Economic Outlook for Southeast Asia, China and India 2021

REALLOCATING RESOURCES FOR DIGITALISATION

2021

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Foreword

The *Economic Outlook for Southeast Asia, China and India* is a regular publication on Asia's regional economic growth, development and regional integration processes. It focuses on the economic conditions of the Association of Southeast Asian Nations (ASEAN) member countries (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam) and two large economies in the region, China and India. Beginning with the first release of the Update of the Outlook in 2018, following the Special Supplements of the 2016 and 2017 editions, the Outlook has become a biannual publication to ensure that the projections, data and analysis remain current and useful. This publication evolved from the Southeast Asian Economic Outlook.

The Outlook was initially proposed at an informal reflection group on Southeast Asia in 2008 as a follow-up of the Council Meeting at Ministerial level (MCM) in 2007 and was accepted by ministers and senior officials from ASEAN countries at the occasion of the 2nd OECD Southeast Asia Regional Forum in Bangkok in 2009. The Outlook project was officially launched in 2010 and each edition is regularly presented at the occasion of the ASEAN/East Asia Summit. It was included in the OECD's Southeast Asia Regional Programme (SEARP) at the Steering Group Meeting in Jakarta, Indonesia in March 2015, with its role of providing a horizontal view of activities, identifying emerging trends in the region and providing a backbone for the different streams of the Programme confirmed at the 2015 MCM. The Outlook serves as a strategic foresight and policy dialogue tool for the SEARP. The Outlook consultation group (OCG) was established in 2014 with OECD Delegations and embassies of Asian countries in Paris.

This edition of the Outlook is composed of two main parts, each highlighting a particular dimension of recent economic developments in the region. The first chapter presents the regional economic monitor, depicting the economic outlook and macroeconomic challenges in the region. The second chapter focuses on reallocating resources for digitalisation in response to COVID-19. The pandemic has intensified the importance of digital health and digital education, and these sectors require further development. Policy makers need to address the existing barriers. To facilitate digital health, clear regulations are necessary to ensure quality health care and strong compliance with rules on data protection. Health care professionals must also be trained to master the use of digital tools. In digital education, strengthening teachers' digital skills and maintaining quality education in a remote setting are necessary. Furthermore, infrastructure will need to be improved and the benefits of digital health and digital education need to be equitably distributed. The pandemic has also accelerated the fourth industrial revolution. Industry 4.0 technologies have allowed firms to stay responsive to market needs. Several countries in Emerging Asia have taken initiatives to support digitalisation during the pandemic but a number of challenges will need to be addressed for a broader adoption of Industry 4.0. The most frequently cited bottlenecks include lack of adequate infrastructure, as well as digital awareness and financial limitations, notably for smaller firms. Greater regional co-operation is necessary to respond to cyber threats and to strengthen cyber resilience in Emerging Asia.

The OECD Development Centre is committed to working alongside governments of developing and emerging economies and regional actors to identify key areas of intervention in order to address these challenges. The Centre enjoys the full membership of three Southeast Asian countries, namely Indonesia, Thailand and Viet Nam, as well as China and India. This project has also benefited from the generous support of other Emerging Asian countries.

The OECD is committed to supporting Asian countries in their efforts to promote economic and social well-being through rigorous analysis, peer learning and the sharing of best practices.

Acknowledgements

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Acronyms and abbreviations

ACCMSME	ASEAN Coordinating Committee on Micro, Small and Medium Enterprises
ACFTA	ASEAN-China Free Trade Area
ADB	Asian Development Bank
ADBI	Asian Development Bank Institute
AE	Advanced Economy
AFC	Asian financial crisis
AI	Artificial intelligence
AMC	Advanced Market Commitment
AMCC	ASEAN Ministerial Conference on Cybersecurity
AMRO	ASEAN+3 Macroeconomic Research Office
APP	Asset Purchase Programmes
ARPU	Average revenue per user
ASEAN	Association of Southeast Asian Nations
ASEAN-5	Indonesia, Malaysia, the Philippines, Thailand and Viet Nam
ASEAN-10	Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam
ASEAN+3	ASEAN-10 countries plus China, Japan and South Korea
ASEAN+6	ASEAN+3 countries plus Australia, India and New Zealand
BI	Bank Indonesia
BOJ	Bank of Japan
BPO	Business Process Outsourcing
BSP	Bangko Sentral ng Pilipinas
CAD	Canadian Dollar
CAGR	Compound annual growth rate
CAR	Capital adequacy ratio
CCC	Cumulative confirmed cases
CDS	Credit default swap
CII	Critical information infrastructure
CLM	Cambodia, Lao PDR, Myanmar
CPI	Consumer Price Index
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
CSA	Cyber Security Agency
DBS	Development Bank of Singapore
DDoS	Distributed Denial of Service
DHLI	Digital Health Literacy Instrument
DOH	Department of Health
DSGE	Dynamic Stochastic General Equilibrium
EC	European Commission
ECB	European Central Bank
EEA	European Economic Area
EEC	Eastern Economic Corridor
EHR	Electronic Health Record
eICU	Electronic Intensive Care Unit
EME	Emerging market economies
ENQA	European Network on Quality Assurance
EQAR	European Quality Assessment Register
ERIA	Economic Research Institute for ASEAN and East Asia
EU	European Union

FDI	Foreign direct investment
FMM	Federation of Malaysian Manufacturers
GAVI	Global Alliance for Vaccines and Immunisation
GDP	Gross domestic product
GFC	Global financial crisis
GPS	Global Positioning System
GSLS	Green and Sustainability-Linked Loan Grant Scheme
GVC	Global value chains
ICT	Information and communication technology
ICU	Intensive Care Unit
ILO	International Labour Organization
IMF	International Monetary Fund
INR	Indian rupee
IoT	Internet of Things
IP	Intellectual property
IPO	Initial public offering
IT	Information technology
ITU	International Telecommunication Union
LAK	Lao Kip
LND	Large-scale natural disasters
LNG	Liquefied natural gas
MAS	Monetary Authority of Singapore
MBS	Mortgage Backed Security
MCO	Movement control order
MOOCS	Massive open online courses
MOH	Ministry of Health
MPF	Medium-term Projection Framework
MSME	Micro, small and medium enterprises
MYR	Malaysian ringgit
NEER	Nominal effective exchange rate
NGO	Non-governmental organisation
NPL	Non-performing loan
OER	Open educational resources
OECD	Organisation for Economic Co-operation and Development
P/E	Price-to-earnings ratio
PHP	Philippine Peso
PIAAC	Programme for the International Assessment of Adult Competencies
PISA	Programme for International Student Assessment
PPE	Personal protective equipment
PPP	Public-private partnership
QE	Quantitative easing
R&D	Research and development
RBI	Reserve Bank of India
RCEP	Regional Comprehensive Economic Partnership
ROE	Return on equity
RTL	Radio or television learning
SaaS	Security as a service
SAGE	Strategic Advisory Group of Experts on Immunisation
SGD	Singapore dollars
SHN	Stay at home notice
SME	Small and medium-sized enterprises

STV	Special tourist visa
SVAR	Structural vector autoregressive
THB	Thai Baht
TVET	Technical and vocational education and training
TVP	Time varying parameter
UHC	Universal health coverage
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
USD	US dollars
WB	World Bank
WEF	World Economic Forum
WHO	World Health Organisation
YCC	Yield curve control

Executive summary

The growth slowdown in 2020 caused by the COVID-19 pandemic will significantly affect Emerging Asia. Uncertainty surrounding the economic outlook is remarkably high and ultimately depends on each country's ability to manage the spread of the virus and on continuous policy support. The OECD's *Economic Outlook for Southeast Asia, China and India 2021: Reallocating Resources for Digitalisation* first summarises key macroeconomic developments and provides the near-term regional economic outlook for 2021 (Chapter 1). The *Outlook* goes on to examine the importance of reallocating resources for digitalisation, in the health and education sectors in particular, providing suggestions to address barriers that hinder further adoption of digital tools (Chapter 2). It also reviews Industry 4.0 progress and highlights the need to strengthen cyber resilience.

Recovery in Emerging Asia faces significant challenges through 2021

Economic output is unlikely to return to pre-pandemic levels across most Emerging Asian economies in 2021. Average ASEAN real GDP growth in 2021 is forecasted at 5.1%, following an anticipated contraction of 3.4% in 2020. In Emerging Asia – ASEAN-10, China and India – real GDP will increase by 7.4% on average in 2021, after decreasing by 1.7% in 2020. However, the outlook varies greatly among countries depending on factors such as the length and severity of restrictions and lockdowns, differing initial conditions and economic structures, and government capacity to support households and businesses. India is anticipated to be the worst affected Emerging Asian economy with an estimated GDP decline of 9.9%, while Viet Nam will post the strongest growth rate in 2020 (+2.6%). Within ASEAN, the Philippines is projected to experience the sharpest GDP contraction in 2020 (-9.0%). Cambodia's 2020 growth rate (-2.9%) is expected to be the weakest among the CLM countries – Cambodia, Lao PDR and Myanmar. China is set to post positive annual growth for 2020 (1.8%).

Lingering health concerns and government restrictions have weakened consumer spending. A balance sheet recession, in which households and firms pay down debt rather than spending or investing, represents a further risk. This risk is greatest in countries with highly indebted non-financial corporate sectors and fiscally constrained governments. Subdued global growth has also weakened the external sector's contribution to growth in the region. Nearly all countries are expected to experience a deterioration of their current account balance, with the sharpest corrections in countries highly dependent on tourism and exports. Intra-ASEAN exports contracted year-on-year during the first three quarters of 2020. ASEAN exports elsewhere mostly benefited from the rebound in China. Lockdowns and restrictions have led to more significant job losses than in past recessions. Finally, risks to the inflation outlook are broadly balanced, as the pandemic-induced downturn has left its mark on both global and domestic factors underpinning price developments.

Many obstacles threaten the economic recovery. Until an effective vaccine against COVID-19 is widely available, viral transmission will continue to put considerable pressure on health care systems. It will also prevent a timely withdrawal of social restrictions and a return to normal economic conditions. Policy makers need to enhance their pandemic management strategies continuously throughout this period, guaranteeing efficient storage and equitable distribution of vaccines.

Governments in the region will have much less capability to ramp up countercyclical policy if recovery momentum falters. After broad-based monetary policy easing during 2020, real interest rates are historically low. With less room for monetary manoeuvre, policy makers across some Emerging Asian countries turned to unconventional policy during 2020. It is likely that the focus will change from further rate cuts to improving

monetary policy transmission. Several alternative policy options could be considered to facilitate this. One is a monetary policy regime shift in the form of average inflation targeting, or using the natural rate of interest as a supplementary reference of monetary policy. In addition, a tiered rate of interest system could render low interest rates more sustainable for the banking sector.

Moreover, a raft of support measures in 2020 has stretched budget deficits, constraining governments' capacity to engage in further fiscal expansion. For many governments, the key focus in 2021 will be stabilising budget deficits, debt burdens and, in some cases, debt servicing costs. External funding risks will remain the overriding concern for many liquidity-strained governments. With narrower fiscal space, policy makers should devote their attention to improving fiscal multipliers to achieve the dual objective of supporting the economy while restoring fiscal rectitude.

Reallocate resources for digitalisation in health, education and Industry 4.0 in response to COVID-19

Digital health was already an emerging policy priority in the region before COVID-19, and the pandemic has intensified its importance. Various initiatives are necessary to ensure the continuity of telemedicine as a viable alternative to traditional health care. With the digital health industry expanding its services during the pandemic, policy makers need to establish a clear legal framework for data protection that governs the collection, storage, processing and sharing of patients' data. Moreover, simplifying reimbursement rules and expanding their coverage could accelerate telemedicine adoption and ensure its financial sustainability. In addition, policy makers need to overcome several technical and infrastructure barriers to the development and wider adoption of telemedicine, as well as upskilling health professionals in digital technologies. Finally, public authorities should guarantee the equitable distribution of digital health benefits by ensuring equal access to reliable, affordable and easy-to-use equipment.

The pandemic and subsequent government responses have disrupted or transformed the education of billions of students around the globe. The sudden need to adapt to a digital environment has been challenging for schools, teachers and parents alike. Despite much progress, a considerable amount of work remains to be done, including expanding information and communication technology (ICT) infrastructure and access to the Internet and digital devices, to ensure equal access to online education. Many instructors and teachers may need to upgrade their digital skills, and colleges and universities must strive to maintain quality in a remote setting. Moreover, the latter may need to collaborate with the government to support students whose economic situation has changed. Besides, as the pandemic disrupts industries such as travel, tourism and hospitality, causing job loss, there is a significant demand to upskill and reskill adult workers. While lifelong learning programmes and the technical and vocational education and training (TVET) sector could provide this support, they must first adapt to the digital age.

Finally, the COVID-19 pandemic is providing a key impetus for the acceleration of the fourth industrial revolution. Industry 4.0 technologies have allowed firms to stay responsive to market needs. Several countries in Emerging Asia have taken decisive steps to support digitalisation during the pandemic. The most common measure has been to provide firms with incentives to encourage the adoption of e-commerce and the digitalisation of operations and trade channels. While the region faces common challenges in adopting Industry 4.0 technology, country-specific challenges prevail, as each country is at different level of readiness, with different economic structures. Greater regional co-operation is necessary to respond to cyber threats and to strengthen cyber resilience in the region.

Overview

Macroeconomic assessment and economic outlook

Emerging Asian economies remain in the grip of the COVID-19 pandemic; multiple supply and demand shocks are still shaping activity. The nascent recovery of Emerging Asian economies in the third quarter of 2020 was interrupted by a resurgence of the pandemic that led to the reinstatement of containment measures in several countries (Figure 1), including India, Indonesia, Malaysia and Myanmar. These measures are anticipated to weigh on economic activity and sentiment in the short term, with negative effects on consumption and investment. Nevertheless, the impact is expected to be less acute than in the March-April period of 2020, as recent efforts have focused more on local restrictions and targeted containment measures than on full-scale lockdowns.

Figure 1. **Stringency of COVID-19-related restrictions in Emerging Asian economies**
January-December 2020, stringency index on a scale of 0-100

Note: The figure illustrates the number of Emerging Asian countries in each of the five stringency categories during the respective month. Data as of 20 December 2020, except for Cambodia and Viet Nam (14 December). Monthly values of the index represent the average of daily values for the respective month. An index between 0 and 20 denotes the lowest level of stringency; an index between 80 and 100 corresponds to the highest level of stringency, that could include full-scale lockdowns.
Source: OECD Development Centre based on Oxford *COVID-19 Government Response Tracker.*
StatLink ⟐ https://doi.org/10.1787/888934227906

GDP growth for 2020 is projected to average -3.4% across ASEAN economies and -1.7% for Emerging Asia as a whole, although it will be very uneven among countries (Table 1). Viet Nam will continue to recover quickly, benefitting from an early end to its lockdown phase and from increasing foreign demand. India is projected to record the sharpest real GDP contraction among Emerging Asian countries in 2020, with growth of -9.9%. However, uncertainty surrounding the forecast is remarkably high. In many countries in Emerging Asia, recovery prospects are hindered by limited policy space, declining foreign currency revenues and an uncertain situation on the health front, including possible repeated waves of transmission or mutations of the virus. A key upside risk to the forecast is faster deployment of the vaccine, which would allow a return to a more normal economic situation.

Table 1. **Real GDP growth in ASEAN, China and India, 2019-21**

Percentage

	2019	2020	2021
ASEAN-5			
Indonesia	5.0	-2.4	4.0
Malaysia	4.3	-5.2	7.0
Philippines	6.0	-9.0	5.9
Thailand	2.4	-6.4	4.5
Viet Nam	7.0	2.6	7.0
Brunei Darussalam and Singapore			
Brunei Darussalam	3.9	1.8	3.1
Singapore	0.7	-5.5	5.0
CLM countries			
Cambodia	7.1	-2.9	5.4
Lao PDR	5.5	0.6	5.0
Myanmar	6.8	1.7	5.0
China and India			
China	6.1	1.8	8.0
India	4.2	-9.9	7.9
Average of ASEAN-10	4.7	-3.4	5.1
Average of Emerging Asia	5.4	-1.7	7.4

Note: Data are as of 5 January 2021. Data for India and Myanmar relate to fiscal years. The projections for China, India and Indonesia are based on the *OECD Economic Outlook, December 2020*.
Source: OECD Development Centre.

The economic impact of the pandemic has been broad-based, putting key growth drivers under severe strain. This uncertainty shock has affected the behaviour of economic agents, with significant implications for consumption and investment. Typically, consumption tends to fall less than other more volatile components during an economic downturn. However, the COVID-19 pandemic has radically changed the role of private consumption in driving growth (Figure 2, Panel A). For instance, the Philippines and Malaysia recorded sharp falls in private consumption in the first three quarters of 2020. The medium- to long-term impact of the pandemic on private consumption is yet to be fully ascertained and could be inferred from the analysis of past natural disasters (Box 1). On the supply side, the services sector was severely disrupted by the lockdown measures imposed at the beginning of 2020 (Figure 2, Panel B).

Figure 2. **Contribution by demand and supply-side components to real GDP growth in ASEAN-5 economies, 2018-20**
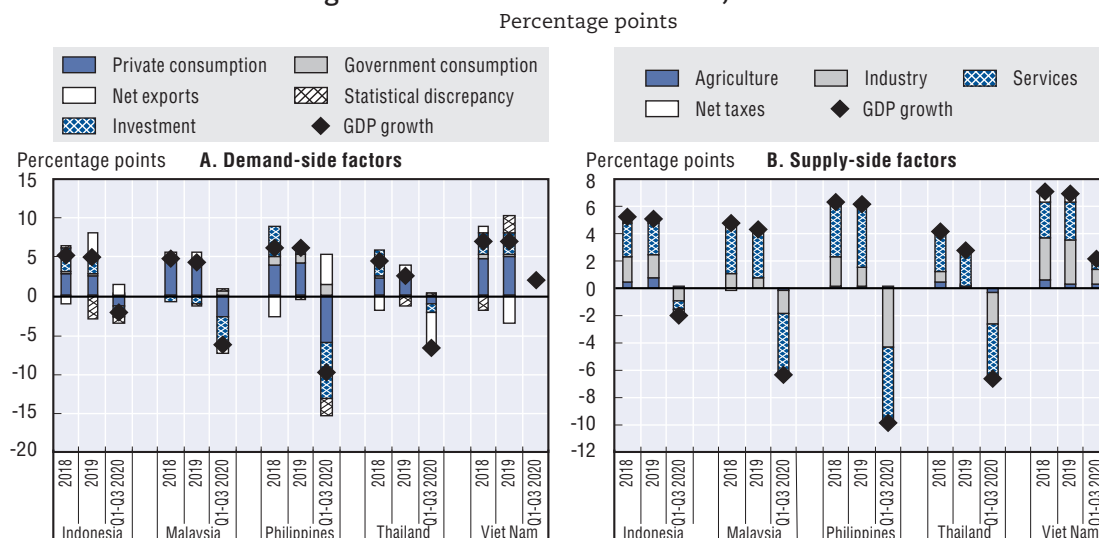
Percentage points

Source: OECD Development Centre calculations based on data from CEIC and national sources.
StatLink https://doi.org/10.1787/888934227925

Box 1. **Changes in consumer behaviour in times of large external shocks: Evidence from natural disasters**

Several studies have empirically demonstrated that large external shocks, such as natural disasters, have a significant effect on private consumption. In addition, the change in consumption behaviour in crisis times is asymmetric across different categories of goods, as consumers tend to postpone purchases of goods classified as discretionary. The consumption effect of the COVID-19 pandemic on private consumption is yet to be fully ascertained.

