+3: Old-Age Labor Force Participation Rates, by Gender
(Index, 1990 = 100)



Source: International Labour Organization; AMRO staff calculations.
Note: Old age refers to people of ages 65 and above.

Figure 2.33. ASEAN+3: Drivers of Population Changes
(Millions of people)



Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: Figures after 2021 use UN estimates (medium variant). Natural change refers to births less deaths, while net migration refers to the difference between immigrants and emigrants. Late-transition ASEAN+3 economies are Hong Kong, Japan, and Korea, while early-transition economies are Cambodia, Indonesia, Lao PDR, and the Philippines.

Macroeconomic Implications of Aging in ASEAN+3

"An aging population will totally change the way our society works."

Lee Hsien Loong, Prime Minister of Singapore

Rapid aging has multifaceted economic implications for long-term macroeconomic stability in ASEAN+3. Among the various aging-related risks, the negative consequences on labor productivity, fiscal health, and overall retirement security concern regional policymakers the most.[12] A shrinking population is likely to translate to lower demand and output, with spillover effects on future investment trends. Higher aging-related fiscal expenditures, along with a smaller working population from which to derive tax revenues, can amplify fiscal vulnerabilities. Additionally, the resulting shift in saving and investment decisions as people approach retirement can directly impact price and financial stability in the ASEAN+3 region. On the other hand, population aging can incentivize faster adoption of labor-saving technology, which will have a positive impact on economy-wide productivity, while also driving the rise of new products and services that comprise the so-called "silver economy."[13] The ultimate impact of population aging is more nuanced and will depend on its extent and policymakers' ability to utilize necessary policy tools (Lee and Mason 2017).

Growth across ASEAN+3 economies can slow down as the working-age population shrinks. A primary concern stemming from an aging population is the decline in the size of the labor force (Box 2.1). Fewer people entering the workforce, along with a rising number of retirees, means fewer labor inputs available for production. This will constrain output for economies that are further ahead in the demographic transition (IMF 2019). Even for ASEAN+3 economies in early transition, the smaller labor supply could reduce the cost advantage they have historically enjoyed from favorable demographics. Some electronics-related and auto-related jobs, for example, are more susceptible to aging and could see earlier retirements than other occupations (Figure 2.34). Labor force participation rates across ASEAN+3 economies also tend to decline when people reach their mid-fifties, underscoring supply risks as economies' average working ages increase (Figures 2.35 and 2.23). Firms can become averse to taking on more investment in response to the shrinking labor force. These dynamics point to a reduction in ASEAN+3 potential growth unless there is a commensurate increase in total factor productivity. In the case of China, for example, overall output growth could be 1.6 percentage points lower in 2050 relative to the counterfactual baseline (with stationary population). That reflects the rapid shrinking of the labor supply—especially from 2040 onward—if no other offsetting measures are put in place (Box 2.2).

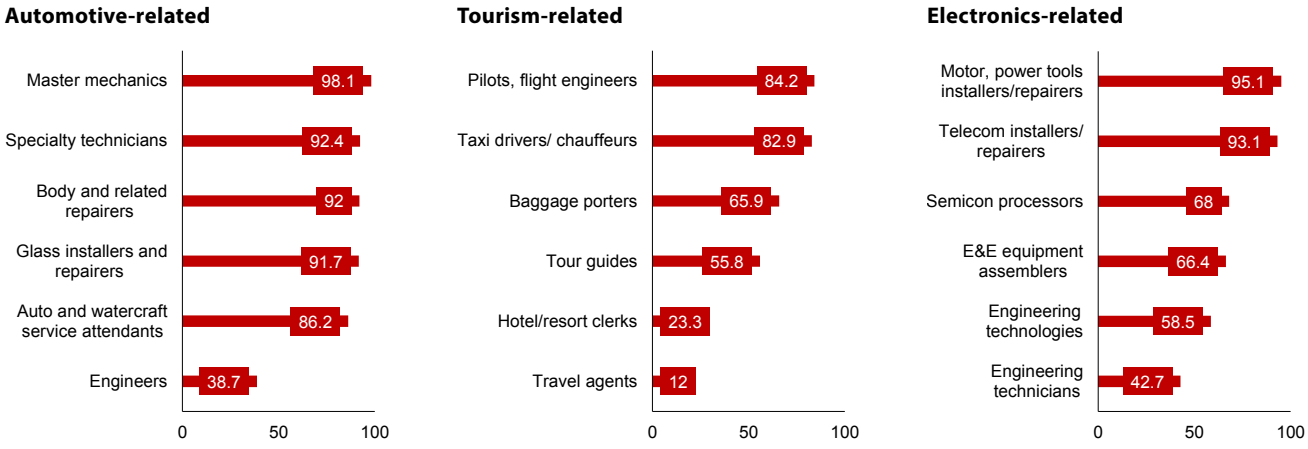
12/ Based on a survey conducted by AMRO on ASEAN+3 central banks and ministries of finance in October 2023. The question was "What do you think are the top three risks to your economy from an aging population?"

13/ The "silver economy" can be taken as the "sum of all economic activity that serve the needs of people aged 50 and over, including the products and services they purchase directly and the further economic activity this spending generates" (European Commission 2018). As such, it is not a single sector. The term is also used closely with the "silver market," a concept that emerged in Japan in the 1970s in relation to age-inclusive provision of goods, services, and facilities.

Growth on a *per capita* basis can also slow due to rising old-age dependency ratios. Downward pressure on GDP per capita growth from rising OADRs across the ASEAN+3 region is only set to increase over the next decade. While late transition economies will see, on average, large or larger declines in the growth of GDP per capita, some in the advanced transition stage—such as Singapore and Thailand—could see growth fall substantially as a result of their increasing dependency ratios (Figure 2.36).
All else equal, labor productivity must rise by a comparable magnitude to offset the decline in the size of the labor force (IMF 2019). Further, as the working-age population shrinks, the number of total workers relative to total consumers (i.e., the entire population) declines over time, putting more pressure on economically active individuals (Lee and Mason 2017). Falling worker-to-consumer ratios in ASEAN+3 mean there will be fewer workers to support total consumption activity over the next decade (Figure 2.37). The additional burden on the working population will be particularly stark in economies where seniors' consumption is primarily funded by government support. In this case, unless the labor supply increases—for example through immigration or an increase in the retirement age—consumption in these economies may have to slow down substantially to mitigate the overall budgetary pressure on the economy.

Declining productivity can magnify the negative impact of aging on the region's long-term growth prospects. Aggregate productivity across ASEAN+3 may also fall in the long term, as older workers could be less productive than their younger counterparts—especially as some cognitive abilities required in many professions tend to decline with age. Some studies suggest that innovation is lower—and slower—in older cohorts, while a more aged workforce may induce less creative destruction (Weinburg 2004; Liang, Wang, and Lazear 2018; Engbom 2019). This negative impact from lower productivity is also likely to be more sizeable than the drag from the shrinking labor supply (Lee and Shin 2021). In the case of Asian economies, Park and Shin (2023) find that aging's negative impact on economic growth primarily occurs through reduced total factor productivity (TFP).[14] For some ASEAN+3 economies, this could be due to the higher tendency of elderly employment in informal work or in low-productivity sectors. More importantly, the lowering of TFP is harder to arrest through labor market interventions—such as by incentivizing immigration or raising the retirement age—and so could have a dampening effect on economic growth.

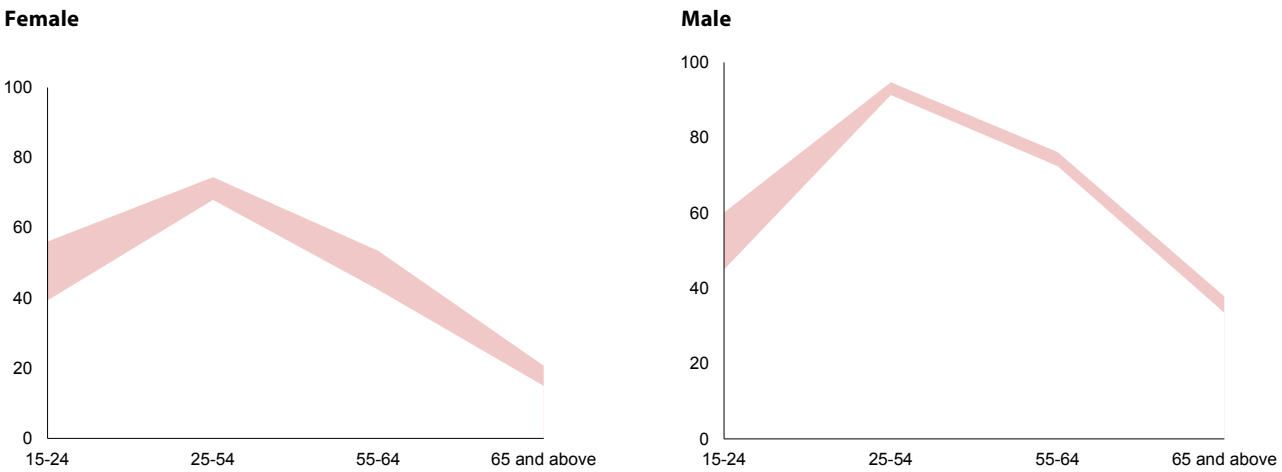
Figure 2.34. Susceptibility Index: Selected Occupations
(Index, higher score = more susceptible to age-related decline in skills)



Source: Belbase, Sanzenbacher, and Gillis (2015).
Note: The Susceptibility Index "systematically assesses the physical and cognitive skills required for each occupation and the tendency of such skills to decline with age." According to the study, a higher index (score) indicates that the job "relies on many abilities that tend to decline early and can be used as an indicator of earlier retirement for individuals in certain occupations."

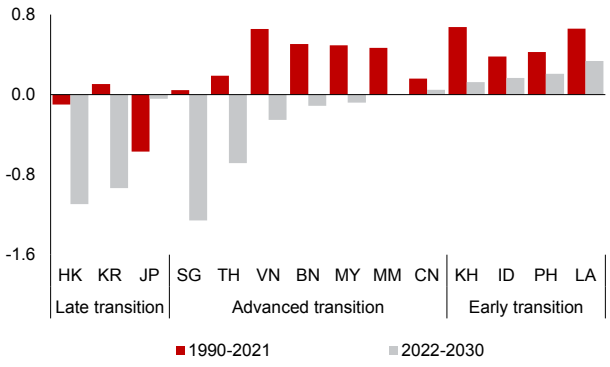
[14] This is, according to Park and Shin (2023), especially because higher labor force participation rates (from encouraging older people to work) can completely offset any shortages in the labor force.

Figure 2.35. ASEAN+3: Labor Force Participation Rates, by Age Bracket, 1990–2021
(Percent)



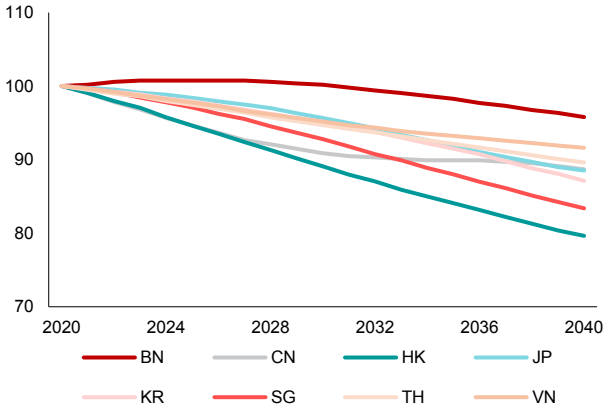
Source: International Labour Organization; AMRO staff calculations.
Note: Areas represent the range of average labor force participation rates from 1990 to 2021 in the region per age bracket.

Figure 2.36. ASEAN+3: Contribution of the Change of the Share of the Working-Age Population to GDP per Capita Growth
(Percent)



Source: World Development Indicators, World Bank; United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. The decomposition methodology follows IMF (2019) and data refers to annual average during the period.

Figure 2.37. Selected ASEAN+3: Workers-to-Consumers Ratio
(Index, 2020 = 100)



Source: National Transfer Accounts; AMRO staff calculations.
Note: BN = Brunei; CN = China; HK = Hong Kong; JP = Japan; KR = Korea; SG = Singapore; TH = Thailand; VN = Vietnam. Data refers to the "Support Ratio" in the National Transfer Accounts project. The lower the support ratio, the fewer workers there are to finance consumers (young, prime age, and seniors) in the economy. Only economies with falling ratios to 2040 are included in the chart.

Box 2.1:

Population Aging and Economic Growth: Stocktaking Evidence

The impact of aging on economic growth has been the subject of numerous studies. Most of the existing literature tends to focus on developed economies, since many are already in advanced stages of the demographic transition. The general agreement in the findings is that population aging has a dampening effect on economic growth, and several studies have attempted to quantify this impact. A study by Maestas, Mullen, and Powell (2023) suggests that a 10 percent increase in the population share of those aged 60 and above results in a 5.5 percent decrease in per capita GDP growth in the United States (US). Similarly, Cylus and Al Tayara (2021)—in a global study across 180 countries—found that a 1 percentage point rise in the share of the ages 55 to 69 demographic is associated with a 0.67 percentage point reduction in real GDP per capita growth. Focusing specifically on Asian economies, Otsu and Shibayama (2016) estimated that population aging would reduce annual GDP per capita growth rates by 0.21 percentage points between 2015 and 2050, compared to a benchmark model without demographic effects.

In general, the negative consequences on growth can manifest through several channels, but primarily through (1) lower productivity growth, (2) a contracting labor supply, and (3) decreased savings.

Lower productivity

The predominant view is that population aging affects output growth by lowering productivity. Maestas, Mullen and Powell (2023) found that two-thirds of the slowdown in US GDP growth between 1980 and 2010 was driven by slower growth in labor productivity. The IMF (2017a), in a study of 32 Asian and European economies, found that a higher share of older workers is associated with a significant slowdown in labor productivity, which they then attribute to lower growth in total factor productivity (TFP). In the Asia sample, an aging workforce could lower TFP growth by as much as 0.3 percentage points annually. In line with this finding, Lee and Shin (2021) highlighted the reduced TFP growth as the most significant channel through which the negative effects of aging operate. Linking population age structure and TFP growth, Feyrer (2007, 2008) identified a hump-shaped relationship between both variables. TFP growth appears to peak for workers aged 40 to 49, and a 5 percentage point increase in the share of this age group (to total population) over a decade is linked to a 1–2 percentage point increase in productivity growth in each year. Similarly, Werding (2008) found that age-related contributions to TFP growth peak for workers in their forties.

One possible mechanism in which an aging population could result in lower productivity growth is through lower innovation. Derrien, Kecskés, and Nguyen (2018) found a strong negative relationship between age and innovation in a US study: a younger labor force tends to produce more innovation. Their study showed that a 1 standard deviation decrease in mean age is associated with a 5 percent to 11 percent increase in the number of patents and a 2 percent increase in productivity. Aksoy and others (2019) similarly estimated that aging may lead to a 15 percent to 30 percent drop in per capita patent applications among OECD countries in the next two decades.

Lower supply of labor

In addition to lowering productivity, aging affects an economy's labor supply. As individuals surpass working age (typically up to 64), many choose to retire and the workforce could contract if the number of retirees exceeds the number of new labor force entrants. Even within the working-age population, labor force participation rates (LFPRs) across the world are lower for older individuals, compounding the effects of a shrinking workforce. In their 2023 study, Maestas, Mullen and Powell estimated that one-third of the slowdown in US GDP growth was due to the slower labor force growth. Specifically, a 10 percent increase in the share of population aged 60 and above leads to a 1.7 percentage point decrease in the growth rate of workers per capita. For OECD countries, Kotschy

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This box was written by Megan Wen Xi Chong.

and Bloom (2023) estimate that income per capita will grow at 2.5 percent annually between 2020 and 2050, if working-age shares were fixed at their 2015 levels. After accounting for the fall in working-age shares due to retirement, growth of income per capita will be lowered to 1.7 percent annually. Zooming into Asia, Park and Shin (2011) estimated that over 40 percent of the aging-induced decline in the growth of Singapore's GDP per capita between 2021 and 2030 can be explained by the decline in the ratio of workers to total population. Singapore exhibited the largest slowdown in GDP per capita in their sample.

However, aging's drag on labor supply can be partially compensated for by an increase in old-age LFPR. LFPRs for older individuals in high-income economies have increased substantially over the past two decades. Looking at OECD countries, Lee and Shin (2021) found that the slower growth in the share of the working population—due to the increase in the number of seniors—can be more than offset by the increase in the LFPR. In 13 Asian economies, a 6 percentage points increase in the LFPR could boost annual GDP growth by as much as 0.3 percentage points, as highlighted by the IMF (2017a).

Lower savings

Aging also affects economic growth by reducing saving and investment rates. The life cycle hypothesis, put forward by Modigliani and Brumberg (1954), posits that individuals attempt to maintain the same level of consumption throughout their lives. As such, they increase their savings when their earnings are high to finance their consumption during retirement, when their incomes are low. Consequently, as a population ages, aggregate savings will also fall as individuals save less in their senior years.

The savings rate has been shown to be significantly correlated with an economy's age composition. Bosworth and Chodorow-Reich (2006) and Higgins (1998), for example, find that increases in youth and old-age dependency ratios are associated with lower saving rates. More crucially, the lower rate of saving leads to less capital accumulation and investment.[1] This then weighs on economic growth, as highlighted by Park and Shin (2011) in their study of 12 Asian economies. For example, nearly 30 percent of the projected aging-induced decline in Korea's GDP per capita—between 2021 and 2030—is due to reduced savings, which then translate into a decline in the economy's capital intensity. In a broader sample covering OECD countries, Aksoy and others (2019) project that demographic changes will, on average, reduce savings by 3 percentage points of GDP and investment by 2 percentage points, ultimately cutting output growth by 1.25 percentage points of GDP across the sample by 2030, when compared to initial growth in 2010.

1/ Aging's impact on national savings-investment patterns will also have bearing on economies' capital flows and current account positions. This is discussed in detail in IMF (2019), which point out that an economy that is experiencing a slower rate of aging relative to the rest of the world could expect its current account balance to deteriorate as they receive more capital from economies that are aging more rapidly (and thus saving more). This, of course, carries its own distributional effects within the recipient economy. See, for example, Krueger and Ludwig (2007).

Box 2.2:

Macroeconomic Consequences of Population Aging in China

China is undergoing a significant demographic transformation. Beyond the decline in total population, the age structure of its people has shifted rapidly. Sustained decreases in mortality and fertility rates since the 1970s have led to a transition from a youthful to an aging population structure, with the proportion of seniors—those aged 65 and above—rising from 8.9 percent in 2010 to 14.9 percent in 2022. These demographic trends are expected to persist and will continue to shape the population structure. According to the latest United Nations (UN) population projections (medium variant), the proportion of seniors is likely to double to 30.1 percent by 2050 from 2022, making China one of the most aged economies in the world by the middle of this century. This also reflects a likely 7.6 percent contraction of the total population between 2022 and 2050 (Figure 2.2.1).

A general equilibrium life-cycle model—following the approach of Auerbach and Kotlikoff (1987)—is employed to assess the potential macroeconomic implications of China's demographic transformation. This dynamic model represents the world economy as two regions: China and the rest of world. Each region is populated by 70 overlapping generations of adult agents, with uncertain lifespans, who raise children and supply labor inelastically. The model assumes capital as fully mobile internationally, while labor is not, and also incorporates a stylized pay-as-you-go (PAYG) pension plan to simulate the actual pension schemes in China and the rest of the world. Calibrated to economic and population data for 2020, the model spans from 2020 to 2300 to ensure a steady state is attained. A counterfactual "reference" scenario is first constructed, with a stationary population in China. The UN population projections (medium variant) are then introduced under a "demographic shock" scenario. The difference between these two scenarios helps unveil the macroeconomic effects of future demographic changes in China.

Demographic transition is estimated as reducing China's long-term economic growth. Simulation results indicate that the annual GDP growth rate over 2020–2050 would be trimmed by 0.79 percentage points as the population continues to age (Figure 2.2.2). Per capita GDP growth would also be slower as the supply of productivity-adjusted effective labor shrinks faster than the population.[1] Due to differences in labor productivity and workforce participation across age cohorts, the aging of the labor force will lead to a larger decline in effective labor. As capital substitutes for more expensive labor, the deceleration in the growth of the capital stock—induced by population aging—will be more modest than that of labor.

The severity of demographic shocks on China's economic growth will also vary over time. As post-famine baby boomers (those born between 1962 and 1970) reach the age of 65 and above, China's aging will accelerate thereafter, resulting in a reduction of about 0.75 percentage points in annual growth from 2026 to 2028 (Figure 2.2.3 and Figure 2.2.4, left panel). As fewer people then enter retirement age, this growth deceleration caused by demographic transition will moderate in the 2030s. However, GDP growth is likely to deteriorate significantly after 2040 as the continuous reduction in new, young workforce entrants leads to a rapid decline in labor supply (Figure 2.2.4, center panel). In 2050, demographic changes could lower China's growth rate by as much as 1.63 percentage points.

In addition, the evolving balance between investment and savings as the population ages could see China's current account position improve. As labor declines and output growth slows in a demographic shock scenario, investment growth will also be lower. However, as capital per worker increases, investment—as a share of GDP—will rise slightly compared to the reference scenario (Figure 2.2.4, right panel). Despite the higher proportion of elderly people amid the demographic transition, household savings as a share of GDP would

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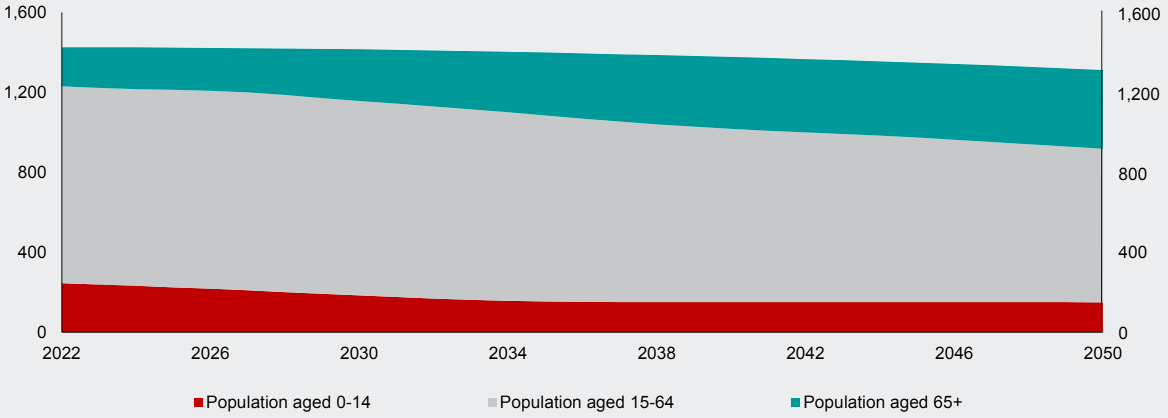
This box was written by Fan Zhai.

1/ Effective labor is the aggregate labor measured in efficiency units. It is defined as the sum of the labor force of each age cohort multiplied by its corresponding age-specific productivity.

also increase for two reasons: (1) lower fertility reduces spending on the consumption of children, and (2) the anticipated longer time in retirement (due to increased longevity) effectively lowers households' discount rate. As the increase in savings rate exceeds that of investment, China's current account balance, as a ratio to GDP, is estimated to be 2.2 percentage points higher on average than in the reference scenario during 2020–2050.

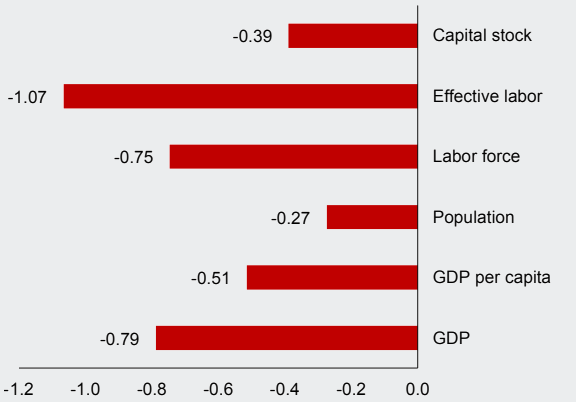
Population aging will also impose a significant pension burden for China. In 2050, pension expenditure as a share of GDP is projected to expand by 3.7 percentage points, rising from 7.9 percent in the reference scenario to 11.6 percent amid demographic shocks (Figure 2.2.4, right panel). This increase would necessitate additional government financing—for example, by raising taxes or issuing more bonds—to fill the resulting gap. Under a defined-benefit PAYG scheme, the contribution rate for the current generation of workers must be increased to balance the pension fund, potentially exerting additional pressures on economic growth.

Figure 2.2.1. China: UN Population Projections
(Millions of persons)



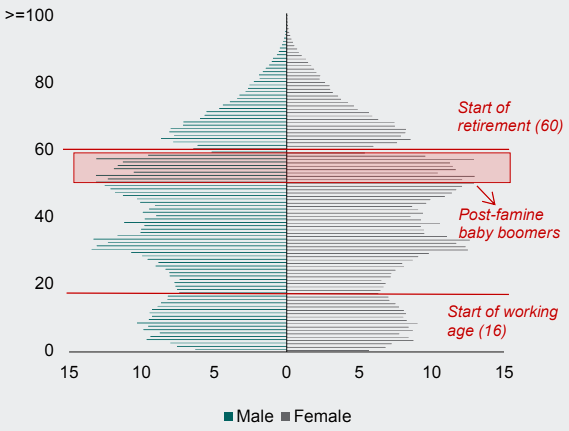
Source: United Nations Department of Economic and Social Affairs, Population Division.
Note: Data refers to medium variant projections.

Figure 2.2.2. China: Growth Impact of Projected Demographic Changes, 2021–50
(Percentage points difference relative to the reference scenario)



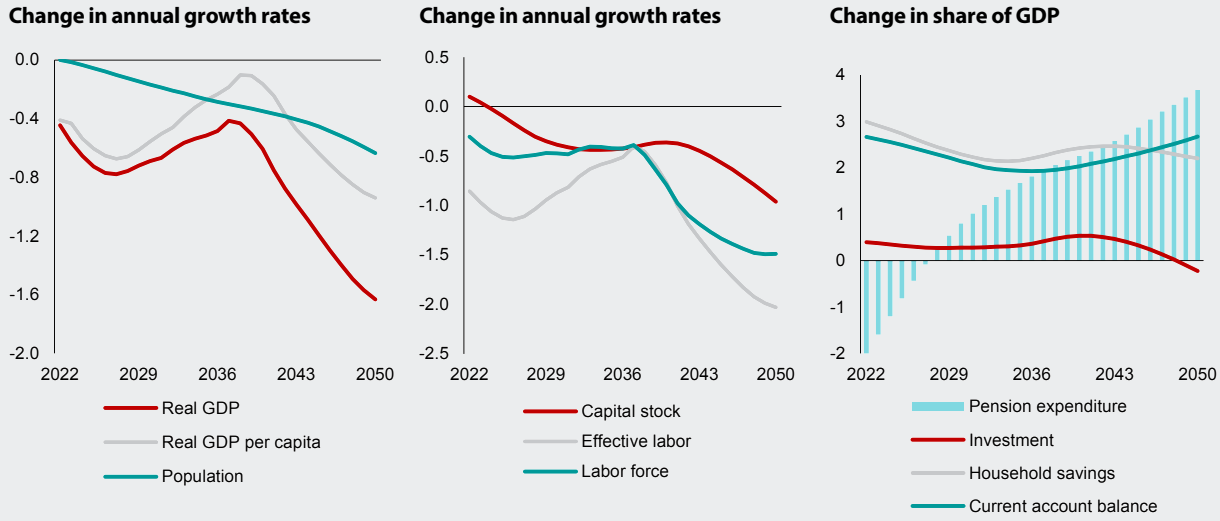
Source: AMRO staff.
Note: Data represents the percentage point change in average annual growth rates between the demographic shock scenario and the counterfactual reference scenario.

Figure 2.2.3. China: Population Pyramid, 2020
(Millions of persons)



Source: The Seventh National Population Census, National Bureau of Statistics, China.

Figure 2.2.4. China: Macroeconomic Impacts of Projected Demographic Changes, Relative to Reference Scenario
(Percentage points)



Source: AMRO staff.
Note: The "demographic shock" scenario does not take into account any policy responses.

On the other hand, the impact of aging on inflation dynamics is much more complex. Demographic changes cause relative price changes due to the differences in consumption preferences between the young and the old. For example, older people spend more on services, such as long-term care, and housing maintenance, whereas younger populations mostly spend on goods, like clothing, electronics, and motor vehicles (Lee 2016; Nerlich and Schroth 2018). Since the 1980s, favorable global demographics—leading to a large young workforce—have helped foster low inflation; however, as once-abundant labor shrinks in coming decades, this tailwind will soon be reversed and become inflationary (Carstens 2022). Yet, even as an aging population can drive up wages due to labor shortages, it can also lead to downward pressure on long-term prices from expectations of weaker future growth. Ultimately, the relative magnitude of these counteracting forces will influence the extent of aging's impact on ASEAN+3 price stability (Table 2.2).

Aging populations will put pressure on public finances across ASEAN+3. Rapid aging can exacerbate fiscal vulnerabilities across the region's economies. Moving forward, demand for health care services, pensions, and other elderly care facilities will increase across ASEAN+3 (Figure 2.38). Additional fiscal costs for health care spending in 2032—compared to 2022—are estimated to range from under 1 percent of GDP (in China, Japan, and Thailand) to more than 2 percent of GDP (in Hong Kong, Korea, and Singapore) (AMRO 2023). However, tax revenues may not necessarily rise in tandem.[15] If governments need to borrow more to pay for old-age benefits, this could also lead to a "crowding out" of private investment (Lee and Mason 2017). In addition, aging can lead public debt-to-GDP ratios to worsen over time by depressing aggregate output (Box 1.5). Various social protection programs for seniors are in place across the region's economies, but their effectiveness tends to be undermined by structural challenges and questions on long-term financial sustainability (Box 2.3). For those with less developed social safety nets, this means significant reforms are needed to prevent fiscal imbalances while ensuring the welfare of the old-age population. Economies in the early stages of the demographic transition have more time to deal with these weaknesses than their peers, but the fast pace of aging underscores the need for rapid and timely action (Figure 2.39).

Aging can affect ASEAN+3 financial stability through its impact on (equilibrium) real interest rates and changing demand for financial assets. Aging impacts savings at the aggregate level, which means that the real equilibrium interest rate would have to adjust in response to the changes to demand and supply for savings.[16] Various empirical studies have identified demographic transition as a main driver of declining equilibrium real interest rates. As aging accelerates globally, low equilibrium interest rates could complicate central banks' ability to manage inflation moving forward in cases where it is very low—as in Japan (Hong and Schneider 2020). The financial system will also not be immune to the impacts of aging. In the case of China, the shrinking cohort of individuals aged 25 to 39 years—typically first-time home buyers—could

Table 2.2. Population Aging and Inflation—A Tale of Two Views

Impact	**Channels of transmission** (from selected studies)
Inflationary	• Aging affects consumption-savings decisions across an individual's lifetime: working-age individuals save more to prepare for spending in retirement (net savers), and those who retire then spend their accumulated wealth for consumption (net consumers). A larger share of net consumers to total population creates, in turn, a demand-driven inflationary impulse (Lindh and Malmberg 2000; Juselius and Takats 2016).[17] • Labor shortages also push up real wages, which compounds the impact from the supply side. • Aging, if driven by falling birth rates, can be inflationary—as the smaller tax base reduces the fiscal surplus, and could prompt the government to allow inflation to rise to erode the value of its debt and maintain solvency (Katagiri, Konishi, and Ueda 2020).
Deflationary	• An aging population feeds expectations of a growth slowdown and so exerts deflation pressures (Shirakawa 2012). • Some services consumed more frequently by the older population—such as preventive visits—also tend to be more price-inelastic to higher demand, which could have a dampening effect on their respective price levels (Lis, Nickel, and Papetti 2020). • Some studies suggest that seniors tend to favor low inflation due to redistributive effects, which suggests that a larger share of seniors to the total population may influence monetary policy to be biased toward low inflation (Bullard, Garriga, and Waller 2012). • The abovementioned influence on policymaking is also suggested by Katagiri, Konishi, and Ueda (2020): if aging is driven by increased longevity—which increases the share of the older (voting) population—this can be deflationary as governments try to keep inflation low.

Source: AMRO staff compilation.

15/ For example, as older people spend more on services such as health care, the direct tax revenues (collected from spending on durable goods) is unlikely to rise substantially.

16/ This would also carry implications for economies' current account dynamics and external positions (Box 2.1).

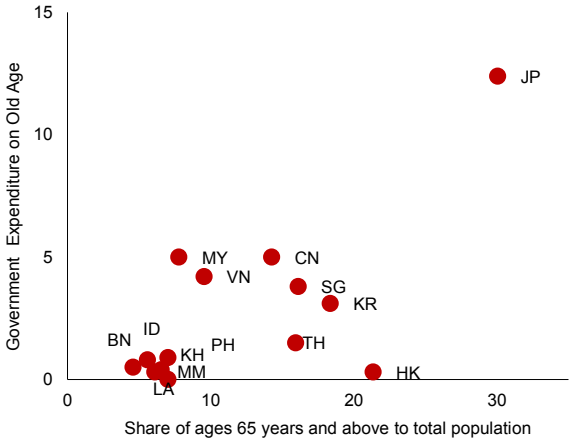
17/ Goodhart and Pradhan (2017) also highlights that the production process, in itself, is disinflationary. Given that the senior population consists purely of consumers, this group generates an inflation impulse (which workers can offset through production).

further dampen long-term demand for real estate, with negative repercussions on banks with considerable linkages with the property sector (Magnus 2022).[18] Elsewhere, evidence from Japan finds that aging has encouraged more market-based finance (i.e., stock market activity) than bank financing—with long-term implications on bank profitability and soundness (IMF 2017b). A higher proportion of older individuals can reduce local demand for credit (due to their accumulated savings), which could push banks toward other (potentially riskier) sources of income, to lend with lower standards in order to extend credit, or to search for higher yields in overseas markets (Doerr, Kabas, and Ongena 2021). A confluence of these factors could complicate the long-term management of financial stability in ASEAN+3.