Figure 3. **Private consumption behaviour in the aftermath of selected natural disasters in Thailand and the Philippines**
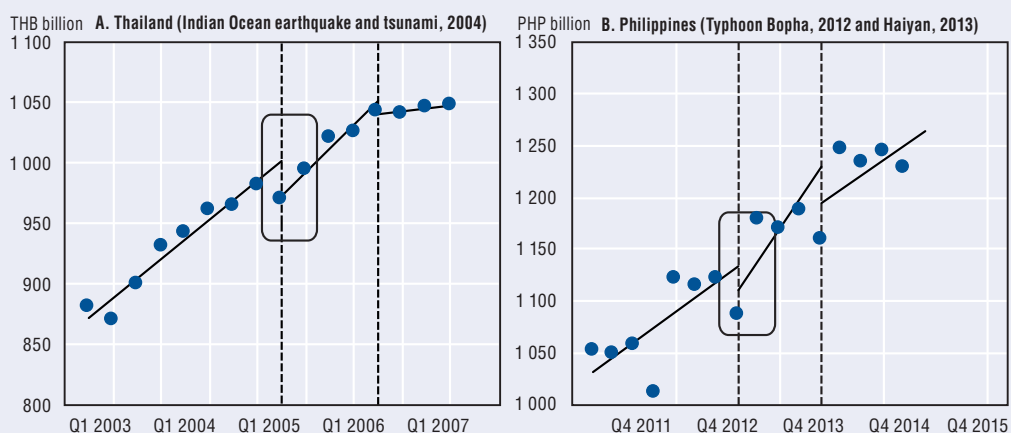
Note: The data represent quarterly household consumption. "THB" stands for Thai baht and "PHP" stands for Philippine peso.
Source: OECD Development Centre based on Tanaka, Ibrahim and Hean (2021).
StatLink https://doi.org/10.1787/888934227944

To contribute to this discussion, analysis of consumer behaviour in the aftermath of selected natural disasters in the Philippines and Thailand was conducted (For more details, see Tanaka, Ibrahim and Hean, 2021). The results show that consumption fell within the quarter immediately following disasters in both countries, though the level of reduction varied by country (Figure 3). However, in line with the literature and the permanent income hypothesis, the study finds that private consumption returns to pre-disaster levels in both countries.

Financial markets have held up well over the past few months, mainly due to the massive provision of liquidity by central banks. Equity markets proved quite resilient, erasing some of the losses recorded as the pandemic struck in the first quarter of 2020 (Figure 4, Panel A). Bond markets continued to price in low credit and interest risk, with 10-year sovereign spreads over equivalent-maturity US Treasuries narrowing in most Emerging Asian countries (Figure 4, Panel B). Although favourable market-funding conditions have helped to cushion the economic impact of the pandemic, they may also reveal a potential disconnect of the financial sphere from the real sphere of the economy.

Figure 4. **Change in benchmark stock price indices and spreads to 10-year US Treasuries of selected Emerging Asian economies, 2020-21**
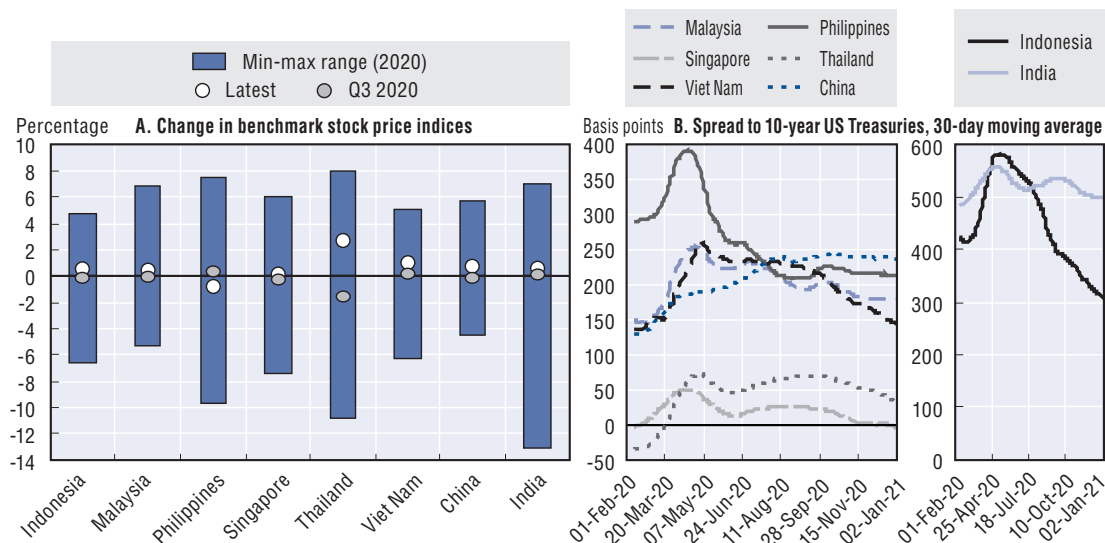
Note: Latest stock price data are as of 5 January 2021. Data for Q3 2020 are as of end-September. Data refer to the following stock market indices: SSE Composite (China), BSE Sensex 30 (India), JSE Composite (Indonesia), FTSE KLCI Index (Malaysia), PSEi Index (the Philippines), FTSE Straits Times Index (Singapore), SET Index (Thailand) and VNI Index (Viet Nam).
Source: OECD Development Centre calculations based on data from Refinitiv Eikon.
StatLink https://doi.org/10.1787/888934227963

Pressure on bank balance sheets could intensify, as debt levels have risen since the onset of the crisis. When looking at the evolution of private debt, most Emerging Asian countries are more concerned about the rise of corporate debt, while Thailand seems to be more exposed to household debt (Figure 5). As debt burdens are increasing and incomes are dwindling, the impact on bank balance sheets may become more acute once debt-relief measures are withdrawn. In addition, an increase in banks' exposure to sovereign debt, a trend particularly visible in Malaysia over the past quarters, could reinforce the complex interlinkages between the sovereign and banks, the so-called "sovereign-bank nexus". This could have important financial stability implications.

Figure 5. **Level and change in private and public sector debt in selected Emerging Asian economies, 2020**

Note: Current level of debt-to-GDP ratios as of Q2 2020. "HHs" stands for households and "NFCs" stands for non-financial corporations.
Source: OECD Development Centre based on data from the Bank for International Settlements.
StatLink https://doi.org/10.1787/888934227982
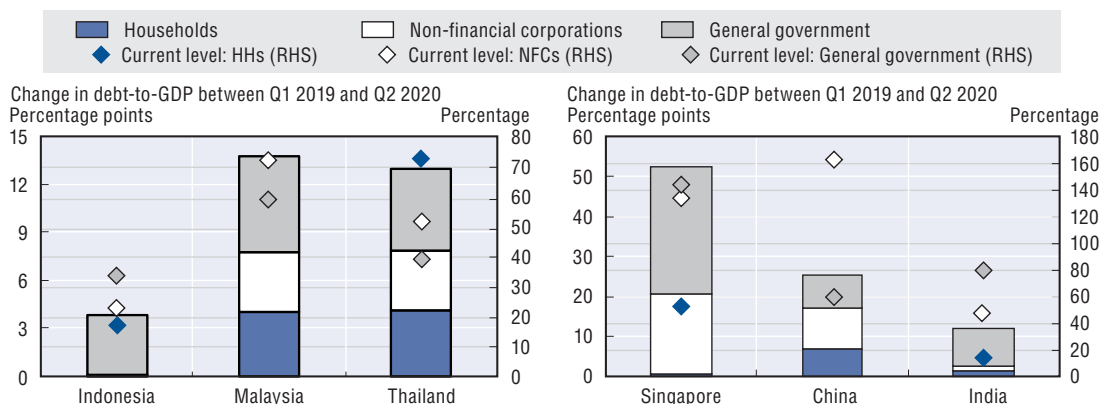
Current account balances will deteriorate in 2020, with most components projected to contribute less than in 2019. Early success containing the virus in East Asia eased supply disruptions that was quicker than the pick-up in global demand. Manufacturing activity has rebounded, but services continue to languish. Tourism-oriented countries are set to suffer the sharpest corrections in their current accounts in 2020. Overall, countries where the current account position is expected to deteriorate in 2020 have experienced much larger depreciations in nominal effective terms, while countries where the current account position is forecast to improve have seen their currencies appreciate.

Trade has recovered over the past months, mostly due to demand from China and, to a certain extent, the United States. China's share in the exports of Indonesia increased from approximately 15% in the first quarter of 2020 to nearly 22% in the second quarter (Figure 6). Similarly, in the case of Malaysia, China's share edged approximately five percentage points higher, from 13% in the first quarter of 2020 to 18% in the second quarter (Figure 6). Looking ahead, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the Regional Comprehensive Economic Partnership (RCEP) are anticipated to contribute substantially to the development of intra-Asia trade and regional co-operation. These two agreements come amid a severe economic downturn and at a time when the gradual erosion of multilateral trading norms and an increased tendency towards global protectionism are curbing global trade.

Figure 6. **Total exports of selected ASEAN economies by destination, Q1-Q2 2020**
Share of total exports, percentage
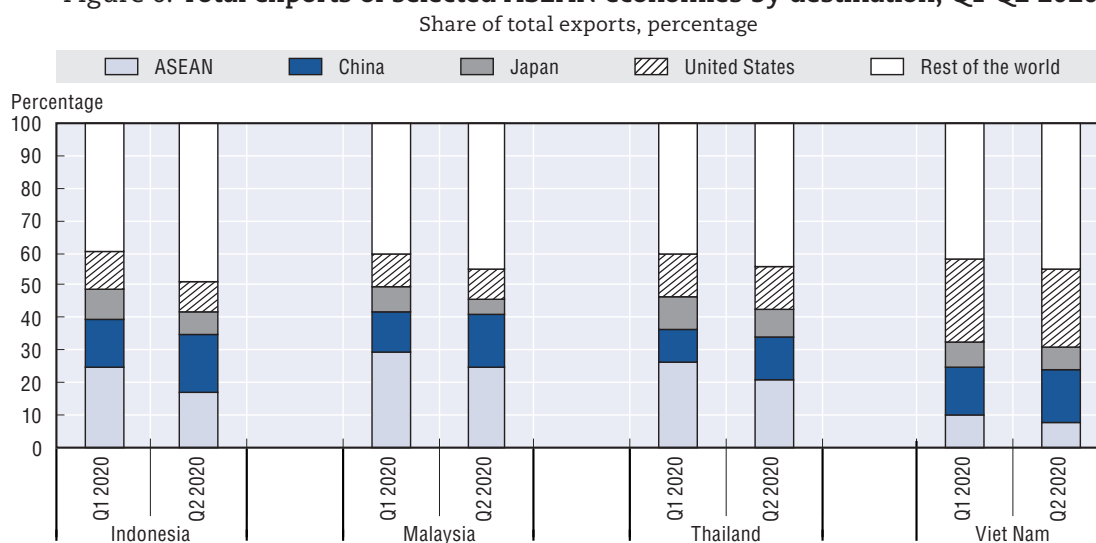
Source: OECD Development Centre calculations based on data from CEIC and national sources.
StatLink https://doi.org/10.1787/888934228001

The COVID-19 pandemic has put labour markets under severe strain. Job losses during the first half of 2020 were unprecedented when compared to similar periods of previous recession episodes in Malaysia, the Philippines and Thailand (Figure 7). The impact has been asymmetric, with younger and less qualified workers more affected by the downturn. Consequently, downward pressures on prices are set to dominate the outlook, as weak demand and labour market slack should more than offset the upward pressure on prices triggered by supply-side disruptions. However, core inflation could edge slightly higher in 2021, with demand for some domestic services anticipated to pick up gradually as remaining restrictions are removed, assuming the pandemic is kept under control. External inflation could see an uptick as the new US administration has pledged more fiscal stimulus.

Figure 7. **Changes in unemployment around recession periods in selected ASEAN economies, 1991-2020**

Note: Recessions are defined as two consecutive quarters of negative real GDP growth. The horizontal axis reports the starting and ending quarter of the recession. Data on quarterly GDP growth for Malaysia are only available starting from Q1 2001. Data on the quarterly unemployment rate in Thailand are not available for the period Q2 1997 to Q4 1998, which has also been identified as a recession. "Change in unemployment rate during the recession" refers to the difference between the unemployment rate prevalent in the ending quarter of the recession and the unemployment rate prevalent in the starting quarter. "Change in the unemployment rate during the year following the end of the recession" refers to the difference between the unemployment rate four quarters after the end of the recession and the unemployment rate prevalent in the ending quarter of the recession. The 1991 Philippine recession was triggered by a combination of fiscal imbalances and exogenous shocks, including worldwide interest rate increases and an unprecedented succession of natural disasters.
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink ⟨⟩ https://doi.org/10.1787/888934228020

Finally, another pandemic-related trend is the larger than anticipated increase in e-commerce and e-payment transactions. E-commerce markets in Emerging Asia have maintained double-digit growth since 2015, and this trend is likely to continue in the medium term. With the implementation of physical distancing and lockdowns, e-commerce has provided effective solutions for the support of daily life. From 2019 to 2020, the number of e-commerce users is projected to increase by 37 million in ASEAN, 71 million in China and 50 million in India. By the end of 2020, more than 60% of the Chinese population had shopped on line at least once. Projected e-commerce penetration in ASEAN increased to nearly 44% in 2020 from 38% in 2019, while in India it increased to 40% from 36% (Figure 8).

Figure 8. **Increasing e-commerce penetration and average revenue per user, 2019-20**
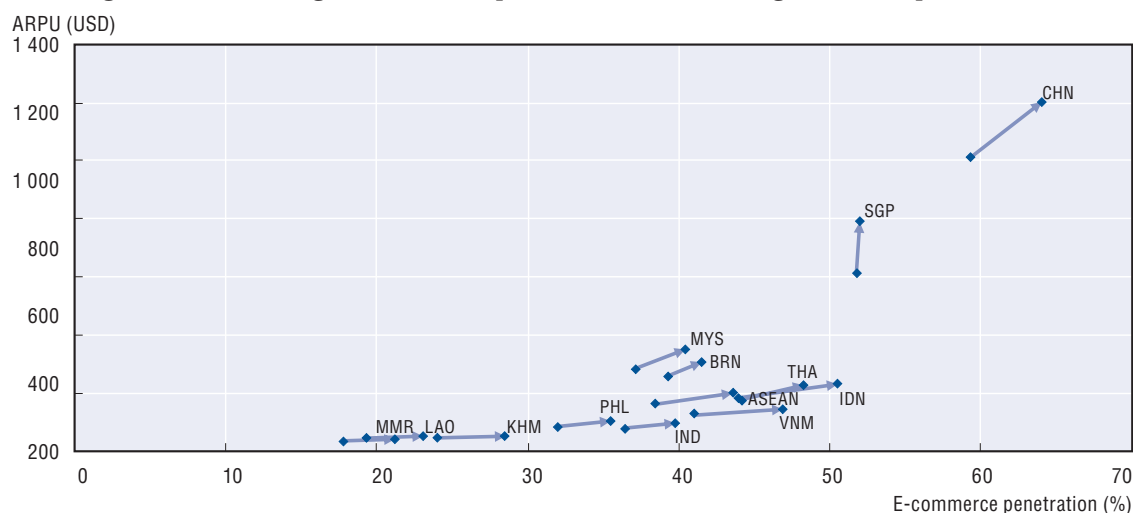
Note: "ARPU" stands for average revenue per user. E-commerce penetration is defined as the percentage of individuals in the respective country that have purchased goods and services on line at least once within the past 12 months.
Source: OECD Development Centre based on data from the World Bank *World Development Indicators* database and Statista.

StatLink ᵃᵃˢᵖ https://doi.org/10.1787/888934228039

The global boom in e-commerce and its acceleration during the COVID-19 crisis are changing mentalities, for example by helping micro, small and medium enterprises (MSMEs) to maintain their business operations during lockdowns. To maximise the use of e-commerce, Emerging Asia needs more holistic strategies at both the national and regional levels. Governments should adopt digital tools to improve the coverage and quality of online public services. They should also create better conditions for self-learning/training. Partnerships with the private sector should be particularly encouraged. In addition, policy makers need to ensure that antitrust rules are fit for the digital age.

ASEAN-5

- In **Indonesia**, the number of confirmed cases of COVID-19 surged in recent weeks. Private consumption was hit particularly hard in 2020, while weaker corporate balance sheets limited private investment. Commodity prices and a weak tourism sector could present further downside risks to a sustained recovery. After an anticipated drop of 2.4% in 2020, real GDP is forecast to grow by 4.0% in 2021, starting from a low base.

- The pandemic and the recent reinstatement of restrictions in **Malaysia** led to an unprecedented downturn in economic activity in 2020, with real GDP projected to contract by 5.2%. By averting large-scale lay-offs, Malaysia is anticipated to see economic growth rebound to +7.0% in 2021, from a low base, unless restrictions on movement are extended or tightened for a prolonged period.

- In the **Philippines**, the pandemic and ensuing restrictions dragged the economy into a deep recession. The contraction of real GDP in 2020, at -9.0%, is projected to be the most severe among ASEAN economies. Public investment and net exports are expected to support a partial economic recovery in 2021 (+5.9%), although rising debt costs, declining remittances and the capacity of the government to service debt remain major downside risks to the outlook.

- **Thailand** has been severely affected by the pandemic, as its dependence on international tourism makes it particularly vulnerable to shocks triggered by

travel restrictions. The number of cumulative confirmed cases of COVID-19 saw a spike over the past few months. The rapid appreciation of the Thai baht in the final quarter of 2020 has been another drag on a fragile economic recovery. Additional risks are related to rising household debt and an escalation of social tensions that could further hamper growth. The anticipated 6.4% real GDP decline in 2020 will be followed by growth of 4.5% in 2021, from a low base.

- The successful measures implemented to contain the pandemic in **Viet Nam** have supported a relatively quick rebound of the economy in 2020, forecast at 2.6%, the strongest in the Emerging Asia region. The resilience of the industrial sector contributed decisively to growth, despite the fact that major factories were initially affected by supply-chain disruptions. Real GDP is anticipated to grow by 7.0% in 2021, although the outlook for exports remains highly uncertain.

Brunei Darussalam and Singapore

- The economy of **Brunei Darussalam** is in for a solid performance in 2021 (+3.1%), following relatively robust growth in 2020, anticipated at 1.8%. The external sector made a large positive contribution to growth in the first half of 2020, as exports increased steadily in the second and third quarters of the past year. Industrial production also remained robust, driven by construction at a major petrochemical refinery.

- **Singapore**'s economy contracted sharply in 2020 due to the pandemic (forecast at -5.5%). External demand collapsed, especially for business services, as travel restrictions choked the tourism sector. Sizeable budgetary and financial support measures have cushioned the fall in GDP and the rise in unemployment. The anticipated recovery in 2021 (+5.0%) is highly uncertain and largely depends on external demand.

Cambodia, Lao PDR and Myanmar

- The economy of **Cambodia** suffered its sharpest contraction in decades in 2020 (-2.9%). The tourism shock is having severe knock-on effects on domestic consumption and investment, while supply bottlenecks and weak external demand have led to a slowdown in the production of garment, textile and footwear products. A recovery is foreseen for 2021 (+5.4%).

- The substantial disruptive effects of the pandemic further slowed **Lao PDR**'s real GDP growth, which is expected to settle at 0.6% in 2020. The downturn was largely driven by a steep fall in private consumption due to worsening labour-market conditions and rising poverty. Real GDP growth is forecast at 5.0% in 2021, although the depreciation of the Lao kip, the bumpy recovery in tourism receipts and the fall in remittances represent considerable downside risks.

- After a relatively mild first wave of COVID-19 cases in **Myanmar** during the spring of 2020, a much larger second wave followed in the autumn, prompting authorities to reinstate tight restrictions. The shock had widespread effects across the economy, depressing private consumption, industrial activity and net exports. In addition, domestic political risks remain substantial. Following an anticipated modest increase of 1.7% in 2020, real GDP growth is seen gathering pace in 2021 (+5.0%).

China and India

- **China** is expected to post positive GDP growth in 2020 (+1.8%). With the pandemic brought under control early, economic activity rebounded strongly in the second and third quarters of 2020. Despite weaker activity in services, real GDP growth is anticipated to pick up to 8.0% in 2021. As a key source of risk to the outlook, leverage in the public sector and the broader economy will rise significantly.

- **India** is expected to record a historic recession in 2020 (-9.9%), the sharpest fall in Emerging Asia. The recovery of real GDP is expected to gain traction in 2021 (+7.9%), starting from a low base. Uncertainty is high due to underlying structural bottlenecks, such as high reliance on services and vulnerabilities in the banking and financial sectors, while unfavourable developments on the health front and narrowing policy space constitute additional threats.

Risks to growth and policy challenges in light of COVID-19

Emerging Asian economies are anticipated to initiate a recovery over the medium and near term as the downturn induced by the COVID-19 pandemic gradually dissipates. However, several risks could derail the growth momentum. These risks are related to the evolution of the situation on the health front and to narrowing monetary and fiscal policy space.

Policy makers need to strengthen their pandemic management strategies on a continuous basis

The pandemic is forcing governments to make quick decisions and take drastic actions to protect their citizens. Public health responses relying on human behaviour are economical and easy to implement: wearing masks, washing hands, covering the mouth and nose when coughing or sneezing, disinfecting surfaces and physical distancing. Policy makers should therefore keep raising public awareness about personal hygiene through government campaigns, the news media and social media.

The response to the COVID-19 pandemic has created opportunities to reform health care systems in ways that were rarely possible previously. A government has the obligation to ensure the provision of health care for all, and this cannot be achieved without adequate staffing and sufficient medical equipment. There is still a real need for health professionals in hospitals, both in big cities and in rural or remote areas where health staff is typically sparser. The workforce needs to be expanded, and ongoing investment in training and education of health professionals should be provided for a more sustainable health care system.

With the stabilisation of the COVID-19 situation in more countries, the health care focus could be shifted from treatment back to prevention. Persistent shortages of critical medical supplies, such as personal protective equipment (PPE), present a danger not only to the public but also to doctors and nurses. Health care workers are more vulnerable than the general population due to their frequent contact with infected individuals. Health care systems were overstretched in the early stages of the pandemic. As the crisis eases thanks to limited business activity, tight border restrictions and deployment of a vaccine, policy makers need to maintain a skilled and qualified workforce by ensuring adequate supplies of PPE, including face masks, goggles, face shields, gloves and protective suits.

As the number of cases soars in some Emerging Asian countries, hospital capacity is another important policy focus. During a pandemic, hospital beds are used as an indicator of health care service availability. In the event of an outbreak, the influx of patients can rapidly lead to hospital saturation. More hospitals thus need to be built, and this requires the readying of space, human capital and equipment. Demand can be high for critical care resources, such as ventilators and beds in intensive care units, especially in rural areas and smaller hospitals. Individuals should have equal access to health care facilities during and after the pandemic, regardless of location of residence.

With governments under pressure to secure COVID-19 vaccines for their population, it is important that countries in the region work together to maintain a steady and affordable supply. The distribution of a vaccine requires a substantial and developed logistical infrastructure with cold-storage facilities. In order to be effective, the COVID-19 vaccine

needs cold temperatures during both transportation and storage. This can be provided through so-called cold chain equipment, which provides a temperature-controlled supply chain from the time of production to final delivery and administration of the vaccine. Deficient power supplies or a power outage can disable the equipment, breaking this chain and resulting in doses of the vaccine being spoiled. Another issue countries are facing is the efficient and fair distribution of the vaccine. When supply is insufficient, resources should be allocated based on an ethical framework and epidemiological models, adapted to the situation in each country.

The focus of monetary policy should shift to improving policy transmission

Over recent months, Emerging Asian authorities have implemented various measures to counteract market dysfunctionality, through a broad range of tools. Central banks have brought down key policy rates and reserve requirements for banks in several steps. The central banks of China, India, Indonesia, Malaysia, Myanmar, the Philippines, Thailand and Viet Nam lowered policy rates by between 30 and 300 bps in 2020 (Figure 9, Panel A), while the Monetary Authority of Singapore (MAS) has kept its exchange rate-based monetary stance unchanged since April 2020. China, India, Indonesia and the Philippines also implemented reductions in reserve requirement ratios (RRR) applicable to banks (Figure 9, Panel B).

Figure 9. **Monetary policy actions in selected Emerging Asian economies, 2020**

Note: For China, policy rate relates to the one-year loan prime rate; RRR cuts for small and medium banks in China that specialise in lending to priority sectors are even larger. For India, SLR means statutory liquidity ratio and CRR means cash reserve ratio. For Indonesia, the first local-currency RRR cut was announced in December 2019, effective January 2020. In March 2020, Indonesia lowered the foreign currency RRR by 400 bps and the RRR of banks engaged in import and export financing by 50 bps. For the Philippines, RRR covers commercial banks' local currency deposits. The data are from 1 January 2020 to 4 December 2020.
Source: OECD Development Centre calculations based on data from CEIC and national sources.
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The successive policy rate cuts have substantially narrowed monetary space across most Emerging Asian countries. Monetary policy has therefore entered unconventional territory in order to preserve monetary space and avoid further deepening of the economic downturn. Several countries launched purchases of government bonds denominated in

domestic currency to rectify market dislocations and to act as buyers or dealers of last resort. India, Indonesia and the Philippines are among the emerging market economies that have called upon the central bank to support the economy through unconventional measures. The central banks of these three countries have resorted to quantitative easing, as narrowing monetary space called for alternative forms of balance-sheet expansion.

The scope for additional monetary policy rate cuts is limited in most countries in the region. The focus of monetary policy could likely shift from lowering interest rates to improving policy transmission. Several policy options could be envisaged to preserve monetary space while supporting the economy. Each of these options has specific advantages, but also carries risks that need to be carefully considered.

Quantitative easing (QE) programmes and a yield curve control (YCC) policy are potential avenues, but these two policy options have some limitations, rendering them unsuitable in the current circumstances. Central banks could expand their QE programmes and try to maximise their effectiveness, but they could soon face difficulty in purchasing sovereign bonds. While an YCC policy could be a more efficient tool than the current sovereign asset purchases, this policy may put a central bank in a precarious situation because exiting rate targeting is potentially challenging.

Adjustments to the monetary regime or the implementation of a tiered interest rate system are potentially more promising. In Emerging Asia, inflation-targeting regimes are currently in place in Indonesia, the Philippines, Thailand and India. However, over the past few years the central banks of the four countries have struggled to maintain headline inflation within the target range. Average inflation targeting may be an effective tool in the current economic environment, where sluggish price increases have obliged central banks to implement hefty policy rate cuts, thus narrowing monetary space. Implementing an average-inflation targeting regime could pose practical challenges, however. For instance, the respective central bank would need to define several parameters, including the length of the inflation-averaging period and how quickly it intends to move average inflation back to target, among other parameters. Tiered interest rates, whereby low or negative rates are limited to only a part of a bank's overall balance sheet, could achieve the dual objective of supporting the economy while limiting the impact on bank profitability.

The COVID-19 crisis, accompanied by lacklustre growth, weak investment and high unemployment, has also rekindled interest in the natural rate of interest as a reference for monetary policy makers. Given the importance of the natural rate of interest as a benchmark for monetary policy and, potentially, as an indicator of the monetary stance, an estimate of the natural rate of interest was conducted for several countries in Emerging Asia, namely Indonesia, Malaysia, the Philippines, Singapore and Thailand (Tanaka, Ibrahim and Brekelmans, 2021). In particular, the focus is on the impact of the Asian financial crisis of 1997-98 (AFC) and global financial crisis of 2007-08 (GFC) on the real natural rates of interest of the five countries in the sample. The analysis reveals a decline in the real natural rates of interest over the period under analysis, most notably in Indonesia and Thailand (Figure 11). The impact of the AFC and GFC on the natural rates of interest of Indonesia and Thailand is heterogeneous. The effect is stronger in Indonesia in terms of impact, while the impact is more persistent in the case of Thailand (Figure 10). Policy makers in Emerging Asia therefore need to address the issue of declining natural rates of interest. A combination of structural measures to boost productivity growth and fiscal measures to stimulate global aggregate demand may be needed to reverse the drop in the natural rate of interest.

Figure 10. **Average impact of the AFC and GFC on the natural rates of interest of Indonesia and Thailand**

Note: The dotted lines are the error bands (90% confidence intervals) around the projection estimate. LB stands for lower bound and UB stands for upper bound. The blue line in the middle is the projection estimate (IRF standing for impulse response function). The vertical axis refers to the natural rate of interest and the horizontal axis to the months after the shocks.
Source: OECD Development Centre based on Tanaka, Ibrahim and Brekelmans (2021).
StatLink https://doi.org/10.1787/888934228077

Finally, policy makers need to be mindful of the capital flow implications of monetary policy. Capital flow volatility is a key area of concern and vulnerability for emerging market economies. Surges in capital flows are often followed by sudden stops. This volatility is often the result of changes to the monetary policy stance and other developments in advanced economies, and may not necessarily be related to domestic factors. Low interest rates in advanced economies encourage a yield-search behaviour, triggering outflows from these economies into emerging market economies.

Fiscal support should become more targeted

The fiscal stance was strongly expansionary in 2020 due to the sizeable emergency fiscal measures implemented to shore up economies. Southeast Asian countries have announced stimulus packages amounting to approximately 0.1%-15% of their respective GDPs. The launch of these large-scale packages will lead to a significant worsening of fiscal balances, with a double-digit deterioration anticipated in Singapore (Figure 11). Given the renewed local and national surges in infection rates, the recovery and full reopening of some economies remain tentative, with risks to the downside. The longer each economy remains in semi-hibernation, the longer lasting will be the damage to the corporate sector and the labour market, and the longer the recovery will take. While support measures are expected to be lighter and more targeted over the medium term to ease pressure on public finances, they are not anticipated to be withdrawn fully as long as the private sector is unable to resume its role as the engine of growth.

Figure 11. **Total amount of fiscal packages and estimated impact on the fiscal balance of selected ASEAN economies**

Note: The cut-off date for the fiscal stimulus data is 30 November 2020. Data on amount of fiscal stimulus are not available for Brunei Darussalam. Data on fiscal balance refer to the general government. The 2019 data on fiscal balances are based on the IMF *World Economic Outlook* database, October 2020. The 2020 forecasts of the fiscal balance for Cambodia, Lao PDR, Myanmar and Singapore are based on the IMF *World Economic Outlook* database, October 2020. The 2020 forecast of the fiscal balance for Indonesia is based on the *OECD Economic Outlook*, December 2020.
Source: OECD Development Centre ; OECD Economic Outlook, December 2020; ADB COVID 19 *Policy Database*, https://covid19policy.adb.org/, and IMF World Economic Outlook database, October 2020, https://www.imf.org/en/Publications/SPROLLS/world-economic-outlook-databases#sort=%40imfdate%20descending.
StatLink 🔗 https://doi.org/10.1787/888934228096

The fiscal policy response to the COVID-19 crisis to date has been a patchwork of increased allocations to health care systems and spending on pandemic-related equipment, transfers to households and transfers to firms. With regards to household support, the main theme across countries has been to provide immediate relief to the most vulnerable, while some countries also sought to ensure food security. Indonesia, for example, expanded its social welfare programme to include food assistance. As for measures aimed at the corporate sector, the initial response in most countries focused on shielding vulnerable SMEs and companies operating in the most affected sectors, namely tourism, transport and travel. The most common approaches have been to reduce labour and corporate taxation.

Prior to the onset of the pandemic, Emerging Asian economies had room to expand their primary balance deficits in response to the economic fallout triggered by the health crisis. Debt levels are comparatively lower than in most OECD countries, while prior prudent fiscal management translated into overall stable budgetary balances. Nevertheless, the COVID-19 crisis will leave a lasting mark on public finances in the region. In addition to substantial fiscal stimulus, the declining revenue-to-GDP and rising expenditure-to-GDP ratios through the operation of tax breaks and revenue shortfalls also contribute to explaining the unfavourable fiscal outlook. Government debt levels and budget deficits are projected to increase across the board in 2020.

For many governments, the key focus in 2021 will be stabilising budget deficits, debt burdens and, in some cases, debt servicing costs. The residual maturity of public debt is an important factor affecting refinancing conditions for governments. A large share of debt with a short residual maturity implies that this part must be renewed within a relatively short period, which could turn out to be more costly in times of weak investor sentiment. The share of securities with a residual maturity of one year or less currently ranges from 3.6% in Cambodia to 14.9% in China (Figure 12, Panel A). External funding risks constitute another

overriding concern for many liquidity-strained governments. Indeed, a country's financial vulnerability to a significant deterioration in its fiscal position depends on the share of public debt held by foreign investors. One of the main risks associated with foreign borrowing is that, as interest costs rise over time, servicing foreign debt exerts substantial deflationary pressures on the domestic economy. The share of public debt held by external creditors in 2020 varies greatly across countries, roughly from 9.1% to 53.4% (Figure 12, Panel B).

Figure 12. **Sovereign debt maturity profile and government debt held by external creditors in selected Emerging Asian economies**
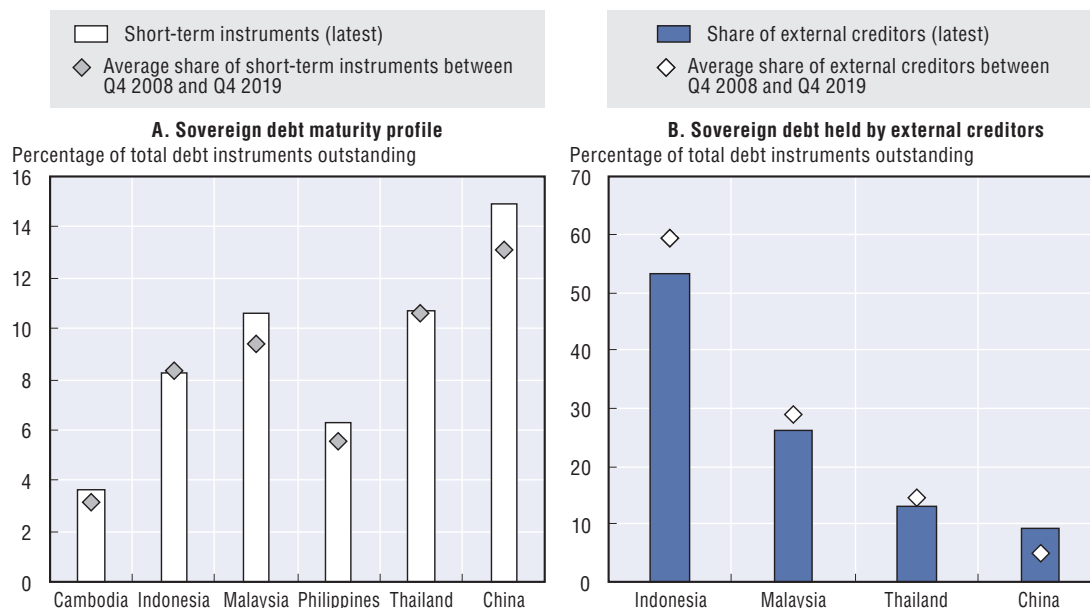
Note: The share of short-term instruments is obtained by summing the share of short-term instruments with initial maturity of one year or less and long-term instruments with residual maturity of one year or less. Data in the Panel A are as of Q2 2020, except for Cambodia (Q4 2019), China (Q1 2020) and Malaysia (Q4 2018). Data in the Panel B are as of Q2 2020, except for Cambodia (Q4 2019), China (Q1 2020) and Malaysia (Q1 2020). In both panels, the data capture central government debt, except for Cambodia and Malaysia (budgetary central government).
Source: OECD Development Centre based on World Bank, *Quarterly Public Sector Debt* database.
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With narrower fiscal space, policy makers should devote their attention to making fiscal support more targeted. Improving fiscal multipliers is of importance for ensuring an effective disbursement of scarce resources. In general, fiscal multipliers tend to be lower in emerging market economies than in advanced economies.