However, aging's consequences on macrostability are incremental over the long term. In the medium term, there remains room for economic gains. For economies like Malaysia and Vietnam, the still-stable share of economically active individuals in the next decade suggest that productive gains can still be had—even as the share of the elderly population grows rapidly. Further, expectations of labor shortages should encourage firms to undertake labor-saving capital investment, which should translate into higher output per worker. An aging population also induces technology adoption, with growth-enhancing effects (Acemoglu and Restrepo 2018). Automation and new technologies, such as robotics and artificial intelligence, can help offset the negative impact of shrinking workforces while augmenting the skills of older workers. The deepening of ASEAN+3 capital markets can also occur as pension assets rise—with corresponding development in individual capital markets that could allow for more effective accumulation and mobilization of retirement savings.

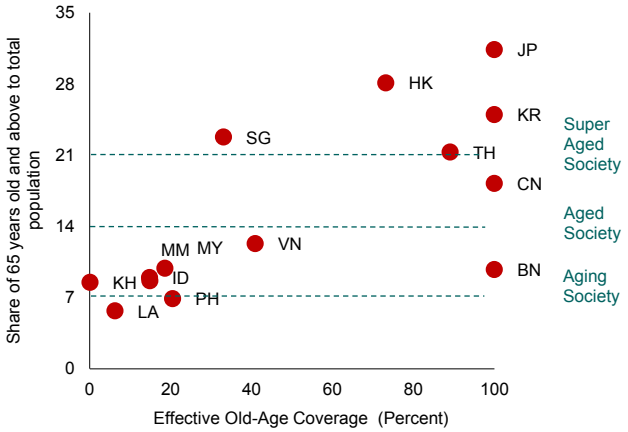
Positively supporting aging trends can open potential sources of growth for the ASEAN+3 region. The longevity dividend highlights how the older population is a latent resource that can be mobilized to support future growth. Advances in medicine have prolonged "biological" ages, extending years of productive life. Older cohorts also have an accumulation of experience and knowledge that increases with age (especially in expert fields) and can offer many competencies based on a wealth of experience. However, realizing this potential would first require a reframing of the issue of aging in the context of the ASEAN+3 region.

Figure 2.38. ASEAN+3: Old-Age Public Expenditure and Old-Age Ratios
(Percent of GDP)



Source: United Nations Department of Economic and Social Affairs, Population Division; International Labour Organization; AMRO staff calculations.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Old-age ratios are as of 2021. Government expenditure on old-age (as of 2020, or latest available year) includes expenditure on services and transfers provided to old-age individuals and expenditure on services provided on a collective basis (including contributory and non-contributory).

Figure 2.39. ASEAN+3: Effective Old-Age Coverage versus Old-Age Ratios, 2030
(Percent of total population)



Source: United Nations Department of Economic and Social Affairs, Population Division; International Labour Organization; AMRO staff calculations.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Effective coverage of old-age refers to ratio of persons above statutory retirement age receiving an old-age pension to the number of persons above statutory retirement age (including contributory and non-contributory).

18/ Under medium-fertility variant projections, this age cohort for China is projected to be 20 percent smaller in 2030—relative to 2020—and will shrink by a further 10 percent by 2050.

Box 2.3:

Old-Age Social Protection in ASEAN+3 Economies

Old-age social protection systems across ASEAN+3 economies are very diverse and characterized by distinct stages of maturity and institutional arrangements. While the definition of "social protection" varies across economies, the term usually refers to three pillars that a society provides to protect its population against economic and social distress: (1) social assistance, (2) social insurance, and (3) labour market programs (OECD 2018). Social protection aims to promote aging with dignity by providing income security and access to essential social services for seniors, including to essential health services and long-term care. In ASEAN+3, legal frameworks across these three areas—old-age pension, universal health coverage (UHC), and long-term care (LTC) insurance—exist in varying degrees, with Japan, Korea, and Singapore having the most comprehensive scope of legal coverage (Table 2.3.1).

The structure and design of ASEAN+3 pension systems vary across economies, requiring care when undertaking a regional comparison (Figure 2.3.1).

Except for Lao PDR, all economies in the region offer some form of pension floor (Tier 0), which guarantees minimum income security for seniors.[1] The schemes can be categorized into (1) universal, (2) means-tested, and (3) pension-tested to determine recipient eligibility.[2] In terms of pension floor financing, Japan and China rely on a mixed financing arrangement (financed by member contributions and tax) while the rest rely on a tax-financed non-contributory scheme.

Tier 1 schemes, which aim to provide income replacement in old age, are either provident savings fund or pension funds with defined contribution or defined benefit schemes. At present, Myanmar is the only ASEAN+3 economy that has yet to introduce a national pension scheme for formal private sector workers, although legal provisions are in place. In terms of financing, China, Japan, and Korea—which have larger elderly populations—resort to a mix of fiscal subsidy and member contributions to finance Tier 1 schemes while member contributions finance the rest.

Table 2.3.1. ASEAN+3: Social Protection Systems for Seniors

	Existence of Legal Framework		
	Old-age pension	Universal health coverage	Long-term care insurance
Brunei	✓	✓	None
Cambodia	✓	✓	None
China	✓	o	◊
Hong Kong	✓	o	None
Indonesia	✓	o	None
Japan	✓	✓	✓
Korea	✓	✓	✓
Lao PDR	✓	o	None
Malaysia	✓	o	None
Myanmar	●	o	None
Philippines	✓	✓	None
Singapore	✓	✓	✓
Thailand	✓	✓	None
Vietnam	✓	o	None

✓ Program is anchored in national legislation
o Backed by a national plan instead of legislation
● Program is yet to be fully implemented
◊ Program is under pilot trial

Source: World Health Organization; International Labour Organization; AMRO staff compilation based on officially published national documents.
Note: For universal health coverage (UHC), this refers to whether economies have an explicit UHC law.

This box was written by Dek Joe Sum.

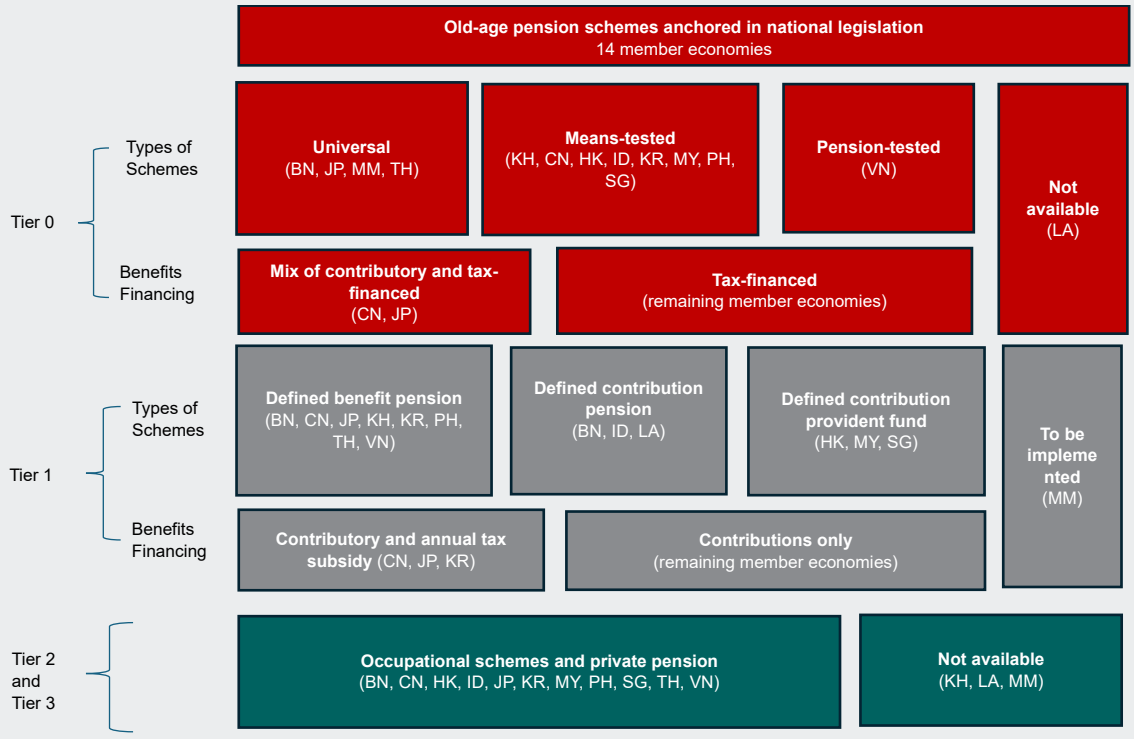
1/ This box considers the term "multi-tier" and "multi-pillar" to be broadly synonymous. The term "multi-tier" is used throughout rather than "multi-pillar" as the former better represents the overlapping nature of pension system components.

2/ Vietnam uses a pension-tested scheme, where seniors aged 80 years and above who do not have access to the Vietnamese Social Security (VSS) system are qualified for a defined benefit and a non-contributory pension floor. It is called as such because qualification depends on access to the VSS.

Tier 2 and 3 schemes, which are fully-funded occupational and private schemes, are available in every economy except Cambodia, Lao PDR, and Myanmar. In terms of effective old-age coverage, the ratio is broadly higher in economies that are projected to become aged and super-aged societies by 2030 (Figure 2.39 in this chapter). Brunei stands out, however, as it is likely to achieve 100 percent old-age coverage by 2030 despite having a much slower pace of aging than Japan, Korea, and China. Similarly, fiscal spending on pension and other old-age related benefits is higher in economies with a larger elderly population (Figure 2.38 in this chapter). A notable exception is Hong Kong. Its significantly lower level of spending compared to ASEAN+3 peers with a similar demographic pattern is because the pension system receives no government subsidies.[3]

Social protection for seniors also requires easy access to publicly provided, affordable social services, such as health care. In line with the objective of UHC, social protection systems are "expected to guarantee access to health care without hardship by satisfying the criteria of availability, accessibility, acceptability, and quality" (ILO 2022). However, given budgetary restrictions, governments often face a dilemma involving competing demands from expanding the population and service coverages and providing quality medical care. This underscores the importance of health financing policies. A balanced and well-designed system for financing health care can deliver quality health services, equitable utilization of resources, and financial protection for the vulnerable population, while achieving long-term financial sustainability. According to the World Health Organization (2021a), the success of health financing systems depends on the performance of three important functions: (1) revenue collection, (2) pooling and management of resources, and (3) purchasing of services and interventions. Hence, careful consideration needs to be given to budgeting frameworks of social protection and health insurance schemes to improve the sustainability and impact of health financing.

Figure 2.3.1. ASEAN+3: Multi-tier Pension Systems



Source: International Labour Organization; AMRO staff compilation based on officially published national documents.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. This regional comparison excludes civil servant pension, including for military personnel, for brevity. Tier 2 refers to complementary schemes and Tier 3 refers to voluntary personal pension. Both are usually fully and privately funded, with limited exceptions, and as such are lumped together in this box.

3/ This is attributed to the fact that old-age pensions in Hong Kong, China are mainly financed through the Mandatory Provident Fund.

In ASEAN+3, most economies have developed some form of contribution-based scheme to finance their health systems, either through social health insurance or a mix of social and community-based health insurance (Table 2.3.2). A contribution-based financing scheme brings the benefits of risk-pooling, stable revenue flows, and access to a broader range of services and products. However, administrative complexity can also make it challenging to manage. For example, the World Bank (2020) found that the fragmented intergovernmental transfers in Indonesia's decentralized system have created a fundamental disconnect between the level and geographic distribution of public health financing and the benefits offered, leading to implicit rationing and inequities in the incidence of social health expenditure. Contribution-based financing schemes are also vulnerable to exclusion and resource gaps, especially in economies with large informal sectors. For example, in Cambodia, Lao PDR, and Myanmar, out-of-pocket (OOP) payments—a modality considered inefficient and inequitable—remain the dominant source for current health expenditure financing, despite the existence of other various contributory schemes (Figure 2.3.2).

Other economies—Brunei, Hong Kong, and Malaysia—use a tax-based national health system as their financing method. While this method provides universal legal coverage and risk-pooling for the entire population, it is prone to unstable funding due to competing priorities for public expenditure. Malaysia's one-size-fits-all fee structure and reliance on a single source of tax financing have contributed to prolonged underinvestment in health and a health budget that no longer matches the reality of its changing demographics (Malaysia Ministry of Health 2023). These outcomes underscore the challenge of achieving UHC across the ASEAN+3 region, and the need to undertake necessary policy reforms to provide adequate social health protection. Currently, the region's aged and super-aged societies generally enjoy a higher coverage in essential health services and tend to implement larger public health-related spending (Figures 2.3.3 and 2.3.4).

Increased longevity and decreased fertility rates in ASEAN+3 have raised concerns about who will provide care for the growing number of older people (who will have more long-term and complex care needs) and how to finance this long-term care. Japan and Korea are the early movers, having institutionalised LTC insurance schemes more than a decade ago, while China is undertaking a pilot trial for LTC insurance in 49 cities. In the ASEAN, Singapore is the only economy to have institutionalised LTC insurance through the CareShield Life and LTC Bill in 2019. The differing speeds in LTC institutionalization reflect demographic patterns across the region, as well as the speed of aging, and different levels of social protection development. While there has been no systematic data collection or estimates on how much informal care costs, the majority of LTC financing in ASEAN is from private financing—including through family care, unpaid family labor, and volunteer care—and OOP expenditure for health and social care services, or the employment of domestic workers to provide care (Wyse and Walker 2021).

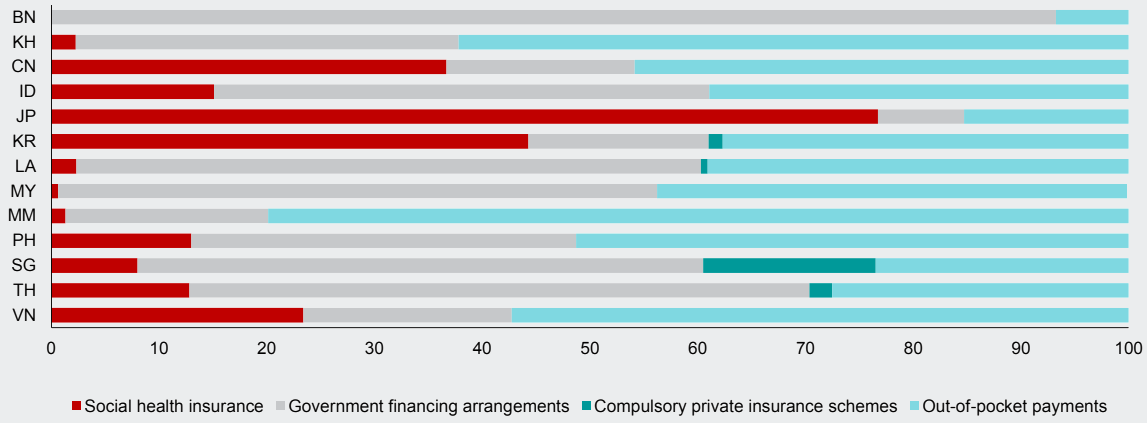
Moving forward, the spectrum of maturity and institutional features of old-age social protection systems in ASEAN+3 will remain highly diverse, especially as each economy is confronted with unique challenges arising from population aging.

Table 2.3.2. ASEAN+3: Health System Financing Mechanisms

	Health system	Long-term care
Brunei	Tax-based national health system	N/A
Cambodia	Limited social/community-based health insurance coverage and social assistance	N/A
China	Social health insurance	N/A
Hong Kong	Tax-based national health system	N/A
Indonesia	Social health insurance	N/A
Japan	Social health insurance	Social long-term care insurance
Korea	Social health insurance	Social long-term care insurance
Lao PDR	Limited social/community-based health insurance coverage and social assistance	N/A
Malaysia	Tax-based national health system	N/A
Myanmar	Limited social health insurance coverage and social assistance	N/A
Philippines	Social health insurance	N/A
Singapore	Tax-based public health system and social health insurance	Social long-term care insurance
Thailand	Tax-based national health system and social health insurance	N/A
Vietnam	Social health insurance	N/A

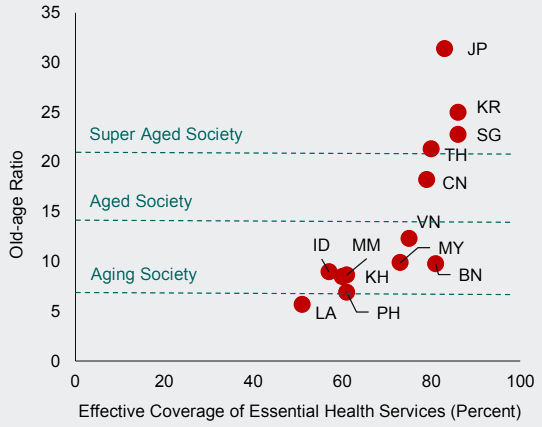
Source: World Health Organization; International Labour Organization; AMRO staff compilation based on officially published national documents.
Note: The information refers to the scheme each member economy uses to finance its statutory health system and long-term care program. It is important to note that the statutory financing arrangement may not necessarily be the dominant source of financing. The classification of health system financing scheme used in this box follows ILO (2015) and OECD/WHO/Eurostat (2011), with necessary adjustments to reflect the latest arrangement in ASEAN+3 member economies. N/A = not available.

Figure 2.3.2. ASEAN+3: Sources of Current Health Expenditure Financing, 2021
(Percent of current health expenditure)



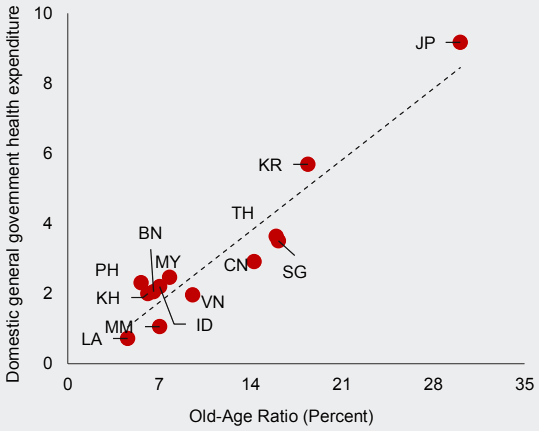
Source: World Health Organization (2021a); national authorities.
Note: BN = Brunei; CN = China; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Data for Hong Kong are not available. For further details on financing sources, refer to WHO (2021a).

Figure 2.3.3. ASEAN+3: Old-age Ratios and Effective Coverage of Essential Health Services, 2030
(Percent)



Source: United Nations via Haver Analytics; International Labour Organization.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. The old-age ratio is defined as the share of people of ages 65 years and above in the total population. Coverage of essential health services is defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, noncommunicable diseases, and service capacity and access, among the general and the most disadvantaged population.

Figure 2.3.4. ASEAN+3: Domestic General Government Health Expenditure and Old-age Ratios
(Percent of GDP)



Source: United Nations via Haver Analytics and International Labour Organization.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. The old-age ratio is defined as the share of people of ages 65 years and above in the total population, and the data are as of 2023. General government expenditure on health—with data as of 2021—includes all public sources for health system such as domestic revenue (internal transfers and grants, transfers); subsidies to voluntary health insurance beneficiaries; nonprofit institutions serving households or enterprise financing schemes; as well as compulsory prepayment and social health insurance contributions.

Rethinking Aging for ASEAN+3

"Demography is destiny—really?"

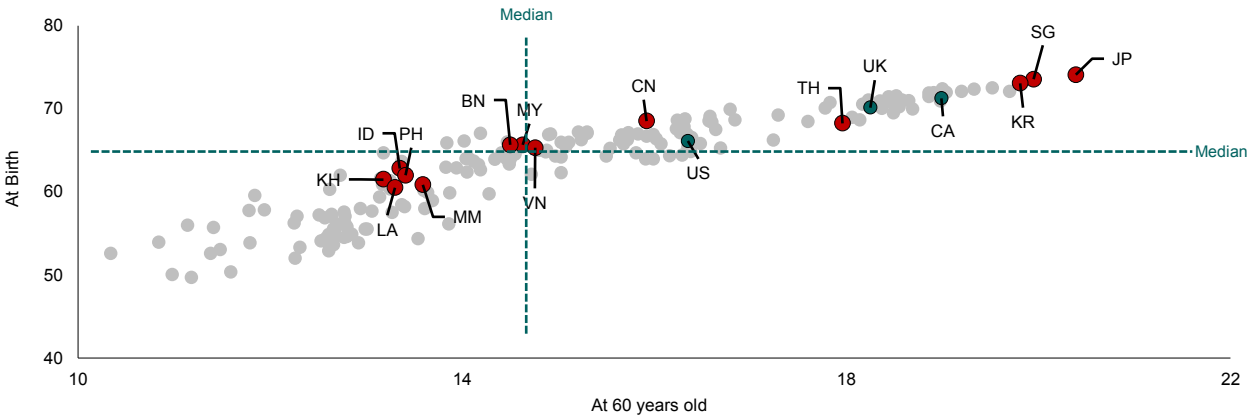
David Bloom, Harvard School of Public Health Professor, March 2020

Conventional measures of aging, such as the old-age boundary of 60 or 65 years, tend to overlook the dramatic increase in life expectancy. Global life expectancy (at birth) in 2021 is 71 years, 25 years longer than it was in 1950. In the ASEAN+3, an average person can expect to live at least three decades longer than someone born in 1950. Economies like Korea, Thailand, China, and Singapore have seen much higher gains in lifespan. In other words, while the region is aging, it is living longer and hence, biologically, it is aging more *slowly* than it did in previous generations. The longer lifespan brings into question what defines "old" and how it is measured. Conventional measures of aging—such as the median age and old-age dependency ratios—tend to consider and/or emphasize the *chronological* age, or how long one has lived. Many existing studies highlight the shortcomings of doing so: by ignoring the state of health and quality of life, these measures suffer from being backward-looking, narrow, and isolated from demographic realities (Gietel-Basten, Saucedo, and Scherbov 2020; Scott 2023). Comparisons across economies are less meaningful when using chronological ages, or even across time for a single economy.[19]

Prospective measures offer a more realistic way of thinking about aging—and how to respond. In contrast to the chronological measure of aging, prospective measures look at the *biological* age—or how many more years one has left. By considering whether people are aging well, the issue of demographic transition shifts from a largely negative narrative (more older people requiring economic support) to one that recognizes the potential economic gains from longer productive lives, or the longevity dividend. This is especially relevant for several ASEAN+3 economies that are living longer and also healthier, compared to other peers, even advanced ones (Figure 2.40). Prospective measures remove the boundary to old age and allow it to change over time. Sanderson and Scherbov (2007, 2010) use life expectancy-equivalent ages to measure aging: an age group is considered to be old only when their average remaining life expectancy is less than 15 years. They also suggest that dependency must be viewed as a presence of disability rather than as a function of age. Beyond statistics, these proposals have important policy implications: prospective measures can offer more realistic fiscal costs of aging and affect future policies on pensions, elderly care, and old-age support (Gietel-Basten, Saucedo, and Scherbov 2020).[20]

From a prospective approach, the trajectory of aging in the ASEAN+3 region is more gradual than it is often perceived to be. Following Sanderson and Scherbov (2007), *prospective* old-age population shares suggest that the old-age population in ASEAN+3 will be about 26 percent of the total population by 2050, half of what conventional old-age population shares suggest (Figure 2.41). This lower share by 2050 is equivalent to about 200 million people "re-included" in the region's

Figure 2.40. World: Healthy Life Expectancy, 2019
(Number of years)



Source: World Health Organization.
Note: BN = Brunei; CA = Canada; CN = China; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; UK = United Kingdom; US = United States; VN = Vietnam. Healthy life expectancy refers to the average number of years that a person can expect to live in "full health" by taking into account years lived in less than full health due to disease and/or injury. Gray dots correspond to other economies. Data not available for Hong Kong.

19/ For example, the health status of a 90-year-old in an advanced economy cannot be the same as a similarly aged individual in another economy with a less-developed medical system.

20/ This is because health care expenditures tend to be more linked to life expectancy than chronological age.

workforce. The prospective measure also suggests that the working-age cohorts could still expand within the decade and peak by mid-2030s (Figure 2.42). Economies in advanced stages of transition, especially Singapore, Thailand, and China, are expected to benefit significantly from the potential longevity dividend. Smaller gains for late-transition economies imply that more older people are already part of their current labor force. For those in early transition, the impact will be small until 2050, but will increase thereafter as they enter the latter stages of aging. Similarly, *prospective* median age calculations suggest lower median ages, especially in Plus-3 economies (Figure 2.43). Longer life expectancies have led to a younger ASEAN+3 population, in biological terms, who can be productive for longer.

This carries several macroeconomic policy implications for ASEAN+3 economies. By considering biological aging, the inevitable demographic transition becomes less daunting and offers a more optimistic outlook on the region's long-term growth. A prospective approach reframes aging as a relatively more manageable policy challenge for ASEAN+3, while at the same time keeping the "demographic window of opportunity… open for longer," (Basten, Yip, and Chui 2013). Implementing reforms aimed at encouraging older worker participation can help buffer against aging's negative impact on long-term growth. By enabling longer working careers beyond an old-age boundary as one option, individuals would—to some extent—need to accumulate less wealth (for retirement), and longer working careers would boost income, delay the age for dis-saving, and encourage more consumption. This, in turn, could ease downward pressure on real interest rates, with implications for the conduct of monetary policy. A prospective approach to aging also underscores the need to enhance pension systems to incorporate longer life expectancies across the ASEAN+3. By offering more refined estimates on future age-related spending, utilization of the prospective measures could also minimize the risk of overestimating future fiscal liabilities, especially given ASEAN+3's multiple spending priorities.

This is not to say that population aging is no longer an issue of concern for the ASEAN+3 region. Reframing the issue of aging, however, allows policymaking to shift from merely responding to the challenges of aging to maximizing the benefits of a larger—and healthier—workforce. While many myths about aging—such that older workers compete with younger workers for job opportunities and that they are less productive—have already been found to be empirically untrue, ageism and ageist attitudes remain persistent globally even when these are economically costly (Gruber, Milligan, and Wise 2011; World Health Organization 2021b).[21] For ASEAN+3, policies that combat these hurdles and support longevity would become as crucial as policies that mitigate the economic burden of aging.

Rather, rethinking aging in ASEAN+3 beyond an age boundary highlights the need for a more nuanced policy approach. It is crucial to acknowledge that with older cohorts a highly heterogenous group, some policies that work for one group—or one economy—may not work for another. For example, the "reskillability" of new retirees would likely be higher than those who have already retired for some time. Involuntary retirees—or those who retire early due to various reasons—would also require a different policy approach, given that they are unable to tap their pensions to finance consumption until they reach the requisite retirement age. Across the ASEAN+3 region, the policy challenge of reskilling (and upskilling) the older workers will be more urgent in aging economies that are also experiencing a faster pace of structural transformation. Deeper and more granular understanding of how longer life expectancies change workers' incentives, needs, and behaviors would be critical—however, this area, especially in ASEAN+3, still needs further empirical research.

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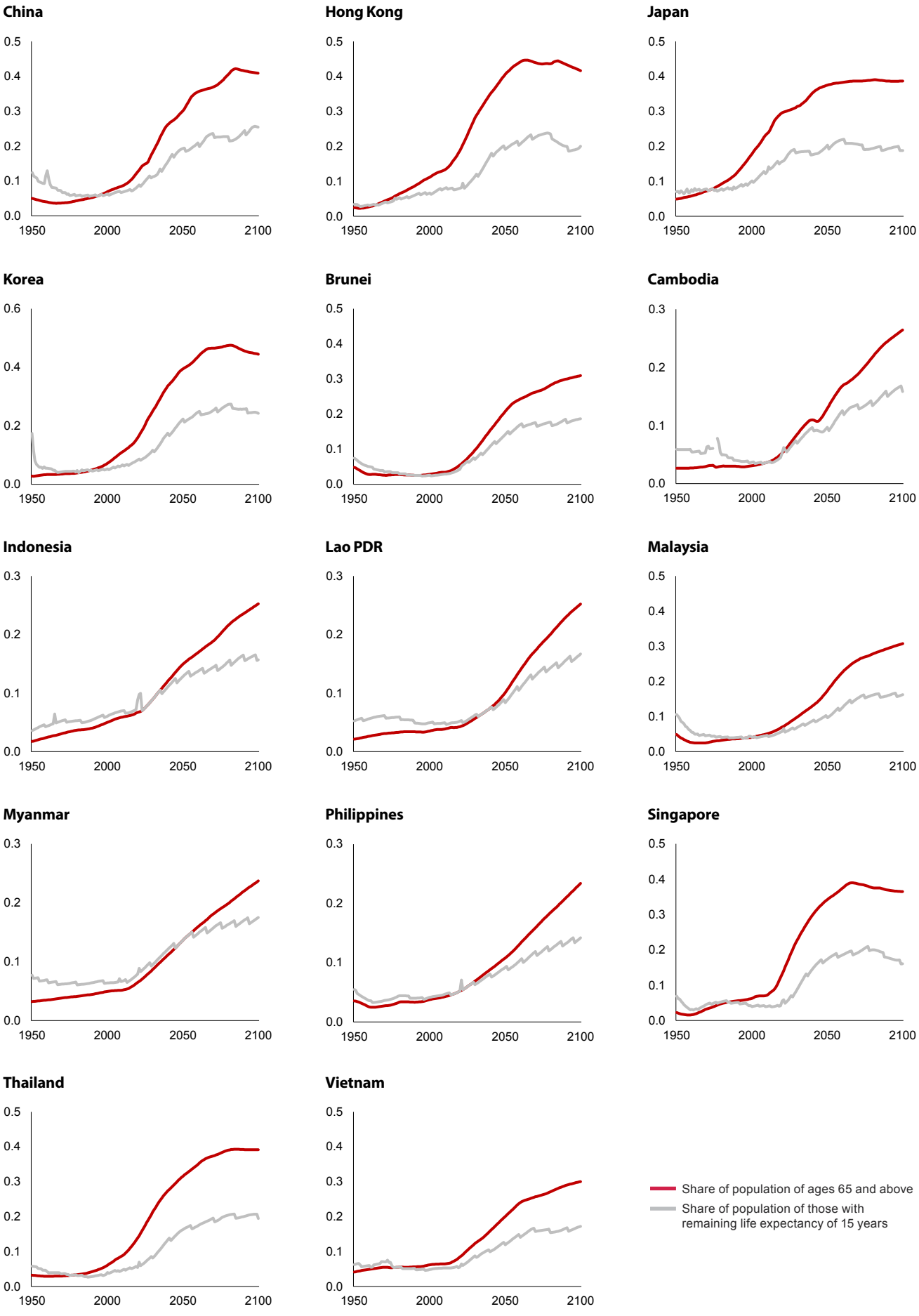
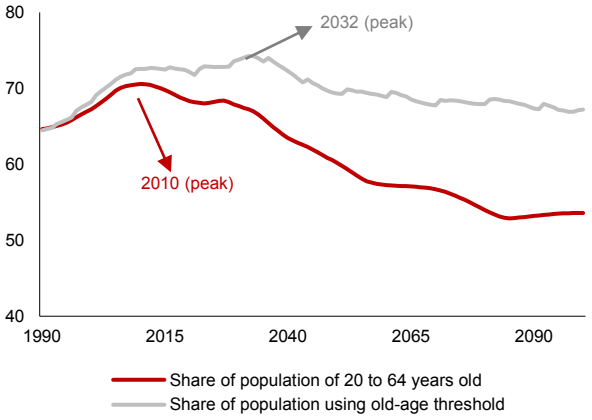
[21] That enabling older individuals to work for longer would reduce job prospects for younger workers—or alternatively, to encourage them to retire would provide more work to younger employees—is usually referred to as the "lump of labor" fallacy. It falsely rests on the assumption that there is a fixed amount of work to be done in an economy, discounting the reality that as workers increase, the economy (and economic activity) correspondingly expands and creates more work.

Figure 2.41. ASEAN+3: Prospective versus Retrospective Measures of Old Age Population
(Ratio to total population)



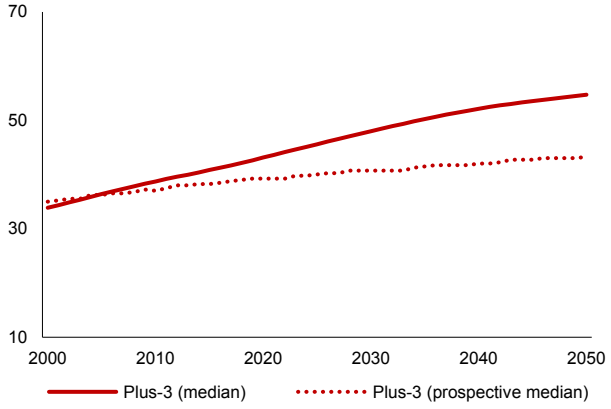
Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.

Figure 2.42. ASEAN+3: Prospective versus Retrospective Measures of Working-Age Population
(Percent of total population)



Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: Figures after 2021 use UN estimates (medium variant).

Figure 2.43. Plus-3: Prospective versus Retrospective Measures of Median Age
(Years)



Source: United Nations Department of Economic and Social Affairs, Population Division; AMRO staff calculations.
Note: Figures after 2021 use UN estimates (medium variant). While the median age is the age that divides the population into two numerically equal groups, the prospective median age for each year is the age in that year's life table where the remaining life expectancy is the same as the median age in the reference year (2010).

Policy Considerations

"The current difficulties come not from the continued population aging itself, but from the delayed response to it."

Masaaki Shirakawa, Former Governor of the Bank of Japan

Various policy measures are already being implemented across the ASEAN+3 region to address the adverse impact of population aging. However, more needs to be done to mitigate its potential impact on growth and macroeconomic stability. The nature of policy responses will necessarily differ across member economies, in view of the varied speeds of aging, the diverse characteristics of the aging population, and the variety of domestic conditions. Nevertheless, successfully navigating the rapidly changing demographic realities requires all sectors of the economy to adapt, including industry and financial institutions. While the issue of an aging population may initially appear as primarily a domestic issue, it has significant cross-border implications and thus requires international cooperation.