Increasing attention should be devoted to understanding the prerequisites for fiscal stimuli to deliver the desired impact on output. A better understanding is needed on the confluence of several factors, including: the components of government spending, public debt and tax base; fiscal policy, monetary policy, socioeconomic and institutional factors; and the role of central banks and quasi-governmental entities such as sovereign wealth funds and state-owned enterprises. In general, the GDP effects of fiscal stimuli that take the form of public spending shocks (i.e. government consumption and investment) tend to be larger than those involving tax reductions or direct transfers to households.

Maximising the use of digital health tools to cope with pandemics

Before COVID-19, digital health was already an emerging policy priority in the region, and the pandemic has intensified its importance. With a surge in demand for health care and a shortage of physicians in Emerging Asian countries, innovative digital health

solutions reduce hospital attendance, enable rapid delivery of diagnosis and treatment, and provide equality of access to health care. Digital health tools, which minimise physical contact, have also provided safety for the people using them. At the same time, strict quarantines and physical distancing measures have made it difficult for patients to access health facilities. With rural communities heavily disadvantaged by limited medical resources, digital health tools could also reshape the distribution of health workers in rural and urban areas. Digital health has been increasingly explored as a mechanism to improve conditions in underserved regions. Reducing pressure on intensive care units (ICUs) has been a primary public health concern during the pandemic. To improve timely health care access in rural and remote areas and bridge the demand-supply gap, remotely monitored intensive care units (electronic ICUs, or eICUs) were established in several countries even before the pandemic.

Furthermore, digital health helps to increase productivity by gathering large amounts of data on patients to build personal health profiles and even predict their probability of acquiring certain diseases and the evolution of existing conditions. It can therefore be argued that digital health could foster a shift from treatment to prevention. Indeed, health professionals can use this vast knowledge base to offer preventive care, increase the precision of diagnoses and design targeted treatment. The saved time and the reduced cost can allow health professionals to divert their focus to more urgent issues.

During the COVID-19 pandemic, artificial intelligence (AI) has also been used in some OECD countries to carry out specific tasks, such as pre-hospital triage for COVID-19. From a patient perspective, digital health platforms can support the entire cycle, from pre-treatment diagnosis to post-care management. Digital platforms allow patients to book appointments on line, go through a faster triage process and receive electronic prescriptions. They also reduce direct contact between health workers and patients, thus decreasing the risk of hospital contagion and preserving personal protective equipment for health workers.

Emerging Asia's use of digital health tools is booming

Emerging Asian countries quickly recognised the benefits of introducing digital health tools to improve access to health care during the COVID-19 pandemic. Governments across the region have endorsed initiatives to develop telemedicine services to lighten the burden on hospitals and clinics. Although digital health tools have been used for a while in some countries, their wide adoption did not start until the pandemic began. Indeed, the use of digital health tools in the region is booming during the pandemic (Figure 13).

Figure 13. **Daily active users of telemedicine platforms in Indonesia and Singapore, March 2020**
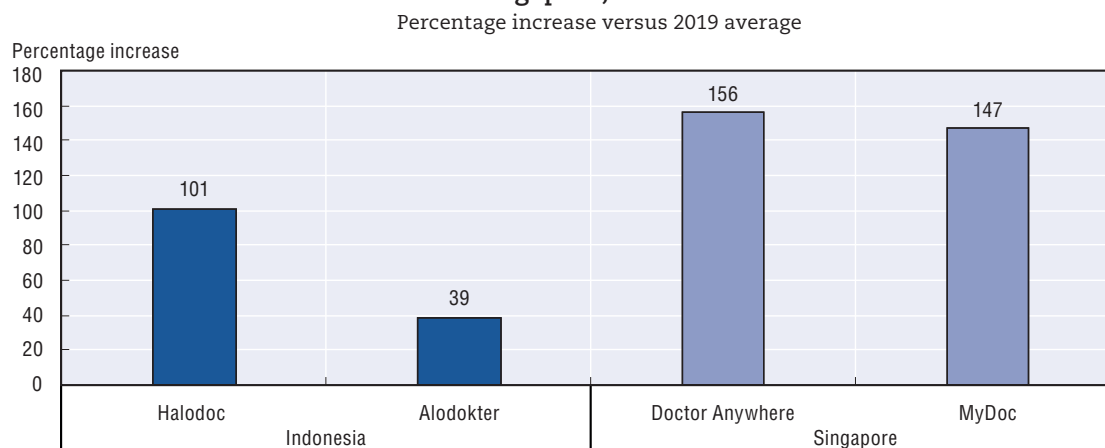
Percentage increase versus 2019 average

Source: Kapur and Boulton (2020).
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Digital health tools provide remarkable ways to overcome barriers to care, especially in archipelagic countries such as Indonesia, the Philippines and Malaysia. In all of these countries, plus Thailand, the rise of interest in telehealth followed the rise in cumulative confirmed cases (CCC) of COVID-19 (Figure 14).

Figure 14. **Interest in telehealth and cumulative confirmed cases of COVID-19 in selected ASEAN economies, February-November 2020**

Source: OECD Development Centre based on data from Johns Hopkins University and Google Trends (accessed on 8 December 2020).

StatLink https://doi.org/10.1787/888934228153
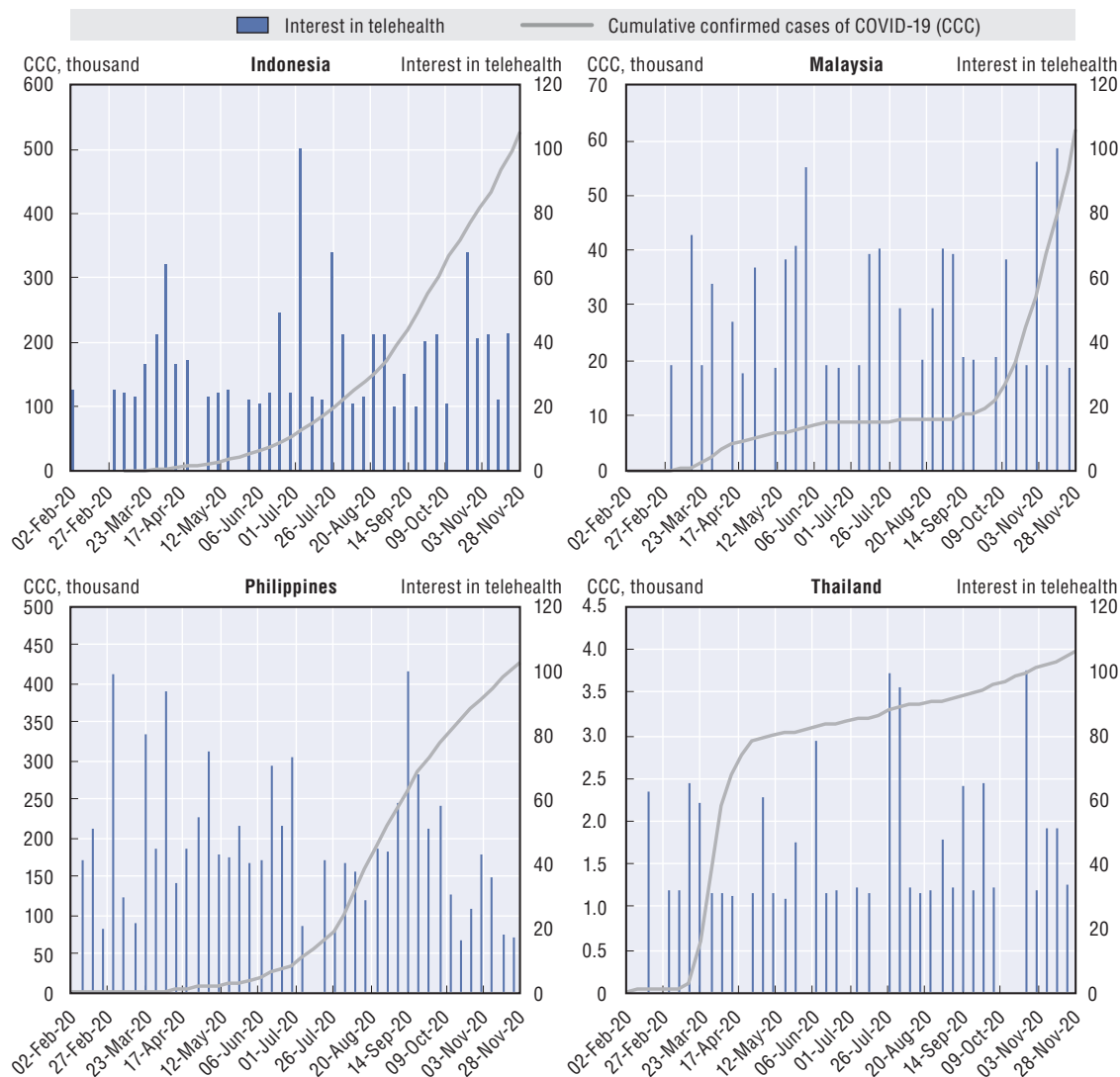
Regulatory frameworks are needed in the digital health industry

As the digital health industry rushes to expand its service during the pandemic, rules and regulations are necessary to ensure that the population receives reliable quality care. Medical licensing authorities at various levels of government should collaborate to provide guidelines that support innovation without compromising safety. Telemedicine frameworks are currently at different levels of development in Emerging Asian countries, and various amendments have been implemented in response to the pandemic.

Privacy and data concerns can deter patients from accessing digital health. A data protection framework is a building block for the sustainability of digital health, but some ASEAN countries lack any legislation on privacy and data protection or have only draft legislation. In 2019, the Global Digital Health Index assessed countries' digital health preparedness and adoption, and measured the readiness of the wider health system to adopt digital health interventions. The index shows that many ASEAN countries lack a legal framework for data security; laws or regulations on privacy, confidentiality and access to health information; a protocol for regulating or certifying devices and digital services; and rules on cross-border data security and sharing.

Governments should strive to protect personal health data by clarifying ambiguities within data governance frameworks. The following steps are important:

- licensing telehealth service providers
- mandating data encryption and password protection on telehealth platforms
- utilising insider threat monitoring
- ensuring continuous investment in consumer data protection.

Expanding the reimbursement of telemedicine is another key determinant of access to care and disease monitoring. The financial sustainability of telemedicine requires reimbursement on a par with that of in-person consultations. Either fee-based or value-based reimbursement schemes could be envisaged, depending on how telemedicine services are produced and consumed. For instance, value-based care and reimbursement is considered to provide more incentives for cost-efficient health care practices.

The digital skills of health care workers need enhancement

An urgent need to upskill health care workers to handle new digital health technologies has become apparent during the COVID-19 pandemic. A majority of ASEAN countries are suffering from shortages of doctors and trained medical personnel. Thorough training on operating technologies and use of digital services must be provided before health care providers face patients. Best practices involve short-term intensive training, such as workshops and seminars, or subsidised online vocational education. Certificates can be delivered to demonstrate the qualification of health workers to use digital platforms. It has also been found that lack of user-centred design is a main barrier for successfully implementing technology into health care. Studies have found that the ability of physicians to integrate technology in their health care operations rests heavily upon this design principle. Technologies should be reliable and easy to learn and use.

Overcoming technological barriers in digital health is crucial

Governments also need to overcome technological barriers to the development of digital health services. Many developing countries do not possess sufficient infrastructure to support the functioning of digital health. At the most fundamental level, the unreliable supply of electricity is the primary barrier to realising the promise of telehealth. In Cambodia, for example, which has relied on power imported from Thailand, Viet Nam and Lao PDR, an uninterruptible power supply should be installed to reduce exposure to the risk of power failures or shortages. In Indonesia, the infrastructure for information and communications technology (ICT) is weak and Internet coverage is lower than in some Southeast Asian countries. While mobile data in Indonesia is very affordable, costing roughly 50% of what consumers in other ASEAN countries pay, average connection speed and Internet bandwidth is much lower than in Singapore, Thailand or Malaysia. Internet coverage in rural and remote areas of some ASEAN countries remains a major concern. In the least developed countries, such as Lao PDR, Cambodia and Myanmar, a large proportion of the population still had no stable Internet access or no Internet access at

all, with Internet penetration rates of 50% or lower as of August 2019. In the medium to longer term, policy makers should boost the digital transformation by removing barriers to investment in networks.

Equitable distribution of the benefits of telemedicine must be ensured

The advent of COVID-19 has shed light on digital divides. Lack of education is a major factor contributing to digital exclusion, as the most educated people are likely to be early adopters of newer technologies. Improvements in health technologies tend to increase disparities in health access across education groups, because education enhances the ability to exploit technological advances. The most educated people therefore make the best initial use of this new information and adopt newer technologies first. Income is another factor restricting broadband adoption and use. For instance, in India, Indonesia and the Philippines, more highly educated people and those with higher incomes are more likely to be Internet users (Figure 15). The gap by level of educational attainment is particularly striking in these three countries.

Figure 15. **Internet usage by level of education and income in selected Emerging Asian economies, 2019**

Note: Data refer to percentage of people who use the Internet at least occasionally or report owning a smartphone.
Source: Pew Research Centre (2020).
StatLink ⟨᠍⟩ https://doi.org/10.1787/888934228172
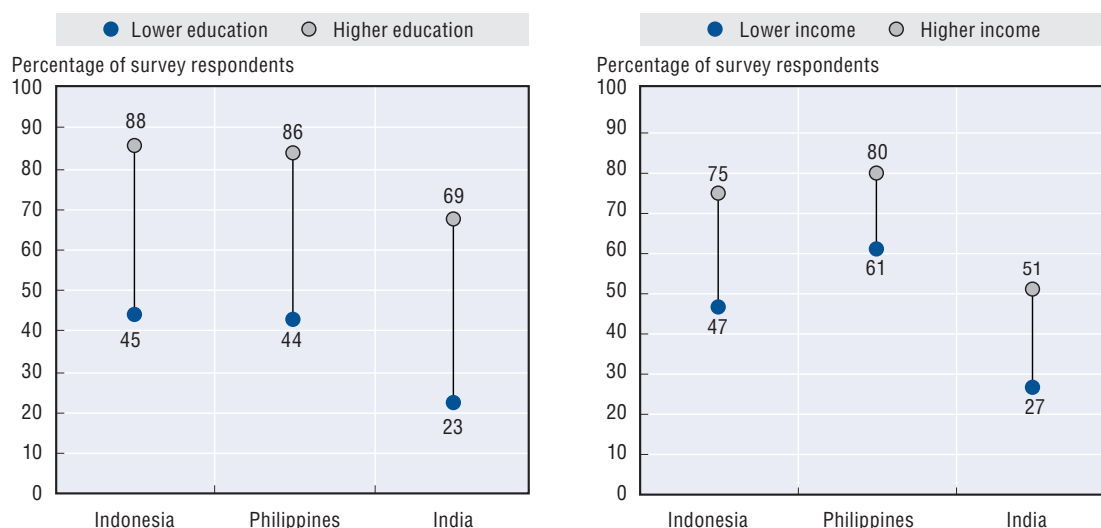
Providing people with access to reliable equipment is undoubtedly the most promising avenue for bridging the digital divide in access to telemedicine. Reopening places that enable free public access to the Internet could be prioritised, with the necessary health safeguards in place. In the meantime, digital isolation could be tackled through immediate and pragmatic solutions. For example, buses equipped with solar-powered Wi-Fi routers are being used to provide Internet access to isolated and underserved communities in the United States. The strategy for reducing digital divides should also involve the establishment of intensive and long-term support networks to help people acquire sufficient digital expertise. Finally, education campaigns are necessary to inform the public about the benefits of telemedicine as a trustworthy health management strategy.

Upgrading digital skills to facilitate online education

The COVID-19 pandemic and subsequent government responses have disrupted education across the globe. Billions of students have had their education interrupted or transformed through attempts to reduce transmission of the virus by limiting physical contact. In addition, at a time when the pandemic is also disrupting industries such as travel, tourism and hospitality, and causing job losses, there is a significant demand for upskilling and reskilling of adult workers, in particular to enhance digital skills ranging from basic computer or digital device operation to innovative tasks in programming.

Schools closed across Emerging Asia in response to the pandemic

Some degree of primary or secondary school closure occurred in China, India and every ASEAN economy during the pandemic. Some of these closures were localised to areas with high transmission rates of the virus, while others were nationwide. Some Emerging Asian countries started to implement school closure policies as early as February 2020, while by April entire school systems were shut across the region (Figure 16).

Figure 16. **School closure policies in Emerging Asia, January to November 2020**
Stringency level*

Note: * The stringency of school closure policies is defined on a scale from 0 to 3, as follows: 0 – no measures; 1 – recommend closing, or all schools open with alterations resulting in significant differences compared to usual non-COVID-19 operations; 2 – require closing, but only some levels or categories (e.g. just high schools, or public schools); and 3 – require closing at all levels. Monthly values of the stringency indicator have been obtained by averaging the daily values for the respective month. Average of ASEAN-10 countries, China and India. Data as of 26 November 2020.
Source: OECD Development Centre based on data from Oxford COVID-19 *Government Response Tracker*.
StatLink 🔗 https://doi.org/10.1787/888934228191

The reopening of schools began in May 2020 in some areas in the region, with the implementation of hygienic measures. Decisions on whether or not to reopen schools, or to what extent, should protect the rights of children and be based on helping them to achieve the best holistic outcome. This approach should consider the benefits and drawbacks of attending physical classes versus staying at home, from various viewpoints: physical health and COVID-19; learning opportunities; mental and emotional health; and risks or costs to family members and communities. Another aspect to consider is the scope of school closures, i.e. whether they should be enacted at the national or subnational level. Several studies have modelled the relative benefits of different school closure strategies during pandemics, but the evidence is rather mixed. Another strand of analysis explores the merits of implementing blended school opening strategies and their optimal structure, distinguishing between alternate weeks and alternate days of in-person learning.

The use of distance learning is increasing rapidly

As students were abruptly forced out of schools, distance-learning strategies were rapidly developed and implemented worldwide in an effort to provide continuity of learning and to stave off the economic costs associated with a delayed education. Figure 17 shows the quarterly downloads of educational mobile apps since the start of 2017, with Q1 2020 (the start of the declared pandemic) having the most downloads.

Figure 17. **Global mobile education app downloads, Q1 2017 to Q1 2020**
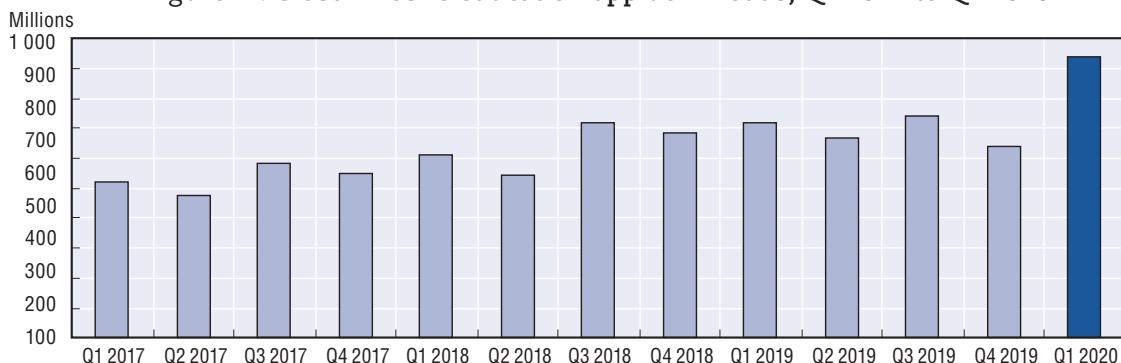
Source: Statista (2020), "Worldwide mobile education app downloads from 1st quarter 2017 to 1st quarter 2020, by platform", www.statista.com/statistics/1128262/mobile-education-app-downloads-worldwide-platforms-millions/.
StatLink ⟨⟩ https://doi.org/10.1787/888934228210

Keyword searches related to internet-based learning significantly increased starting from the first quarter of 2020, the period when physical distancing restrictions began to be implemented in many ASEAN countries. Figure 18 shows keyword search trends on selected national learning platforms for each corresponding country. These trends suggest growing awareness of digital learning.

Figure 18. **Keyword search trends related to selected national learning platforms, 2020**
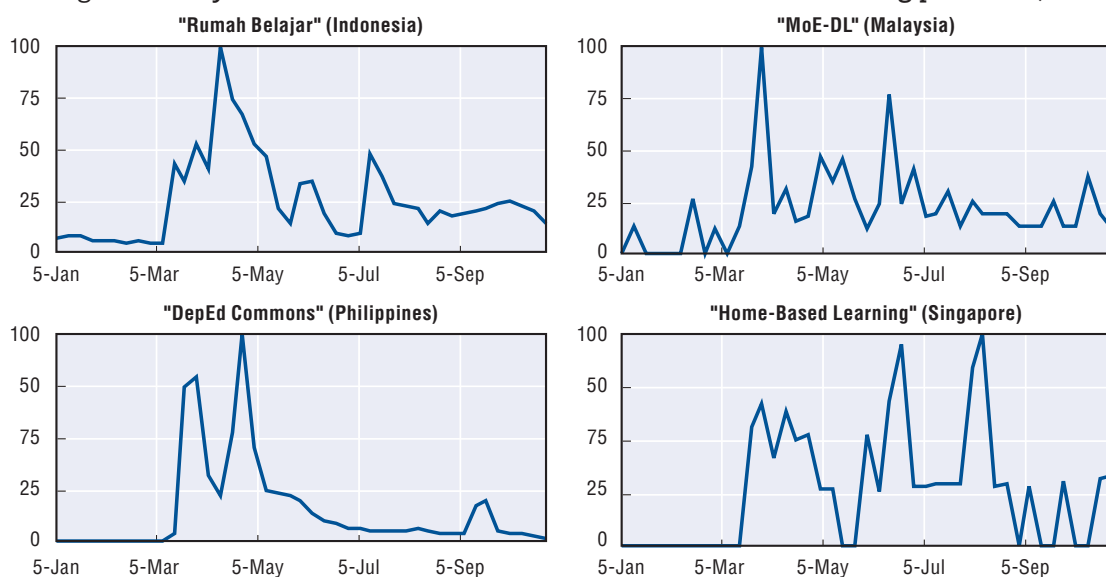
Note: Numbers represent search interest relative to the highest point on the chart for the given country and time (January-October). A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means there was not enough data for this term.
Source: Google Trends, accessed 26 November 2020.
StatLink ⟨⟩ https://doi.org/10.1787/888934228229

Among the ASEAN-10, each country developed national strategies to implement distance learning, with some freedom for subnational authorities to make modifications relevant to their localities. While every country utilised Internet-based learning, several turned to television, radio or mobile phone as alternatives. In some cases, instructors or authorities delivered physical learning materials to students in a safe manner.

Colleges and universities need to ensure the quality of online education

The COVID-19 pandemic has led colleges and universities to transition to online learning. In areas with weaker Internet penetration, however, online learning may not be possible, leading to students deferring their studies. Policies should focus on student retention, both during and after the period of restriction. Governments may need to subsidise tuition or offer soft student loans, with payment or interest holidays for some time after graduation. In the event that academic terms must be repeated due to the interruptions, financial relief should be made available. It is important for educational institutions to consider whether enough of the term material was covered and whether students were properly assessed prior to any consideration of blanket advancement.

Another concern for universities is the administration of examinations. Typical exams are not permissible under public health measures where educational institutions are closed, and this has led to the deferral of exams or graduation until the sanitary situation changes or an alternative method can be found. Challenges include adapting exams for computer-based completion and the preservation of academic integrity. Policy options to curb cheating could include requiring students to use a camera and show identification to prevent someone else from taking the test on their behalf; allowing professors to assess suspected cheating for those who refuse to use a camera; and avoiding fitting grades to a predetermined distribution.

Subjects with necessary practical components, such as sciences, engineering and medicine, require students to spend time on campus to master the use of techniques, tools or software. It is important that students have the opportunity to complete these practical aspects of their programmes in order to be fully qualified to enter the workforce. Universities will have to work with students and authorities to develop methods of allowing students to complete this part of their education safely and with as little delay as possible. Financial investment in the development of online laboratories, typically called WebLabs or iLabs, could be envisaged as a medium-to long-term solution.

Distance learning requires improved ICT infrastructure and attention to digital divides

Differences in Internet coverage and speed have exposed students in Emerging Asia to varying levels of disruption following the implementation of COVID-19-related restrictions. Levels of disruption may have been lower in countries with fast and widely available Internet, such as Singapore and China. Inversely, students in Cambodia, India, Indonesia, Lao PDR, Myanmar and the Philippines have likely faced greater difficulties in studying remotely, as Internet availability and quality are low in these countries (Figure 19).

Figure 19. **Fixed broadband subscriptions and speed in selected Emerging Asian economies**
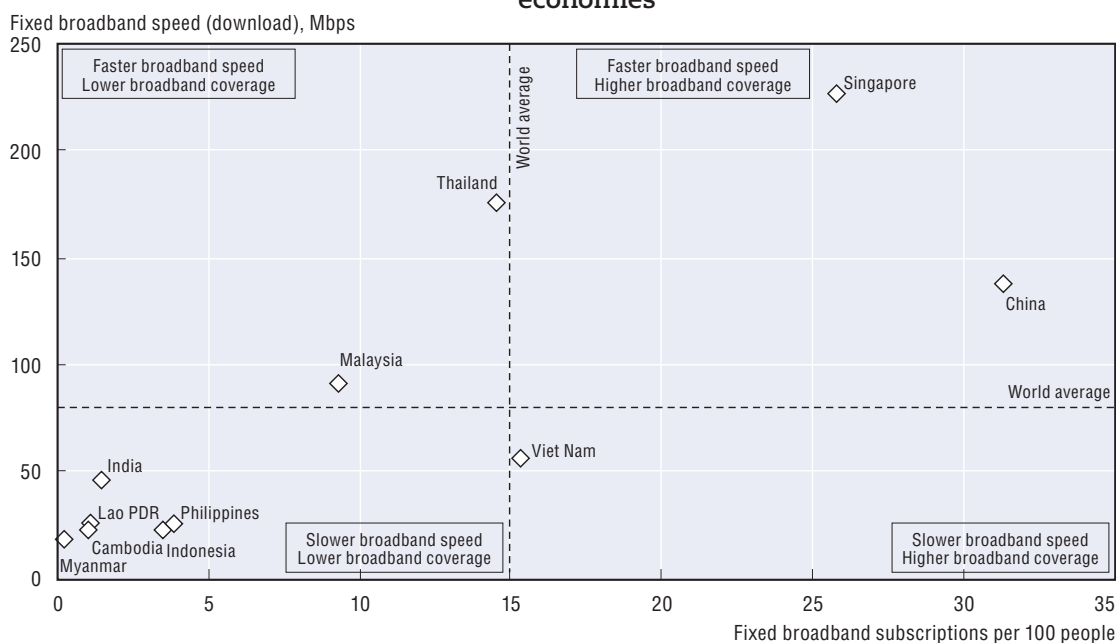
Fixed broadband speed (download), Mbps

Note: Data on fixed broadband subscriptions are as of 2019, except for Myanmar (2018) and world average (2018). Data on fixed broadband speed (download) are as of September 2020.
Source: OECD Development Centre based on data from World Bank and Speedtest Global Index.
StatLink 🔗 https://doi.org/10.1787/888934228248

Access to ICT is the linchpin of the entire distance learning effort. In the short term, several countries have developed alternatives to online learning, as described above, but these have disadvantages. Radio, television and physical home learning (where physical learning materials are safely delivered to homes by officials or post) deny students opportunities to interact with teachers and receive rapid support in the event of questions or learning struggles. A child who misses the scheduled broadcast misses the daily lessons, perhaps with limited if any opportunity to review. Likewise, radio or television learning removes any opportunity for self-pacing.

Multiple digital divides exist in Emerging Asia and pose significant barriers to effective distance learning. Examples include divides among socio-economic or age groups, between genders and among and within countries. Uneven ICT infrastructure development among various provinces or regions within a country could exacerbate regional disparities. For instance, Indonesian ICT development varies significantly by province. The capital, Jakarta, and a handful of other provinces score above the national average, but the bulk of provinces display much lower scores. People who live in areas with weak ICT infrastructure will likely face greater challenges to study and work remotely compared to their compatriots from the capital and other regions with more developed ICT infrastructure.

Two immediate solutions for bridging the digital divide in the short term, as necessitated by public health measures, are to provide data access and devices. Governments and telecommunication companies should collaborate to increase the coverage and capabilities of Internet networks in order to support more connections by more people, especially in disadvantaged areas. Alternative transitory solutions can be offered using mobile Internet relay. Public authorities should consider keeping places that provide public access to the Internet open, with the necessary safety measures in place.

In addition, different video streaming platforms that offer different streaming formats and resolutions could be explored for the conduct of online classes so that students could opt for a lower resolution for viewing in order to save their data allocations.

Lifelong improvement in digital skills is vital

One of the most persistent barriers to digital education is instructors' poor digital skills. In some countries, digital learning technologies sit unused simply because instructors do not know how to operate them. This has been laid bare by the need to pivot swiftly to digital education in response to COVID-19. Moreover, each career or discipline will likely have specialised digital skills that must be learned by a person desiring to enter the field. The ability to master new digital skills rapidly will be critical for stabilising employment and for income mobility.

Several strategies can be implemented on a short-term basis to increase people's capacity to interact efficiently with new technologies. The first could be to reinforce household and family support and community peer support to promote the uptake of digital skills. In the longer term, policy makers should aim to increase the presence of digital skills acquisition in school curricula. For both students and teachers, curricula should be updated to include a focus on developing digital skills, both generally and within the context of school subjects and employment preparation.

As more of the economy moves to digital platforms, people without some basic aptitude will be left behind in their careers. Countries in the region should ensure that lifelong learning for employment is tangibly beneficial and should encourage employers to work towards this goal. Lifelong learning efforts should be widely recognised and lead to benefits such as increases in wages, job security and/or employability. Educational authorities should be in regular communication with industry experts about labour market conditions to direct people to the areas of need and to update curricula continuously to fit current industry standards.

TVET has the potential to play a key role in the recovery but it must adapt

Millions of workers in Emerging Asia will need to reskill to earn a living during and after COVID-19. Some learning platforms are offering solutions to idle workers: those who are not able to continue their regular activities and are unable to work remotely, as well as furloughed workers, workers in informal sectors and self-employed workers. Moreover, some individuals might find returning to full-time study infeasible. Technical and Vocational Education and Training (TVET) offers a unique solution because many TVET disciplines have an apprenticeship component. As an apprentice, one can learn and perform paid work simultaneously.

TVET institutions can co-ordinate with authorities to participate in the health response to COVID-19 while simultaneously encouraging reskilling of newly unemployed workers in sectors expected to have slow or incomplete recoveries. This is already occurring in the region. TVET institutions in Thailand have been asked to contribute to the production of hand sanitiser; some Malaysian TVET institutions are assisting with the production of ventilators; Indonesian TVET institutions are beginning or expanding training for medical equipment technicians; institutions in the Philippines are producing hand sanitiser and masks. For as long as COVID-19 poses a public health threat, medical supplies will remain in high demand. Educational authorities may consider adopting a production school model, where trainees work under supervision as they learn, with only the most necessary theory to perform their required tasks. If these programmes were offered to individuals in need of reskilling, they could provide a short-term solution to unemployment caused by COVID-19 and restrictive measures, while giving people skills to build on for longer-term career prospects.

However, the COVID-19 pandemic has wreaked havoc on the TVET sector due to the closure of workplaces as part of public health measures, depriving students of the practical learning they need. The TVET sector has had to scramble to adapt digitally. Several approaches could be envisaged for ensuring the digitalisation of TVET, including Massive Open Online Courses (MOOCs), Open Educational Resources (OER) and digital simulators. Additionally, with the rapid shift of TVET to digital modes, maintenance of quality instruction is essential. In the European Union, the European Network on Quality Assurance and the European Quality Assessment Register have guided national quality-assurance agencies on their responses. Forming similar bodies at the regional level within ASEAN could help with information sharing on methods to improve TVET and provide more support to reciprocal recognition of TVET training from accredited institutions in ASEAN countries.

Accelerating Industry 4.0 in the post-COVID-19 era

The importance of adopting Industry 4.0 technologies has been highlighted by the COVID-19 crisis. Restrictions on movement have slowed economic activities. Lockdown measures have also disrupted the functioning of global value chains, and this has been particularly problematic for countries with a high dependency on foreign suppliers. Adopting Industry 4.0 technologies can keep employees safe from exposure to disease while maintaining operational activities. Several countries in Emerging Asia have translated their awareness of the potential of advanced digital technologies for economic progress into a national policy agenda (Table 2), even before the pandemic.

Table 2. **Examples of Industry 4.0 initiatives in Emerging Asia**

Country	Industry 4.0 initiatives	Launch year
ASEAN-5		
Indonesia	Making Indonesia 4.0	2018
Malaysia	Industry4wrd	2018
Philippines	Inclusive Innovation Industrial Strategy (i3s)	2016
Thailand	Thailand 4.0	2016
Viet Nam	National Digital Transformation Programme by 2025 with orientations towards 2030	2020
Brunei Darussalam and Singapore		
Brunei Darussalam	Digital Economy Masterplan 2025	2020
Singapore	Smart Nation Smart Industry Readiness Index	2014
	SMEs Go Digital	2017
China and India		
China	Made in China 2025 Internet Plus	2015
India	Make in India SAMARTH Udyog Bharat 4.0	2014

Source: OECD Development Centre compilation based on national sources.

As countries seek to reform their industries, the region has seen wide adoption of industrial robots. Asia remains the strongest market for industrial robots, with the share of newly installed robots accounting for two-thirds of global supply. China's annual installation of industrial robots is the highest globally, with around 140 500 new robots installed in 2019 (Figure 20).

Figure 20. **Annual installations of industrial robots and robot density, 2019**
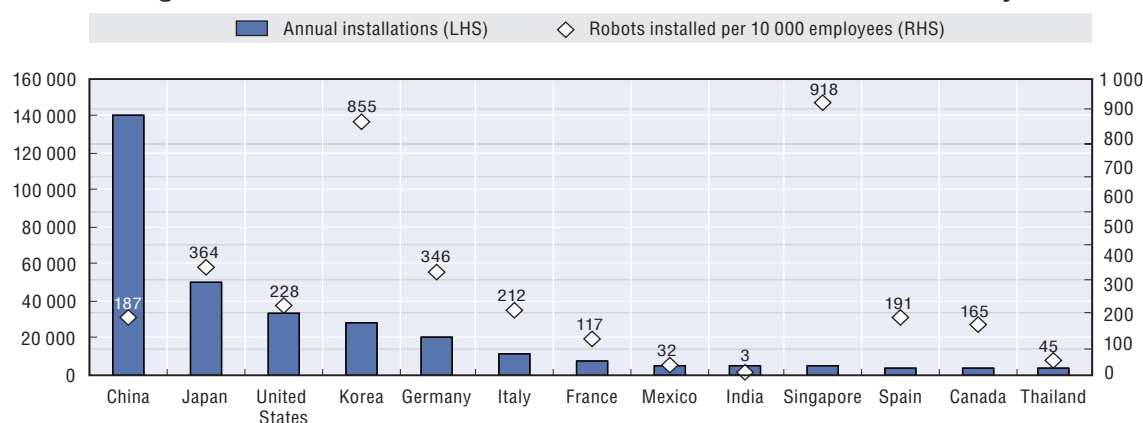
Note: Data for annual installations in Singapore are from 2018. Data for robots installed per 10 000 employees in Mexico, India and Thailand are from 2016. LHS means left-hand scale. RHS means right-hand scale.
Source: OECD Development Centre based on data from IFR and Consultancy Asia (2018).
StatLink ⟨⟩ https://doi.org/10.1787/888934228267

The pandemic accelerates progress towards Industry 4.0

The coronavirus pandemic appears to be working as a trigger for accelerating the fourth industrial revolution. Indeed, innovation, agility and flexibility in production systems are proving essential for firms to survive during the pandemic, and Industry 4.0 technologies are allowing firms to stay responsive to market needs. In parallel, the need to manage cash-flow pressures that have arisen during the pandemic has pushed many firms to improve business efficiency using technology. Many businesses in Emerging Asia, including SMEs, are tapping into the opportunities offered by the digital economy as a way to cope with the COVID-19 crisis and initiatives have been introduced or adjusted by governments to spur digitalisation of businesses to help them thrive amid the pandemic (Table 3).