Key to harnessing the longevity dividend are policies and structures that allow ASEAN+3 populations to age productively. An aging population does not need be to a significant headwind to ASEAN+3 long-term growth, especially if the population is allowed and able to remain engaged in productive activities for longer.

By aiming for "healthy" longevity, a state where years in good health—across physical, mental, and social dimensions—approach a person's chronological life span (NAM 2022), ASEAN+3 economies can leverage on the experience and knowledge of an older workforce and enhance their human capital, while reducing the negative macroeconomic consequences of aging. Without doubt, these will require a multipronged, multifaceted approach that encompasses all stakeholders and various aspects of public policy—from labor policy, health policy, industrial policy (to promote the development of elderly care industries), to urban planning, among others. These longevity-related policies—some of which are being gradually implemented, or explored, across ASEAN+3—must be pursued proactively, given the speed of aging across the region (Table 2.3). These would provide a solid foundation for the successful implementation of other aging-related policies: for example, increasing retirement ages will only exacerbate macroeconomic pressures if the population is characterized by long yet unhealthy lives.

Table 2.3. ASEAN+3: Selected Policy Actions to Respond to the Challenge of Aging, as of December 2023

Policy	BN	CN	HK	ID	JP	KH	KR	LA	MY	MM	PH	SG	TH	VN
Longevity dividend														
Policies that enable and encourage older adults to remain in the workforce longer *(e.g., workplace policies to ensure worker health and safety; increasing opportunities for part-time work and flexible schedules)*		○	●		●	○	●				●	●	○	
Support lifelong learning and retraining *(e.g., grants or tax breaks to promote upskilling of employees, grants to individuals for engaging in midcareer training)*	●	○	●	●	●	○	●		●	●		●	○	●
Social infrastructure														
Develop legal protections for the rights of older people and ending age-based discrimination					●	○	●	●			●	●		●
Public information campaigns that highlight the value of older people to society	●	●		●	●	●		●	●		●	●	●	●
Ensuring basic financial security for older people *(e.g., through retirement income systems, or support for older people with no income)*	●	○	●	●	●		●		●	●	●	●	●	●
Physical environment														
Updating physical infrastructure to address affordability, insufficiencies, and inefficiencies in housing stock, as well as support autonomy and social connection *(e.g., age-friendly community and housing design protocols that enhance access to food, transportation, social services, and engagement)*		○	●		●		●					●	○	
Promoting policy solutions for healthy longevity, intergenerational connection, and social cohesion *(e.g., public spaces that promote social cohesion and encourage physical activity; promoting individual savings and financial literacy)*	●		●	●		●	●				●	●	○	●
Health systems														
Investments in affordable, accessible public health care systems, including geriatric care models, for providing person-centered, integrated care for older people	●	○	●	●	●	○	●	●		○		●	○	●
Public policies to incentivize individuals to engage in prevention and wellness activities *(e.g., preventive screening, address risk factors for chronic conditions, promote positive health behaviors)*	●	●		●	●	●	●		○	○	●	●	○	●
Providing financial and technological support, training, and career pathways for informal caregivers as well as the paid long-term care workforce *(e.g., support for families and caregivers)*	●				●					●		●	○	

○ Policies are in the process of implementation ● Policies have already been implemented

Source: AMRO staff compilation.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Policies (and descriptions) have been selected/curated from the recommendations of the National Academy of Medicine (2022).

Raising old-age (and retirees') labor participation rate will be crucial to reduce the impact of the shrinking labor, but supportive enablers must be in place. ASEAN+3 economies can reap substantial benefits from promoting age-inclusive and gender-inclusive labor policies. Female labor participation rates in the ASEAN+3 have lagged those of men, but the discrepancy is even more pronounced in older cohorts: for ages 65 and above, female LFPR rates are nearly half those of males. Increasing overall female participation would require massive and long-term improvements on both the demand-side (such as subsidized childcare) and supply-side (such as re-entry programs). *Generally*, raising older workers' participation requires a well-targeted mix of incentives and reforms to remove barriers to work. Existing labor rules and structures that bar older people's ability to join or stay longer in the workforce would have to be reviewed, and incentives—such as flexible or part-time work arrangements—should be expanded in parallel. *Specifically*, enhancement of labor policies must take into account the heterogeneity of the older cohorts—new retirees versus old retirees, and the incidence of leaving the workforce involuntarily, among others—in tandem with domestic labor market conditions. In the same vein, technology can be utilized to make jobs more age-friendly and make them less physically demanding, especially for seniors (Section IV). As longer working lives in ASEAN+3 will require multiple rounds of learning and training, lifelong learning systems will be crucial for workers to improve their employability in their later years.

Faced with an aging workforce, ASEAN+3 economies must leverage technology to boost productivity. The COVID-19 pandemic has already spurred innovation in many sectors across the ASEAN+3—including retail, banking, and health care—which could help lift the region toward a higher productivity-driven growth (AMRO 2022). Economies would benefit from capitalizing on these post-pandemic trends. Amid population aging, many technologies can enhance economy-wide productivity by substituting for scarce labor, or by complementing existing human capital. Financial and fiscal support would be crucial to improve firms' access to these technologies, especially in sectors with a high exposure to age-susceptible jobs. Policymakers can play a role by fostering a competitive business environment, which would further spur innovation, and by facilitating the necessary reallocation of capital and labor to more productive sectors. Boosting the productivity of human capital would also require improvements in health that reduce age-related diseases and promote preventive health care, through advanced medical technology and life sciences.

Pension system reforms will augment the economy's ability to mitigate shocks from rapid aging. While some in the ASEAN+3 have well-developed pension systems, most are still beset by issues relating to coverage and adequacy of benefits. Coverage levels of mandatory pension schemes across the region vary from as low as 30 percent of the working population to as high as 90 percent (OECD 2022). Statutory retirement ages should be revised periodically to incorporate a more prospective view of aging, in particular by taking account of lengthening life expectancies across the region. In some ASEAN economies, where the definition of dependency is more complex, the concept of "pensionable" rather than "retirement" age could more appropriate (Gietel-Basten, Scherbov, and Sanderson 2016; ADB 2019). For others in the region, the financial sustainability of social insurance programs would have to be strengthened by learning from peers (Box 2.3). In parallel, policymaking must be mindful of the distributional consequences of particular reforms—for example, when raising the retirement age, which can be an option to minimize fiscal risks. In ASEAN+3 economies where the informal sector is large and/or where the "gig economy" is rapidly expanding, an increase in pension eligibility age may not be as effective. Similarly, where older workers already constitute a high portion of the workforce, raising the retirement age may not necessarily be the priority option (NAM 2022).

International cooperation will help facilitate knowledge-sharing, technology diffusion, and people movement that can ease existing labor shortages. Migration of foreign workers can play a part in alleviating the labor supply shock from an aging (local) population. Additionally, long-term demand for jobs related to care-giving and elder care are likely to increase, especially in economies in the late and advanced stages of the demographic transition. To this end, regional cooperation can pave the way for freer movement of labor across the ASEAN+3 region to complement—not substitute—other measures in response to aging while balancing against other policy priorities. Nevertheless, many barriers to intraregional labor movement exist, including license standards, limited sectors that migrants can access, and costly pre-employment requirements. Further, only movement of skilled labor is allowed in ASEAN under the ASEAN Economic Community Blueprint, in contrast with the European Union that allows free movement for all types of labor (Lan 2022). Closer international ties would also be positive for technology diffusion and knowledge sharing, especially given rapid advancements in medical technology, automation, and artificial intelligence. Continuously addressing the digital divide within and across ASEAN+3 economies could be instrumental in creating new employment opportunities for the aging population.

III. Navigating Trade Reconfiguration

Global trade is in the midst of significant change. This trend is not new: global value chains, or GVCs, and globalization in general, have gone through "ebbs and flows" as part of trade's evolution (Aiyar and others 2023). Over their history, GVCs have become longer and increasingly complex, facilitated by the improvement in transportation and fall in global logistic costs.[22] Large multinational companies outsourced segments of their production to emerging market and developing economies to maximize efficiencies, helping boost growth and incomes especially in Asia (AMRO 2021). Since the global financial crisis, however, global trade in goods has grown slower than overall output. Alongside the moderation in cross-border lending and investment flows, these trends have been viewed by some as the beginning of the end of globalization. With the rise in anti-globalization sentiments and protectionism in recent years, this idea of globalization's impending demise persists. Nevertheless, three major trends now dominate the ongoing changes in the global trade landscape:

First, international trade relations are increasingly being realigned, notably by geopolitical considerations. Various shocks of the last 10 years, especially during the pandemic, highlighted the merits of diversification to reduce risks of supply chain disruptions. They unveiled excessive reliance on only a few suppliers around the world, prompting many global companies to relocate some of their activities to minimize future disruptions to their supply chains. Yet, beyond these unpredictable events, the realignment in global trade is also now increasingly driven by policies—such as those arising from national strategic objectives—which is leading to growing concerns about geoeconomic fragmentation.[23]

Second, global trade is becoming more concentrated, especially within major trading relationships (UNCTAD 2023a). Generally, global trade concentration has been on an upward trend since the global financial crisis, reflecting, in part, the continued rise in trade corridors and preferential trading agreements. More recently, however, concentration patterns increasingly reflect a reorientation of international trade flows between and among economies that are considered geopolitically "close" or "friendly" (UNCTAD 2023b). This is closely linked with rising friendshoring activity globally, especially given that these activities often redirect trade and investments toward economies that share the same geopolitical views or values. On the other hand, this also implies declining diversification in trade partners globally. In an environment increasingly beset by supply chain disruptions, highly concentrated trade carries risks to economic security and resilience.

Third, trade in services is playing a larger and more significant role than goods in driving global trade. Globalization skeptics tend to highlight that global goods trade has long peaked; however, this pattern does not hold true for cross-border services. Thanks to technology, many barriers to services trade have not only been overcome, but their removal has created new export opportunities—such as digitally enabled services—for many developing economies. Moreover, even traditional GVCs incorporate and increasingly rely on these traded services, in line with the "servicification" of GVCs (Mirodout 2017). The future of globalization, as Baldwin (2022) points out, is in the hands of services trade. In particular, services that are increasingly powered by technology to become tradeable across borders are set to become an important engine of growth for many in the ASEAN+3 region (AMRO 2018).

This section looks at these three global trends in ASEAN+3 and examines what they mean for the region's future trade prospects. Without a doubt, the face of global trade is changing, and so will its role as a driver of ASEAN+3's long-term growth and stability. While the ongoing shifts in global trade carry potential risks, they also present emerging opportunities for the region's economies. How these three currents will influence GVCs—and ASEAN+3 economies' role within them—remains highly complex. Ultimately, how the region adapts and responds to these trends will be crucial to ensuring the sustainability of its long-term trade and growth prospects.

22/ "Global value chains," as used in this section, refer to international production sharing, where production is broken into activities and tasks that are carried out in different economies.

23/ Aiyar and others (2023) defines geoeconomic fragmentation as a "policy-driven reversal of global economic integration often guided by strategic considerations." Some domestic policies, such as those undertaken to ensure domestic financial stability within an economy, do not necessarily fall under this definition, as the authors argue.

Trade, Realigned

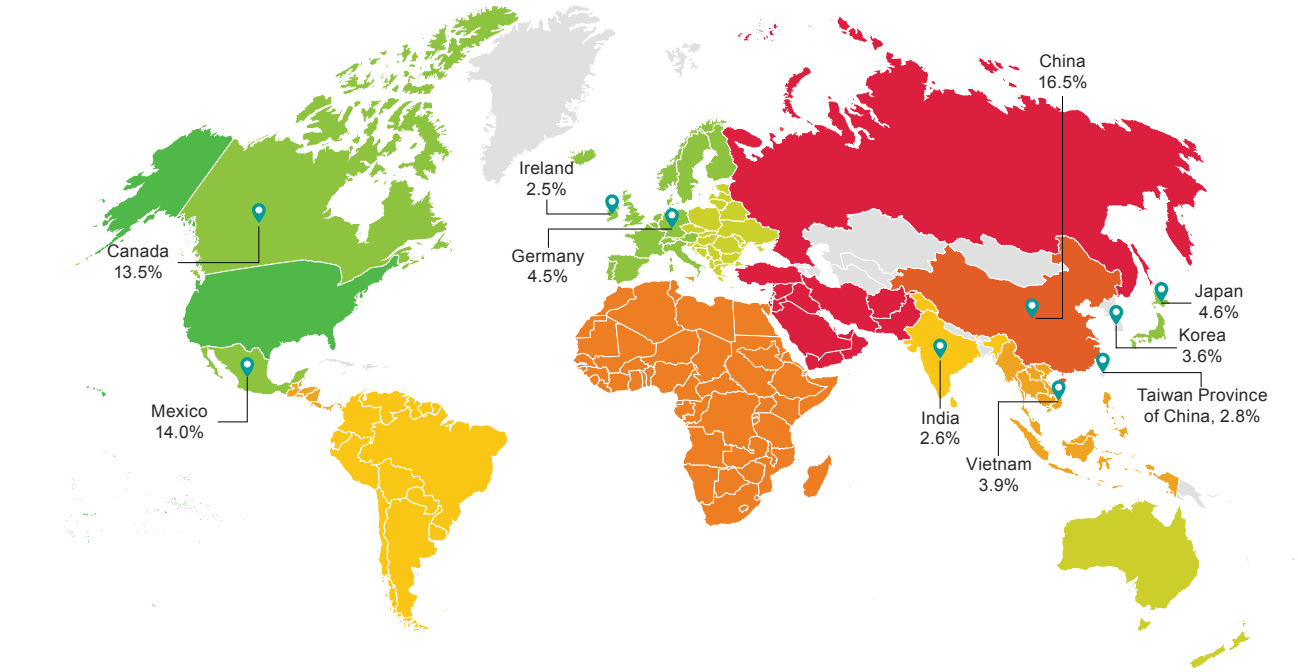
"Let's build on and deepen economic integration … with the countries we know we can count on."

Janet Yellen, US Treasury Secretary, April 2022

Geopolitical relationships—especially between the United States and China—are increasingly reshaping international trade flows. Amid debate surrounding "decoupling" and "de-risking", the threat of geoeconomic fragmentation has become more pertinent than ever (Figure 2.44). Ongoing Trump-era tariffs and reinvigoration of US industrial policy, through state and federal incentives, combined to drive US reshoring activity to an all-time high last year. Most of these are cases of "automatic reshoring," where US firms increase their domestic investments and production as an alternative to relying on imports—consistent with the surge in manufacturing construction spending in the United States (Figure 2.45). Government incentives are cited as a key driver for US firms; as such, the electrical equipment and electronics sectors are the top contributors to reshoring activity (Reshoring Initiative 2023).[24] In ASEAN+3, the Plus-3 is especially affected. The same is true for US nearshoring activity, with "friendshored" projects to Mexico and Canada coming mostly from Asia (Figure 2.46). As the World Trade Organization [WTO] (2023) points out, such cross-border activity fuel signs that both international trade and investment patterns are becoming increasingly influenced by geopolitical proximity.

Trade flows between the United States and China, as expected, have slowed—with spillover effects to the rest of the world. Tariff rates between the two economies remain very high—US tariffs on Chinese products covered by Section 301 are six times higher than for the rest of the world (Brown 2023).[25] These continue to affect about 65 percent of US imports from China, a considerable portion of which are being pivoted to other trading partners. Thus, while bilateral trade flows between United States and China reached a record-high of USD 690.6 billion in 2022, trade expansion has slowed—from a monthly average of 4.2 percent in 2016–2018 to only 1.9 percent in 2019–2023 (Figure 2.47). In addition, bilateral trade growth has been slower, on average, compared to their respective trade with other partners. Consequently, China's share of US imports has been declining steadily since 2018—and replaced by other economies, with a few from the ASEAN+3 region (Figure 2.48). The fall in China's share is pronounced for advanced technology products, such as semiconductors and telecommunications equipment (Figure 2.49).

Figure 2.44. United States: Geopolitical Risk of Top 10 Import Sources

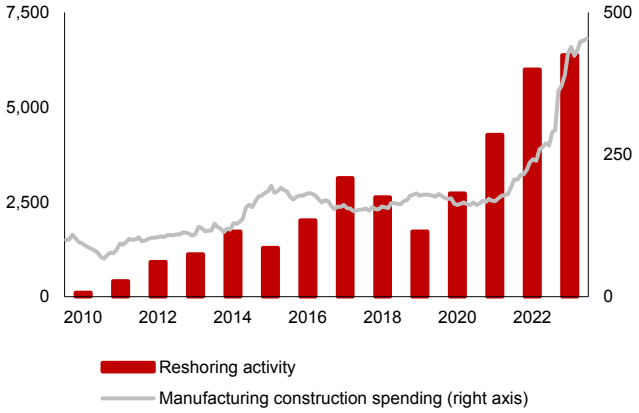


Source: Reshoring Initiative; AMRO staff calculations.
Note: The redder the map, the higher the geopolitical risk. Geopolitical risk, as defined by the Reshoring Initiative, is the "probability in one year of a major disruption in trade resulting in the cessation of imports from that economy to the United States as a result of an adverse geopolitical event". Data in the bubbles represents the selected economy's share of US imports in 2022. Data for geopolitical risk is as of August 2023.

24/ These incentives, for example, are covered by the US Inflation Reduction Act as well as the CHIPS and Science Act. Both were passed into legislation in August 2023.

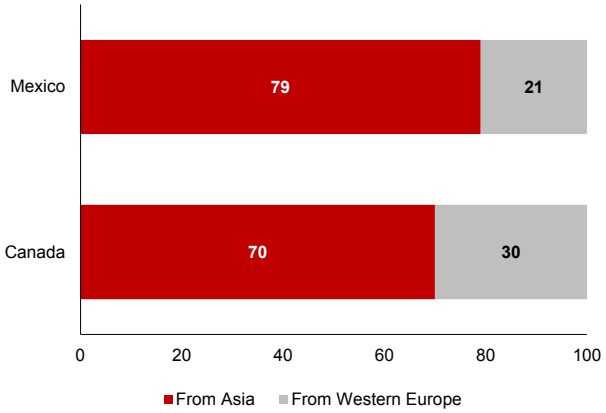
25/ Under Section 301 of the Trade Act of 1974, the Trump administration began by imposing tariffs of 25 percent on products covering roughly USD 34 billion of US imports from China in July 2018. Subsequent increases were imposed in August 2018 (USD 16 billion), September 2018 (USD 200 billion), and lastly in September 2019 (USD 102 billion).

Figure 2.45. United States: Reshoring Activities and Manufacturing Construction Spending
(Index, 2010 = 100; Index, Jan 2010 = 100)



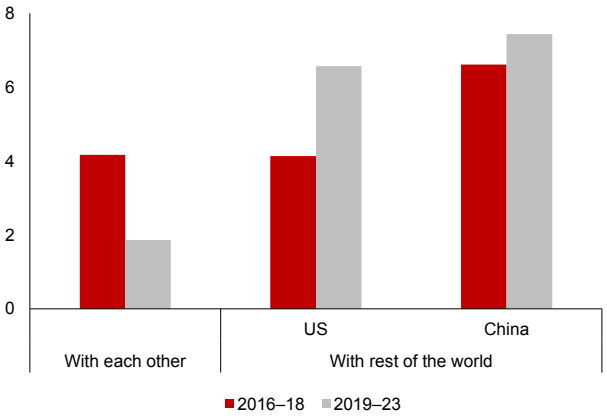
Source: Reshoring Initiative; National authorities via Haver Analytics; AMRO staff calculations.
Note: Data for reshoring activity is on an annual basis and refers to the number of jobs generated from these reshored projects. Data for construction spending is monthly.

Figure 2.46. United States: Nearshored Projects to Canada and Mexico by Source, 2010–23
(Percent)



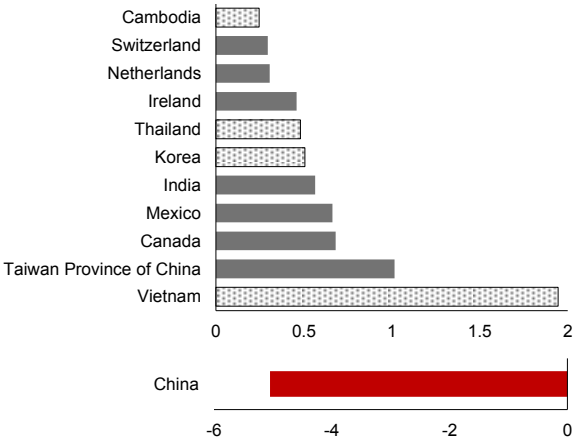
Source: Reshoring Initiative.

Figure 2.47. China and United States: Growth of Total Trade, by Partner
(Percent)



Source: IHS Markit; AMRO staff calculations.
Note: Data refers to the average over the period of the monthly (year-on-year) growth rates. Latest data are up to September 2023.

Figure 2.48. Selected Economies: Change in Share to US imports, 2017–2022
(Percentage points)



Source: IHS Markit; AMRO staff calculations.
Note: Patterned bars indicate (non-China) ASEAN+3 economies.

Interestingly, several economies that have gained China's "lost" export share in the US market are also importing more from China. Several economies have seen their shares of the US market increase in the past five years—led by Vietnam, Taiwan Province of China, Canada, Mexico, India, as well as Korea. When it comes to strategic goods exports to the United States, the first two economies are also the biggest gainers of market share (Figure 2.50). Yet, while these other exporters are stepping in to fill China's previous role, US dependence on China may not be necessarily unwinding. Freund and others (2023) find that for electronics-related products in particular—a pain point for both economies—markets that have increased their exports to the United States over time have also increased their imports from China. In other words, supply chain linkages with China appears to be deepening at the same time that these exporters are increasingly catering to higher US demand.

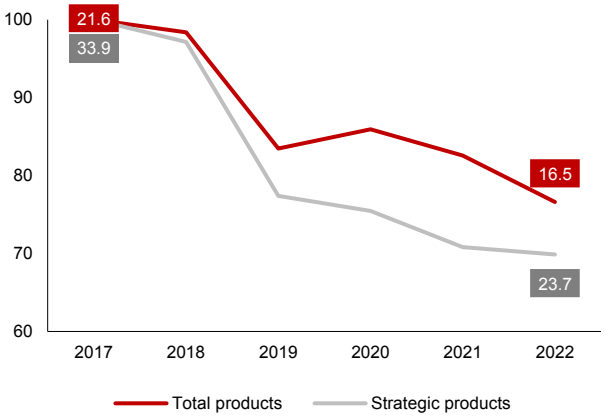
As a result, some sectoral GVCs are "lengthening," with economies acting as additional "links" between the United States and China. Global GVC production has become longer in the past three to five years, largely reflecting the pattern seen in China's supply chains (Figure 2.51). Its average GVC production length has been rising since 2018, which implies that its value-added exports increasingly undergo additional production stages—in other economies—before reaching their final demand market. Qiu, Shin, and Zhang (2023) also highlight this trend of longer supply chains, especially as other economies—particularly from Asia—now increasingly "account for a greater portion of *suppliers* to US customers … as well as accounting for a greater portion of *customers* to Chinese suppliers." Investors that shift supply chains away from China, more often than not, move production to locations where economic linkages with China are already strong (Curran and others 2023). Value-added trade measures are also consistent with the continued rise in these

indirect linkages between the two economies. One, value-added originating from China that is absorbed by US final demand has not fallen substantially over the years, despite calls of decoupling. This is also true for the US value-added imports of manufacturing goods, about a fifth of which continues to be derived from China, based on the latest available data (Figure 2.52). The rise of "additional links" also mean that US trade exposure to supply chains involving China, in other words, remains higher than what headline trade figures suggest—what Baldwin, Freeman, and Theodorakopoulos (2023) calls "hidden exposure."

Within the region, ASEAN economies are increasingly accounting for a larger share of these indirect links between China and the United States. Given China's extensive and key role in many GVCs, its total value-added manufacturing exports to the United States have increasingly gone through third-party economies: from 12 percent in 2000, the group's share has nearly doubled to about 20 percent in 2020.[26] This proportion spiked in 2019, growing by about 18 percent from 2018, against its average annual growth of 3 percent in 2013–2018. Of China's indirect value-added exports to the United States, about 35 percent is accounted for by ASEAN+3 (ex China) economies. This share has also been rising—implying the increasing role of the region as a link or "additional stop" between China and the United States, especially ASEAN (Figure 2.53, top panel). This holds true across various sectors, including electrical equipment, chemicals and non-metallic products, and rubber exports, among others. Economies that have been able to benefit from the lengthening are those where China's foreign investor presence is already strong or they have existing comparative advantage in affected industries—led by Vietnam, Thailand, and to some extent, Malaysia (Figure 2.53, bottom panel).[27] Strong existing manufacturing (and support) capabilities help facilitate "plug-and-play" for new FDI enterprises, rather than them having to build the necessary ecosystem from the ground up.

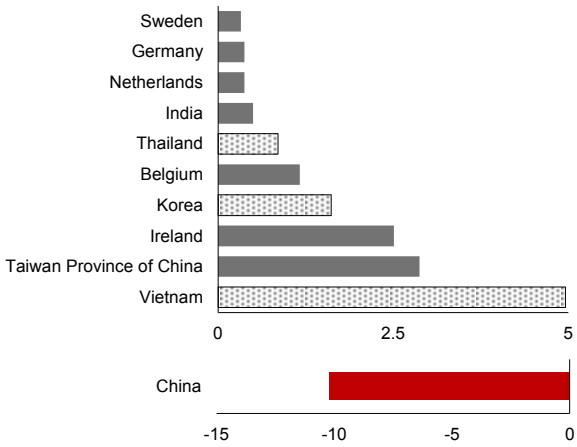
Regional economies benefitting from this lengthening of the China–US supply chains can also be gleaned from more granular, high-frequency trade data. Analysis of China's exports to the United States at the 4-digit HS level show that China has lost market shares in about 800 different products over 2017–2022.[28] The ASEAN+3 region was able to "win" the substitution game for about a third of these products, absorbing the larger portion of China's lost market share when compared to the rest of the world. ASEAN economies benefitted the most, led by Vietnam, Thailand, Cambodia, and Indonesia. Note that these markets have, over time, welcomed a significant amount of Chinese foreign direct investments (FDI), and also considers China as their top source of imports. Vietnam's foothold—accounting for about 60 percent of ASEAN's overall gains—is in part due to the structure of its manufacturing sector having similarities with China, as well as the latter's investment reach across the industry (Box 2.4) (Zhao and Ho 2023). Similarly, Thailand's advantage stems from its deepening linkages with China, coupled with a strong comparative advantage in auto manufacturing (Hinojales 2023).

Figure 2.49. China: Change in Share to US Imports, by Product Type
(Index, 2017 = 100)



Source: IHS Markit; AMRO staff calculations.
Note: "Strategic products" corresponds to the 644 commodities listed by US Census Bureau (2022) as "Advanced Technology Products." Numbers in boxes correspond to China's respective shares (in percent) for each product type for that period.

Figure 2.50. Selected Economies: Change in Share to US Imports of Strategic Goods, 2017–2022
(Percentage points)



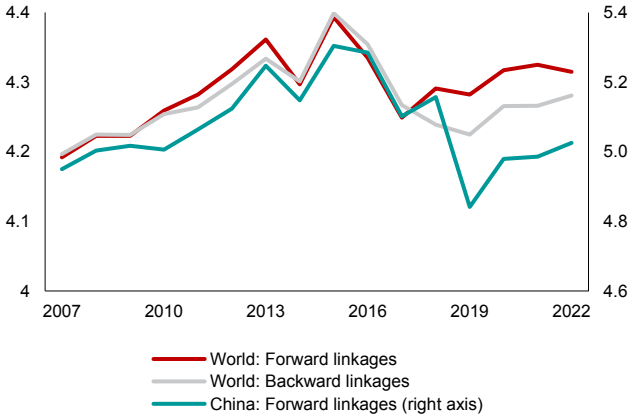
Source: IHS Markit; AMRO staff calculations.
Note: "Strategic products" corresponds to the 644 commodities listed by US Census Bureau (2022) as "Advanced Technology Products." Note: Patterned bars indicate (non-China) ASEAN+3 economies.

26/ In 2020, 80.8 percent of China's *total* value-added exports to the United States were exported *directly* by China, and the remaining 20 percent exported *indirectly* by the rest of the world. Of the *indirect* exports, 35.8 percent was accounted for by ASEAN+3 economies (ASEAN: 23.8 percent; Plus-3 ex China: 12.0 percent). AMRO's analysis utilizes OECD's Trade in Value Added (TiVA) 2023 database, with the latest data as of 2020.

27/ Other economies in ASEAN have increased their shares in other specific sectors. For example, Cambodia for textiles and textile products (including leather and footwear) and wood and paper products; the Philippines for other non-metallic mineral products, basic metals, as well as computers, electronic and electrical equipment; Indonesia for fabricated metal products and other manufacturing (corresponding to ISIC rev 4 categories 31-33); and Singapore for food and beverage products and basic metals.

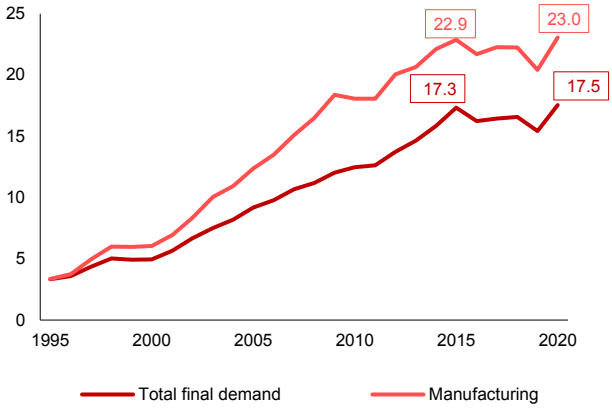
28/ In total, there were 1,227 different types of commodities analyzed at the HS 4-digit level.

Figure 2.51. World and China: Length of GVC Production
(Number of stages)



Source: Asian Development Bank Multiregional Input-Output Tables; AMRO staff calculations.
Note: Forward (backward) linkages refers to the average number of stages separating the source (consumption) of the value-added (final goods) and its final consumption (value-added origin) for the portion of the production that is involved in global value chains, as defined by ADB (2023). Individual economy figures are export-weighted to derive the worldwide production length.

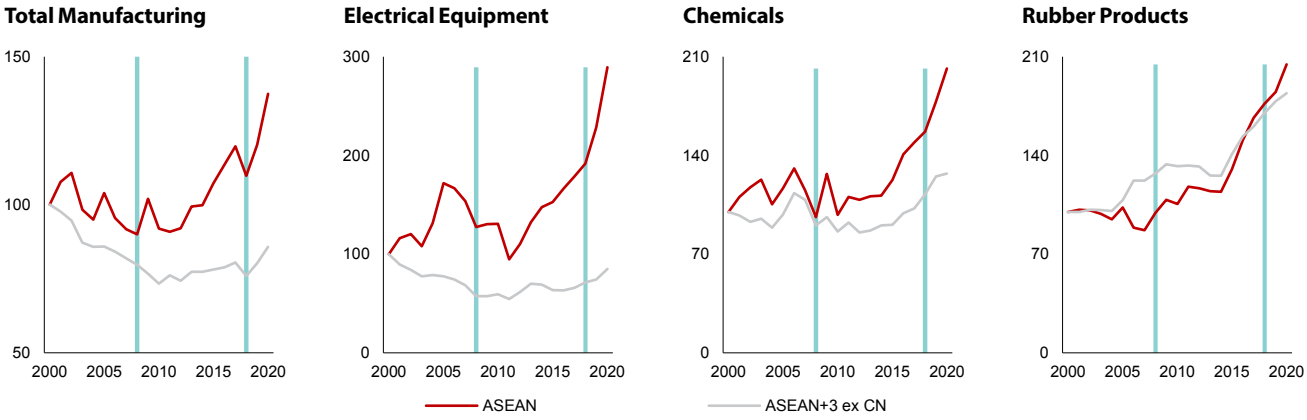
Figure 2.52. China: Domestic Value-Added Absorbed by the United States
(Percent of US demand)



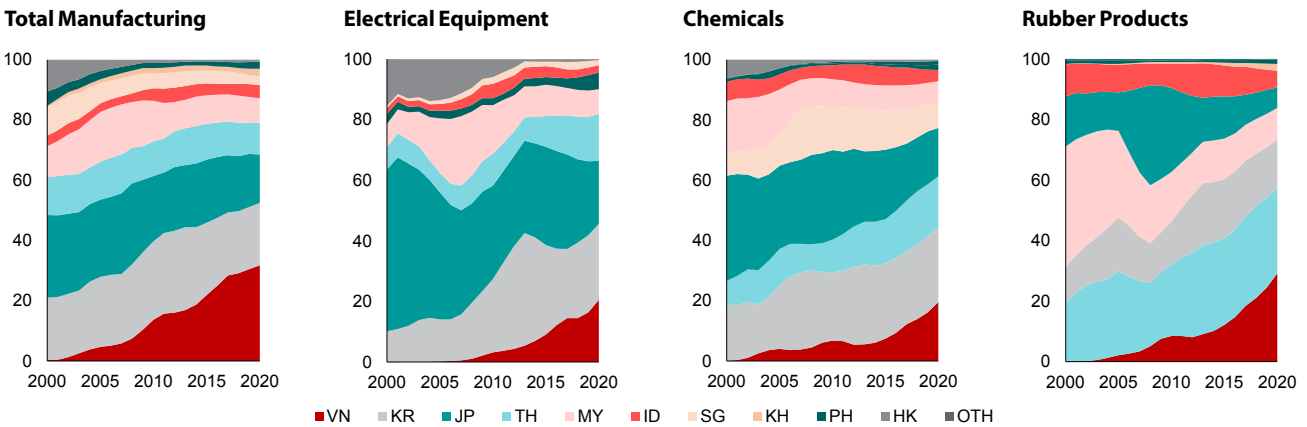
Source: Organization for Economic Cooperation and Development Trade in Value-Added database 2023; AMRO staff calculations.
Note: "Total final demand" refers to the share of China's value-added (both direct and indirect) to the total foreign value embodied in US final demand. "Manufacturing" refers to China's manufacturing value added (both direct and indirect) that is imported by the United States, as percent of US total manufacturing value-added imports. Latest data on value-added trade is 2020.

Figure 2.53. ASEAN+3: China's Domestic Value-Added Exported to the United States via the Region, Selected Sectors

Share
(Index, 2000 = 100)



Contribution to Share, by Economy
(Percent)



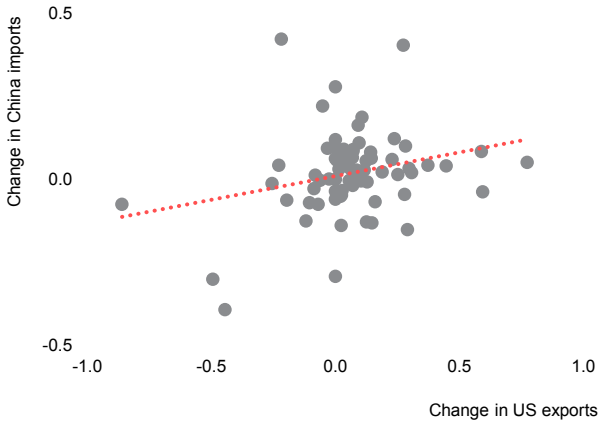
Source: Organization for Economic Cooperation and Development Trade in Value-Added database 2023; AMRO staff calculations.
Note: HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; MY = Malaysia; OTH = others; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. "Share" corresponds to the value-added of China that is exported by ASEAN (ASEAN+3) to the United States, as percent of the value-added of China that is exported via all third-party economies to the United States. Horizontal bars in the top panel correspond to 2008 (global financial crisis) and 2018 (US-China trade tensions). Latest data on value-added trade is 2020.

In addition, regional economies' role as an additional "link" between China and the United States appears more evident in medium- to high-tech sectors. China's exports of electrical machinery and electronics have been those most affected by US trade policy, followed by chemicals, as well as optical and other precision instruments. For these products, ASEAN economies were able to substantially increase their exports to the United States; at the same time, corresponding imports from China also rose (Figure 2.54). When analyzed at the 4-digit commodity level across the region, this observation appears to be more evident in medium- to high-technology manufacturing sectors, but less so for those considered as low-technology (Figure 2.55). ASEAN economies' gains in these low-technology—and labor-intensive—industries are most likely because of their cost advantage amid growing US demand for these products, and less so because of global supply chains being reconfigured due to US–China tensions.[29]

Investment intentions toward ASEAN+3 economies also point to this "trade link" effect. New FDI announcements from China to the rest of ASEAN+3 suggest that China-based investors are now mostly taking advantage of neighboring economies' "manufacturing hub" potential, rather than to primarily serve the domestic market. The latter was, historically, China-based investors' primary FDI motive—until 2019 (Figure 2.56). Over 2020–2023, about 37 percent of announced FDI intentions from China were for serving the domestic markets in the ASEAN+3, while those for serving external markets (in and outside the region) stood at 63 percent—about 25 percent higher than the share in 2019. This also emerges in non-China FDI flows into ASEAN+3, although to a smaller extent (Figure 2.57), consistent with the view that a few in the region could indeed become "connector" economies—especially if geoeconomic fragmentation were to deepen further.[30] This stems from their ability to attract greenfield investments—Vietnam for electronics, Indonesia for electric vehicle batteries—and position themselves as strong manufacturing hubs.

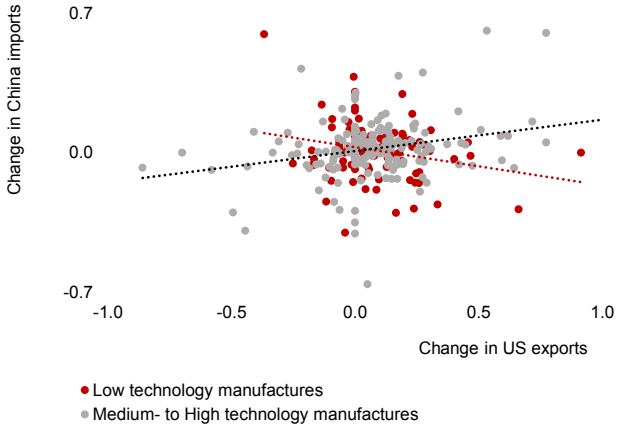
In sum, lengthening global value chains is one way that the realignment in global trade is manifesting and, so far, is tilted favorably toward the ASEAN+3. However, while the region seems to be receiving windfall benefits through additional trade and new investments, this does not imply that it will be a straightforward win-win situation. The shift in international trade flows driven by US-China geopolitical dynamics is, in reality, more nuanced, requiring continuous analysis and policy attention. At the current juncture, trade opportunities can still be gained, especially for developing economies with strong comparative advantage in products highly affected by changing US-China bilateral relations. Country-specific factors—such as the availability of labor, wage conditions, and infrastructure capabilities, among others—would also play a role in whether an economy will (or continue to) benefit from the ongoing trade realignment. However, global trade overall could be less efficient and costlier in the long term. Resilience against shocks is also not a guaranteed success: Qiu, Shin, and Zhang (2023) highlight that the lengthening of China–US supply chains has not been accompanied by greater diversification. In the case of future shocks, the overall hit to growth—including in the ASEAN+3—could be larger than potential gains as investment and trade flows operate less along economic considerations.

Figure 2.54. ASEAN: Change in Exports to the United States and Imports from China of Selected Commodities, 2017–2022
(Percent, year-on-year)



Source: IHS Markit; AMRO staff calculations.
Note: Data refers to 71 HS codes (4-digit level) that fall under subheadings 84, 85, 28, and 90.

Figure 2.55. ASEAN: Change in Exports to the United States and Imports from China by Technology Type, 2017–2022
(Percent, year-on-year)

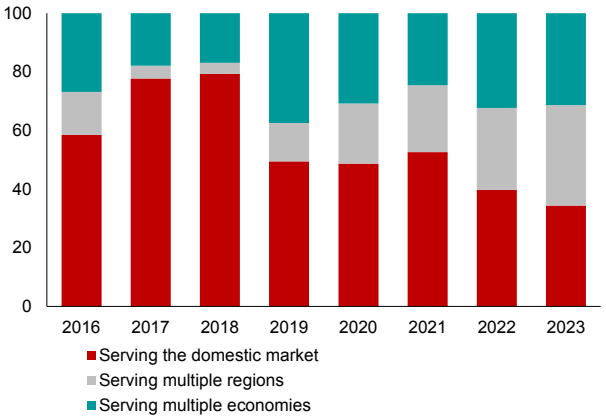


Source: IHS Markit; AMRO staff calculations.
Note: Low-technology manufactures include food, beverages and tobacco; textiles and textile products; leather, leather products and footwear; wood and products of wood and cork; pulp, paper, printing and publishing; and rubber and plastics. All other manufacturing are classified as medium- to high-technology manufacturing.

29/ ASEAN's biggest gains in the US market in the past five years were mostly on agricultural products and foodstuff. In addition, Zhao and Ho (2023) find that more than half of the increase in ASEAN's overall share of the US market is concentrated in labor-intensive sectors.

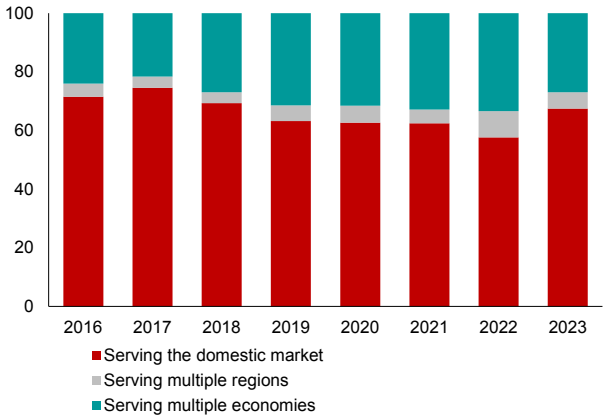
30/ These economies are defined by Curran and others (2023) as those that can act as new links between China and the United States and Europe, among others. They have identified five countries: Vietnam, Poland, Mexico, Morocco, and Indonesia.

Figure 2.56. China: FDI Announcements Destined for ASEAN+3, by Target Market
(Percent of total announcements)



Source: Orbis; AMRO staff calculations.
Note: Orbis classifies a project as "domestic" if it is primarily designed to serve the local market of the area where the investment will be, "regional" if the project stipulates that it will serve multiple economies, or "global" if it will serve a number of regions or several regions across different continents.

Figure 2.57. ASEAN+3 ex China: Non-Chinese Inward FDI Announcements, by Target Market
(Percent of total announcements)



Source: Orbis; AMRO staff calculations.
Note: Orbis classifies a project as "domestic" if the project is primarily designed to serve the local market of the area where the investment will be, "regional" if the project stipulates that it will serve multiple economies, or "global" if it will serve a number of regions or several regions across different continents.

Box 2.4:

Where Do China and ASEAN Stand in the Ongoing Trade Reconfiguration?

China has managed to maintain its position as a global trade hub despite its trade conflict with the United States (US). Uncertainties arising from the trade tensions and concerns about supply chain security post-pandemic have raised questions about trade relocating outside China, potentially diminishing its leading role in global trade. In aggregate, China's share of global exports ceased its upward trajectory around 2015 and then stabilized, with a temporary reversal in 2020.

A detailed analysis of sectors by Zhao and Ho (2023) at the HS 4-digit level reveals a decline in China's export shares in certain, mainly labor-intensive sectors such as clothing and footwear. Among its medium- to large-sized sectors, about 30 percent experienced a decrease in their global export share from 2015 to 2022, accounting for about 26 percent of China's total exports.[1] The global export share in the top half of these "declining" sectors fell from 39 percent in 2015 to 29 percent in 2022 (Figure 2.4.1, left panel). The decline coincided with China's industrial upgrading strategy and deliberate offshoring efforts to address rising costs.

Nevertheless, China continues to gain advantage in a majority of industries. In about 70 percent of medium- to large-sized sectors, which contribute to more than half of China's total exports, China's global export shares increased from 2015 to 2022. The global export share in the top half of these "ascendant" sectors surged from 18 percent in 2015 to nearly 29 percent in 2022 (Figure 2.4.1, right panel). A significant portion of these are medium- or high-skill and technology-intensive industries, aligning with China's economic development and policy direction.

The significance of the US as a major trade partner to China has been impacted by the ongoing trade conflict. Following the tariff hikes in 2018, bilateral trade between the world's two biggest economies experienced a reduction in absolute value terms, with a temporary reversal during the pandemic period. The share of China's exports to the US as a percentage of its total exports declined to 16.7 percent in 2019 from 19.3 percent in 2018. Despite a slight rebound in 2020, the importance of the US as a destination for China's exports continued to diminish in 2021 and 2022 (Figure 2.4.2). Moreover, the US contribution to China's total export growth in 2022 was only 0.1 percentage point (out of the 7 percent overall growth), a significant contrast to the period prior to 2018. China's imports from the US exhibited a similar performance (Zhao 2024). Although China's export shares to the US in China's declining sectors remained relatively stable, growth of its exports to the US in its ascendant sectors—where China is gaining global market shares—has been slower relative to exports to other trade partners.

ASEAN economies, with Vietnam at the forefront, have gained global market shares and attracted foreign direct investment (FDI) amid the ongoing trade reconfiguration. In sectors where China's global export shares have fallen, ASEAN has partially substituted for China's losses—though to a lesser extent than the European Union. Vietnam, in particular, has benefited not only from the rise in export share in China's declining sectors, but also achieved modest gains in its ascending sectors (Figure 2.4.3). This trend is underscored by substantial and growing FDI inflows. Vietnam has become a preferred destination for FDI from economies such as Korea, Singapore, Japan, and China, due to its cost-competitive and abundant workforce, growing domestic market, and stable political environment, among other factors. The country's increasing appeal as a favorable alternative manufacturing location has occurred together with widespread adoption of the "Plus One" strategy by manufacturers. As a result, the US has been increasing its investments in Vietnam, particularly in high-tech sectors (del Rosario and Zhao 2023). Meanwhile, China has extended its FDI flows to Vietnam toward more advanced sectors such as electronics, semiconductors, and energy storage (batteries).

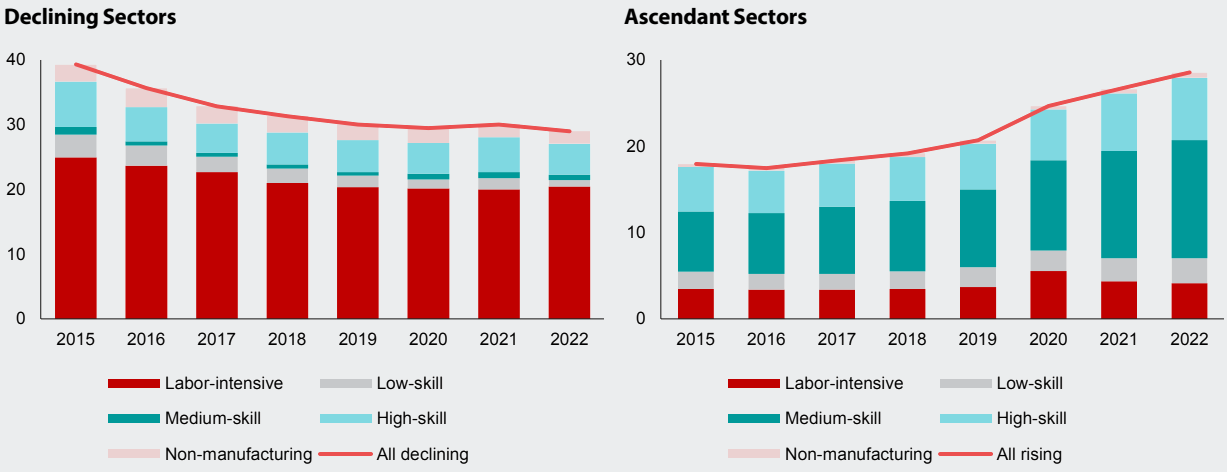
This box was written by Hongyan Zhao, and is largely based on Zhao and Ho (2023).

1/ The medium- or large-sized sectors refer to those with export shares exceeding the average share of each sector in China's total exports. At the HS 4-digit level, there are more than 1,000 sectors. The average share is about 0.08 percent, with 226 sectors at the HS 4-digit level exceeding this threshold.

Despite navigating trade reconfiguration relatively well so far, ASEAN economies face limitations in increasing their domestic value added in trade. China and ASEAN have enhanced their participation in global value chains (GVCs), leading to a rise in their shares of global exports and global domestic value-added. However, although domestic value-added in ASEAN has grown over the years, its proportion to ASEAN's gross exports is considerably lower than that in China, at about 60 percent compared to China's 80 percent over 1995–2020.

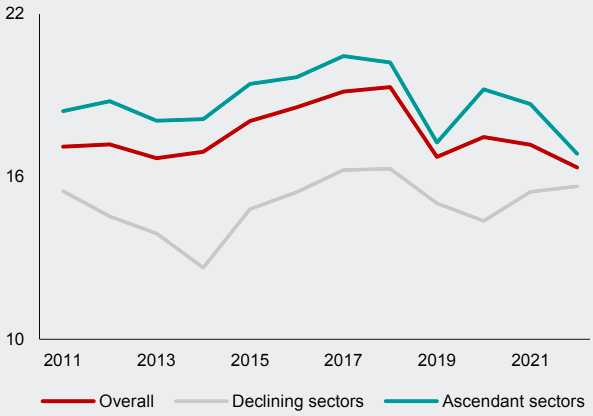
Among ASEAN economies, Vietnam's figure is even lower and continues to decrease (from 68 percent in 1995 to 45 percent in 2020). This is due to the slower growth in domestic value-added than for gross exports, indicating limited spillovers from international trade to domestic production. Cultivating a robust domestic industrial ecosystem will be crucial to incorporate more stages of production within the economy and capture greater value-added along GVCs (Zhao and Ho 2024).

Figure 2.4.1. China: Share of Global Exports, by Sector
(Percent of global exports of sectors)



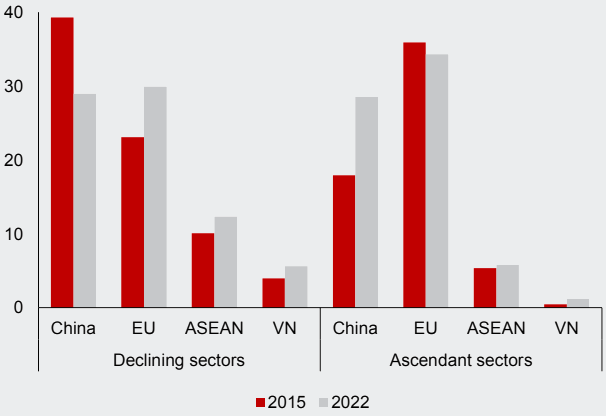
Source: IHS Markit; UNCOMTRADE; AMRO staff calculations.

Figure 2.4.2. China: Export Shares to the United States, 2011–2022
(Percent of total exports)



Source: IHS Markit; UNCOMTRADE; AMRO staff calculations.
Note: The rebound in China's exports to the United States in 2020 reflected the increase in its exports of medical and health-related products, especially as US domestic production for these goods has been affected by COVID-19 pandemic restrictions.

Figure 2.4.3. Selected Economies: Global Export Shares in China's Declining and Ascendant Sectors, 2015–2022
(Percent)



Source: IHS Markit; UNCOMTRDADE; AMRO staff calculations.
Note: US = United States; VN = Vietnam. EU here refers to 17 countries of the European Union, with 10 countries excluded—Bulgaria, Croatia, Cyprus, Estonia, Greece, Latvia, Lithuania, Luxembourg, Malta, and Slovenia—due to data unavailability. ASEAN excludes Cambodia, Lao PDR, and Myanmar, also due to data unavailability.

A Less Diversified Trade Landscape

"It's OK to have your eggs in one basket, as long as you control what happens to that basket."

Elon Musk, Tesla Chief Executive Officer

Despite lengthening global supply chains, international trade has only become more concentrated in the last decade (Figure 2.58). Market concentration refers to whether an economy imports (exports) a particular commodity from (to) only a few or many trading partners. Lower concentration measures—such as the Herfindahl-Hirschman index (HHI)—suggests that an economy's trading activity is relatively well-distributed across several partners.[31] The World Trade Organization (WTO 2023) estimates that the number of products exported by an average of only four economies—corresponding to an HHI value of 2,500—has increased from 14 percent in 2000 to 20 percent of all traded goods by 2021. The share of these "bottleneck products" to global trade values have also more than doubled during the period, with China the single largest source of these products.[32] A narrower definition that only considers goods with three exporters or less—or an HHI of 3,000—covers a tenth of global trade in 2021 (White and others 2023). However, this increases to 40 percent when including goods that are imported from only a few suppliers—even when multiple potential sources exist—due to trade policy incentives or other market considerations.[33]

Trade concentration carries both costs and benefits. Supply chain disruptions of recent years have underscored the downsides of highly concentrated import sources or suppliers. The Russia-Ukraine conflict, which escalated into a crisis, exposed the critical role that these two economies played in the global supply chains of many food staples, including wheat, maize, and oilseeds (del Rosario and Wynn 2023). Sanctions and agricultural export restrictions also highlighted the risks of importing from only a few producers, as well as its second-round effects.[34] Exporting to only a few trading partners likewise carries its own risks. High concentration can sharpen the effect of a disruption in a key market, such as from slower growth or the introduction of a new regulation. However, high concentration can also bring economic benefits, including lower overhead costs and other efficiency gains that can lead to higher profits, especially in a stable trade environment (Wickes, Adams, and Brown 2022). Market concentration allows for the development of long-standing and deeper trade relationships, which could act as a buffer to short-term trade disruptions, price fluctuations, or higher external uncertainty.

The global mining and electronics sectors have especially become more concentrated over the last decade. While the increase in concentration is relatively broad-based, trade in primary resources (minerals, agriculture, and energy) are relatively more concentrated than that of manufactured goods (Figure 2.59). At a more granular view, the most concentrated industries globally are minerals, agriculture, electronics, as well as textiles—with minerals and electronics having risen the most over the years (McKinsey & Company 2023). The underlying drivers of supply concentration vary across sectors. High concentration in international minerals trade is mainly due to very few suppliers with the natural endowments, especially for processed and refined mineral products. For agriculture, on the other hand, concentration is mostly being driven by economy-specific considerations. For example, since 2020, about 80 percent of Philippine rice imports is sourced from a single supplier (Vietnam) despite the presence of many other rice exporters, such as India and Thailand. For electronics, the concentration arises from the strong competitive advantage of key producers such as China, Korea, and Japan. The most concentrated electronics products globally are laptops and mobile phones (McKinsey & Company 2023). Latest trade data suggests that for both products, between 70 percent and 80 percent of global imports are supplied by China.

Reflecting the global trend, ASEAN+3 import markets have become less diversified. In 2021, about 40 percent of the region's top 20 imports were sourced from three global suppliers or fewer (Figure 2.60). The trend in ASEAN+3's import concentration since the 2000s reflects two diverging paths experienced by GVCs in the past 30 years: the expansion in international trade and supply chains in the early 2000s helped facilitate lower trade concentration, but this was reversed after the global financial crisis as global trade and financial flows slowed. Between 2010 and 2021, nine of the region's economies experienced higher trade concentration, led by the Philippines, Vietnam, Singapore, and Japan; only Hong Kong registered

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31/ The HHI is a traditional method for measuring industry concentration and market competitiveness, but it can also be transformed to measure export and import diversification, whether for a specific sector, product, or trading partner. An economy with trade concentrated in a very few markets will have an index value close to 10,000. On the other hand, one with a perfectly diversified trade portfolio will have an index close to zero.

32/ China is estimated to provide about 36 percent of these bottleneck products, followed by the US, with about 6 percent (WTO 2023).

33/ Seong and others 2022 highlights that there are two types of concentration in global trade. In the first type, concentration can occur because a particular commodity is only produced by a small group of trading partners—owing to their natural endowments or because the trading partner is able to specialize, achieve economies of scale, and thus attain significant comparative advantage in that particular commodity—the so-called "global concentration." In the second type, concentration could also arise even if there are multiple suppliers of one product. In this case, other factors such as supplier proximity (i.e., transport costs), the structure of the domestic industry or the market (for example, the prevalence of foreign direct investment), and trade policies like preferential trading agreements can influence the pattern of trade concentration. This is what Seong and others (2022) called "local concentration."

34/ While ASEAN+3's direct linkages to both economies are not huge, the indirect hit to the region through higher global commodity prices and, consequently, domestic inflation has been quite substantial.

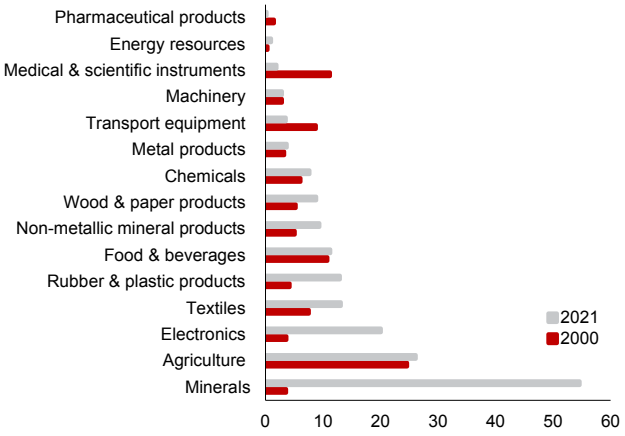
a decline (Figure 2.61). This increase also reflects that trade has become more concentrated for sectors where ASEAN+3 economies have substantial GVC participation, including in the manufacturing of garments, textiles, rubber products, and electronics (Figure 2.59).

The increase in trade concentration across ASEAN+3 economies has been largely driven by economy-specific considerations, not from the lack of suppliers. On aggregate, ASEAN+3 imports with fewer than three global suppliers are mostly concentrated in five products/commodities, in terms of value: (1) soybeans, (2) iron ores and concentrates, (3) synthetic rubber, (4) automatic data processing machines (i.e., laptops), and (5) mobile or wireless phones.[35] ASEAN+3's high trade concentration in these commodities results from a lack of alternative suppliers. For example, about 86 percent of ASEAN+3's iron ore imports in 2022 were supplied by two economies: Australia and Brazil.[36] However, many in the region also choose to source their key imports from only a few, select trading partners, even when many suppliers exist (Figure 2.62). This concentration "by choice" reflects, in part, the proliferation of preferential trading agreements (within and outside the region) that have substantially reduced tariffs, as well as lower logistics and transportation costs that naturally arise from trading with geographically close economies. More importantly, this suggests that ASEAN+3 economies have still-untapped import sources and substantial room for import diversification to help increase resilience to external shocks.

Figure 2.58. World: HH Market Concentration of Trade
(Index, 2000 = 100; number)

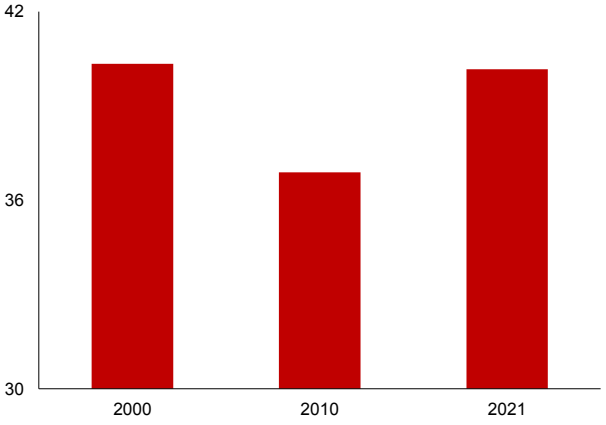
Source: World Integrated Trade Solution, World Bank; AMRO staff calculations.
Note: The HH (Herfindahl-Hirschman) index is a measure of the dispersion of trade value across an exporter's partners. An increasing index value represents increasing concentration. Data covers 118 economies in the World Bank database that reported concentration data from 2020 to 2021.

Figure 2.59. World: Most Concentrated Sectors, 2000 versus 2021
(Percent of sector imports)



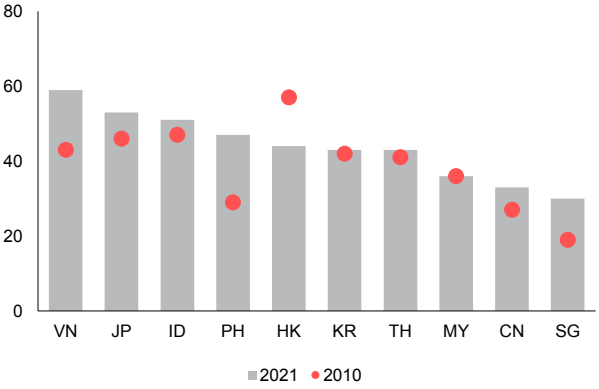
Source: McKinsey Global Trade Explorer; AMRO staff calculations.
Note: The sector category follows McKinsey Global Trade Explorer (2023) based on their analysis at the HS-6 digit level. For each sector, data refers to the share of products that only have three or fewer suppliers globally (Herfindahl-Hirschman index greater than 3,000) to the world's imports of that sector.

Figure 2.60. ASEAN+3: Import Concentration
(Percent, trade-weighted)



Source: McKinsey Global Trade Explorer; AMRO staff calculations.
Note: Individual economy concentration rates have been aggregated using export shares as weights. Data refers to the share of imports that only have three or fewer suppliers globally (Herfindahl-Hirschman index greater than 3,000) to each economy's total imports.

Figure 2.61. Selected ASEAN+3: Import Concentration, by Economy
(Percent)



Source: McKinsey Global Trade Explorer; AMRO staff calculations.
Note: CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Data refers to the share of imports that only have three or fewer suppliers globally (Herfindahl-Hirschman index greater than 3,000) to each economy's top 20 imports.

35/ AMRO's analysis is based on data extracted from McKinsey's Global Trade Explorer, and refers to HS codes 120190, 260111, 400251, 847130 and 847180, and 851712.

36/ The third source is South Africa, but it accounts for only 5 percent of total imports.

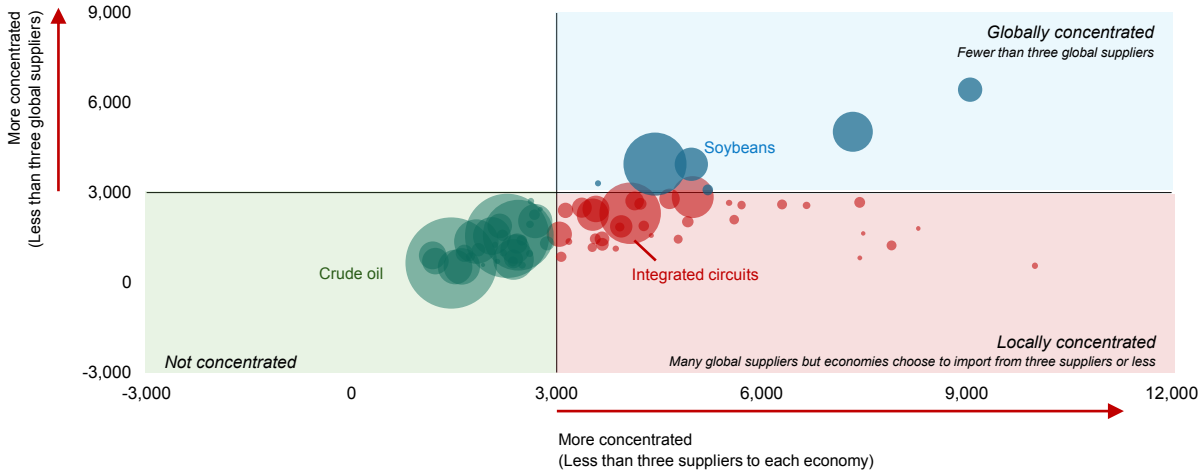
Within ASEAN+3, the intensity of concentration varies—and so do their underlying drivers. Economy-level concentration ranges from about 30 percent to 60 percent (Figure 2.61). Vietnam, Japan, and Indonesia are considered the most concentrated economies, with most of their top 20 imports sourced only from three suppliers. About 95 percent of intermediate inputs for mobile phone manufacturing in Vietnam come from China and Korea, despite the presence of other major suppliers.[37] This reliance is interlinked with the heavy presence of Korean and Chinese multinational firms that use Vietnam as a final processing hub. In Japan, about 70 percent of coal imports are supplied by Australia, as most of its domestic infrastructure (e.g., boilers) have been designed to function best with high-grade coal. Similar to Vietnam, Indonesia is also highly concentrated in imports of intermediate goods for mobile phone manufacturing; however, this is because of the dominance of Chinese firms in the industry, primarily to cater to the large domestic market (Na 2023). In contrast, Malaysia, China, and Singapore are the most diversified economies in the ASEAN+3 region.

Like its import market basket, ASEAN+3's exports have become concentrated in fewer destination markets in the past 10 years. ASEAN+3 economies, in general, already have some of the most diversified trading relationships in the world. As expected, the region's smaller economies are the least diversified, as smaller manufacturing capabilities and lower export volumes mean they are only able to cater to fewer buyers. Nevertheless, the pace of export market diversification in most economies has also slowed in the past decade (Figure 2.63). Only China, and the smaller economies of Brunei, Cambodia, and Myanmar, have moved in the opposite direction. China's broader export reach over the years reflects, in part, the changing nature of its participation in GVCs: its increasing involvement in more upstream production and the lengthening of its GVCs (Figure 2.51).[38]

The decline in export diversification in other ASEAN+3 economies reflect their increasing reliance on the massive and growing Chinese market. China has intensified its position *within* each economy's top export partners. Its growing share of ASEAN+3 total exports suggests that diversification in the region is only happening partially, and only with regards to non-Chinese markets (Figure 2.64). China has held on to the position of being ASEAN's largest trading partner for more than a decade (Xinhua 2022). ASEAN exports—especially in value-added terms—is also now increasingly shifting toward meeting the growing *final* demand in China: in 2021, 20 percent of ASEAN's total domestic value-added exports was absorbed by China, compared to only 6 percent in 2000 (Hinojales, Kho, and Tan 2023).

In sum, the ASEAN+3 region's trade relations are gradually becoming less diversified. Further, a confluence of factors suggest that this could be the status quo in the medium term. One, the lengthening of China–US value chains is likely to further deepen the region's reliance on China as a source of raw materials and intermediate inputs. This, alongside China's growing importance as an export market—while an outcome of the massive size of its economy—raises concern about overreliance on any one partner. Second, attention to the commodities

Figure 2.62. ASEAN+3: Import Concentration Map, 2021
(HH Index)



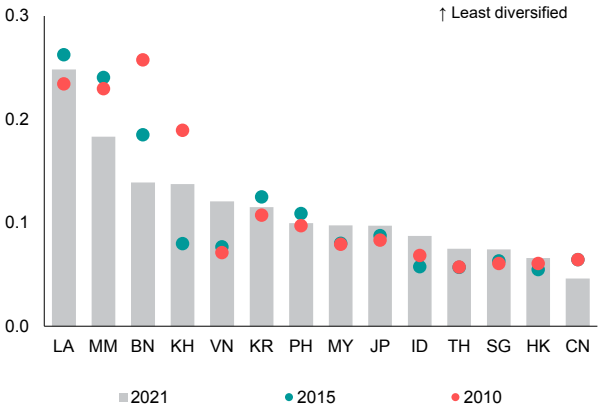
Source: McKinsey Global Trade Explorer; AMRO staff calculations.
Note: . HH = Herfindahl-Hirschman. The top 20 imports of each of the 10 ASEAN+3 economies in 2021 has been aggregated to derive the regional concentration map. The bubbles represent the total import value of that commodity. Map excludes Brunei, Cambodia, Myanmar, and Lao PDR.

37/ Other suppliers include Taiwan Province of China, Singapore, United States, and Japan.

38/ This is also seen in the fact that China's GVC linkages with East Asia (including Hong Kong, Japan, and Korea) are mostly being driven by backward linkages, while its GVC linkages with Southeast Asia, by forward linkages (Park 2023).