Table 3. **Initiatives to support digitalisation during COVID-19**

Country	Initiative	Details
ASEAN-5		
Indonesia	IoT Smart Machine	Providing IoT Smart Machines to retail markets, pharmacies and supermarket chains to minimise personal interactions when people purchase daily necessities and groceries
Malaysia	National Economic Recovery Plan (PENJANA)	Offering a set of incentives for MSMEs and mid-tier companies to encourage adoption of e-commerce and to digitalise operations and trade channels
Philippines	Small Enterprise Technology Upgrading Programme (SET-UP)	Providing assistance to MSMEs for procuring necessary equipment and training, and offering an innovation enabling, interest-free loan of PHP 5 million (Philippine pesos).
Thailand	Saphan Digital	Offering local businesses, individuals and NGOs a wide range of digital support and access to experts to help them acquire digital skills
Viet Nam	Digital transformation campaign	A campaign to step up digital transformation using cloud computing technology; some domestic cloud-computing enterprises have committed to offer a 20% discount to new users to stimulate demand
Brunei Darussalam and Singapore		
Brunei Darussalam	eKadaiBrunei	An online e-commerce directory to facilitate a safe and convenient way to do business amid the pandemic; the directory lists online grocery stores, department stores, delivery systems and payment platforms, among others
Singapore	Stay Healthy, Go Digital	Providing support for SMEs to adopt pre-approved digital solutions through grants, free trials and limited-time offers
China and India		
China	Action Plan to Digitalise MSMEs	Collecting and pooling digital service providers, and recommending a range of digital platforms, solutions, products and services for MSMEs; the plan focuses on promoting digital management and operation, exploring new business models such as service-oriented manufacturing, using digital platforms to guarantee supply chains and strengthening data sharing and development
India	Digitalising MSMEs	Providing support to develop platforms, apps and software products such as enterprise resource planning (ERP), accounting and customer service software

Source: OECD Development Centre compilation based on national sources and OECD (2020).

Industry 4.0 faces country-specific challenges in Emerging Asia

While there are common challenges in the region concerning Industry 4.0, country-specific challenges prevail, as each country is at a different level of readiness and has a different economic structure (Table 4). These challenges include a lack of digital awareness, insufficient budget, a shortage of skilled labour and inadequate infrastructure.

Table 4. **Country-specific challenges for Industry 4.0 in Emerging Asia**

Country	Industry 4.0 challenges
ASEAN-5	
Indonesia	Raising awareness of new digital technologies
Malaysia	Addressing financing issues to boost digitalisation of SMEs
Philippines	Meeting the need for future skills
Thailand	Overcoming skills shortages
Viet Nam	Creating incentives for digital transformation
Brunei Darussalam and Singapore	
Brunei Darussalam	Fostering digital awareness and SME development
Singapore	Boosting technology adoption among SMEs
CLM countries	
Cambodia	Enabling conducive industrial infrastructure
Lao PDR	Expanding digital connectivity
Myanmar	Improving basic infrastructure
China and India	
China	Setting technological standards
India	Fostering SME participation and addressing cybersecurity

Source: OECD Development Centre based on various national sources.

Greater regional co-operation is needed for a smooth transition to Industry 4.0

The COVID-19 crisis led some businesses to transform their operations digitally, and many are joining the digital economy. The seamless flow of data and information is a fundamental component of this transformation. The ability to access, process and store data across borders can bring many benefits, for example increasing the range of cloud service providers available to firms. Access to larger resources can also create opportunities for new forms of collaboration to improve performance and increase efficiency. Moreover, open data sharing platforms can catalyse collective innovation among countries. Despite these benefits, the free flow of data can also bring challenges, especially issues related to confidential and sensitive information placed on commercial servers, such as health records and financial transactions. Therefore, countries must co-ordinate in setting rules and regulations that govern cross-border data flows.

Cybersecurity threats not only concern national institutions but also have cross-border implications. ASEAN might need to invest more to respond to increasingly sophisticated cyber threats and to strengthen cyber resilience in the region. A regional co-ordination platform could facilitate information sharing related to threat detection, improve awareness and enable cross-border co-operation. Regional co-operation is also needed to harmonise cybersecurity standards and regulations. Differing country-level regulations may burden firms that seek to expand their business internationally. By harmonising cybersecurity standards and regulations, compliance costs for firms can be reduced. The ASEAN nations have launched an ASEAN Digital Integration Framework (DIF) to overcome the barriers to digital integration. The DIF's main targets are to facilitate seamless trade; protect data while supporting digital trade and innovation; enable seamless digital payments; broaden the digital talent base; foster entrepreneurship; and co-ordinate actions. The project was finalised in 2018 and adopted in 2019.

Key challenges must be addressed to bolster cybersecurity

Responses to the COVID-19 pandemic caused more businesses and individuals to go on line due to physical distancing measures. This has led to an online environment ripe for cybercrime. However, ASEAN investment in developing cybersecurity measures and policies is still limited. Some initiatives to enhance the security of regional cyberspace are underway, including the ASEAN Cyber Capacity Programme, funded by Singapore, and the ASEAN-Japan Cybersecurity Capacity Building Centre, which is intended to develop a cybersecurity workforce.

The cybersecurity capabilities of ASEAN member states vary considerably. Whether cybersecurity mechanisms are instated at the technological or socio-economic level, those differences pose a challenge in providing a unified and cohesive response to the increase in both the number of threats and the new types of threats that have emerged following the onset of the COVID-19 pandemic. Moreover, an infrastructure technology gap exists within ASEAN. Closing that gap logically precedes the development of technologies that safeguard that very infrastructure. ASEAN countries must strengthen the development of critical infrastructure technology and subsequently establish robust cybersecurity safeguards. In addition to the many infrastructural and legislative challenges to cybersecurity, ASEAN countries also face shortages of skilled workers in the field. These can be ameliorated through educational incentives and tight government collaboration with universities and industry.

The work-from-home arrangements that blossomed in response to COVID-19 have highlighted the reality that cybersecurity capabilities are indeed crucial going forward. A secure cyberspace fosters both growth in business activity and governmental stability. Co-operation between the public and private sectors is more vital than ever. Furthermore, a cyberspace that is governed at the regional level, rather than at the national level, creates a more unified system that is more resilient in the face of cyber threats.

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Chapter 1

Macroeconomic assessment and economic outlook in Emerging Asia

Emerging Asian economies – ASEAN, China and India, are in the midst of their deepest recession in decades. The downturn is expected to be widespread across demand components, with the exception of government consumption that was supported by substantial budgetary stimulus. Economies heavily dependent upon tourism and exports have been particularly affected by the pandemic-induced global recession. Inflation is expected to remain subdued, while unemployment soars and budget deficit and debt rise sharply. A recovery is anticipated to gradually take hold on the back of favourable financing conditions and supportive macroeconomic policies. Substantial uncertainties regarding the outlook prevail as the health crisis continues to unfold in most countries in Emerging Asia and globally. Policy makers in the region need to continuously strengthen the capacity of their health care systems to withstand potential new waves of the pandemic or more virulent strains. As monetary and fiscal space have narrowed appreciably, the focus in 2021 should be on improving monetary policy transmission and making fiscal spending more targeted.

Introduction

The COVID-19 pandemic triggered a severe economic crisis in Emerging Asia: Southeast Asia, China and India. A nascent recovery in the third quarter of 2020 was interrupted by a resurgence of the pandemic, which led to a reinstatement of containment measures in several countries in the region. Notwithstanding, 2020 growth rates have been mostly revised upwards from the projections released in the *July 2020* and *November 2020 Update*. Although the economic downturns stem from a common source, the impact of the crisis varies vastly across economies. Viet Nam is the main driver of growth in ASEAN, while India is expected to post the weakest performance among its peers (Figure 1.1). The major economic drivers have encountered material challenges across the region. The pandemic has radically changed the role of private consumption and investment in driving growth, while the manufacturing and services sector were negatively impacted by the lockdown measures.

Financial markets held steady, while accommodative monetary policy stances maintained favourable financing conditions. However, the impact of the crisis on sectoral balance sheets is already apparent, with rising public and private debt levels. The pandemic is also expected to have a large and unequal impact on current account balances, with the largest corrections in countries that are dependent on tourism and exports. In parallel, trade has mostly benefited from growing Chinese demand, while intra-ASEAN exports dwindled. The signing of the Regional Comprehensive Economic Partnership (RCEP) agreement is anticipated to support the economic recovery going forward. With regards to labour markets, job losses since the onset of the pandemic have been unprecedented. Inflationary pressures are low, with the pandemic-induced global downturn leaving its mark on both domestic and global factors underpinning price developments. Finally, the pandemic is broadly responsible for the current growth observed in e-commerce and e-payment activity in the region.

Looking ahead, uncertainty is remarkably high. The economic recovery will largely depend on each country's ability to manage possible new waves of the pandemic and cope with potential virus mutations. It will also hinge on the ability of governments to support the economy amid narrowing monetary and fiscal space.

Figure 1.1. **Real GDP growth of Southeast Asia, China and India**
Comparison between 2019, 2020 and 2021 growth rates, percentage
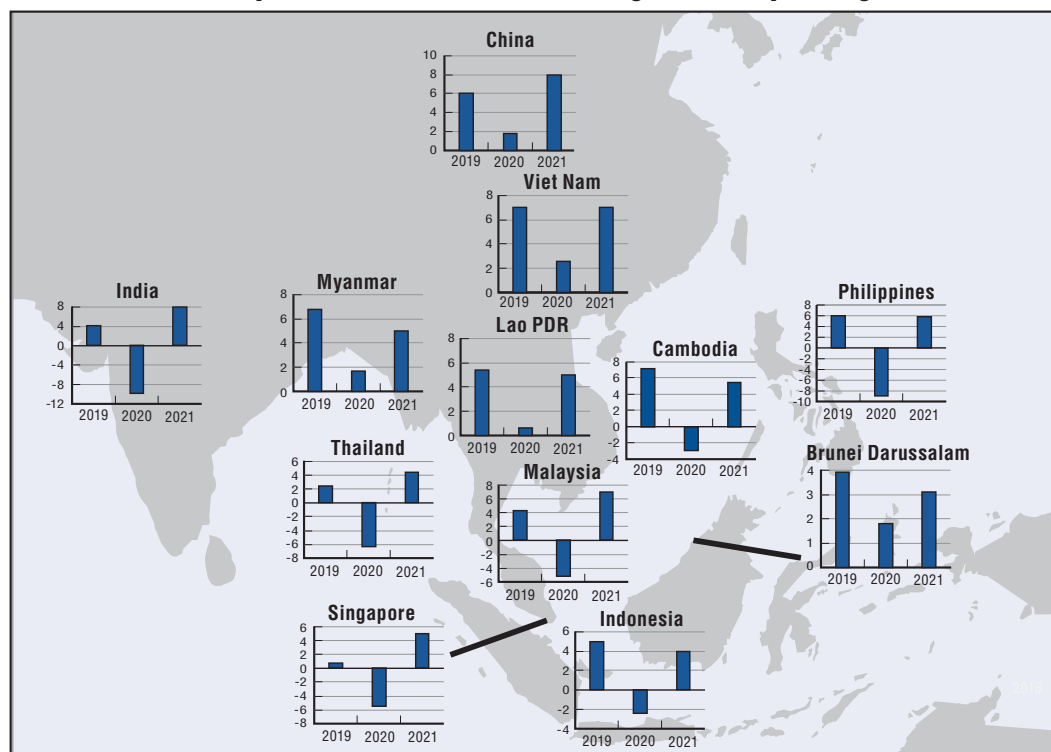
Note: Data are as of 5 January 2021. Data for India and Myanmar relate to fiscal years. The projections for China, India and Indonesia are based on the OECD Economic Outlook, December 2020.
Source: OECD Development Centre.
StatLink https://doi.org/10.1787/888934228286

Overview and main findings

Economic output is unlikely to return to pre-pandemic levels across most Emerging Asian economies in 2021. Average ASEAN real GDP growth in 2021 is forecast at 5.1%, following a contraction of 3.4% in 2020 (Table 1.1). In Emerging Asia, real GDP will increase by 7.4% on average in 2021, from a low base, after inching 1.7% lower in 2020. The performance is anticipated to be very uneven across countries. Viet Nam has recovered quickly (+2.6% in 2020), benefitting from an early end to its lockdown phase at the beginning of 2020, as well as from increasing foreign demand and targeted policy support. At the other extreme, real GDP growth in 2020 will be sharply negative in India (-9.9%) and the Philippines (-9.0%). In many countries in Emerging Asia, an uncertain situation on the health front and limited policy space hinder recovery prospects for 2021.

Table 1.1. Real GDP growth in ASEAN, China and India, 2019-21

Percentage

	2019	2020	2021
ASEAN-5			
Indonesia	5.0	-2.4	4.0
Malaysia	4.3	-5.2	7.0
Philippines	6.0	-9.0	5.9
Thailand	2.4	-6.4	4.5
Viet Nam	7.0	2.6	7.0
Brunei Darussalam and Singapore			
Brunei Darussalam	3.9	1.8	3.1
Singapore	0.7	-5.5	5.0
CLM countries			
Cambodia	7.1	-2.9	5.4
Lao PDR	5.5	0.6	5.0
Myanmar	6.8	1.7	5.0
China and India			
China	6.1	1.8	8.0
India	4.2	-9.9	7.9
Average of ASEAN-10	4.7	-3.4	5.1
Average of Emerging Asia	5.4	-1.7	7.4

Note: Data are as of 5 January 2021. Data for India and Myanmar relate to fiscal years. The projections for China, India and Indonesia are based on the *OECD Economic Outlook, December 2020*.
Source: OECD Development Centre.

ASEAN-5

- In **Indonesia**, COVID-19-related restrictions were implemented more slowly and were relaxed sooner than in similarly affected countries, and the number of COVID-19 cases surged in recent weeks. Private consumption was hit particularly hard in 2020, while weaker corporate balance sheets limited private investment. Commodity prices and a weak tourism sector could present further downside risks to a sustained recovery. After an anticipated drop of 2.4% in 2020, real GDP is forecast to bounce back in 2021 (+4.0%), starting from a low base.

- The pandemic and the recent reinstatement of restrictions in **Malaysia** led to an unprecedented downturn in economic activity in 2020, with real GDP projected to contract by 5.2%. By averting large-scale lay-offs, Malaysia is anticipated to see economic growth rebound in 2021 from a low base (+7.0%), unless the current movement restrictions are extended or tightened for a prolonged period. The focus on the digital economy and new growth sectors, as well as gains from the RCEP agreement, are anticipated to sustain Malaysia's economy over the medium term.

- In the **Philippines**, the pandemic and ensuing restrictions dragged the economy into a deep recession in 2020. The contraction of real GDP in the Philippines is projected to be the most severe among ASEAN economies in 2020 (-9.0%). Public investment and net exports are expected to support a partial economic recovery in 2021 (+5.9%), although rising debt costs and the capacity of the government to service debt remain major downside risks to the outlook. At the same time, uncertainty about international travel and the muted recovery in major economies should affect services exports and remittances by overseas workers.

- **Thailand** has been severely affected by the pandemic, as its dependence on international tourism make it particularly vulnerable to shocks triggered by travel restrictions. The number of cumulative confirmed cases of COVID-19 saw a spike

over the past few months, in particular during the month of December 2020. The rapid appreciation of the Thai baht in the final quarter of 2020 has been another drag on a fragile economic recovery. Additional risks are related to rising household debt and an escalation of social tensions that could further hamper growth. A swift policy response has helped to cushion the impact on employment and businesses, translating into a recovery in 2021 (+4.5%) following an anticipated 6.4% decline in 2020.

- The successful measures implemented to contain the pandemic in **Viet Nam** have supported a relatively quick rebound of the economy in 2020 (forecast at 2.6%), the strongest in the Emerging Asia region. The resilience of the industrial sector contributed decisively to growth, despite the fact that major factories were initially affected by supply-chain disruptions. Real GDP is anticipated to grow by 7.0% in 2021. Other downside risks come from rising unemployment, potential tensions with the United States and the budgetary costs of the crisis, which will continue accumulating.

Brunei Darussalam and Singapore

- The economy of **Brunei Darussalam** is in for a solid performance in 2021 (+3.1%), following relatively robust growth in 2020, anticipated at 1.8%. The external sector made a large positive contribution to growth in the first three quarters of 2020, as exports increased steadily in the second and third quarters. Industrial production also remained robust, driven by construction works at a major petrochemical refinery, more than offsetting the decline in services.

- **Singapore**'s economy contracted sharply in 2020 due to the pandemic (forecast at -5.5%). External demand collapsed, especially for business services, as travel restrictions choked the tourism sector. Sizeable budgetary and financial support measures have cushioned the fall in GDP and the rise in unemployment, and are expected to push the general government balance deep into negative territory. The anticipated recovery in 2021 (+5.0%) is highly uncertain and will largely depend on external demand.

Cambodia, Lao PDR and Myanmar

- The economy of **Cambodia** suffered its sharpest contraction in decades in 2020, anticipated at -2.9%. Overall, the tourism shock is having severe knock-on effects on domestic consumption and investment, while supply bottlenecks and weak external demand have led to a slowdown in the production of garment, textile and footwear products. A recovery is foreseen for 2021 (+5.4%), with some of the recent trade agreements signed by Cambodia expected to start delivering benefits.

- The substantial disruptive effects of the pandemic further slowed **Lao PDR**'s real GDP growth in 2020, expected to settle at 0.6%. The downturn was largely driven by a steep fall of private consumption due to worsening labour market conditions and rising poverty. Exports also contracted steadily, while supply-chain disruptions particularly affected the garment industry. Real GDP growth is forecast at 5.0% in 2021, although the depreciation of the Lao kip, the bumpy recovery in tourism receipts and the fall in migrant remittances represent considerable downside risks to the outlook.