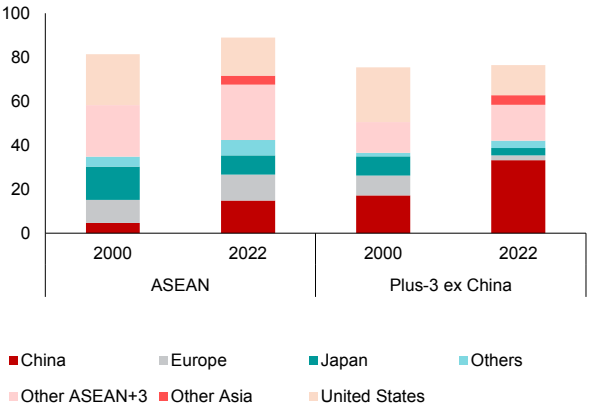
that are essential to the region's future growth—such as for clean energy transition and digitalization—suggests that ASEAN+3 economies could be facing even high(er) concentration. The shift to clean energy and electric vehicles especially will drive a huge increase in requirements for critical minerals (AMRO 2023). Yet, substantial portions of critical mineral supply chains are currently concentrated in a few economies, and the complexity of restructuring suggest that many of these are likely to remain concentrated in the medium to long term (International Renewable Energy Agency 2023). Unfortunately, these supply chains are also among the most vulnerable to geopolitical risks, such as those arising from resource nationalism.

Figure 2.63. ASEAN+3: Export Market Concentration, 2021
(HH Index)



Source: World Trade Integrated Solutions, World Bank; AMRO staff calculations.
Note: BN = Brunei; CN = China; ID = Indonesia; JP = Japan; KH = Cambodia; HK = Hong Kong; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. For ease of reading, the Herfindahl-Hirschman (HH) index values are transformed to range from 0 to 1 in this chart.

Figure 2.64. ASEAN+3: Top 10 Export Markets
(Percent of total exports)



Source: IHS Markit; AMRO staff calculations.
Note: Data consists of the shares of top 10 export partners/markets for each subregion for that particular year. As such, the composition of regional groupings (e.g., Europe) changes over time. The subregional aggregates were calculated using simple averaging of partner shares.

Rising Importance of Services Trade

"Services offshoring is the new globalization frontier."

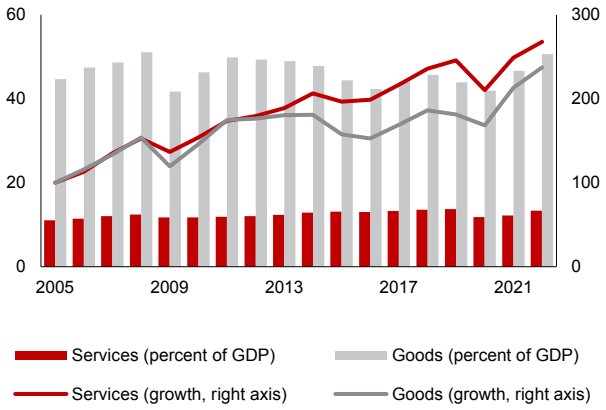
World Trade Organization, October 2023

In contrast to global goods trade, cross-border trade in services continues to grow at a robust pace. Trade in services stands at a fraction of global goods trade: at about 15 percent of global GDP in 2022, this is less than half the share of goods (Figure 2.65). The heavy weight of goods in global trade masks the diverging growth trajectories between the two, with the brisk expansion in services trade serving as a counterweight to the argument that globalization has already peaked (AMRO 2018, 2019). Globally, Europe remains the largest services trader—accounting for nearly half of total services trade in the past 10 years—and is also the biggest net service exporter. Asia comes in second, followed by the Americas (Figure 2.66). The Asian region has traditionally been a net services importer, although its services trade deficit has continuously shrunk since 2014. It first became a net exporter in 2022, owing to the robust expansion in exports of information, computer, and telecommunications services.

Global services trade has been dominated by developed—rather than developing—economies. Over two-thirds of global trade in services is largely driven by advanced economies, primarily as the largest service flows are linked to knowledge-intensive activities and intellectual property. In 2022, about 60 percent of global services traded across the world are categorized as "other services": these are dominated by professional and management consulting services, as well as services that are required in highly technical fields.[39] Service flows that are knowledge-intensive tend to be largely concentrated in developed economies, where "superstar effects … reinforce the persistence of knowledge hubs" (Seong and others 2022). In fact, the top 10 exporters of services—led by the United States, United Kingdom, and Germany—are also the top importers (Figure 2.67). Nevertheless, supply (and demand) from emerging market and developing economies have increased over the years. Asia, in fact, is the fastest-growing region for cross-border trade in services—mostly led by China and India (Figure 2.68).

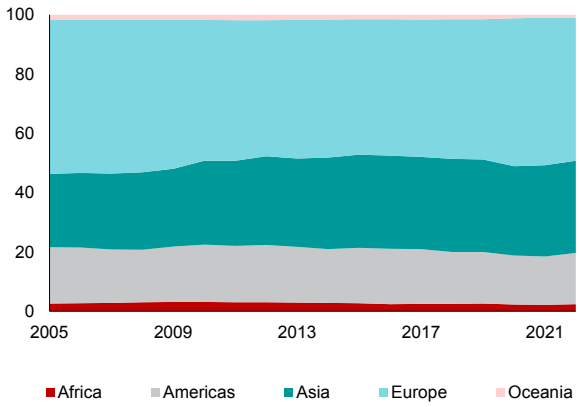
39/ "Other services" as defined by United Nations Conference on Trade and Development (UNCTAD) is comprised of the following categories: construction; insurance and pension services; financial services; charges for the use of intellectual property not included elsewhere; telecommunications, computer and information services; other business services; personal, cultural and recreational services; government goods and services not included elsewhere; and services not allocated elsewhere.

Figure 2.65. World: Goods and Services Trade
(Percent of GDP; index, 2005 = 100)



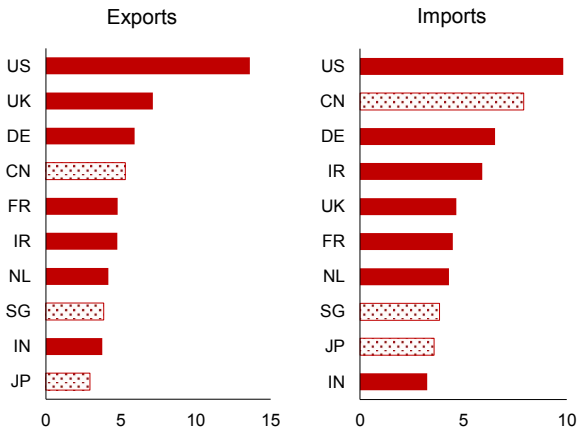
Source: World Development Indicators, World Bank; United Nations Conference on Trade and Development; AMRO staff calculations.
Note: Data refers to exports and imports.

Figure 2.66. World: Services Trade, by Region
(Percent of world trade)



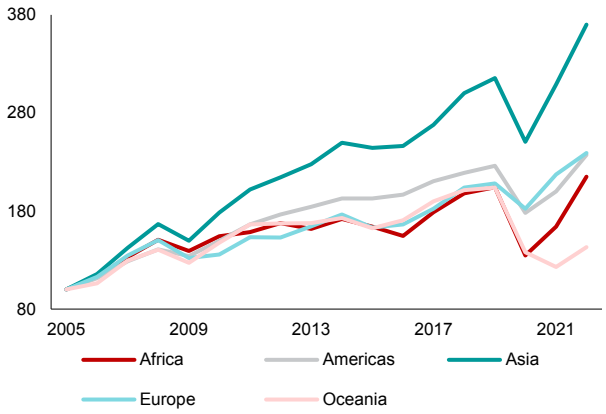
Source: United Nations Conference on Trade and Development; AMRO staff calculations.

Figure 2.67. Top Services Traders, 2018–2022
(Percent of world services trade)



Source: United Nations Conference on Trade and Development; AMRO staff calculations.
Note: CN = China; DE = Germany; FR = France; IN = India; IR = Ireland; JP = Japan; NL = Netherlands; SG = Singapore; UK = United Kingdom; US = United States. Patterned bars represent ASEAN+3 economies.

Figure 2.68. World: Growth in Services Trade, by Region
(Index, 2005 = 100)



Source: United Nations Conference on Trade and Development; AMRO staff calculations.

The momentum behind digitally deliverable services is particularly strong. Digital delivery is empowering skilled workers to export their services and expertise to anywhere and anyone in the world (UNCTAD 2023c). The COVID-19 pandemic especially induced a quicker adoption and consumption of digital services globally, and specific segments—such as e-commerce and digital financial services—are expected to thrive well into the future as new growth drivers (AMRO 2022). Many types of services can be delivered digitally over ICT networks, and more so because advances in technology have rapidly lowered many barriers to their trade.[40] In 2010, less than 45 percent of total services trade globally are considered digitally tradeable, and this rose as high as over 60 percent during the COVID-19 pandemic.[41] Consequently, developed economies—with their much more advanced ICT capabilities, better access to technological goods and services, and larger financial resources—also dominate trade in digitally deliverable services, although this dominance is slowly being eroded. In particular, trade in intermediate services—many of which are and can be digitally provided by developing economies—is poised to become the next growth driver of cross-border services (Baldwin 2022).

Currently, trade in services comprise a small portion of the ASEAN+3 economy, despite growing much faster than the region's merchandise trade. Nearly a fifth of global services trade originates from ASEAN+3 economies. However, cross-border trade in services still account for less than 10 percent of the region's GDP in 2022, a not-so-significant share. Services exports, for example, have grown faster than goods exports since 2006—helped by advances in technology and favorable regulations—even when considering the impact of the

40/ Digitally deliverable services (a subset of "other services") is a combination of insurance and pension services; financial services; charges for use of intellectual property not included elsewhere; telecommunications, computer, and information services; research and development services; professional and management consulting services; architectural, engineering, scientific, and other technical services; trade-related services; other business services not included elsewhere; audio-visual related services; health services; education services; and heritage and recreational services (IMF-OECD- WTO 2023).

41/ However, trade that is *actually* delivered digitally is much smaller than this ratio (UNCTAD 2023b).

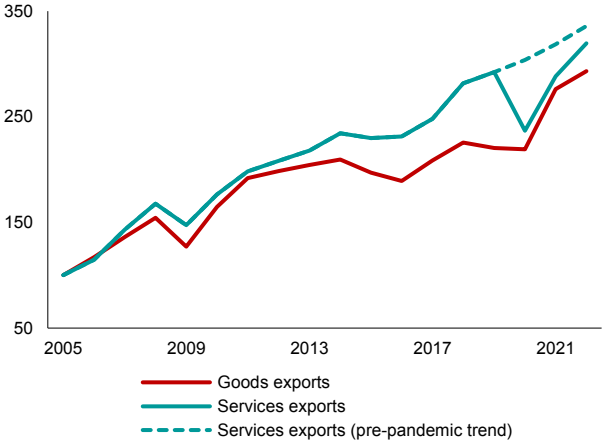
pandemic (Figure 2.69). The more technologically-advanced economies in the ASEAN+3—like the Plus-3 and Singapore—are the most involved in international services trade. This reinforces the concentration patterns observed globally when it comes to knowledge-intensive flows (Figure 2.67).

Most economies in the ASEAN+3 region have yet to fully harness the potential of modern—and digitally deliverable—services as a growth driver. In contrast to traditional services, modern services can be traded "without proximity between buyer and supplier" (Loungani and others 2017). Hence, they are not subject to the same constraints faced by traditional services, and they tend to employ skilled workers and more technology (Alege and Ogundipe 2013).[42] In ASEAN+3, there appears to be a mild positive relationship between the volume of an economy's services trade activity and its ability to leverage on modern services. Singapore, being a global business hub and leading financial center, is the biggest regional trader in international services, with its total trade (services exports and imports) accounting for about 126 percent of its GDP. The next biggest is Hong Kong—with trade in international services at 40 percent of GDP—owing to its large financial services sector (Figure 2.70). For nearly half of the ASEAN+3 economies, however, trade in services accounts for less than 10 percent of total output, highlighting a significant untapped potential for export growth. Most of the ASEAN+3 economies are also net importers of services—except for Cambodia, Myanmar, the Philippines, Hong Kong, and Singapore (Figure 2.71).

Among the modern services sector's advantages is its resilience to various external shocks. Despite various shocks in recent years—for example, the global financial crisis and especially the COVID-19 pandemic—ASEAN+3's modern services sector has grown faster than both traditional and nondigitally deliverable counterparts (Figure 2.72). A significant portion of the region's modern services are related to professional, technical, and financial services, and those related to the use of intellectual property. This pattern reflects the attractiveness of several ASEAN+3 economies as global business service centers, powered by their highly competitive, skilled, multilingual workforces. The region, in fact, has become a net exporter of these skilled services since 2017 (Figure 2.73). While China continues to experience rapid growth in its exports of modern services, some ASEAN economies—led by Singapore and the Philippines—have also robustly grown them by leveraging on their comparative advantage (Figure 2.74).

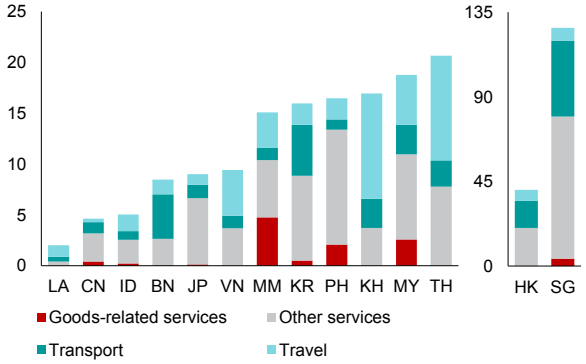
In sum, services trade—especially modern services—is a silver lining for the ASEAN+3 region amid a shifting trade environment. There is, however, a requisite precondition to reaping its benefits: minimizing constraints to trade. However, these remain pervasive globally—including in the ASEAN+3 region—as national trade and regulatory policies in individual services sectors are "often made with limited regard for economy-wide impacts" (OECD 2023).[43] Trade in services are mostly limited by domestic regulations or bureaucracy; for modern services, the hurdles are mostly due to technology (Baldwin 2022). OECD data suggests that ASEAN+3 economies are among those with the highest barriers to cross-border services trade, particularly when it comes to foreign entry and the movement of people (Figure 2.75). Digital services trade, on the other hand, is hampered primarily by the quality of infrastructure (Figure 2.76). While ASEAN+3 economies have managed to ease the number of barriers to overall services trade over time—especially by improving regulatory transparency—the constraints on its digital service trade has not substantially improved, reflecting the long-standing and persistent challenges in scaling up ICT-related infrastructure.

Figure 2.69. ASEAN+3: Goods and Services Exports
(Index, 2005 = 100)



Source: United Nations Conference on Trade and Development; AMRO staff calculations.
Note: Data refers to imports and exports.

Figure 2.70. ASEAN+3: Total Services Trade by Category, 2022
(Percent of GDP)

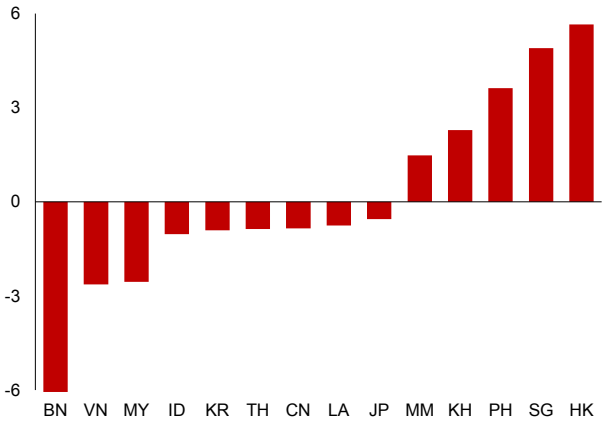


Source: United Nations Conference on Trade and Development; national authorities; World Bank; and AMRO staff calculations.
Note: BN = Brunei; CN = China; ID = Indonesia; JP = Japan; KH = Cambodia; HK = Hong Kong; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

42/ ASEAN+3 service exports generally fall into four categories: (1) travel; (2) transport; (3) goods-related services—collectively, "traditional" services—and (4) other business services, under which "modern" services fall. Modern services and digitally deliverable services are sometimes used interchangeably.

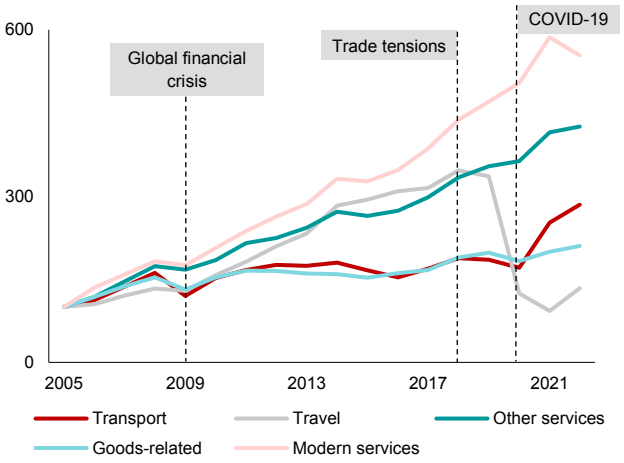
43/ These include licensing quotas, professional qualifications, as well as immigration rules, among others, that make it difficult for service providers to enter a market.

Figure 2.71. ASEAN+3: Net Services Trade, 2018–2022
(Percent of GDP)



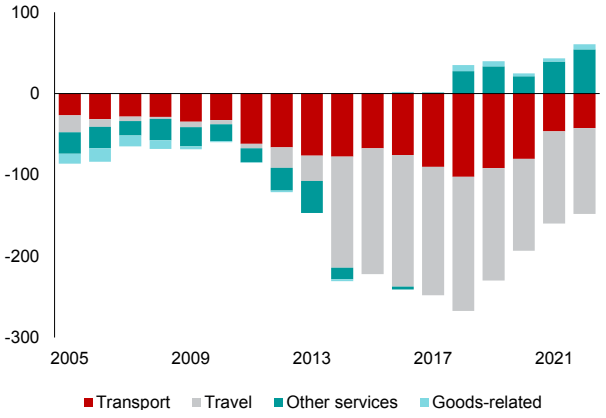
Source: United Nations Conference on Trade and Development; national authorities; AMRO staff calculations.
Note: BN = Brunei; CN = China; ID = Indonesia; JP = Japan; KH = Cambodia; HK = Hong Kong; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. Data for Singapore has been sourced from SingStat.

Figure 2.72. ASEAN+3: Services Trade, by Category
(Index, 2005 = 100)



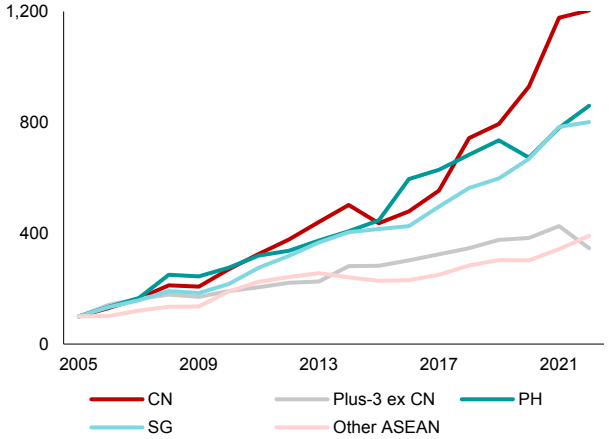
Source: United Nations Conference on Trade and Development; AMRO staff calculations.
Note: "Modern services" is a subset of "Other services".

Figure 2.73. ASEAN+3: Net Services Trade, by Category
(Billions of US dollars)



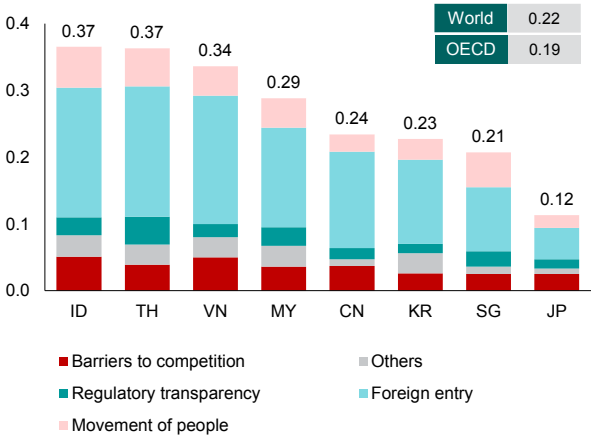
Source: United Nations Conference on Trade and Development; AMRO staff calculations.

Figure 2.74. Selected ASEAN+3: Modern Services Exports
(Index, 2005 = 100)



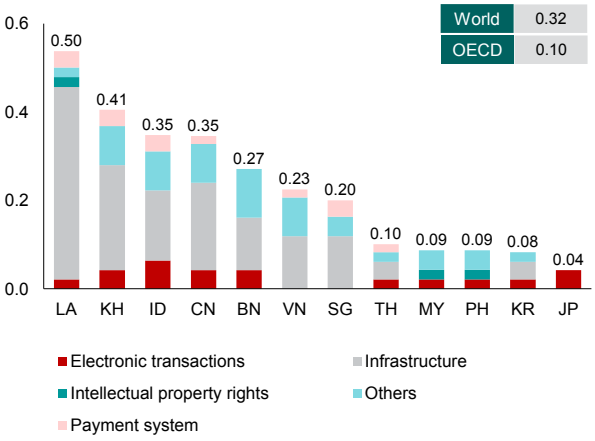
Source: United Nations Conference on Trade and Development; AMRO staff calculations.
Note: CN = China; PH = the Philippines; Plus-3 ex CN = Hong Kong, Japan, and Korea; SG = Singapore; VN = Vietnam.

Figure 2.75. Selected ASEAN+3: Services Trade Restrictiveness, 2023
(Score, most restrictive = 1)



Source: Organisation for Economic Co-operation and Development (OECD); AMRO staff calculations.
Note: CN = China; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; SG = Singapore; TH = Thailand; VN = Vietnam. The OECD Services Trade Restrictiveness Index measures regulations affecting trade in services in 22 sectors. Data for other ASEAN+3 economies are not available.

Figure 2.76. Selected ASEAN+3: Digital Services Trade Restrictiveness, 2023
(Score, most restrictive = 1)



Source: Organisation for Economic Co-operation and Development (OECD); AMRO staff calculations.
Note: BN = Brunei; CN = China; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. The OECD Digital Services Trade Restrictiveness Index measures cross-cutting barriers that inhibit or completely prohibit firms' ability to supply services using electronic networks. Data for other ASEAN+3 economies are not available.

Macroeconomic Implications of Shifting Global Trade

"The raw fact is that every successful example of economic development this past century..... has taken place via globalization."

Paul Krugman, 2008 Nobel Prize Winner for Economics

The consequences of ongoing changes in the global trade landscape depend on the motivations that drive them. To the extent that the search for growth, resilience, and economic security drives these changes, the global economy would be better off, albeit with some loss in efficiency. However, global trade realignments that are primarily geopolitically motivated, manifesting as higher protectionism on grounds of strategic rivalry, will reverse many of the economic gains that trade openness has brought to many, with substantial impact on developing economies—including in the ASEAN+3.

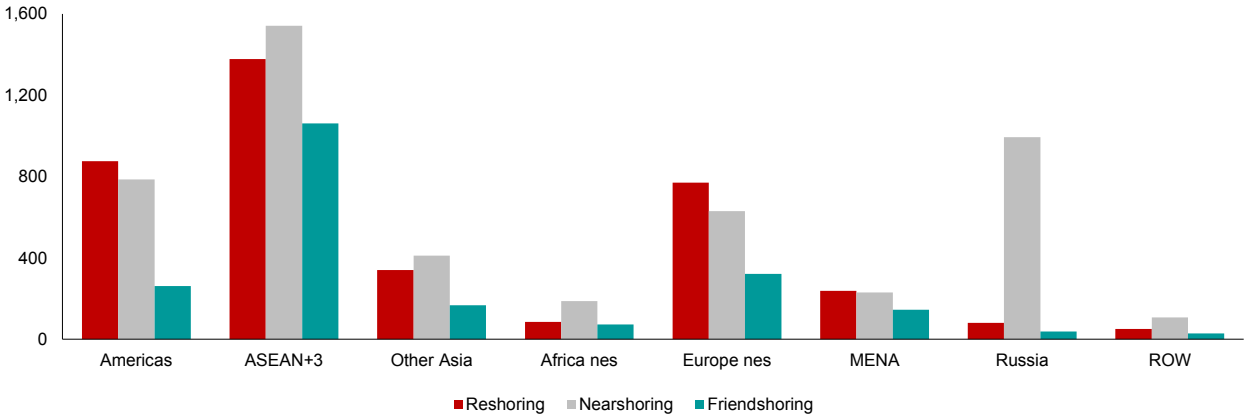
The cost of geoeconomic fragmentation could be substantial. Notwithstanding the still-growing body of empirical work quantifying its consequences, geoeconomic fragmentation's transmission channels are relatively well-identified: rerouting and potential distortion of trade flows, redirection and possible slowdown in capital investment, barriers to labor mobility, as well as reduced diffusion of knowledge and technology. Depending on the severity of the hypothetical decoupling across blocs, current estimates on overall economic losses from geoeconomic fragmentation range from 1.2 percent to 6.9 percent of global GDP (Aiyar and others 2023).[44] Across various studies, the cost of fragmentation increases as the scope of restrictions widens and the more the products involved are of strategic value. More importantly, the resulting economic losses could be permanent. Country-level estimates of geoeconomic fragmentation tend to be greater—going as high as 12 percent of GDP—as these net out any substitution gains that may arise when economies are forced to trade within or across preferred blocs (Goes and Bekkers 2022). Bolhuis, Chen, and Kett (2023) show that losses would be most severe for emerging market and developing economies, especially since they are more reliant on global trade for many key commodities.

Such a scenario would be economically costly for ASEAN+3 economies, which are highly integrated with the rest of the world. Cerdeiro, Kothari, and Redl (2022), for example, estimated that Asia's permanent output loss from a two-bloc world will be twice that of the world economy. This is mostly due to the loss of export markets (as trade is eliminated between rival blocs) and breakdown or disruption of production networks, where ASEAN+3 economies are entrenched. However, this is an extreme scenario. Anecdotal evidence suggests that many emerging market and developing economies may be able to reap the benefits of trade diversion—as long as they are still able to trade freely with the larger economies. Nevertheless, even short of full-on decoupling scenarios, some estimates suggest that export losses for the ASEAN+3 region could be substantial (Figure 2.77). This reflects ASEAN+3's extensive participation in GVCs, trade linkages with distant economies, and its reliance on the United States and Europe as markets. Geoeconomic fragmentation could also lead to rising ASEAN+3 unemployment as trade restrictions constrain demand, as well as a lower-than-average rise in employment and real wages, thereby amplifying the overall potential economic costs (Petri and Plummer 2023).

Increased geoeconomic fragmentation could lead to more volatile inflation in the ASEAN+3. Decades of globalization have, in many ways, acted as a positive, inflation-reducing supply shock. The overall increase in productive capacity and competition, as many economies were able to join GVCs, increased efficiency and reduced costs. Geoeconomic fragmentation runs the risk of reversing this trend, especially in an increasingly concentrated trade environment. This could occur in various ways: (1) through lower shares of imports of raw materials from lower-wage economies, (2) higher prices of products that are only supplied by a few producers (such as critical minerals), and (3) through higher costs that multinational companies need to shoulder to operate in fragmented markets. Price volatility is also likely to increase, especially if abrupt shifts in trade patterns lead to market imbalances—especially in highly concentrated commodity markets (IMF 2023). With ASEAN+3 economies among the largest commodity importers, this makes them more sensitive to commodity price swings. Estimates put the prices of several commodities as rising by more than 150 percent if economies were forced to trade within hypothetical blocs (IMF 2023). These products include lithium, iron ore, and copper—all of which ASEAN+3, especially China, imports in substantial quantities (Figure 2.78). The region is particularly sensitive to iron ore market dynamics, as only two economies provide most of its supply (Figure 2.62).

44/ In most studies, geoeconomic fragmentation is defined as total elimination of trade between two competing or non-aligned blocs. Some studies take a more conservative approach and limit the "decoupling" to a particular sector, such as electronics or specific food commodities.

Figure 2.77. World: Export Losses from Selected Geopolitical Scenarios in 2035, by Regions
(Billions of US dollars)



Source: Petri and Plummer (2023); AMRO staff calculations.
Note: MENA = Middle East and North Africa; ROW = rest of world. Detailed scenarios are as in Petri and Plummer (2023). Data refer to export changes from baseline, and follow the groupings in the original publication, except for ASEAN+3 (aggregated using individual economy results), Other Asia (aggregated using individual economy results), and Europe not elsewhere specified (nes). United Kingdom is included in Europe nes, while it was a separate item in the original publication.

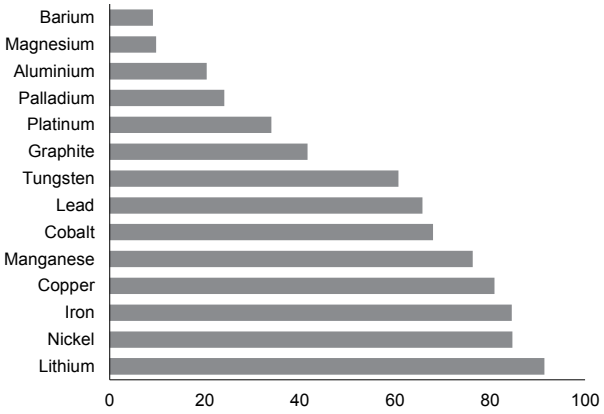
Geoeconomic fragmentation will make it more difficult for ASEAN+3 to address "perennial" risks to macroeconomic stability—such as those coming from climate change and a rapidly aging population (Figure 1.48 in Chapter 1). Even without the challenge of geoeconomic fragmentation, the road to net zero already necessitates an unprecedented amount of investments, and is also expected to lead to higher energy and food prices in the long-term (AMRO 2023). In the face of a rapidly aging population, overall health care costs are also expected to rise (Section II). Geoeconomic fragmentation not only exacerbates these cost pressures but also makes it challenging to solve problems of mutual interest. If trade fragmentation ultimately leads to financial fragmentation (Aiyar and others 2023), the options for additional financing to undertake the necessary responses to ASEAN+3's perennial risks would be greatly reduced.

More broadly, the ongoing trade realignment may challenge ASEAN+3's export competitiveness. Longer average distances between firms across different regions have implications for trade costs.[45] Alfaro and Chor (2023) estimate that US buyers may have to pay about 2 percent to 10 percent more for imports from ASEAN+3 economies that replace imports from China in the US market (Figure 2.79). This implies that, to some extent, ASEAN+3 exports could even be more expensive than other competitors (such as Mexico and emerging Europe), which could raise questions about the future competitiveness of the region's exports despite recent gains. In addition, the higher uncertainty in a fragmented environment pushes up the costs for multinational companies, which in turn weighs down local currencies as investors price in the higher risk (Engel and West 2005). As currency depreciation pushes up prices of imports—including intermediate inputs for the manufacturing sector—this could further erode ASEAN economies' cost advantage against alternative markets, especially those that are geographically closer to the United States and offer cheaper transport costs.

Lastly, ASEAN+3 needs to be mindful of too-high trade concentration—whether driven by geoeconomic fragmentation or otherwise—in its search for economic security. Well-diversified trading relationships have, and will continue to, form a critical cornerstone of economic resilience. The ability of ASEAN+3 economies to swiftly tap into alternative import sources during times of crises—like the COVID-19 pandemic—was crucial in mitigating the overall growth impact of the shock, which would otherwise have been larger if the region only had fewer trading partners. High concentration with a particular trade partner also acts as an amplifier of shocks, both positive and negative. In the current global trade environment beset by major secular shifts, and thus higher uncertainty, slowing or declining diversification can exacerbate trade vulnerabilities in ASEAN+3 economies. The higher the number of trading relationships, the higher an economy's immediate options in the event of a crisis. This can be especially useful in an environment where the "source of future shocks is unknown" (WTO 2023).

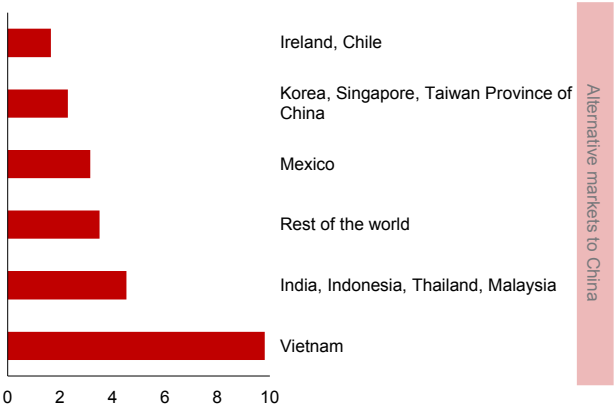
45/ That there is no corresponding increase in network density, and diversification, suggests that costs are unlikely to be substantially reduced with the lengthening of GVCs (Qiu, Shin, and Zhang 2023).

Figure 2.78. ASEAN+3: Imports of Geopolitically Sensitive Commodities, 2022
(Percent of world imports)



Source: IMF (2023); AMRO staff calculations.
Note: "Geopolitically sensitive" commodities are defined as those estimated in IMF (2023) to experience a price increase of above 150 percent due to fragmentation in individual commodity markets.

Figure 2.79. United States: Import Unit Values by Source Market, 2017–2022
(Percent change in import price)



Source: Alfaro and Chor (2023); AMRO staff calculations.
Note: Data refers to the change in the unit price for US importers, for every 5 percentage point decrease in China's share to the US market.

A Balanced View for ASEAN+3

"A crisis is a terrible thing to waste."

Paul Romer, former Chief Economist of the World Bank

Fortunately, there are mitigating factors for ASEAN+3 against the downside risks arising from shifting global ties. First, the likelihood of a security-based fragmentation between China and the United States must be viewed in perspective (Box 2.5). While bilateral relations remain highly complex, the Biden-Xi meeting in November 2023 at the sidelines of the Asia-Pacific Economic Cooperation Summit underscored both economies' willingness to cooperate, or "recouple," in areas where they can (Cheng 2023). Considering that mutual interests for both economies—such as climate finance and health security—are high, this suggests that US-China competition could be self-limiting (Grimes 2023). The possibility of a full-on decoupling is made more challenging by China having increasing supply chain participation across many key manufacturing sectors, and that the US remains exposed—through indirect links—to these supply chains (Figure 2.52). While reconfiguration of such complex chains away from China are possible in theory, doing so will entail considerable time as well as significant transition and adjustment costs (AMRO 2021).