- After a relatively mild first wave of COVID-19 cases in **Myanmar** during the spring, a much larger second wave followed in the autumn of 2020, prompting authorities to reinstate tight restrictions. The shock had widespread effects across the economy, depressing private consumption, industrial activity and net exports. In addition, domestic political risks remain substantial. Following an anticipated modest increase of 1.7% in 2020, real GDP growth is seen gathering pace in 2021 (+5.0%), provided the recovery in manufacturing picks up pace.

China and India

- **China** is expected to post positive GDP growth in 2020 (+1.8%). As the pandemic was brought under control early, economic activity rebounded strongly in the second and third quarters of 2020. Despite weaker activity in services, real GDP growth of 8.0% is expected in 2021. Leverage in the public sector and the broader economy will rise significantly, keeping contingent liabilities as a key source of risk to the outlook. Uncertainty surrounding the trade tensions with the United States also tilt the risk balance to the downside.

- **India** is expected to record a historic recession in 2020 (-9.9%), the sharpest fall in Emerging Asia. GDP growth is expected to be 7.9% in 2021, starting from a low base. Uncertainty is high due to underlying structural bottlenecks, such as high reliance on services and vulnerabilities in the banking and financial sectors, while unfavourable developments on the health front and narrowing policy space constitute additional threats to the near-term growth outlook.

Other key points of the economic outlook and assessment

- The pandemic has put the key growth drivers under strain. Private consumption, which tends to decline less than other more volatile components during an economic downturn, contracted sharply in most countries. On the supply side, the resilience of the services sector, which supported the economy during other episodes of weak growth, was severely compromised.

- Continued cases, high case fatality rates and potentially more contagious virus strains will continue to put considerable strain on local health care systems. This risk will likely remain elevated until a vaccine against COVID-19 or an effective treatment become widely available. Policy makers in Emerging Asia need to continuously strengthen their pandemic management strategies. In the short run, they need to ensure the vaccine is stored in appropriate conditions and that it is equitably distributed among the population. In the longer run, the training of health care professionals and strengthening hospital capacity are primordial.

- Emerging Asian countries kept very accommodative policy stances in order to maintain favourable financing conditions. Over the last few months, yields on long-term government bonds have fallen relative to yields on short-term tenors in most countries. On the other hand, conditions in short-term interbank markets had rather mixed evolutions, with interbank spreads widening in several countries, amid rising concerns over banking-sector stability. The potential for additional monetary policy rate cuts is limited in most countries in the region. Several policy options could be explored to preserve monetary space, while continuing to support the economy. Among these, a regime shift to average inflation targeting or focusing on the natural rate of interest as a reference for monetary policy, or a tiered interest rate system appear to be potential avenues in this regard.

- Inflationary pressures are subsiding in most Emerging Asian countries and are expected to be broadly balanced due to the remaining slack in the economy.

- The pandemic exacted a toll on sectoral balance sheets. Both public and private debt increased by several percentage points between the first quarter of 2019 and the second quarter of 2020. The situation is particularly preoccupying in countries that entered the crisis with already elevated debt levels. These developments carry significant implications in terms of solvency, in particular for firms in sectors most affected by the pandemic-induced recession.

- The fiscal stance is projected to be strongly expansionary in 2020, owing to the sizeable emergency fiscal measures implemented to shore up the economy. Prior to the onset of the pandemic, most Emerging Asian economies had room to expand

their primary balance deficits in response to the economic fallout triggered by the pandemic. However, government debt levels and budget deficits are projected to increase across the board in 2020. With narrower fiscal space, policy makers should strive to make fiscal spending more targeted.

- Nearly all ASEAN countries are anticipated to experience a deterioration of their current account balances, with the sharpest corrections in those countries that are highly dependent on tourism and trade. At the same time, the pandemic has weakened the contribution of exports to the growth of Emerging Asian countries. Exports initiated a recovery in the second half of 2020, mostly supported by strong demand from China and, to a lesser extent, the United States. The pandemic has led to stronger than anticipated growth in e-commerce and e-payments.

- The pandemic also delivered a major blow to labour markets. Job losses since the beginning of the COVID-19 crisis have been more significant than those recorded during the same period of past recession episodes. The labour market adjustment has been more acute for the most vulnerable categories of workers.

Box 1.1. **Measuring the economic impact of COVID-19:** **Growth resilience to large external shocks**

The economic forecasts that are regularly published in the *Economic Outlook for Southeast Asia, China and India* (*Outlook* hereafter) are derived from the Medium-term Projection Framework for Growth and Development (MPF). The MPF is an analytical tool developed in 2010 for the first edition of the *Outlook*. Concisely, the MPF has two components, namely baseline models for medium-term projections and economic projection models. Baseline models determine potential output and the output gap, while the economic projection models provide the components of output and other variables. The estimates of potential output gaps used in the baseline models are based on the dynamic stochastic general equilibrium (DSGE) approach. The economic projection models, based on general equilibrium approach, comprise a set of equations describing the five sectors of the economy: the real sector, the monetary sector, the fiscal sector, the balance of payments sector and the debt sector (OECD, 2012). The baseline model was revised for the 2015 edition of the *Outlook* (OECD, 2015).

The COVID-19 outbreak represents a large external shock, different from other crises experienced by Emerging Asian countries in the past, chiefly the Asian financial crisis of 1997-98 (AFC) and the global financial crisis of 2007-08 (GFC). Measuring the economic impact of external shocks on economic activity is challenging for several reasons. First, gauging how countries will differ in their shock absorption capacity must take into account a variety of parameters that pertain to countries' economic structures. Second, large exogenous shocks tend to occur less frequently, limiting the potential for comparative studies. Third, the behaviour of economic agents in crisis times may deviate from that prescribed by conventional wisdom. General equilibrium approaches like the MPF may therefore not be suitable for forecasting economic activity during the current crisis period.

A review of the literature shows that there are several approaches to measuring the direct and indirect economic costs of large-scale external shocks, such as natural disasters. Several distinct methods have been utilised, including approaches based on case studies, event studies or input-output tables. However, a large number of academic papers rely on the analysis of time series for quantifying the impact of external shocks, in particular by using structural vector autoregressive (SVAR) methods, whose versatility is widely acknowledged (Bordo and Murshid, 2002; Canova, 2005; Mackowiak, 2006; Ludvigson et al. 2020).

Box 1.1. **Measuring the economic impact of COVID-19: Growth resilience to large external shocks** *(cont.)*

Variations of the SVAR model have been utilised, for instance by Gupta et al. (2020), who develop a time-varying parameter structural vector autoregressive (TVP-SVAR) model to analyse the dynamic impact of uncertainty due to pandemics on output growth.

Figure 1.2. **Impact of large natural disasters on GDP growth in the Philippines and Thailand**
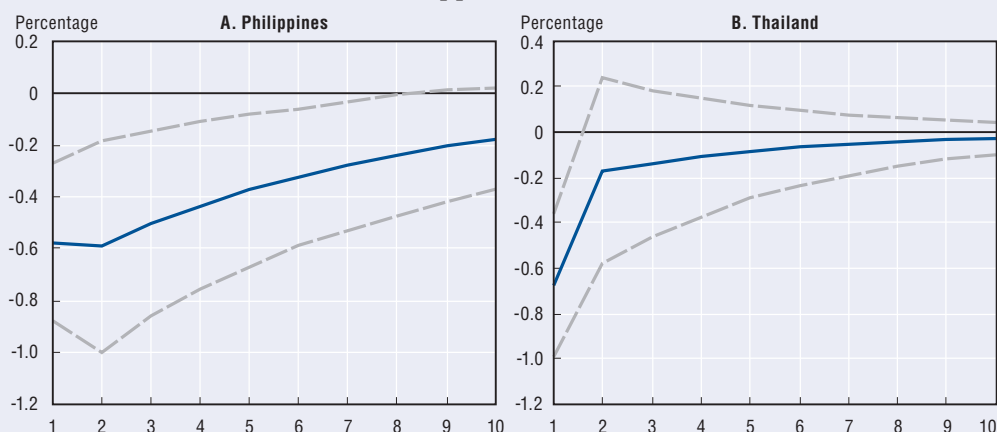
Note: The dotted lines are the error bands (lower bound and upper bound) and the blue line in the middle is the impulse response function. The horizontal axis indicates the time after the shocks in quarters.
Source: OECD Development Centre based on Tanaka, Ibrahim and Lagrine (2021).
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In light of these considerations, we use a time-series based approach, as a supplementary tool of the MPF for estimating the growth impact of external shocks of Emerging Asian countries for the *Outlook 2021* projections. The analysis is undertaken within a structural vector autoregressive (SVAR) model, which is suited to capture both the size and the speed of the impact (For more details, please see Tanaka, Ibrahim and Lagrine, 2021). We use data on large-scale natural disasters (LNDs) that Emerging Asian countries have faced over the past decades as a sort of proxy variable for large external shocks. Insights on the size and speed of external shocks are derived from impulse response functions. For instance, our empirical results show that LNDs have a large negative impact on GDP growth in Thailand and the Philippines, although the speed at which the impact wanes differs, with a more persistent impact in the Philippines (Figure 1.2). Growth resilience to large external shocks will be determined by economic systems and policy reactions.

Recent developments and near-term outlook

Emerging Asian economies remain in the grip of the COVID-19 pandemic, and supply and demand shocks are still shaping economic activity. Nearly all Emerging Asian countries recorded negative quarterly growth rates in the second quarter of 2020 (Table 1.2), with double-digit declines in Malaysia (-17.1%), the Philippines (-16.3%), Singapore (-13.3%) and Thailand (-12.1%). High-frequency indicators of economic activity and business surveys in most Emerging Asian economies point to an improvement in the third quarter. The recovery is proceeding at different speeds across the region, shaped mainly by developments on the pandemic front but also by other factors, such as the success of policies in shoring up the economy and the pace of the recovery in major trading partners. In the third quarter, real GDP growth rates ranged from roughly -11.5% in the Philippines to 4.9% in China.

Table 1.2. **Quarterly real GDP growth in ASEAN, China and India, 2019-20**
Year-on-year percentage changes

	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020
ASEAN-5 countries							
Indonesia	5.1	5.1	5.0	5.0	3.0	-5.3	-3.5
Malaysia	4.5	4.8	4.4	3.6	0.7	-17.1	-2.7
Philippines	5.7	5.4	6.3	6.7	-0.2	-16.3	-11.5
Thailand	2.9	2.4	2.6	1.5	-1.8	-12.1	-6.4
Viet Nam	6.8	6.7	7.5	7.0	3.7	0.4	2.7
Brunei Darussalam and Singapore							
Brunei Darussalam	-0.2	6.6	2.1	7.1	2.4	3.0	0.5
Singapore	1.0	0.2	0.7	1.0	-0.2	-13.4	-5.6
CLM countries							
Myanmar	7.5	7.9	6.5	5.4			
China and India							
China	6.4	6.2	6.0	6.0	-6.8	3.1	4.9
India	5.2	4.4	4.1	3.1	-23.9	-7.5	

Note: Data as of 5 January 2020. Data for India and Myanmar relate to fiscal years.
Source: OECD Development Centre, based on CEIC and national sources.

Entering the final quarter of 2020, however, momentum is subdued and is expected to be hit by the latest round of restrictions. All in all, restrictions were relaxed in phases as of June, while the August-December period was marked by a new round of tightening (Figure 1.3). As the pandemic continues to spread (Figure 1.4), increasing the risk of hospital congestion, the reinstatement of restrictive measures, which already took place in India, Indonesia, Malaysia and Myanmar, could become more widespread. However, recent efforts have focused more on restrictions at the local level and targeted containment measures rather than full-scale lockdowns. These restrictions are anticipated to weigh on economic activity and sentiment in the short term, with negative effects on private consumption and investment. Nevertheless, the impact on Q4 GDP growth is expected to be more contained than in the March-April period, as the approach to curbing the recent surge in infections has been more targeted.

Overall, ASEAN economies are forecast to have contracted by an average of 3.4% in 2020, while the projection for the broader Emerging Asia region is set at -1.7%. This implies that the average 2021 output growth in ASEAN (+5.1%) and Emerging Asian economies (+7.4%) will barely return to pre-pandemic levels. The projected growth in 2020 is very uneven across Emerging Asian countries. Viet Nam's economy has recovered quickly (+2.6%), benefitting from an early end to its lockdown restrictions and increasing foreign demand. However, in many other countries in the region, limited policy space combined with falling foreign currency revenues and an uncertain situation on the health front have hindered recovery prospects. Growth rates in 2020 are forecast to range between -9.9% in India and 2.6% in Viet Nam.

Figure 1.3. Stringency of COVID-19-related restrictions in Emerging Asian economies

January-December 2020, stringency index on a scale of 0-100

Note: The figure illustrates the number of Emerging Asian countries in each of the five stringency categories during the respective month. Data as of 20 December 2020, except for Cambodia and Viet Nam (14 December). Monthly values of the index represent the average of daily values for the respective month. An index between 0 and 20 denotes the lowest level of stringency; an index between 80 and 100 corresponds to the highest level of stringency, that could include full-scale lockdowns.

Source: OECD Development Centre based on Oxford *COVID-19 Government Response Tracker*.

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Figure 1.4. Cumulative confirmed cases of COVID-19 in Emerging Asia
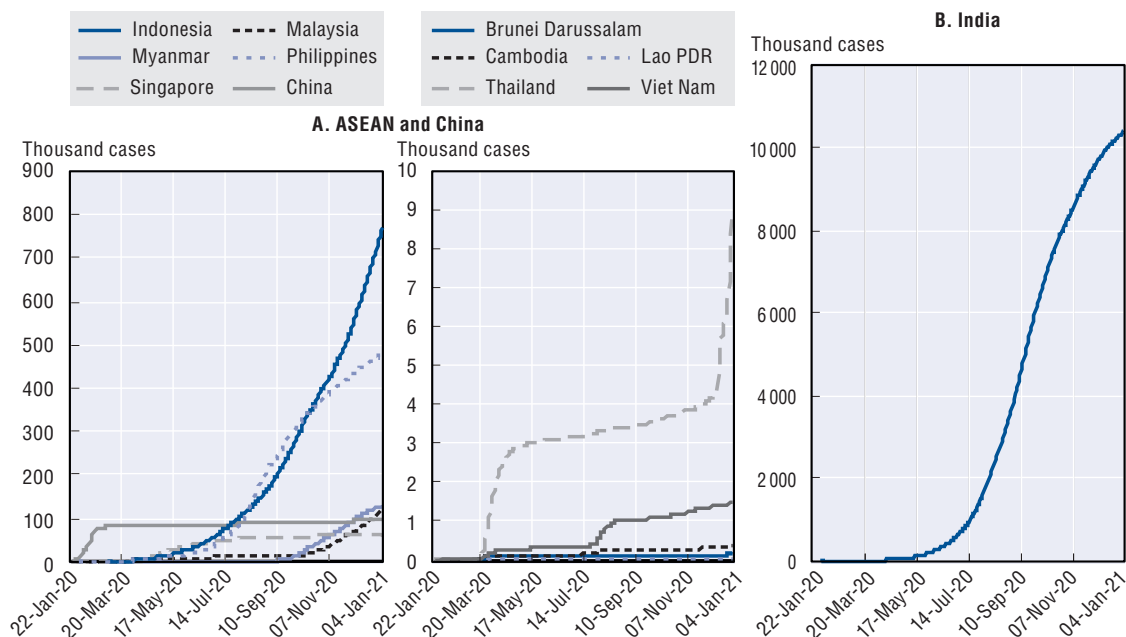
Note: Data as of 5 January 2021.

Source: Johns Hopkins University.

StatLink ᐧᐧ https://doi.org/10.1787/888934228324

Uncertainty is remarkably high, as would be expected following an economic crisis triggered by a global health crisis that is not yet over. The impact on output, unemployment and balance sheets is likely to be profound, and the prospective recovery may prove different from earlier cycles. As a result, non-negligible downside risks loom further out on the forecast horizon for Emerging Asian economies. The main risk is undoubtedly related to the evolution of the COVID-19 pandemic. Escalating tensions between the United States and China could have wide-reaching implications, spanning trade, financial flows and technology. A deterioration in global financial conditions could aggravate pre-existing vulnerabilities, push vulnerable firms into bankruptcy and worsen credit risk and financial stability. In addition, the asymmetric impact of the pandemic on the poor and most vulnerable could give rise to social tensions, as generally thin welfare systems have exacerbated the uneven distribution of the pandemic's costs. On the other hand, the key upside risks to the forecast are faster advances in the deployment of COVID-19 vaccines or effective treatments that would allow a return to a "business as usual" economic environment together with waning US political uncertainty.

ASEAN-5

Indonesia saw its real GDP contract by 5.3% in the second quarter of 2020 and by a further 3.5% in Q3, with the main drivers of growth weakened by the effects of restrictive measures implemented since March. The breakdown of GDP growth in the first three quarters of 2020 shows that the contraction was mainly driven by exports and investment (Figure 1.5). Private consumption fell, with the intensification of concerns over job security eroding consumer sentiment (Figure 1.7). Investment was weak, as a series of infrastructure projects were postponed due to the pandemic. Net exports made a negative contribution to growth in the first three quarters, as some of Indonesia's major trading partners saw their economic activity contract sharply in Q2 and only slightly rebound in Q3. On the supply side, agriculture made a positive contribution to growth, while industry and services contributed negatively (Figure 1.5). Transportation and storage, together with wholesale and retail trade, contributed the most to the decline in services, while information and communication activities showed greater resilience (Figure 1.6).