Second, the ASEAN+3 region's deep and diverse free trade agreements provide some degree of certainty in a highly uncertain landscape. WTO rules and commitments help contribute to a more stable trade policy environment (Jakubik and Piermartini 2023). The region's deep and dense trading relationships have helped minimize shocks from sudden demand-supply fluctuations following recent external shocks. The pursuit of more free trade agreements will open up opportunities to non-traditional markets and expand options for economic diversification. They can also provide ASEAN+3 economies with buffers against commodity price shocks, which are amplified by geoeconomic fragmentation and smaller international markets (IMF 2023). Large and advanced free trade agreements—like the Regional Comprehensive Economic Partnership (RCEP)—offer ready counterweight to the negative effects of geopolitically-motivated trade realignment and should thus be maximized. Mutual trade cooperation provides benefits in the face of higher uncertainty: for example, export gains within the RCEP bloc may be able to offset about 18 percent of member economies' likely export losses under a high global friendshoring scenario (Petri and Plummer 2023).

Third, the ongoing trade realignment is an opportunity for "reindustrialization"—especially for the larger ASEAN economies. Beyond the recent gains in trade for ASEAN (some of which could be short-term in nature), longer value chains provide a window of opportunity for ASEAN economies to not only deepen their GVC participation—especially in medium- to high-productivity sectors—but also to reverse years of deindustrialization. The decline in the manufacturing sector's share of GDP in most economies in the ASEAN-5 has been attributed to a variety of factors: slow industrial upgrading in high-value added activities, limited spending in infrastructure and innovation, as well as prevalence of low-skilled labor in the workforce. Adopting a strategic, longer-term view for industrial and FDI policies, while tackling these structural bottlenecks, will help the region's economies successfully position themselves as additional nodes in evolving global supply chains, discover and leverage new sectoral

sources of growth in manufacturing—especially for the smaller ASEAN—and simultaneously navigate increasing competition from other emerging economies (Figure 2.53).

Fourth, rising services trade—especially digitally deliverables ones—offer new and inclusive drivers of growth. Underpinned by ongoing technological advancements, the outlook for global services trade is bright. Technological barriers to trade are falling rapidly alongside increasing digital modes of delivery. Further, the entry point for many developing economies into the services value chain is not as steep: digitally deliverable services do not require the massive physical capital required by manufacturing and merchandise trade. Deepening services trade especially within the ASEAN+3 region can unlock new avenues for growth and provide opportunities for broader segments of society—especially for women, youth, and small and medium-sized enterprises. The role of new-generation trade agreements such as RCEP and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, or CPTPP, cannot be understated, especially as it further liberalizes "modern services" including financial, telecommunications, and professional services—demand for which is expected to remain robust into the future.

Fifth, ASEAN+3 can leverage technology to help mitigate risks from geoeconomic fragmentation. Amid the specter of more prohibitive international trade policies because of security-based fragmentation, technology will play a crucial role in dampening the overall impact by helping reduce costs—for example, through operations optimization (Section IV). On the other hand, the threat of bifurcated technology—or emergence of competing technologies between blocs—is a legitimate concern for ASEAN+3 economies (AMRO 2021). Technology bifurcation can result in a loss of economies of scale due to incompatible standards, slowing the economic gains that new technology is meant to create. Still, rapid developments in technology itself—such as tech interfaces—mean that divergent technology standards will not stymie the global economy for long, especially as global tech leaders develop the solutions that could overcome such bifurcation.

Box 2.5:

Globalization at a Crossroads: Where Does ASEAN+3 Go From Here?

Authorities in the ASEAN+3 region have identified the reconfiguration of global trade and investment flows as the most pressing challenge to their economies' long-term growth (Figure 2.8 in this chapter). This is not surprising. At the core of the remarkable success in economic development achieved by many regional economies is a trade-driven, export-led model of industrialization (AMRO 2018). Further, the region collectively recognizes that greater economic interdependence, both within ASEAN+3 and with the global economy, has been integral to fostering shared prosperity and stability. However, current trends point to considerable uncertainty over the future of globalization. Having stalled since the global financial crisis, rising geopolitical tensions and protectionist pressures in advanced economies now threaten to unwind existing global economic integration.

Despite escalating rhetoric in some quarters, empirical evidence does not yet indicate that significant deglobalization is under way. Nevertheless, looking at the share of world trade to global GDP and broader foreign direct investment trends, globalization has stalled after reaching a peak just prior to the global financial crisis (Figures 2.5.1 and 2.5.2). This was driven by multiple factors, including slower economic growth in the major advanced economies following the global financial crisis and the sovereign debt crisis in Europe, slower expansion of global value chains (GVCs), China's expanding domestic supplier base ("localization"), maturing economic development more generally, and diminishing trade cost reductions from technological advances (WTO 2023).

However, evidence is beginning to point to a fundamental reconfiguration of global trade and investment flows. The composition of trade is being reshaped along geopolitical lines, with countries increasingly trading with strategic partners and political allies. Reshoring and friendshoring trends have gathered pace, driven partly by geopolitical tensions, especially the US–China economic competition, and also by desires to improve supply chain resilience since the pandemic. Moreover, recognition has grown that global trade concentration has increased in the past decade, further threatening supply chain resilience and stoking reshoring instincts. Overall, the current period is defined by elevated geopolitical uncertainty, with national strategic interests taking priority over economic rationale alone.

Exploring different potential scenarios of the future of globalization can help highlight policy options that could reinforce growth and resilience regardless of how events unfold. If prevailing trends continue unchecked, they could lead toward a more fragmented global economy. One plausible, though unfavorable, future scenario is a *security-based fragmented world*, where global economic ties are completely reshaped along geopolitical lines (Figure 2.5.3). In such a future, the overall global economic environment would be weaker, with emerging markets and developing economies especially vulnerable to diminished trade and investment opportunities, and weakened flows of technology and knowledge. It would also be a less secure world, with reduced international cooperation on challenges that require collective action, such as climate change, cybersecurity, and pandemics. Essentially, this trajectory represents one hypothetical extreme if present trends worsen, resulting in a world less resilient to economic shocks, with more places excluded from progress, and weaker collective efforts on global challenges.

However, this path of fragmentation is not inevitable. An alternate vision, as championed recently by the World Trade Organization, entails renewed commitment to *rules-based economic integration*, or "reglobalization." This could involve extending economic openness to more peoples, economies, and issues. Rather than countries retreating into isolated blocs, this scenario envisages a reinvigorated multilateral trading system that enables deeper and broader global integration, providing a stronger foundation to resolve current concerns surrounding globalization. Diversifying supply chains to engage more economies would enhance resilience against

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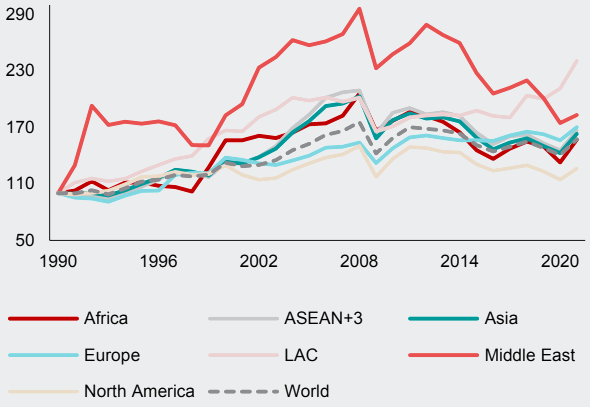
This box was written by Allen Ng.

future shocks. Expanding trade-centric growth to additional emerging market and developing economies could foster wider prosperity. Reinforcing economic interdependence would better facilitate collective action on shared challenges. In short, this reglobalization path offers a future with markets better insulated from disruptions, reduced possibility of the weaponization of trade, and more equitable distribution of its gains, with exciting growth opportunities in new areas of trade, especially in services.

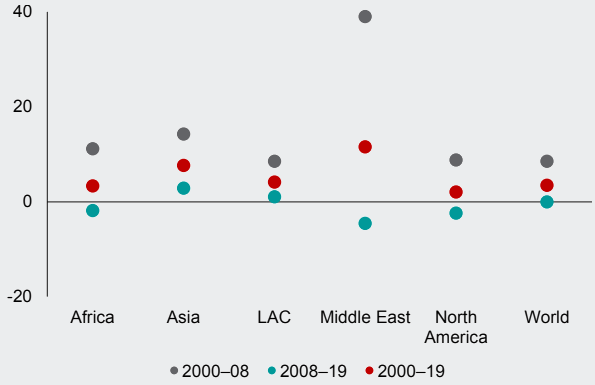
These two scenarios present stylized versions of what could unfold. The actual trajectory remains highly uncertain but will likely fall somewhere in between. Given this uncertainty, what can ASEAN+3 economies do to reinforce growth and resilience? In an ideal scenario, the region could collectively leverage its influence to steer toward reduced fragmentation, through leadership in strengthening multilateral cooperation and trade. However, it is also prudent for ASEAN+3 economies to consider and implement "robust" strategies that would strengthen their economic foundations and promote continued development—regardless of the future face of globalization. By being open to strategies and approaches that could remain viable across multiple possible futures—rather than assuming any single outcome—ASEAN+3 economies can prudently navigate this globalization crossroads.

Figure 2.5.1. World: Total Trade, by Region
(Index, 1990 = 100)



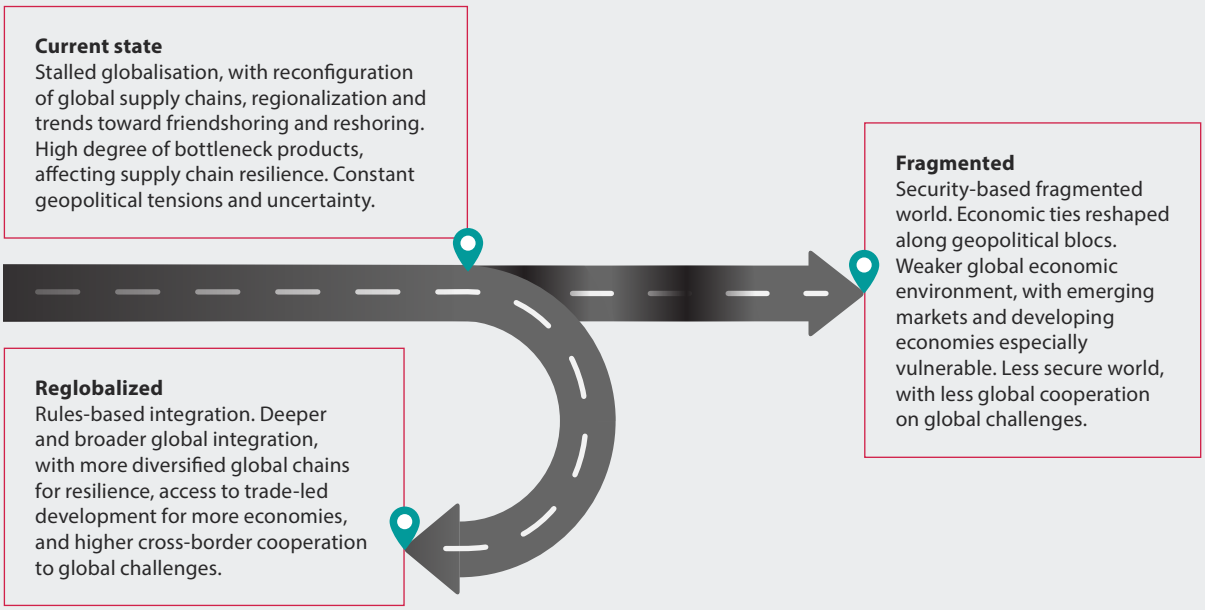
Source: Asia Regional Integration Center, Asian Development Bank; AMRO staff calculations.
Note: LAC = Latin America and the Caribbean.

Figure 2.5.2. World: Growth of FDI
(Percent)



Source: Asia Regional Integration Center, Asian Development Bank; AMRO staff calculations.
Note: LAC = Latin America and the Caribbean. Data represents compounded annual growth rates.

Figure 2.5.3. Globalization at a Crossroads: Potential Scenarios



Source: AMRO staff.

Policy Considerations

"The more complex the world becomes, the more difficult it is to complete something without the cooperation with others."

Alexander Fleming, 1945 Nobel Prize Winner for Physiology/Medicine

The risks from the ongoing trade reconfiguration may not be fully avoidable, but they can be managed. The trajectory of globalization remains highly uncertain (Box 2.5). What is certain, however, is that in an unclear landscape, policies and approaches that perform reasonably well under various contingencies will be invaluable for ASEAN+3 economies. At the current globalization crossroads, the region could pursue several such "weakly dominant" options with a degree of optimality, regardless of how events unfold. These responses are not mutually exclusive, allowing for a combination of complementary measures that reinforce each other. Strong policy signals that attest to open regional and international engagement, coupled with targeted domestic policy adjustments, would allow ASEAN+3 economies to navigate the geoeconomic currents with the least damage.

Intensifying regional cooperation on cross-border challenges will be key. Cooperation creates a wider set of policy options that benefit all ASEAN+3 economies. On some policy areas preferences will never be aligned across economies—yet this is exactly where international coordination can be most fruitful. More importantly, strong commitments to tackling shared challenges will allow ASEAN+3 to integrate more deeply regardless of broader global trends. Progress on these challenges—such as supply chain resilience, climate change, health security, and the digital divide—will help unlock further trade and investment opportunities within the region and reinforce connectivity with the global economy. Regional contractual arrangements can help smooth the impact of sudden market disruptions of highly concentrated products, including in agriculture and semiconductors (AMRO 2022). Cooperation on the digital economy and digital integration will advance ASEAN+3 e-commerce and the growth of digitally deliverable services trade. Overall, by jointly tackling common challenges, ASEAN+3 members can foster greater economic interdependence and integration. This provides a robust foundation for shared prosperity, tapping gains from exchange and specialization while building resilience against external shocks.

Expanding the region's cross-border trade in services necessitates coordinated efforts to liberalize the sector. With appropriate policies, services trade can enable inclusive, resilient growth even amid uncertainty. Prioritizing services trade integration—both within the region and with other markets—will allow ASEAN+3 economies to tap new areas of export-oriented growth that complement existing strengths. However, services trade barriers have remained quite elusive to Asian policymakers (Stephenson 2017). Several ASEAN+3 economies are considered highly restrictive economies globally, especially in trade of market-bridging and digital network services.[46] While RCEP's provisions form a crucial foundation, the greater challenge for ASEAN+3 members would be adhering to the rules, disciplines, and commitments of the agreement to undertake necessary—and often challenging—reforms (Hinojales 2022).

Domestically, policies that enhance competitiveness will enable different sectors of the economy to adjust to the pressures of global trade reconfiguration. This strategy involves emphasizing industrial capacity building and creating an enabling environment for investment and entrepreneurship—especially to take advantage of new areas of growth such as clean energy transition, the digital economy—and in view of an aging world—biotechnology and life sciences, among others. Strengthening domestic manufacturing capabilities also provides a useful buffer against high import dependency and stimulates value-added creation by local enterprises. Supply-side reforms will be crucial to develop more competitive industrial capabilities across the ASEAN+3 region and to enable the workforce to adapt successfully to new demand. Such reforms will facilitate advancing up the value chain, and for some key sectors—such as electronics—doing so could help shield the economy against short-term boom-bust cycles. With stronger industrial foundations and an adaptable workforce, economies can tap new sources of foreign demand and integrate into future GVCs on their own terms—regardless of whether the reconfiguration of trade and investment flows occur due to geoeconomic fragmentation pressures or opportunities from broader reglobalization (Box 2.5).

Broader economic integration will be crucial to managing concentration risks. Pursuing further trade expansion and diversification, especially with new markets, will reinforce growth and economic security of each ASEAN+3 economy and the region as a whole. Diversifying import sources will enable the sourcing of required goods and services from a wider base of partners and minimize risks arising from economy-specific shocks. Expanding the destination of exports—by tapping into rising consumer demand in other emerging market and developing economies—reduces overreliance on traditional advanced economy markets impacted by fragmentation pressures. Thus, existing barriers to diversification must be minimized through supportive regulation at the country-level through proactive removal of administrative bottlenecks and greater trade facilitation, among others. By deepening trade ties in more directions, ASEAN+3 members can drive growth through accessing new opportunities, while building resilience against rising concentration risks and future supply disruptions.

46/ The top 10 services sectors where ASEAN+3, on average, is ranked as highly restrictive are, in order: legal services, accounting services, rail freight transport, air transport, telecommunication, broadcasting, courier services, maritime transport, insurance, and commercial banking. The first two and last two categories are "market-bridging" services (OECD 2022).

IV. Navigating Technological Change

The ASEAN+3 region's growth and development in the past decades have been associated with significant technological advances. Technology has long driven productivity increases across the region's economies, helping create a solid foundation for high-quality jobs and economic growth. Going forward, the role of technology and innovation-driven development will be more salient, given the slowing productivity growth across the region since the global financial crisis in 2008 and 2009 and the anticipated moderation in global growth (Figure 2.6). While most economies in the region are now at least in the middle-income category, they are also facing multiple structural challenges—including the aging and trade reconfiguration issues featured in this chapter and could be caught in a "middle-income trap" if they do not rise above the challenge. As home to some of the most innovative and technologically productive economies in the world, the ASEAN+3 region has tremendous potential to leverage new technologies to deal with these structural challenges and ensure the realization of its long-term growth prospects. However, heterogeneity in technological capabilities across member economies underscores the need for continued innovation and subsequent diffusion of this knowledge. In addition, economies have to prepare for the changes that new technology can bring. The shift to automation, robotics, and artificial intelligence (AI), for example, can lead to short-term job displacement—but it also presents ASEAN+3 with numerous opportunities for new employment and reskilling of workers to handle more complex, uniquely human tasks.

The next section provides a brief discussion on ASEAN+3's strengths as a technology center. Technology's critical role in helping alleviate longer-term structural issues that impact ASEAN+3 long-term growth and stability also features. Recognizing that new technological advances are also strong catalysts of change—and as such can be initially disruptive—the section looks at the implications of the emerging domain of generative AI in creating and displacing jobs. Combined with supportive policies, technological progress can enable the region to successfully navigate the rapidly changing economic environment and sustain dynamic growth in the long-term.

ASEAN+3: A Technology Powerhouse?

"And so not only is Asia benefiting from the uses of new technology, Asia will increasingly be the source of advances in technology."

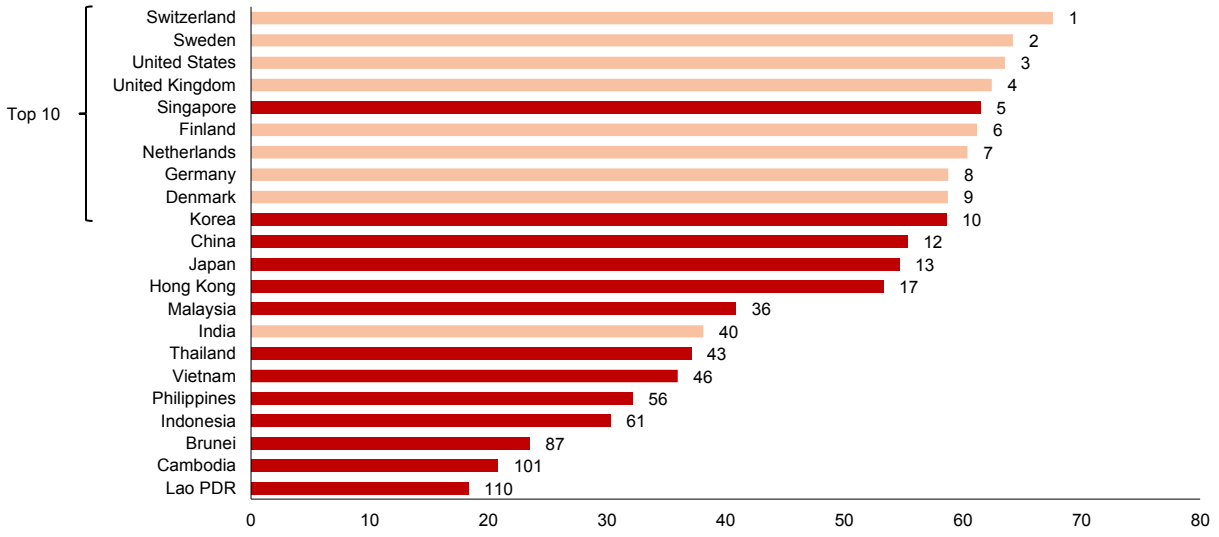
Bill Gates, Co-founder of Microsoft Corporation

The ASEAN+3 region is home to some of the most innovative and technologically productive economies in the world (Figure 2.80). The region accounts for over 60 percent of patents, having overtaken the rest of the world since the early 2010s, mainly contributed by China, Japan, and Korea (Figure 2.81). ASEAN+3 has the highest number of science and technology clusters globally, with the five biggest located in Plus-3 economies: Tokyo-Yokohama (Japan) leads as the largest global cluster, followed by Shenzhen-Hong Kong-Guangzhou (China and Hong Kong), Seoul (Korea), and China's Beijing and Shanghai-Suzhou clusters (Figure 2.82). The Plus-3 economies, alongside Singapore and a few large ASEAN economies, also rank well worldwide in other innovation-related indicators, reflecting the significant resources they have devoted to research and knowledge-building. For example, Korea is one of the top economies in the world for research and development (R&D) spending and in the number of researchers as share of the population (Figure 2.83).

However, there is significant heterogeneity across the region, with different technological and innovative capabilities within and between economies. Despite increasingly robust innovation activity in leading ASEAN+3 economies—evident in their R&D spending and patent activity—its broader impact on the rest of the region remains limited (Figures 2.84 and 2.85). Most economies in the region underperform when it comes to adopting existing technologies and inventing new ones, relative to global benchmarks (World Bank 2021). The diffusion of new technologies and innovation capabilities remains highly uneven, with the most innovative firms far ahead of the rest of the economy.[47] Since the global financial crisis, innovation appears to have become more concentrated in a handful of companies, further exacerbating the divergence in productivity across firms (Dabla-Norris and others 2023). Across sectors, innovation is also more common in manufacturing than in services, despite the latter's increasing role as a driver of growth for many ASEAN+3 economies. These dynamics limit the economy-wide impacts of innovation and constrain overall productivity growth. For ASEAN+3 to maximize technological progress, pushing the innovation frontier through prominent players needs to be accompanied by accelerating technology diffusion to other firms, sectors, and economies.

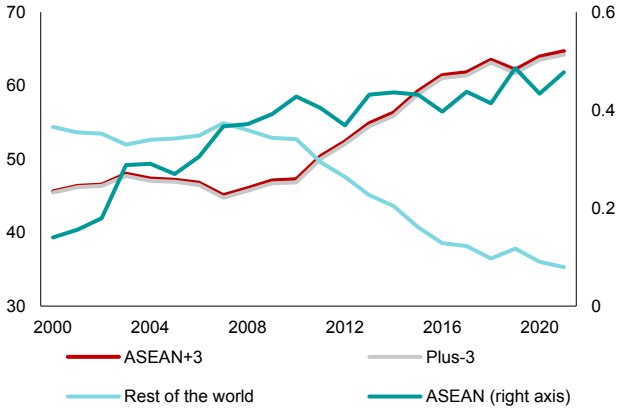
47/ Dabla-Norris and others (2023) also emphasizes lags in diffusion to small and medium enterprises and domestic firms beyond export-linked ones.

Figure 2.80. Selected Economies: Global Innovation Index, 2023
(Score)



Source: World Intellectual Property Organization (2023).
Note: Figures indicate the ranking of the economy. The Global Innovation Index provides performance measures and ranks 132 economies on their innovation ecosystems. The index is built on 81 indicators from international public and private sources.

Figure 2.81. World: Patent Applications
(Percent of world total)



Source: World Intellectual Property Organization (2023).
Note: Data refers to total number of patent applications by applicant's origin.

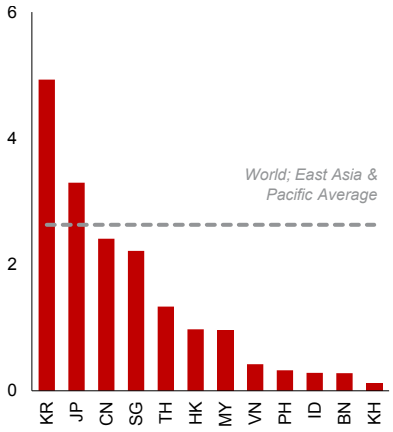
Figure 2.82. World: Top 10 Science and Technology Clusters, 2023

Rank	Cluster Name	Economy
1	Tokyo–Yokohama	Japan
2	Shenzhen–Hong Kong–Guangzhou	China, Hong Kong
3	Seoul	Korea
4	Beijing	China
5	Shanghai–Suzhou	China
6	San Jose–San Francisco, CA	United States
7	Osaka–Kobe–Kyoto	Japan
8	Boston–Cambridge, MA	United States
9	San Diego, CA	United States
10	New York City, NY	United States

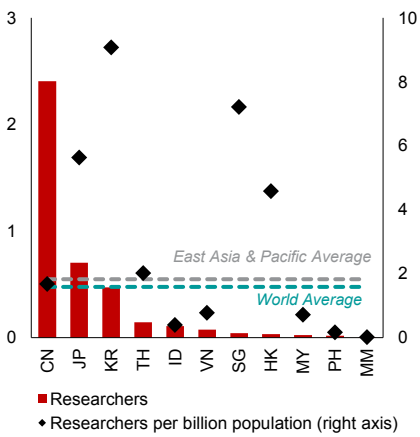
Source: World Intellectual Property Organization (2023).
Note: Science and technology clusters are ranked based on the number of applications under WIPO's Patent Cooperation Treaty, and scientific publications from the Web of Science's Science Citation Index Expanded.

Figure 2.83. ASEAN+3: Selected Innovation Indicators, 2021

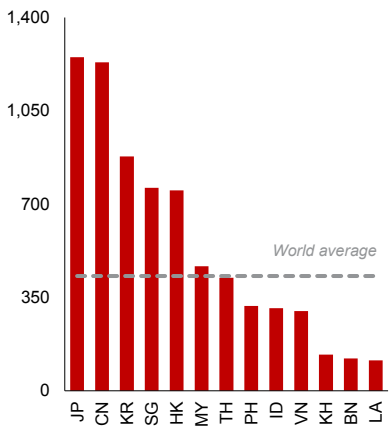
Gross Expenditure on R&D
(Percent of GDP)



Researchers
(Thousands; per billion population)

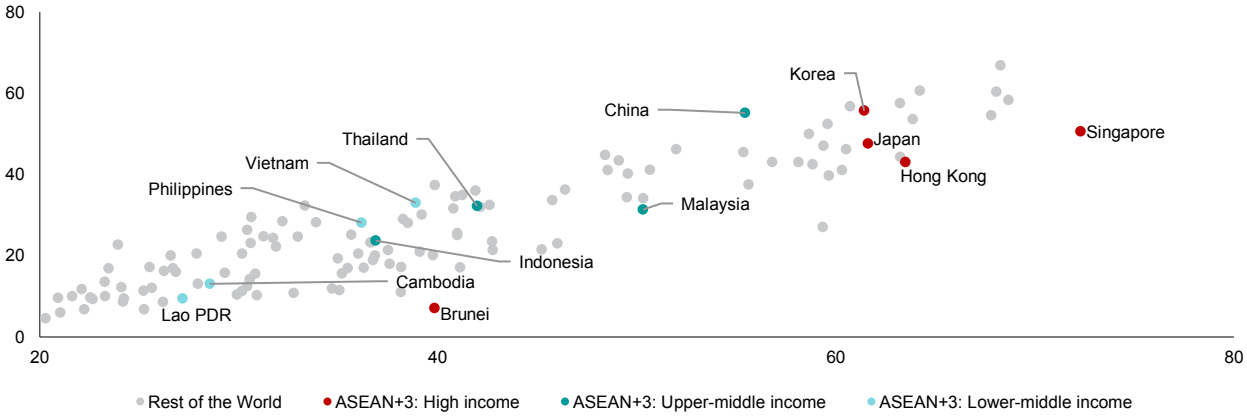


Citations H-Index
(Index)



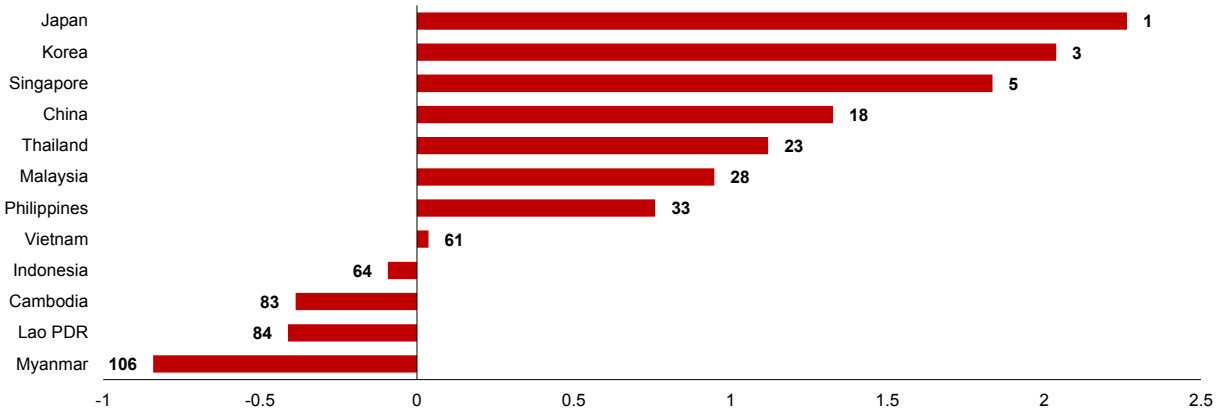
Source: Organisation for Economic Co-operation and Development; United Nations Educational, Scientific and Cultural Organization; SCImago AMRO staff calculations.
Note: BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; MY = Malaysia; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.
For the left panel, gross domestic spending on research and development (R&D) is defined as the total expenditure (current and capital) carried out by all resident companies, research institutes, universities, and government laboratories, and so on, in an economy. It includes R&D funded from abroad but excludes domestic funds for R&D performed outside an economy. Expenditure on R&D data are as of 2021, except for China, Indonesia, Malaysia, Singapore, and Thailand (2020), Vietnam (2019), Brunei and the Philippines (2018), and Cambodia (2015). Researchers in the center panel refer to full-time equivalents; data as of 2021, except for China, Singapore, and Thailand (2020), Vietnam (2019), Malysia and the Philippines (2018), and Cambodia (2015). The H-index (right panel) measures the journal's number of articles (H) that have received at least H citations. It is tabulated from the number of citations received in subsequent years by articles published in a given year, divided by the number of articles published that year. Citations data are as of 2022.

Figure 2.84. World: Innovation Inputs and Outputs Subindexes, 2023
(Score)



Source: World Intellectual Property Organization (2023).
Note: Vertical axis refers to the innovation outputs subindex score, while the horizontal axis refers to the innovation inputs subindex score. The Innovation Inputs Subindex consists of five input pillars capturing elements of the economy that enable and facilitate innovation: (1) institutions, (2) human capital and research, (3) infrastructure, (4) market sophistication, and (5) business sophistication. The Innovation Outputs Subindex provides information about outputs that result from innovative activities within the economy. There are two output pillars: (1) knowledge and technology outputs and (2) creative outputs. Data excludes Myanmar due to data unavailability.

Figure 2.85. ASEAN+3: Economic Complexity Index, 2021
(Score)



Source: The Atlas of Economic Complexity.
Note: Numbers next to the bars refer to the economy's global ranking out of 133 economies. The economic complexity of an economy is calculated based on the diversity of exports it produces and their ubiquity, or the number of the economies able to produce them (and those economies' complexity). Data are not available for Brunei and Hong Kong.

Technology, as a Solution

"Innovation is the driving force behind sustained economic growth. Without new ideas, economies stagnate."

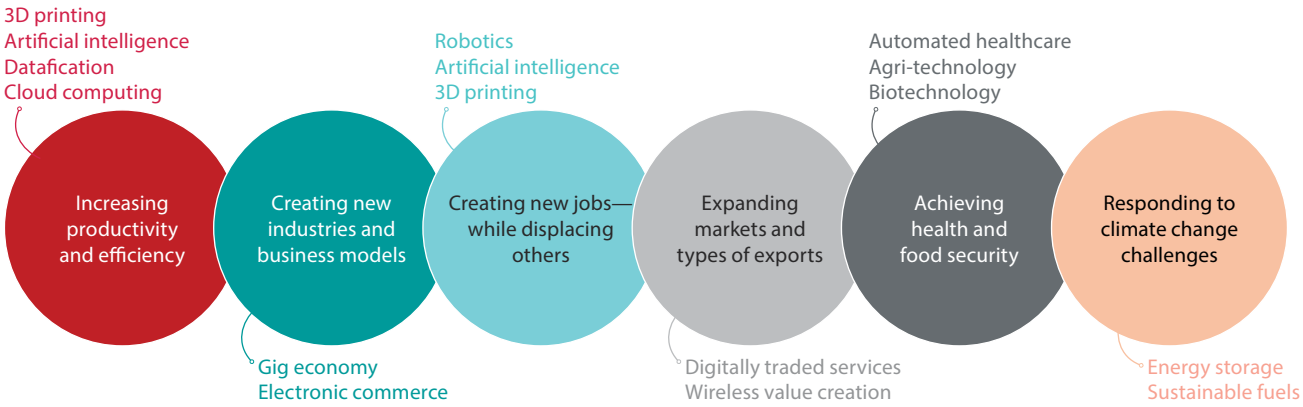
Robert Solow, 1987 Nobel Prize Winner for Economics

ASEAN+3 can leverage new areas of technology to help generate growth opportunities. Technological progress has long been reshaping the economic development of the region and will continue to do so (AMRO 2021, 2022). Automation, digitalization, data analytics, and smart devices, are driving innovation and creating new areas of growth. Advancements in robotics and artificial intelligence, for example, are propelling the region's manufacturing sector into high productivity and enhanced efficiency. Digitalization enables businesses to streamline operations, enhance customer experiences, and develop new, innovative business models. Cloud computing, data analytics, and smart devices, on the other hand, are increasingly being used to improve efficiency and explore new revenue streams, while advanced manufacturing technologies—such as 3D printing—have led to reduced prototyping costs, accelerated production, and enabled more product customization (AMRO 2022).

More importantly, advances in technology can help to alleviate pressing structural challenges in the region. Discovery and development of new technologies will continue to play a key role in helping ASEAN+3 economies navigate the challenges of aging, climate change, and food security, as well as in promoting equitable and sustainable growth (Figure 2.86). During the pandemic, the use of digital technology was given a boost as e-commerce, online delivery services, and video conferencing provided innovative

solutions to immobility for economies under lockdown (AMRO 2022). Through the lens of an aging population, technology offers tools and options to help mitigate the macroeconomic risks from a shrinking workforce, while potentially enabling economies to reap significant dividends from longer and healthier lives. Similarly, amid ongoing global trade reconfiguration, technology can be a critical tool for improving the resilience of ASEAN+3 supply chains and for diversifying into new sources of growth. Within the region, Singapore, Korea, and Hong Kong are considered global leaders in the use and adoption of these emerging and "frontier" technologies, with all three ranking particularly high when it comes to using advanced and innovative technology for industrial activity (Table 2.4).

Figure 2.86. Selected New Technologies and their Likely Implications on ASEAN+3 Economies



Source: AMRO staff.

Table 2.4. ASEAN+3 and Selected Economies: Frontier Technology Readiness Index, 2022
(Index score ranking)

	Total score (Rank)	Index Components				
		ICT deployment	*Skills*	*R&D activity*	*Industry activity*	*Access to finance*
Top 10 economies	*1.00 = highest*	*Rank out of 166 economies*				
United States	1.00	11	18	2	16	2
Sweden	0.99	6	2	16	11	18
Singapore	0.96	7	8	17	4	17
Switzerland	0.94	21	13	12	5	5
Netherlands	0.94	4	9	15	10	31
Korea	0.94	15	26	3	9	7
Germany	0.92	24	17	5	12	40
Finland	0.92	22	5	21	20	30
Hong Kong	0.91	9	23	29	2	1
Belgium	0.91	13	4	23	19	48
Other ASEAN+3 economies						
Japan	0.88 (19)	10	51	7	13	3
Malaysia	0.76 (32)	30	64	28	7	16
China	0.74 (35)	117	92	1	8	4
Thailand	0.64 (49)	40	90	46	41	10
Philippines	0.62 (54)	94	79	52	3	80
Vietnam	0.58 (62)	69	117	41	23	11
Brunei	0.55 (69)	54	38	95	97	93
Indonesia	0.49 (85)	102	107	50	47	97
Cambodia	0.34 (112)	122	123	121	95	14
Myanmar	0.26 (133)	132	143	107	101	118
Lao PDR	0.25 (134)	130	134	152	56	133
Other economies						
India	0.66 (46)	95	109	4	22	75
Mexico	0.58 (61)	70	73	45	31	96

Source: UNCTAD (2023d).
Note: The greener the color, the higher the score or rank. The 2023 index measures 166 economies' "use, adoption, and adaptation" of 17 frontier technologies: artificial intelligence, Internet of Things, big data, blockchain, 5G, 3D printing, robotics, drones, gene editing, nanotechnology, solar PV, concentrated solar power, biofuels, biomass and biogas, wind energy, green hydrogen, and electric vehicles. There were 9 indicators used across the 5 index components. ICT deployment uses internet usage and mean download speed indicators; Skills uses years of schooling and high-skilled employment as share of the working population; R&D activity uses number of scientific publications and patents filed on frontier technologies; Industry activity uses high-tech manufacture and digitally deliverable services exports; while Access to finance uses domestic credit indicators.

Reaping the Longevity Dividend with Technology

Rapid advancements in life sciences, medicine, and biotechnology will enable longer, healthier, and high-quality lives. The potential gains from addressing morbidity and tackling aging-related illnesses could be "dramatically significant" (Chia 2019). Scott, Ellison, and Sinclair (2021) estimate that by targeting aging—that is, delaying the onset of age-related chronic diseases—to achieve one more year of *healthy* life expectancy, the gains to the US economy can be as much as USD 38 trillion. Breakthroughs in pharmaceutical medicine could eventually see ASEAN+3 populations being able to easily access affordable drugs that could help prevent or delay aging-related diseases (Barzilai and others 2018).[48] More advanced techniques in life sciences, such as limb regeneration treatments and gene therapy, could enable the sustainable replacement of aged body parts as well as correct genetic defects that could prolong and improve the quality of life. These technologies that help augment longevity and improve health can be gamechangers for ASEAN+3's workforce potential, especially if made accessible to wider segments of society. Currently, advanced economies—such as the United States, Germany, and Switzerland—are mostly at the frontier of these health care technologies, underscoring the need for close collaboration to enable knowledge-sharing and technology diffusion.

Through automation, robotics, and other intelligent machines, technology can complement human capital in an aging environment. While rapid technological progress may ultimately lead to job displacement, labor-saving technologies will become increasingly important as the working-age population shrinks. An aging workforce can, in turn, be a driver of automation and high robot adoption (Acemoglu and Restrepo 2018). Five ASEAN+3 economies that are further ahead in the demographic transition are among the world's largest markets for industrial robots: Japan and Korea (late transition), and China, Singapore, and Thailand (advanced transition). Together, they accounted for nearly 94 percent of industrial robot installations in the world in 2023, with China taking the largest share (Figure 2.87). Most of these are utilized in the electronics, automotive, and semiconductor sectors, and mostly for physically demanding tasks such as handling and welding (IRF 2023). Strong growth in collaborative robots highlights how technology can complement an aging workforce: for example, "cobots" are cleaning robots used for larger areas while humans do "edge cleaning" (Figure 2.88).[49] Outside of labor-saving solutions, artificial intelligence and machine learning can also augment workers' existing capabilities. As the use of these technologies lifts sectoral productivity (i.e., value added per worker), promoting sectors with greater opportunities for automation could go a long way to increasing economy-wide productivity.

Transforming the nature of work through technology can be a strong incentive for workers to extend their working careers, boosting overall employment. Along with supportive labor policies, technological solutions and devices can transform the nature of work. Several survey-based studies suggest that older workers—many of whom increasingly assume caretaking responsibilities as they age—value certain occupational characteristics, including flexible working hours, adjustable scheduling, and the ability to work remotely (Scott 2023; Choi-Allum 2023) (Figure 2.89). Remote work technologies, "virtual" offices, and collaborative software tools can be utilized to retain or attract the older workforce—given the high value they place on work flexibility (Figure 2.90). These can also incentivize those challenged by the daily commute to work and other age-related mobility issues. Complementing this, workspaces and offices can be transformed to become "age-friendly"—for example, by implementing indoor air and sound quality improvements, as well as lighting adjustments (ADB 2019). Further, the utilization of assistive (and adaptive) technologies—such as hearing aids, screen magnifiers, or wheelchairs—not only help maintain older workers' ability to function independently, but can also improve their access to employment (WHO 2024).

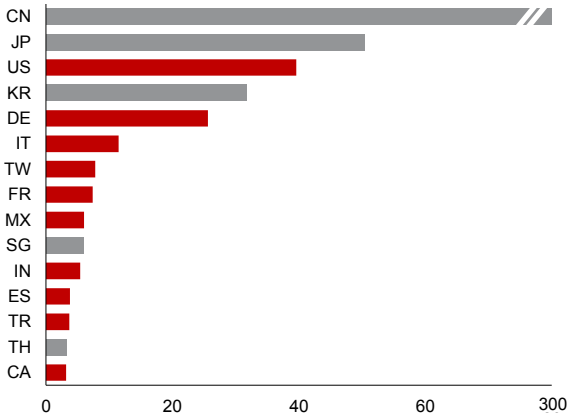
Technology will be a critical enabler of lifelong learning and skills development. Online learning (and related platforms) continues to expand globally, providing a massive opportunity for older workers to acquire new skills at their own pace to make the most out of longer life expectancies. Three in five 45-plus adults in Asia say that "age does not limit their ability to work" and more than half recognize the need to update their skills to acquire a (new) job (Figure 2.91). Successful lifelong education, especially for an aging population, requires a deep understanding of how people learn (Jung 2019). Digitally deliverable education, including massive open online courses, caters to older workers' preference for flexibility and greater autonomy (in the learning process). Technology can also be used to personalize delivery to adapt to older workers' different learning curves: "smart" learning environments, as well as smart devices and applications, can make "adaptive adjustments through specific programs to help with efficient learning" (Blake 2020).[50] Simulation tools, such as virtual and augmented reality, are now increasingly being used in leading ASEAN+3 economies to enhance the learning experience of the elderly population.

48/ A key example of this is the United States' Targeting Age with Metformin (TAME) study. Metformin is a cheap, widely-used first-line of treatment drug for diabetes, but appears to hold some potential to delay the onset of age-related diseases and conditions including cancer and Alzheimer's disease, by intervening into their underlying aging process. The TAME trial is an ongoing large-scale human to test Metformin for this purpose (Barzilai and others 2018).

49/ With service robots, the humans still typically stays in the process—for example, by clearing things away from the robot or putting objects onto it (IRF 2023).

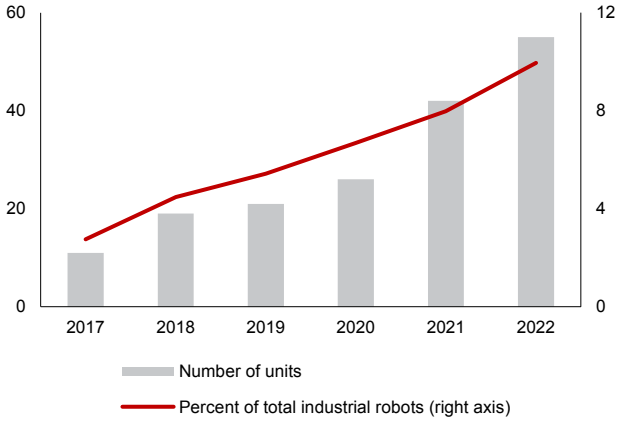
50/ Cheung and others (2021) define a smart learning environment as "one that emphasizes learning flexibility, effectiveness, efficiency, engagement, adaptivity, and reflectiveness" and improves the learning experience "based on learning traits, preferences and progress, features increased degrees of engagement, knowledge access, feedback and guidance, and uses rich-media with a seamless access to pertinent information, real-life and on-the-go mentoring with the use of technologies to continuously enhance the learning environment."

Figure 2.87. Top 15 Economies: Annual Industrial Robot Installations, 2023
(Thousand units)



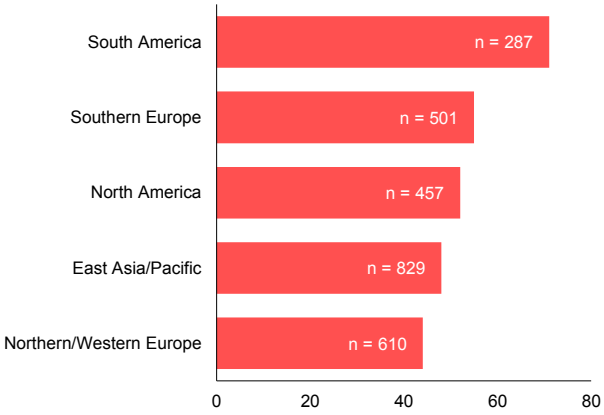
Source: International Federation of Robotics; AMRO staff calculations.
Note: CA = Canada; CN = China; DE = Germany; ES = Spain; FR = France; IN = India; IT = Italy; JP = Japan; KR = Korea; MX = Mexico; SG = Singapore; TH = Thailand; TR = Türkiye; TW = Taiwan Province of China; US = United States.

Figure 2.88. World: Collaborative Robots
(Thousand units; percent)



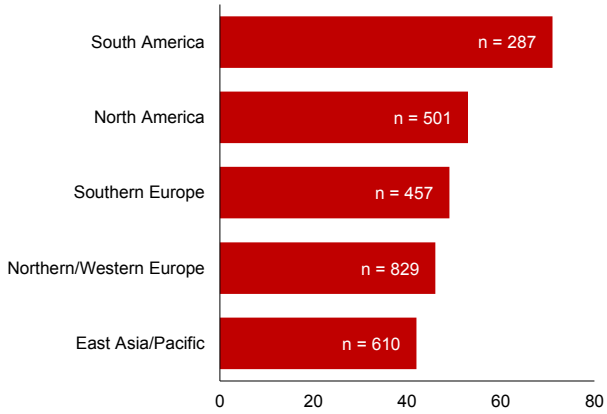
Source: International Federation of Robotics; AMRO staff calculations.
Note: Industrial robots are comprised of (1) traditional and (2) collaborative robots.

Figure 2.89. Selected Economies: Older Workers' Preference for Flexibility
(Percent of respondents)



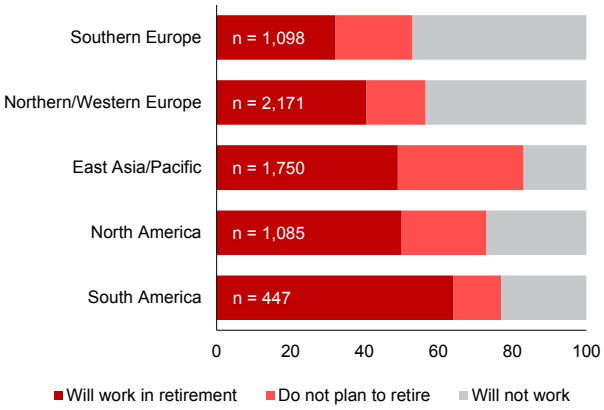
Source: American Association of Retired Persons (AARP) Research, Global Survey Issue Brief 2023.
Note: Respondents are aged 45 and above. Economies included are Australia, Japan, and Korea (East Asia/Pacific); Canada and the United States (North America); Finland, France, Germany, and the United Kingdom (Northern/Western Europe); Brazil (South America); and Italy and Spain (Southern Europe).

Figure 2.90. Selected Economies: Older Workers' Engagement in Some Type of Remote Work
(Percent of respondents)



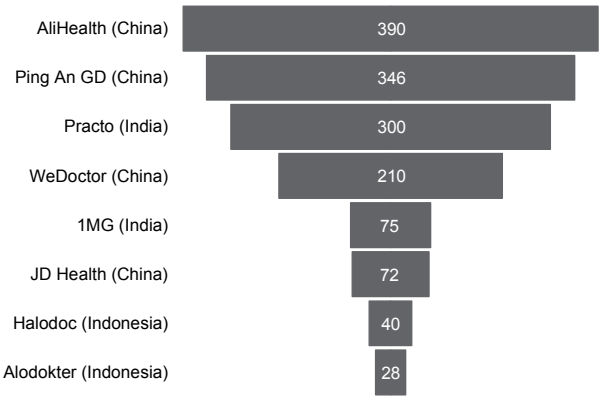
Source: American Association of Retired Persons (AARP) Research, Global Survey Issue Brief 2023.
Note: Respondents are aged 45 and above. Economies included are Australia, Japan, and Korea (East Asia/Pacific); Canada and the United States (North America); Finland, France, Germany, and the United Kingdom (Northern/Western Europe); Brazil (South America); and Italy and Spain (Southern Europe).

Figure 2.91. Selected Economies: Older Workers' Post-Retirement Plans
(Percent of respondents)



Source: American Association of Retired Persons (AARP) Research, Global Survey Issue Brief 2023.
Note: Respondents are aged 45 and above. Economies included are Australia, Japan, and Korea (East Asia/Pacific); Canada and the United States (North America); Finland, France, Germany, and the United Kingdom (Northern/Western Europe); Brazil (South America); and Italy and Spain (Southern Europe).

Figure 2.92. Top 10: Leading Digital Health Platforms Globally, as of January 2023
(Millions of users)



Source: Statista.

Lastly, the future of health care in ASEAN+3 will be increasingly data-driven. With populations across the region aging, pressures on ASEAN+3 health care systems are only set to increase. Health care priorities in the region would have to transform *from* treatment *to* prevention, given the likely rise in aging-related illnesses. Data will underpin this transformation. As highlighted by the COVID-19 experience, tech-enabled solutions can provide new models of health care and modes of delivery to help cope (Figure 2.92). Smart wearable devices can help older individuals monitor their own health, act as "nudges" for favorable behavioral changes that can improve longevity, and may serve as alert systems. Other technologies, such as remote patient monitoring—or the use of technology to gather patient data for transmission to health professionals—harness data and cloud computing with the goal of improving access to health care and its quality. Machine learning, for example, can be utilized on vast amounts of clinical data to generate "actionable insights" and facilitate more efficient health care delivery (McCann 2019). In the ASEAN+3 region, Singapore is at the forefront of the ongoing data-driven transformation of the health care industry (Philips 2023).

Achieving Trade Resilience with Technology

Technology can also be a critical tool to navigate a highly fluid trade environment and increase trade resilience. As companies around the world try to reduce risks from geoeconomic shocks and other unforeseen events, global supply chains of the future are likely to be more complex—shaped by various iterations of reshoring, friendshoring, nearshoring, as well as other resilience strategies. Multiple suppliers, as well as manufacturing locations, are likely to be the norm to reduce concentration risks and adapt to sudden fluctuations in demand and supply—a lesson learned from crisis events like the COVID-19 pandemic.

As supply chains of the future become longer, technologies and systems that enable real-time data collection, analysis, and optimization of operations will become increasingly important. Such "smart" supply chains—utilizing blockchain, big data, and artificial intelligence—allow for higher transparency, thus making them more agile, efficient, and resilient in a rapidly changing environment. Robust data infrastructures across various nodes would provide real-time visibility of any emerging supply and demand risks, allowing GVC players to identify vulnerabilities and proactively adjust operations at very short notice to avoid overruns or shortages. Visibility, along with data standardization, should allow multinational enterprises to quickly select alternative or more sustainable suppliers. Predictive algorithms could help identify possible supply chain bottlenecks before they materialize, minimizing the risk of disruptions and negative spillovers to wider economic activity.

Amid ongoing changes in global goods trade, technology will also propel strong growth in ASEAN+3's cross-border (digital) services. International services trade could be at the core of the next wave of globalization. Digitally deliverable services—such as ICT services, business services, and those related to intellectual property—continue to grow over two to three times faster than overall goods and services trade activity. While the current size of services trade may not fully cushion ASEAN+3's aggregate trade performance in the event of a shock, it holds massive opportunities—especially for ASEAN economies—in terms of income generation, job creation, and export diversification. This is especially as the outlook for global services trade remains highly positive, with continued income growth in developed economies generating higher demand for services. Newer technologies could also see more specialized services being developed (PwC 2020). Faster and cheaper internet connections will make them much easier to trade internationally, opening ASEAN+3 to new exports and markets. Global regulatory developments that set rules and standards on the digital economy should spur momentum on digital services trade—both as a new growth driver for ASEAN+3, and as an additional buffer should geopolitics spark disruption to the goods trade landscape.

Technology will continue to drive down the cost of trade, offsetting the likely increase in trade barriers that could arise in a security-based fragmented world. Heightened geopolitical tension is the enemy of trade cooperation, which could manifest as an increase in unilateral trade policies and nontariff barriers imposed on "non-aligned" economies. Resulting distortions in trade flows and higher costs of goods and services globally are among the key concerns of ASEAN+3 economies, especially for imported intermediate inputs (Figure 2.8). Technology may be able to mitigate some of the additional costs, especially as new advancements continue to improve the production process. For example, blockchain technology—increasingly employed in trade logistics and customs processes—can help reduce bottlenecks and clerical errors that cost the shipping and retail industries at least USD 500 billion in losses every year (Daley 2019). 3D printing can substantially reduce order backlogs in the automobile sector, due to its faster turnaround and at a fraction of the normal cost (Cohen, Sargeant, and Somers 2014). Powered by the Internet of Things (IoT), digitalization of logistics can address cost overruns across multiple dimensions of the supply chain. It can do so by optimizing delivery routes (saving on transportation costs), by managing inventory levels through IoT-sensors and devices (saving on warehousing and inventory costs), and by increasing efficiency through process automation (saving on labor costs and potential human error). Similarly, financial technology has potential to ease financial constraints across ASEAN+3 manufacturers. By doing so, especially for smaller Tier 2 and Tier 3 suppliers of leading manufacturers, financial technology can increase resilience throughout the supply chain (AMRO 2021).

Technology, as a Catalyst of Change

"Artificial Intelligence is the New Electricity."

Andrew Ng, Co-founder of Google Brain and Stanford University Professor

New technological breakthroughs mean that ASEAN+3 region could be peering at a new industrial revolution. Technology brings the possible onset of a fundamental change to ASEAN+3 economies: a new industrial revolution, driven primarily, but not solely, by the advancements in artificial intelligence (AI). AI's evolution mirrors the disruptive nature of general-purpose technologies like steam, electricity, and telecommunications, which defined previous industrial revolutions, with its potential to reshape entire industries. Yet, it is AI's ability to foster innovation that is one of its most promising aspects, positioning it as a new method of invention (Craft 2021). A true industrial revolution involves not only technological progress but also the invention of new methods of invention. By enhancing the productivity of research and development, AI has potential to revolutionize the way ASEAN+3 economies create and innovate, driving further technological progress.[51]

Alongside AI, advancements in deep sciences also herald significant potential to reshape the future of ASEAN+3 economies. Waves of innovation in life sciences and health, energy and clean tech, and agri-food technology represent a parallel frontier. Breakthroughs in areas like genetics, nanotechnology, and new materials are transforming understanding and capabilities in many of the region's key sectors. These scientific advancements complement the transformative potential of AI. Their combined impact could lead to a holistic revolution, not only in digital and data-driven innovation but also by making groundbreaking strides in fundamental understanding and manipulation of the natural world. Altogether, this presents possible solutions to address some of the world's most pressing challenges (World Intellectual Property Organization 2022). The unprecedented pace in which COVID-19 vaccines were developed and deployed offers a window on what is possible.

As the region navigates this complex interplay of technological progress, it is vital to approach the future with a sense of cautious speculation. The potential for a new industrial revolution, marked by continued progress in AI and advances in deep sciences, seems tangible, yet the future remains inherently unpredictable. The ASEAN+3 region stands at the precipice of a new era, rich with possibilities but also fraught with uncertainties and risk. Preparing for this future is not just about adopting new technologies. It is also about fostering a conducive environment for innovation, addressing ethical considerations, and ensuring that the benefits of this technological transformation are distributed equitably.

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[51] This aligns with the idea that an industrial revolution is more than just a collection of technological advancements; it is a fundamental change in how humans generate and implement technological ideas (Perez 2010; Craft 2021).

Special Feature: ASEAN+3 and the Economic Impact of Generative AI

"First Law: Technology is neither good nor bad; nor is it neutral."

Melvin Kranzberg, American Historian

In recent years, AI has steadily transformed from a niche technical domain to a potential agent of transformational economic change. Generative AI (Gen AI)—a branch of AI known for autonomously creating novel content, solutions, or strategies—garnered widespread attention in 2022 (Figure 2.93). This was notably influenced by the emergence of consumer-facing Gen AI tools since late-2022, catalyzing a shift in public discourse around AI's capabilities. A pivotal moment was the launch of ChatGPT, which brought AI tools closer to the end-user: it demonstrated practical applications of Gen AI, for example through interactive chat functionality.[52] This development ushered Gen AI from research laboratories into daily life interactions, fostering a range of customized applications and innovations that could have significant benefits to the economy and society.

With ASEAN+3 navigating a dynamic digital transformation, the interaction between Gen AI and the region's economic development is an important area of exploration. Amid these advancements, concerns about potential job displacement have resurfaced, rendering the economic discourse around Gen AI both timely and pertinent. This Special Feature aims to delve into the emerging discussion by offering insights into the current understanding of Gen AI and its potential economic impacts in ASEAN+3. Through a synthesis of existing literature and recent developments in this space, the subsequent discussion seeks to provide a nuanced appraisal of the unfolding economic dialogues surrounding Gen AI, setting the stage for more comprehensive and exhaustive inquiries.

Gen AI: A Primer

Gen AI represents a distinct branch within the broader domain of AI, characterized by its ability to autonomously generate new content, such as text, images, audio, video, or even complex solutions based on patterns and relationships identified within existing data. In contrast to non-generative AI approaches, which rely heavily on "supervised" learning and primarily respond based on preexisting or predefined information, Gen AI employs "unsupervised" or "semisupervised" learning techniques, leveraging underlying data patterns to create original, and often unique, outputs. This capacity of Gen AI extends the potential of AI beyond mere reactive or predictive responses to a realm of proactive and innovative outputs, significantly augmenting the scope of what AI can achieve (Goyal, Varshney, and Rozsa 2023; NVIDIA 2023).

One key defining characteristic of Gen AI is its use of "foundation" models. These models learn by analyzing large, often unstructured, data sets to discern patterns and relationships autonomously, without the need for explicit labeling.[53] Trained on extensive data sets, these "foundation" models then form a base layer upon which further machine learning models or applications can be built. A prime example is GPT-4, the model underlying ChatGPT, which can generate human-like text by identifying and utilizing patterns in the data. The general-purpose learning and transferability features of foundation models serve as a significant advantage for Gen AI: it can operate in a more open-ended exploratory learning environment, fostering the generation of novel content and solutions, and offering a solid and adaptable baseline for a wide range of applications across different domains (Stanford HAI 2021; Amazon 2023). More broadly, Gen AI expands the range of potential AI applications, especially with innovations that enhances its accessibility of use (Data Hacker 2022; Gough 2023).

As such, Gen AI has captured strong interest from both public and private sectors—despite it being in its relatively nascent stage. An April 2023 survey by McKinsey (2023a) showed one-third of responding firms were regularly using Gen AI in at least one business function. Of these, 40 percent planned to undertake more AI-related investments. Similarly, IDC (2023) highlighted that more than 30 percent of its surveyed organizations in Asia-Pacific intended to invest in Gen AI technologies, while close to 40 percent were already exploring use-cases. At present, most use-cases of Gen AI primarily involve marketing and sales, product and service development, service operations such as customer care and back-office support, and software engineering (McKinsey 2023b). The use of Gen AI is also being explored for providing public goods and services. In ASEAN+3, for example, the Singapore government is exploring how Gen AI can raise the productivity of public service officers and improve the delivery of digital services to citizens (Pillai 2023).

52/ On the other hand, non-generative AI necessitates a structured learning environment, where the model learns to make predictions or decisions based on the provided labeled data.

53/ ChatGPT, developed by OpenAI (an artificial intelligence research laboratory), is an advanced AI model that specializes in generating human-like text. Based on the GPT (Generative Pre-trained Transformer) architecture, ChatGPT utilizes deep learning algorithms to understand and produce contextually relevant text. ChatGPT's training involved analyzing vast amounts of text data, enabling it to respond to a wide range of prompts with coherent and contextually appropriate replies.

As the technology continues to evolve, Gen AI is likely to expand its applications and integrate more deeply into various business and industrial domains (Ng 2023). Developments in this field could lead to more sophisticated and beneficial uses of Gen AI, influencing how businesses operate, innovate, and compete. Its use could extend significantly beyond current capabilities, with multimodality and multi-agent systems in Gen AI possibly transitioning platforms—such as ChatGPT—toward more capable, interactive, and adaptive systems that can better navigate and operate within complex, real-world scenarios. Its enhanced ability to process diverse data types and collaborate through multi-agent frameworks could significantly impact various sectors, driving innovation and efficiency in unforeseen ways (Nath and others 2023; Wang and others 2023).

At present, any discussion on the eventual economic impact of Gen AI invariably treads into speculative territory. The technology's rapidly evolving nature means that its interplay with socioeconomic realities is in constant flux, including the development of complementary technologies and the role of regulations in mitigating risks from its use. Despite the excitement over the revolutionary potential of Gen AI, many experts believe that more traditional, non-generative AI technology is expected to continue to unlock more economic value in the next few years. This is especially true when it comes to improving prediction accuracy, optimizing logistics networks, and providing next-purchase recommendations, such as in e-commerce (McKinsey 2023a; Ng 2023).

Figure 2.93. Decades of Progression: From Rule-Based Systems to Advanced Generative AI

Generative AI, as we understand it today, is the culmination of a rich tapestry of developments, discoveries, and paradigm shifts across the timeline of AI research.

Source: AMRO staff compilation; Lawlor and Chang (2023); Lawton (2023), Singh (2023).

Gen AI and the Future of Work

Akin to previous waves of technological change, concerns over potential job displacement have resurfaced along with the strong interest in Gen AI. The current macroeconomic discussion of technology's impact on labor markets has largely evolved through a task-based lens. Tasks are categorized as either "routine" or "non-routine" based on their level of codifiability and procedural specification. Routine tasks, which can be codified and automated, are typically associated with middle-paid occupations, while non-routine tasks are prevalent in both low and high-paid occupations. Earlier frameworks discussed in the literature, such as skills-biased and routine-biased technological changes, posited that technological advancements primarily threaten routine tasks, often leading to job polarization whereby demand for middle-paid occupations will shrink ("hollow out") faster than for low and high-paid ones.[54] More recent studies also acknowledge both task-displacement and task-reinstatement effects, indicating that technology can also create demand for a broader spectrum of labor-intensive tasks.[55]

However, AI is complicating the task-based framework of understanding the impact of technological change on the labor market. Contrary to conventional digital technologies, AI—with its inductive learning capabilities—broadens the scope of tasks that can be automated to encompass non-routine tasks. The potential to automate non-routine tasks across both low and high-paid occupations introduces a scenario of uncertain employment dynamics within these occupational categories, contingent on how much of non-routine tasks can be done using AI (Autor 2022). Further, the advancement of Gen AI into creative tasks—previously not imagined possible for machines—further obfuscates the delineation between the two task categories, thereby challenging the conventional frameworks used to analyze technology's impact on labor markets.

There, however, could be a case for qualified optimism. Technologies such as AI can augment workers' capabilities by facilitating enhanced efficiency, the delivery of higher quality work, or the undertaking of tasks that were previously unattainable.[56] Ultimately, the consequences of Gen AI on the overall macroeconomy, including in the ASEAN+3, hinges on whether it will perpetuate the automation trend at the expense of valuable job creation (particularly for non-high skilled workers), or whether it will lead to the creation of new labor-complementary tasks accessible to a diverse set of workers. In other words, Gen AI can be a potential asset, especially in labor markets where many routine tasks have already been automated. In these economies, it can be applied for non-routine problem-solving and decision-making. In this case, Gen AI—by surfacing pertinent information in a timely manner—not only can complement worker skill and expertise but also counteract the modern dilemma of information overload, helping workers make better-informed decisions.

Further, Gen AI could reduce barriers to labor productivity. By improving information translation, Gen AI can significantly boost human expertise and support workers in unfamiliar situations: for example, in the case of a highly trained immigrant who needs help to overcome a language barrier. While there is potential for Gen AI to assume more operational tasks in certain professions—such as accounting, financial analysis, or computer programming—its development could also lead to higher demand for tasks that require human expertise and judgment. Human intervention, in this case, would entail overseeing automated processes, enhancing communication with customers, and facilitating more sophisticated services that leverage AI tools. Thus, increased AI use will not only retain but also potentially expand the scope and value of human contribution in various professional domains.

Some recent studies highlight its potential in enhancing—rather than displacing—workers. While comprehensive macro-assessment of Gen AI's impact on the labor market is not yet possible, existing micro-level studies showed that Gen AI tools demonstrated a dual role: it can both *automate* and *augment* human work. For example, automation contributed to time efficiency in initial draft creation, and augmentation arose as workers applied expertise and judgement to refine the AI-generated drafts into final products. This observation holds true whether in software development, text creation, or customer support (Figure 2.94). Other studies have also explored the intersection between AI capabilities and the tasks performed by workers across different occupations at a more conceptual level.[57] These studies are typically not intended to assess or predict the precise impact of AI on jobs, but to provide estimates of jobs' "exposure" to AI given their task composition. These, in turn, provide

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54/ See, for example, Autor (2022).

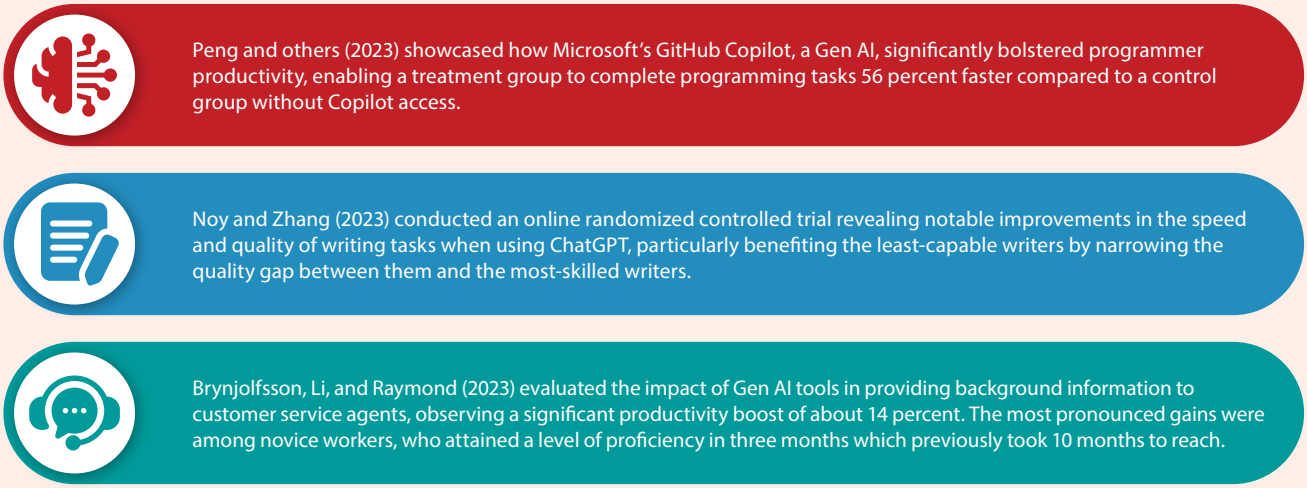
55/ Autor (2022) provides an excellent review of the vast literature of technological change and the labour market, and the uncertainty introduced by advancement in AI. Seminal references for the task-based framework include Autor, Levy and Murnane (2003), Acemoglu and Autor (2011), and Acemoglu and Restrepo (2018), and for task-reinstatement, Acemoglu and Restrepo (2019).

56/ See, for example, a detailed discussion in Acemoglu, Autor and Johnson (2023), as well as Acemoglu and Restrepo (2019) and Autor and others (2022).

57/ McKinsey & Company (2023a), Eloundou and others (2023), and Gmyrek, Berg, and Bescond (2023) are examples of studies focusing on GenAI capabilities.

insights on how the nature of specific jobs could evolve given wider adoption of AI technology. The common theme across such studies is that exposure to Gen AI—at the task level—varies *within* an occupation but can affect a very broad spectrum of occupations. Further, contrary to past automation technologies, high(er)-skilled and high-income occupations are likely to become more exposed to Gen AI capabilities. However, given that each job is a compilation of multiple tasks, it remains unlikely in the near future to come across any occupation where AI tools can execute nearly all the tasks. In line with these studies, AMRO's analysis also shows that more jobs in the ASEAN+3 region are likely to be augmented by AI rather than automated, lending optimism to the use of Gen AI as a tool to improve overall productivity (Box 2.6).

Figure 2.94. Selected Findings on Gen AI's Impact: Augmenting Rather than Displacing Workers



Source: AMRO staff compilation.

Box 2.6:

Gen AI: Augmenting or Displacing Jobs in ASEAN+3?

Gmyrek, Berg, and Bescond (2023) from the International Labour Organisation (ILO) analyzed the potential exposure of various occupations and tasks to Gen AI. They specifically looked at large language models (LLMs), and how this exposure might affect employment.[1] In the study, an occupation is classified as having automation potential if most of its tasks can be automated.[2] On the other hand, a job has augmentation potential if some tasks are difficult to automate while others can be automated more easily. Overall, the study, along with others, finds that LLMs are more likely to augment jobs than automate them. Further, the impact is more pronounced in high- and upper middle-income economies—where occupations with clerical tasks make up a relatively higher proportion of employment—than in low- and lower-middle-income economies. The effects of LLMs are also highly gender-biased, with a larger proportion of women's jobs facing both automation and augmentation potentials compared to men.

AMRO staff, using estimates by the authors, have approximated the potential effects of LLM exposure on jobs in the ASEAN+3 region.[3] The intent is not to have precise estimates of LLM's effects on employment, but to provide broad insights of the direction and distributional impacts of possible changes. Overall, a higher proportion of jobs across ASEAN+3 have potential to be augmented by Gen AI rather than automated (Figure 2.6.1).[4] This suggests that LLMs are more likely to enhance jobs than replace them. However, Japan stands out: given the structural composition of its employment, which has relatively higher proportion of clerical tasks, the economy could be more affected by job automation than job augmentation.[5]

The results vary when employment effects are classified according to ASEAN+3 economies' income group and job skill levels.[6] Across all income groups, a greater proportion of high-skilled jobs than medium-skilled jobs have the potential to be augmented, with lower-income economies benefiting more. High-skilled workers in lower-middle-income economies are likely to benefit the most from augmentation (Figure 2.6.2). On the other hand, a greater share of medium-skilled jobs could be exposed to automation potential than high-skilled jobs, especially in higher-income economies. Meanwhile, LLM technology is unlikely to affect low-skilled jobs, which involve tasks that require considerable physical effort such as cleaning and manual labor.

Disaggregating the results by gender also reveals different impacts on employment. The share of women's jobs that could be affected by LLM technology—both in automation and augmentation—is higher than for jobs held by men and increases with economies' income levels (Figure 2.6.3). This disparity is most evident in high-income economies, where the proportion of women's occupations exposed to automation are more than double that of men. Nonetheless, while women may be disproportionately affected by job automation, they also stand to benefit more from job augmentation.

This box was written by Megan Wen Xi Chong.

1/ LLMs refer to AI algorithms designed to understand, interpret, and generate human language based on extensive training data. These models, such as the GPT series developed by OpenAI, are characterized by their vast number of parameters and deep learning techniques, allowing them to generate coherent and contextually relevant text. LLMs are utilized in a variety of applications, including language translation, content creation, and conversation simulations, demonstrating significant advancements in natural language processing and AI research.

2/ Using the GPT-4 model, a score of exposure to GPT technology is generated for each task defined according to the International Standard Classification of Occupations (ISCO-08). Considering occupations as a collection of tasks with different exposures, jobs are then classified as having automation or augmentation potential based on the mean and standard deviation of task scores generated.

3/ The authors have provided data on augmentation and automation potential for jobs at the ISCO-08 4-digit level. Since employment data for most economies are only available at the 2-digit level, AMRO staff calculated the proportion of occupations in each 2-digit category that are classified as having automation or augmentation potential. The share of occupations with automation or augmentation potential are then applied to country-level employment data to estimate the potential employment effects. For economies with data at only the 1-digit level, a weighted mean is calculated based on the economy's income level classification.

4/ AMRO staff use the most recent data available for employment by ISCO category; however, for some economies, these are still quite dated (e.g., China and Indonesia). Interpretation of economy-specific estimates warrant some degree of caution, especially if employment trends or structure have changed over time.

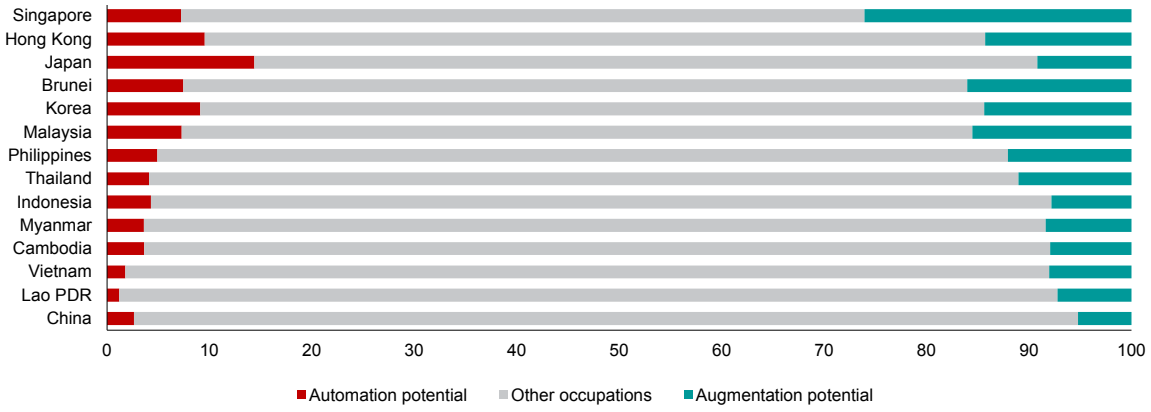
5/ Among ASEAN+3 economies, Japan has the highest proportion of employment that fall under the ISCO category of Clerical Support Workers at 20 percent. For the rest of the region, the proportion of jobs in this category range from 1 percent to 12 percent.

6/ Income groups are defined per the World Bank's income group classification. Skill levels are defined according to the International Labour Organization and based on the ISCO-08 classification.

It is important to stress that these results are not meant to be taken as precise estimates. In addition, this exercise only covers the effects of LLM-based technology, and not broader AI technology. Nevertheless, it provides insights regarding the potential impacts of Gen AI technology on the region's employment. First, more jobs in the ASEAN+3 are likely to be augmented rather than automated, providing a more positive outlook about the use and application of Gen AI technology. However, the distributional impact on employment varies with skills and gender. Medium-skilled jobs face a higher risk of automation, especially those with a larger share of clerical tasks, while high-skilled jobs could benefit more from Gen AI's augmentation potential. Meanwhile, given the types of occupation that women are more involved in compared to men, they could be more disproportionately exposed to both augmentation and automation potentials.[7]

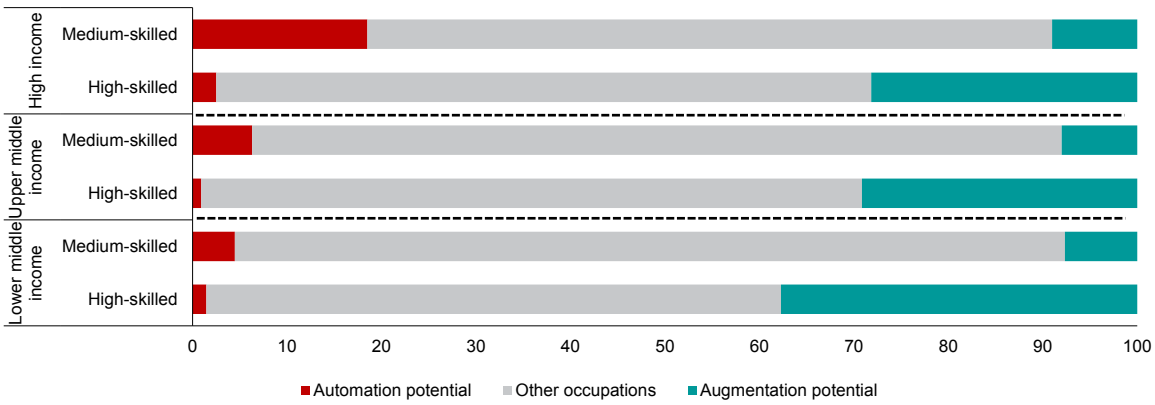
These preliminary findings suggest that the effect of Gen AI on ASEAN+3 employment will likely be uneven. The general-purpose nature of this particular technology is likely to have broad effects across many industries and jobs, bringing both opportunities and challenges. To deal with job displacement concerns, policies can be shaped to create a supportive environment for retraining and upskilling workers likely to be most affected. This way, the ASEAN+3 workforce will be prepared to make the most of Gen AI's capabilities—and while ensuring that no sector, group, or economy gets left behind.

Figure 2.6.1. ASEAN+3: Share of Employment with Automation and Augmentation Potential
(Percent)



Source: Gmyrek, Berg, and Bescond (2023); AMRO staff calculations.
Note: Data refer to the proportion of jobs with automation and augmentation potential as a share of total employment within each economy. Data are as of 2022 (Hong Kong, Korea, Singapore, Thailand, Vietnam), 2021 (Brunei, Cambodia, the Philippines), 2020 (Japan, Myanmar, Malaysia), 2017 (Lao PDR), 2010 (Indonesia), and 2005 (China).

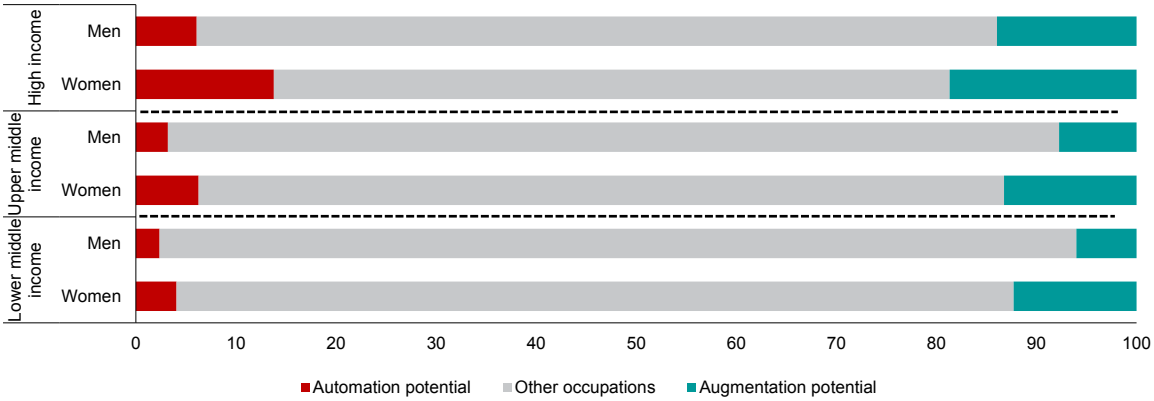
Figure 2.6.2. ASEAN+3: Share of Employment with Augmentation and Automation Potential, by Income Group and Skill Level
(Percent of jobs within each skill category)



Source: Gmyrek, Berg, and Bescond (2023); ILO Labour Force Statistics; AMRO staff calculations.
Note: High-skilled jobs include categories 1 to 3 of the ISCO-08; medium-skilled jobs include categories 4 to 8. The high income group includes Hong Kong, Japan, Korea, Brunei, and Singapore; the upper-middle-income group includes China, Indonesia, Malaysia, and Thailand; the lower-middle income group includes Cambodia, Lao PDR, Myanmar, the Philippines, and Vietnam.

7/ Job categories that have a higher percentage of women than men include professional services, as well as service and sales workers.

Figure 2.6.3. ASEAN+3: Share of Occupations with Automation and Augmentation Potential, by Income Group and Gender
(Percent of jobs within each gender)



Source: Gmyrek, Berg, and Bescond (2023); ILO Labour Force Statistics; AMRO staff calculations.
Note: Data refer to percent of total employment within each sex. The high income group includes Hong Kong, Japan, Korea, Brunei, and Singapore; the upper-middle income group includes China, Indonesia, Malaysia, and Thailand; the lower-middle income group includes Cambodia, Lao PDR, Myanmar, the Philippines, and Vietnam.

Gen AI for the ASEAN+3: Future Direction

Gen AI carries credible promise of boosting productivity growth, yet it is important to maintain a realistic perspective of its macroeconomic impact, especially for the ASEAN+3 region. Major technological innovations in the recent past, such as the internet and the smartphone, serve as cogent reminders: even as these innovations were revolutionary, they did not precipitate substantial surges in growth potential and productivity on a global scale. While their economic impacts are not immaterial, they did not herald a massive boost to overall productivity growth.[58] In the same vein, Gen AI—in tandem with developments of complementary technologies—could have the potential to unlock significant economic value, transforming the modalities of work and livelihoods in ASEAN+3 economies. However, if past technological epochs are a reliable compass, it is prudent not to anticipate a rapid acceleration of macroeconomic growth as a result of Gen AI adoption. The journey to realizing the economic dividends of Gen AI is likely to be gradual, necessitating a balanced view of its opportunities and risks to adeptly navigate the unfolding economic reality.

Gen AI will exhibit uneven impacts both across and within economies in ASEAN+3, and could risk diverging growth trajectories. Most economies—especially those with lower technological capabilities—could be more exposed to the potential disruption that comes with the broader adoption of AI technology. For example, given the relatively large size of the business process outsourcing service industry in the economy, the Philippines could face a greater risk of worker displacement—primarily those engaged in more routine work—as AI gradually reshapes ICT operations, unless it can move into more knowledge-based services. More fundamentally, a concern with widespread Gen AI adoption is its potential to amplify productivity—and growth—divergence within and between ASEAN+3 economies, resulting in slower economic growth in some relative to others. The region's existing digital divide could skew the distribution of economic benefits from Gen AI, with more developed economies and privileged groups possibly reaping most of the rewards. This underscores the need for regional cooperation to bridge the digital divide, ensuring that the economic value generated by Gen AI and associated technologies is shared equitably while minimizing the risk of exacerbating existing inequalities.

Lastly, rapid progress and use of Gen AI and broader AI-related technologies raise important questions about governance, ethics, and values. As the ASEAN+3 region seeks to harness the potential of these technologies and continue to encourage innovation, policymakers and all other stakeholders must come together to develop the right governance frameworks, norms, and standards. This will help steer AI development in a direction that puts human interests first. Some key elements of a human-centric governance approach include (1) principles of transparency, accountability, and bias mitigation in AI systems; (2) managing data privacy risks; (3) monitoring for harmful applications; (4) building capacity to understand AI impacts; and (5) mechanisms for meaningful public consultation and participation. Regional cooperation will also be vital for ASEAN+3 economies to align on shared values, pool expertise and experiences, and develop a unified stance to help shape global norms. Given its diverse makeup, the ASEAN+3 region has the opportunity to offer a model for the ethical deployment of AI technologies, directed toward the common good.

58/ Nobel Prize Winner for Economics Robert Solow famously quipped in 1987 that "…you can see the computer age everywhere but in the productivity statistics." In a global meta-analysis of the impact of ICT on economic growth, Stanley, Doucouliagos, and Steel (2018) found that it does have positive but small- to modest- impact to overall economic growth, especially for advanced economies. The effect is more muted for developing economies.

Policy Considerations

"AI must benefit everyone, including the third of humanity who are still offline."

António Guterres, United Nations Secretary-General

Technological progress, supported and complemented by the right policies, can provide immense socio-economic benefits to ASEAN+3. Technological advances can help unlock solutions to pressing structural issues confronting the region's economies, from demographic shifts, changing global trade dynamics, to environmental challenges, among others, while propelling long-term growth and stability through enhanced productivity and expanded economic opportunities. While the precise, optimal policy mix will differ across the region's diverse economies, sustained efforts to drive technological progress and productivity growth—through openness, capability-building, and support for appropriate types and levels of innovation—will pave the path to more sustainable, inclusive, and innovation-led growth.

ASEAN+3 must take advantage of the opportunity to build on its strengths as a global technology powerhouse. However, the realization of this promising future calls for concerted, cooperative, and adaptive efforts—at both the domestic and the regional levels—to maximize the power of technology. While a granular discussion on policies is beyond the scope of this section, economies could focus on the following areas to best leverage technology as an instrument for achieving their long-term growth objectives:

Firstly, continued commitment to openness and closer regional integration will be paramount. Economic openness not only drives economic growth, but it also serves as a critical avenue for technological diffusion. By attracting leading multinational enterprises and participating in high value-added GVCs, economies could have better access to positive spillovers from global advances in technology. These positive externalities are especially vital for ASEAN+3 economies that are at lower development levels and with varying degrees of technological capabilities. Industrial policies aimed at building local suppliers' capabilities to absorb technology from leading (foreign) firms and innovate, as well as cluster- or network-based policies to encourage the diffusion of technologies within sectors, will be critical to drive the economy up the productivity value chain. Policy frameworks that support cross-border collaboration and reduce trade barriers can amplify these spillovers, fostering a fertile environment for innovation and economic dynamism. Such strategies will not only help economies maximize benefits from GVC participation, but also enhance their capacity to innovate and grow in a technologically driven global economy.

Secondly, prioritizing investment in both hard and soft infrastructure will ensure ASEAN+3's readiness to reap the benefits of technological progress. Future growth strategies for the region will increasingly require a multifaceted approach that includes (1) strengthening infrastructure to support long-term digitalization, (2) developing human capital, (3) scaling up R&D efforts, and (4) fostering a competitive business environment. Investments in education across the region must consider the need for advanced skills programs that are necessary for innovation-led growth, as well as the need to make these programs attractive. For example, industry demand for graduates in the fields of science, technology, engineering and mathematics (STEM) often exceed the supply (Buchholz 2023).[59] R&D efforts can be scaled up by fiscal incentives, robust institutional support, strong talent attraction and retention programs, and by facilitating access to finance for innovative firms, especially for start-ups. Wider technology diffusion and adoption will be enabled by policies that foster competition and reallocate resources to their most efficient use, alongside stronger collaboration among firms, academia, and government to reduce the costs of searching for technology. Such comprehensive investments and policy measures are key to preparing the ASEAN+3 region for current and future technological demands.

Thirdly, reducing the digital divide, and "humanizing" technology will ensure inclusive progress. Advancing digital literacy, improving access to advanced digital tools and resources, and delivering essential ICT training would be essential to support groups of individuals, sectors, enterprises, and communities that are lagging in digital capabilities. Promoting widespread internet connectivity and digital service access across the ASEAN+3 region, while considering the local context—including socioeconomic, geographical, and educational disparities—is key. Humanizing technology means to develop it with a specific group of end-users in mind: if technology becomes too generalized, adoption can be sluggish over time, and certain groups will fall behind as a result (Tan 2019). As the digital divide narrows on the back of increasing connectivity, cyber resilience across ASEAN+3 must be simultaneously strengthened to reduce cyber risks, scams, and potential cross-border spillovers from such threats. Ultimately, innovation policies—including technology safeguards and security frameworks—must evolve with each economy's technological progress: shifting from broad technology adoption to encouraging more advanced innovation activities, while ensuring that all ASEAN+3 economies benefit safely from new technological advancements.

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[59] Latest data from UNESCO Institute for Statistics (2023) suggest that in the ASEAN+3 region, only four economies have over a third of their tertiary education degree recipients coming from the STEM field. These are Malaysia (2022: 40.2 percent), Brunei (2020: 38.4 percent), Singapore (2021: 35.9 percent), Thailand (2023: 31.7 percent), and Korea (2021: 30.4 percent).

V. Summary and Concluding Discussion

The ASEAN+3 region's growth landscape has never been more complex. Thanks to years of solid macroeconomic fundamentals, improvements in governance and regulations, as well as enhanced external resilience, all ASEAN+3 economies have progressively moved up the income ladder, lifting millions of people out of poverty and significantly improving their quality of life. With its growing affluence and rapid industrialization, the ASEAN+3 region has become the biggest driver of global growth (Hinojales, Kho, and Tan 2023).[59] However, concerns are rising that the various tailwinds behind the region's remarkable growth are dissipating. In the next five years, the global economy is projected to grow at an annual rate of 3.1 percent—down from 3.7 percent in the decade prior to COVID-19—with key implications for the expansion of global trade (IMF 2023). Productivity growth has either slowed or stalled in several ASEAN+3 economies, further endangering the region's speed of catch-up with high-income peers. Looking ahead, the ASEAN+3 region is projected to expand by 4.5 percent per year on average this decade, decelerating from its long-term average annual growth of 5.3 percent in 2010–2020.

This deceleration is occurring in an environment that is increasingly overcast by shocks and higher uncertainty. Health crises, natural and climate-related disasters, and geopolitical conflicts are not new phenomena. However, these events have now become increasingly prevalent and will continue to become more common in the medium- to long-term. Moreover, ASEAN+3 economies have yet to fully overcome the scarring effects of the COVID-19 pandemic on their physical, financial, and human capital, as well as overall productivity. As highlighted in AMRO (2022), a "full reckoning of the extent and areas of scarring … can only be achieved years after it is over." Thus, while each of these global events will affect some ASEAN+3 economies more than others, the region as a whole could be navigating these various global forces from a relatively weaker position compared to the pre-pandemic period.

ASEAN+3's long-term growth prospects and development trajectory will be premised on its ability to navigate major global shifts: by managing their risks and leveraging the opportunities they offer. This year's thematic chapter delves into three key secular trends that are of utmost concern to ASEAN+3 policymakers (Figure 2.8). These ongoing shifts will continue to shape—and reshape—not only the ASEAN+3 region's long-term growth path, but also its future role in the global economic order. The chapter looks at each of these secular trends in the region's unique context and experience, and by doing so, offers a few options that will help the region's economies navigate the uncertainties as well as emerging opportunities ahead.

- As highlighted in Section II, Navigating Aging, two-thirds of ASEAN+3 economies are already in advanced- to late-stages of the demographic transition. The strong growth in the region's working-age population—the source of the "demographic dividend" that has helped propel economic growth in the past—is projected to reverse in the second half of this decade. Given its growth implications, the rapid speed of aging across ASEAN+3 economies is raising doubts about the region's macroeconomic prospects. However, when viewed *prospectively*, the ASEAN+3 region, in fact, has a new and largely untapped resource: an expanding older population, who are healthier and can live longer, more productive working lives. As the section highlights, leveraging this resource requires society and policymakers to view aging as not just something to *cope with*, but something to reap *benefits from*. By rethinking aging, the region can successfully turn the "demographic dividend" of the past into the "longevity dividend" of the future.

- Section III, Navigating Trade Reconfiguration, focuses on the key forces underpinning changes in the global trade landscape and how they manifest in ASEAN+3 trade and investment flows. *First*, trade relations globally are being increasingly realigned by geopolitical considerations, resulting in longer value chains especially between China and the United States. In global supply chains where this reconfiguration is occurring, a few ASEAN+3 economies have been able to position themselves as additional nodes. *Second*, global trade is becoming increasingly concentrated. ASEAN+3's import and export market partners have become less diversified compared to previous decades. While this reflects stronger intraregional linkages, such an increase in trade concentration can amplify the propagation of future shocks. *Third*, international trade in services—facilitated by rapid technological advancements—is becoming more important than trade in goods as the driver of globalization. ASEAN+3's exports of modern (and digitally deliverable) services have shown resilience against past economic shocks; but their potential as a growth driver is yet to be fully harnessed.

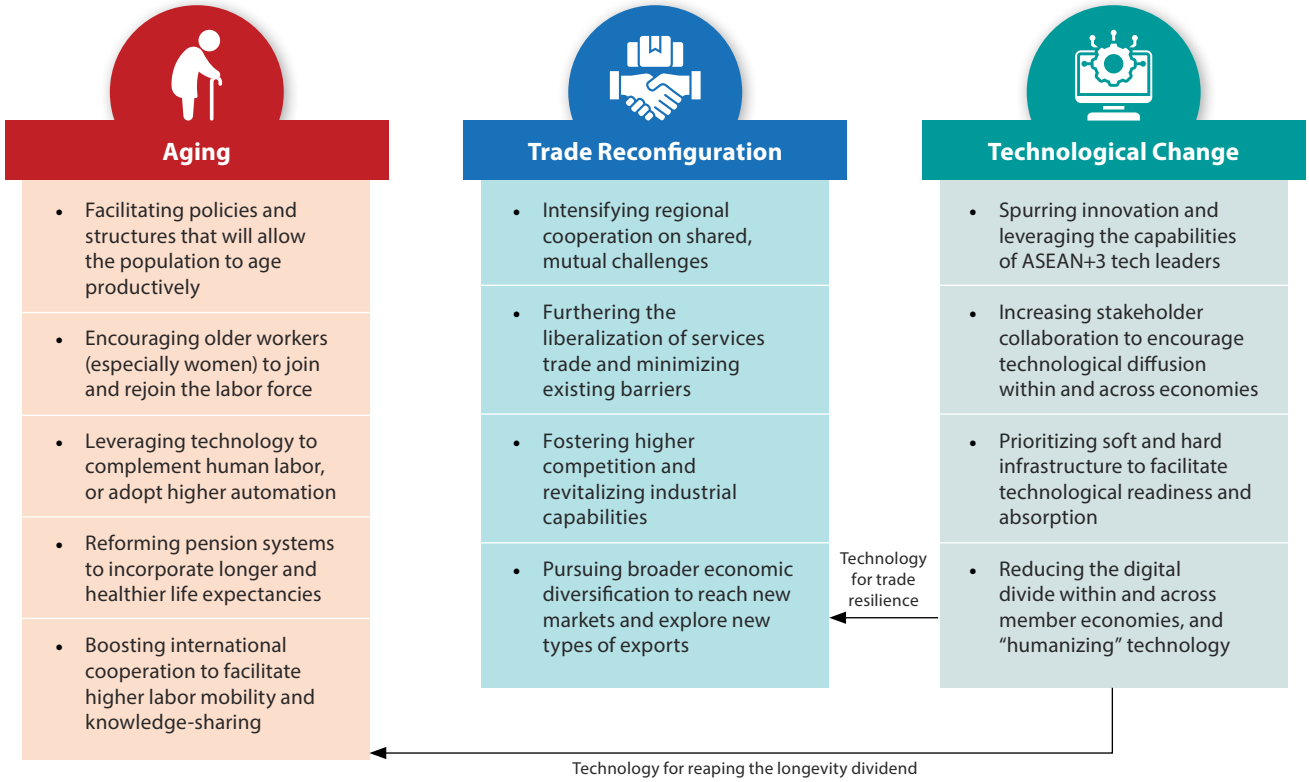
60/ At market exchange rates, the ASEAN+3's share of world GDP is at 28 percent, higher than the United States (25 percent) and the euro area (14 percent). Between 2008 and 2022, the region's contribution to global growth was more than double the combined contribution of both advanced economies.

- Lastly, Section IV, Navigating Technological Change, highlights the dual role technology plays in ASEAN+3's long-term growth. While unlocking solutions to the structural challenges to the region's economies, many new technological breakthroughs—such as digitalization, smart technologies, and artificial intelligence—are fundamentally changing business models and the ways that economies utilize their factors of production. In a *Special Feature*, AMRO staff takes an initial, balanced view on generative artificial intelligence (Gen AI) as a domain that is gathering increasing attention globally, and explores what it implies for the region's workforce. Instead of regarding the technology with concern on its potential to displace jobs, ASEAN+3 economies may benefit from an approach of "qualified optimism." With the proper policies and safeguards in place, Gen AI can be a tool to complement, enhance, and augment the region's labor force.

Well-designed and timely policies, unique to each economy's circumstances, can transform potential risks from these three secular trends into opportunities. The objective of the thematic chapter is to provide context for AMRO's future in-depth research work and help guide domestic and regional policy discussion. For each of the trends, the optimal strategy and policy mix (and timing) will differ across ASEAN+3 economies, but each policy mix can be improved and/or strengthened by the presence of certain key "ingredients" (Figure 2.95). For example, implementing policies and structures that allow for productive aging, accompanied by pension reforms to reflect current demographic realities, will be critical to successfully navigating aging—regardless of whether an economy is in the early or late stages of the demographic transition. Resisting security-based fragmentation and protectionism, while continuously enhancing the ease of doing business domestically, will enable an economy to find a path through the ongoing trade reconfiguration—regardless of the stage of its economic development. Lastly, promoting innovation and technological diffusion, as well as continuously narrowing the digital divide, will ensure that no groups are disproportionately burdened or left behind by rapid technological change.

Among these policies, four common themes emerge that will make for "robust" growth strategies for ASEAN+3, no matter how the future economic order unfolds. Notwithstanding each economy's policy priority—whether rapid aging, trade reconfiguration, technological disruption, or other (domestic) issues—these underlying principles will help reinforce the foundation upon which more specific policies can be built.

Figure 2.95. ASEAN+3: Key Policy Options for Navigating Major Secular Shifts



Source: AMRO staff.
Note: A detailed discussion of each policy recommendation can be found in each section.

- ***Expanding and deepening quality infrastructure.*** Past issues of the AREO have consistently underscored the critical role of good infrastructure—both hard and soft—in invigorating growth and ensuring long-term macroeconomic stability. Reaping the benefits of aging and strengthening the longevity dividend requires a holistic, "whole-of-society" approach to infrastructure development across four domains: physical, social, health systems, and labor markets (NAM 2022). With trade and commerce a lifeblood for ASEAN+3, improving logistics interconnectivity to make regional trade as cost-efficient and seamless as possible will ensure the smooth functioning of regional supply chains in good times, and allow for swift adjustments in times of crisis. The need for widespread digital infrastructure will continue to remain high among the region's spending priorities, especially in a world that is increasingly driven by technological advancement. However, these should not displace the priority put on basic infrastructures like roads, hospitals, schools, utilities, and telecommunications, especially in the region's developing economies (AMRO 2021).

- ***Encouraging innovation and knowledge diffusion.*** Creative and disruptive innovation is a characteristic of a dynamic and resilient economy (AMRO 2022). It will be all but impossible for ASEAN+3 to collect the longevity dividend without innovation in health and work: from the discovery of new medicines, treatments, and other therapeutics, to transforming the nature of work to adapt to an older workforce. New and existing tech-enabled tools—such as "smart supply chains"—and financial technologies can increase the region's overall trade resilience. Embracing and opening up access to these technologies and advanced processes—still concentrated in the hands of a relative few—require a supportive policy environment, one that combines targeted fiscal incentives, robust institutional support, and financing access, especially for innovative firms. Where domestic technological capabilities are still lacking, improving the business environment and investing in local talent will help attract leading multinational enterprises, in turn fostering domestic competition and cultivating technology transfer through FDI.

- ***Promoting inclusivity.*** Discrimination and negative stereotypes toward different groups of society—such as based on age and/or gender—hinder an economy's climb toward higher productivity. A deliberate focus on hiring younger people that arises from misinformed conceptions about older individuals not only leads to additional costs to the hiring firm, but also reduces its future growth and resilience (OECD 2020). Policies that prevent ageism from being pervasive will minimize these economic costs, while allowing the economy to fully unleash the economic potential of a healthy older workforce. By growing the services trade, policy can open massive growth opportunities to a higher share of the ASEAN+3 workforce—especially for women (ADB 2013). Ultimately, ensuring that services trade translates into inclusive growth necessitates addressing gender disparities in all dimensions, such as in education, job types, earnings, and retirement, among others. Capitalizing on the growth opportunities offered by technology—and the growing digital economy—needs to be undertaken alongside the goal of universal digital inclusion in ASEAN+3.

- ***Championing multilateral cooperation.*** Aging, security-based geoeconomic fragmentation, along with climate change and pandemics—these are just some of the long term, common existential challenges to the global economy. Effective responses to these shared challenges require continuous inclusive dialogue among ASEAN+3 economies, as well as cooperation with those outside the region. Upgrading the quality of trade and technological infrastructure will hinge on ASEAN+3 economies' ability to pool regional financing resources and expertise, and to mobilize them. Accelerating technology diffusion to more economies will magnify positive spillovers of innovation, through region-wide productivity gains. Freer movement of people could offer temporary solutions to economies faced with a rapidly shrinking labor force, while more fundamental, domestic adjustments are being made. At a time when the world is increasingly divided, it is imperative that ASEAN+3 stays even more united. Resisting creeping protectionism, remaining committed to the rules-based multilateral trading system, and staying unified will secure the region's long-term growth resilience.

Aging, global trade reconfiguration, and rapid technological changes all interact to make the ASEAN+3 region's long-term growth trajectory more opaque and uncertain. Their associated risks and opportunities could bring forth difficult policy trade-offs for individual ASEAN+3 economies, as well as need firm-handed, domestic adjustments that would have intertemporal and multigenerational consequences. A long-term growth strategy that aligns with the principles highlighted in this chapter will be crucial to enhancing each individual economy's resilience and competitive edge in a highly fluid environment. Simultaneously leveraging the strength of collective action—through stronger regional cooperation—will be key to navigating toward a robust, sustainable, and high-quality future for the entire ASEAN+3 region.

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