Figure 1.5. **Contribution to GDP growth in Indonesia, 2018-20**
Percentage points
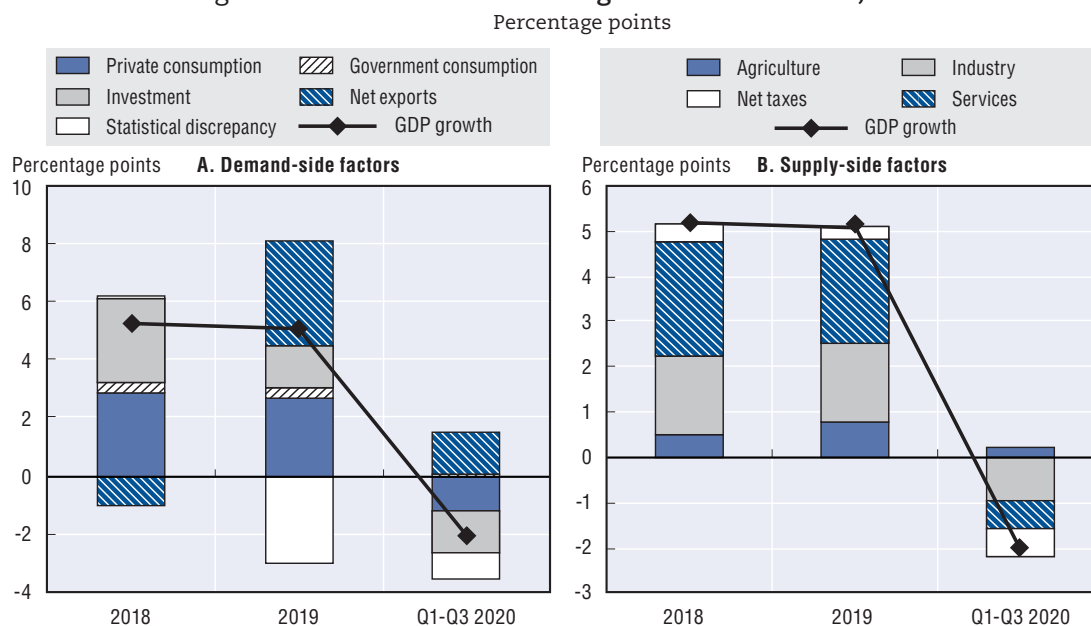
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink 📊 https://doi.org/10.1787/888934228343

Figure 1.6. **Contribution to services growth in Indonesia, 2019-20**
Percentage points
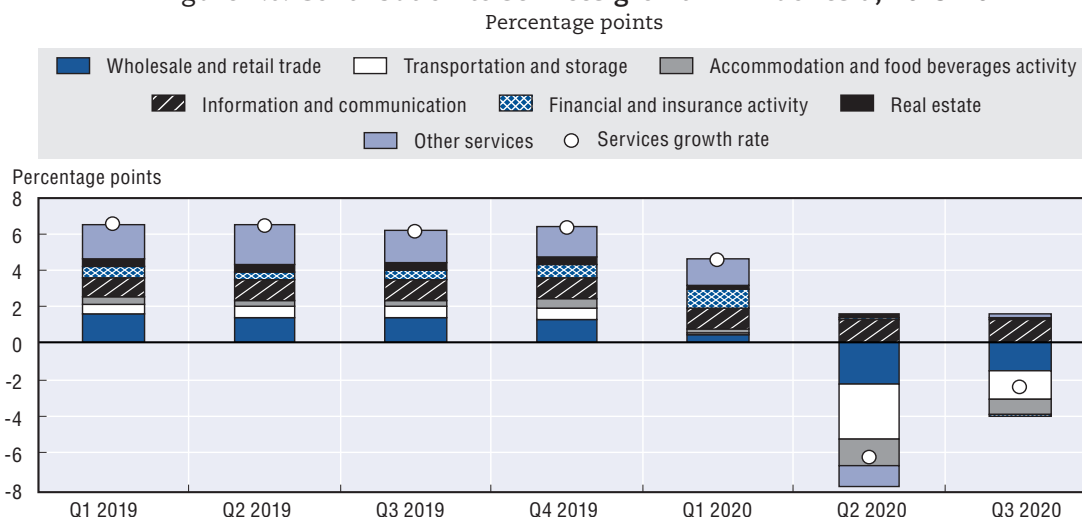
Note: Other services are defined as the sum of the following sub-categories: business services; public administration, defence and social security; education services; human health and social work activity; and miscellaneous services.
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink https://doi.org/10.1787/888934228362

From 5% in 2019, Indonesian GDP growth is forecast to settle at -2.4% in 2020 and to pick up to 4% in 2021. The forecast is subject to considerable risks, however, as COVID-19 continues to spread within the country. Overall, higher unemployment and lower household and corporate incomes are expected to keep consumer demand depressed in the early quarters of 2021, with a more forceful rebound likely only towards the end of 2021. Indonesia's reliance on portfolio investment and commodity exports could make the country particularly vulnerable to new rounds of external risk aversion and other shocks. Recovery in the tourism industry, which accounts for approximately 4% of GDP, will be slow, as international borders remain closed. Higher government spending and lower revenue due to the slowdown will lead to a deterioration of the fiscal balance and a higher debt burden. On the upside, trade prospects are expected to be supported by the recovery of key trading partners. The recent signing of the RCEP is also anticipated to provide a boost to intraregional trade (Box 1.2). The gradual reduction in corporate tax rates between 2021 and 2023, from 25% to 20%, might result in higher corporate investment over the medium term.

Figure 1.7. **Consumer confidence indices in Indonesia, Malaysia, Philippines and Thailand**
2018-20
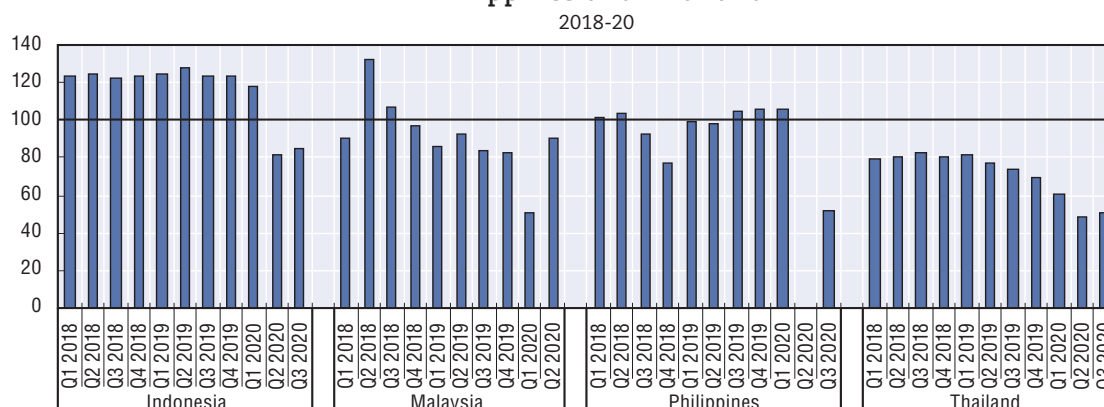
Note: All indices are adjusted to set 100 as neutral confidence point.
Source: CEIC and national sources.
StatLink https://doi.org/10.1787/888934228381

Box 1.2. **Regional agreements could accelerate economic recovery in Asia**

On 15 November 2020, ASEAN member states, together with Australia, China, Japan, Korea and New Zealand, signed the Regional Comprehensive Economic Partnership (RCEP), covering around 30% of the world's population and GDP and 28% of global trade (MoFA, 2020). The RCEP aims to eliminate at least 92% of tariffs on imports among the signatory parties within 20 years of coming into effect, which could be as early as 2021. At the same time, around 65% of services sectors are to be fully open, with increased foreign shareholding limits. Common rules for e-commerce, investment flows, labour mobility, competition, intellectual property, government procurement and development of small and medium-sized enterprises (SMEs) are also expected to be established in the region under RCEP (MTI, 2020a). A joint statement from RCEP signatories highlights the potential for the agreement to support an inclusive and sustainable post-COVID-19 economic recovery, job creation and strengthening of regional supply chains (MoFA, 2020).

RCEP is another multilateral free trade agreement involving countries in Asia-Pacific concluded in the last two years, after the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) was signed in March 2018 and entered into force in December 2018. Of the 15 RCEP member countries, Australia, Brunei Darussalam, Japan, Malaysia, New Zealand, Singapore and Viet Nam are also signatories to CPTPP (MTI, 2020b). The CPTPP foresees tariff cuts on approximately 90% of items upon entry into force, followed by tariff cuts on nearly all other items within 10 years. In addition to tariff cuts, CPTPP contains provisions on, among others, customs and trade facilitation; standards and technical barriers to trade; investment; services; intellectual property; e-commerce; procurement; labour; environmental issues; regulatory coherence; and others (New Zealand Foreign Affairs and Trade, 2018).

The Peterson Institute for International Economics (PIIE) estimates that incremental income gains from RCEP will reach USD 209 billion globally by 2030, building upon USD 121 billion in gains from CPTPP over the same horizon (Petri and Plummer, 2020). These estimated economic gains are projected to counterbalance the USD 301 billion in losses anticipated by PIIE because of the US-China trade conflict, notably the trade barriers in the Phase I trade agreement reached in January 2020. At the country level, projected real income gains by 2030 due to RCEP are anticipated to be largest for Korea, Japan, Malaysia, Brunei Darussalam, Thailand and Viet Nam, augmenting the benefits for Viet Nam, Brunei Darussalam and Malaysia stemming from CPTPP (Figure 1.8). For Brunei Darussalam, China and Singapore, these gains will provide an important offset to the losses of trade diversion resulting from the US-China trade conflict (Petri and Plummer, 2020).

Box 1.2. **Regional agreements could accelerate economic recovery in Asia** (*cont.*)

Figure 1.8. **Projected gains from CPTPP and RCEP versus gains/losses from US-China trade conflict of selected signatory countries**
Incremental real income change by 2030, percentage

■ Gains from CPTPP   ☐ Gains from RCEP   ▨ Gains/losses from US-China trade conflict
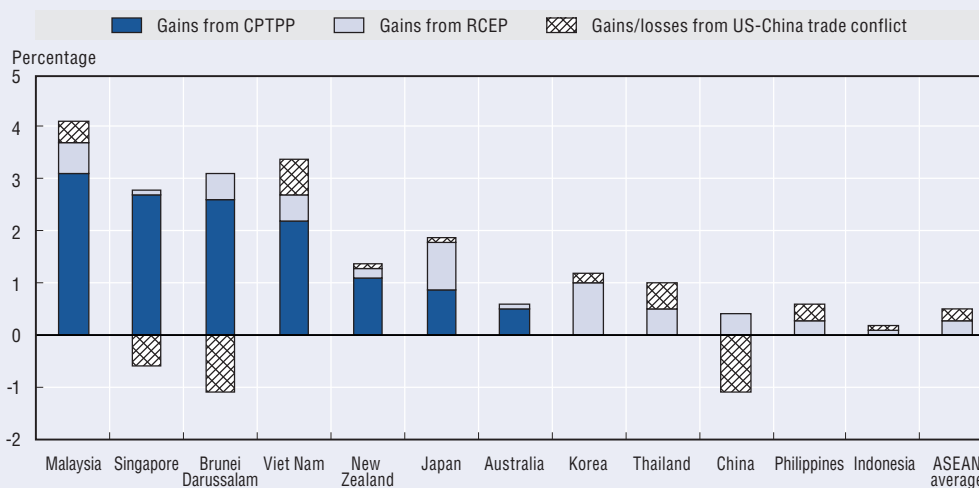
Source: Petri and Plummer (2020).

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Overall, the CPTPP and RCEP agreements are a positive development for intra-Asia trade and regional co-operation, as they come amid a severe economic downturn and at a time when the gradual erosion of multilateral trading norms and an increased tendency towards global protectionism are curbing global trade. CPTPP and RCEP are expected to reorient trade and economic ties away from global linkages and towards regionally focused partnerships in East Asia. While the economic benefits stemming from RCEP are more modest than those inherent in CPTPP, the former maintains its symbolic importance, being the world's largest trade agreement (White & Case, 2020). The RCEP agreement allows for the accession of other countries within 18 months from entering into force. In this regard, the agreement includes a specific clause on the possibility for India to re-join after having opted out of the deal in November 2019 (ASEAN, 2020a).

Due to the upsurge in COVID-19 cases, authorities in **Malaysia** reinstated partial containment measures as of 14 October in several federal territories. Recent data show that the Malaysian economy contracted by 2.7% year-on-year in Q3 2020, recovering from a 17.1% collapse in the previous quarter. Weak growth was registered across most economic sectors in the first three quarters of 2020 (Figure 1.9), due to the imposition of a restrictive nationwide Movement Control Order (MCO) and the subsequent transition to the Conditional MCO in May and to the Recovery MCO in June. The fall in private consumption, albeit significant, was somewhat limited by stimulus measures such as cash transfers and the implementation of a six-month moratorium on loan repayments. Government consumption continued to expand, although at a moderate pace, while investment and net exports were a drag on overall GDP growth. The improvement in Q3 was largely due to the reopening of the economy and a more benign external environment. The manufacturing sector recovered due to strong electrical and electronics production, while services continued to retreat amid persisting weakness in travel and tourism activity. Wholesale and retail trade along with transportation and storage contributed the most to the sharp fall in services activities in the second and third quarters of 2020 (Figure 1.10).

Figure 1.9. **Contribution to GDP growth in Malaysia, 2018-20**
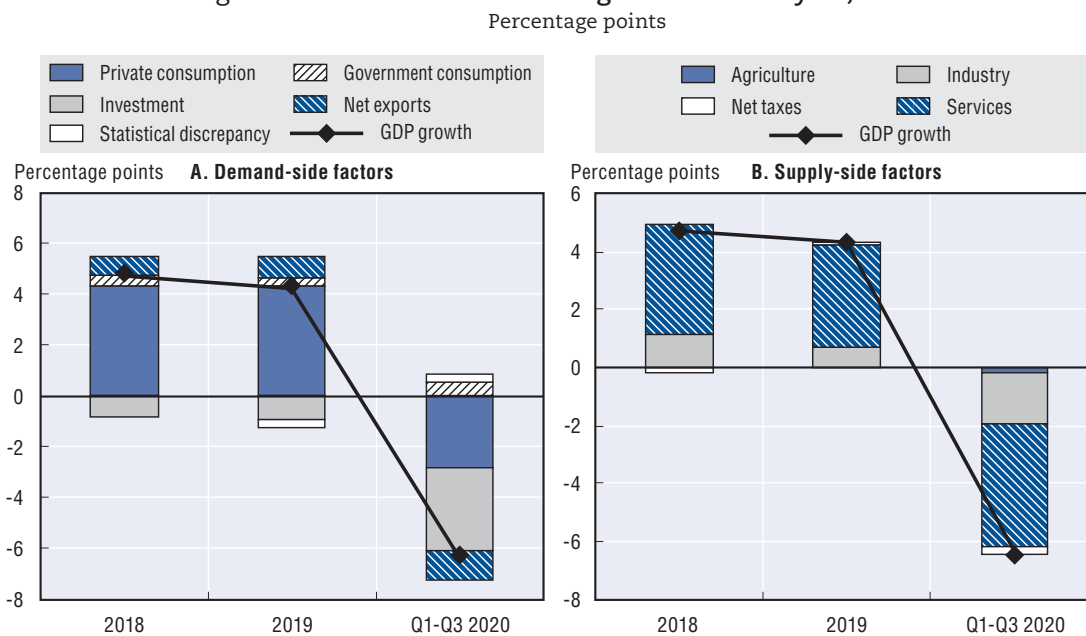
Percentage points

Source: OECD Development Centre based on data from CEIC and national sources.

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Figure 1.10. **Contribution to services growth in Malaysia, 2019-20**
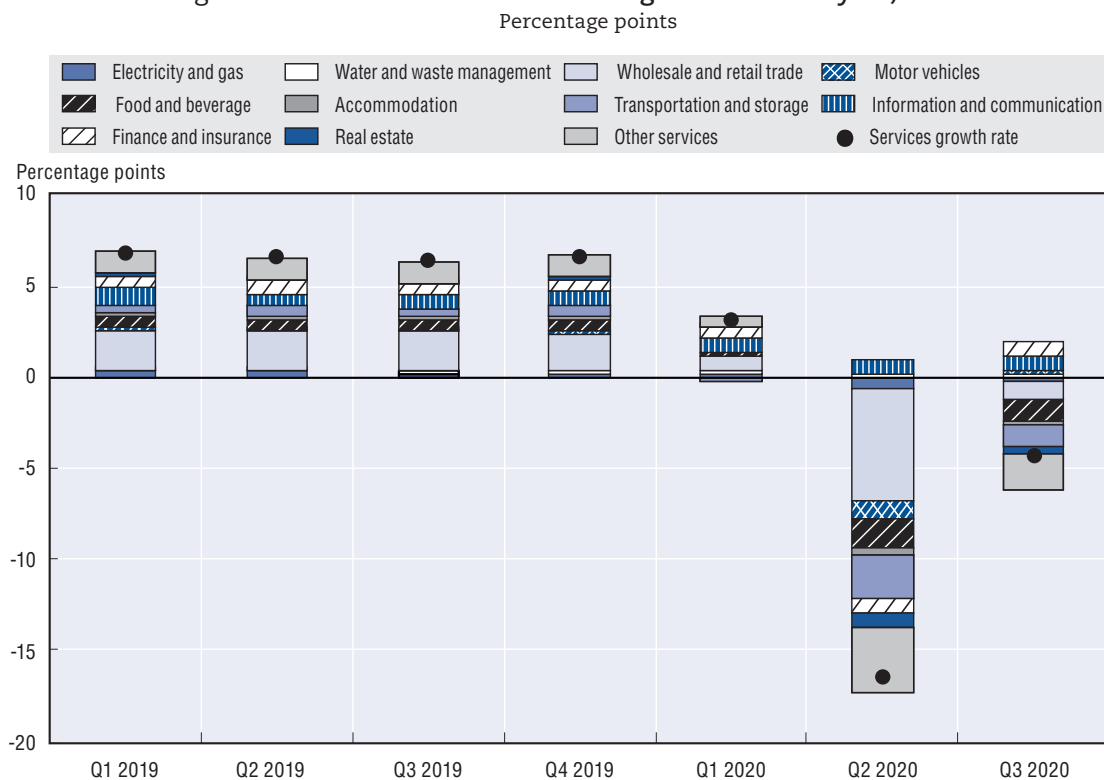
Percentage points

Note: Other services are defined as the sum of the following sub-categories: business services; private education services, private health services; and miscellaneous services.

Source: OECD Development Centre based on data from CEIC and national sources.

StatLink ᵍᵐ𝄞 https://doi.org/10.1787/888934228438

Real GDP growth is forecast to fall to -5.2% in 2020 and to stage a recovery in 2021 (+7.0%), starting from a low base. Economic activity has resumed significantly since the relaxation of restrictions in early May. High frequency indicators such as industrial production point to an expansion in Q3 (Figure 1.11), but uncertainty about the short to medium-term prospects is unusually high due to the fading of earlier principal growth drivers. While private consumption and investment are expected to benefit from the broad measures in the fiscal stimulus packages and the low interest rate environment, a weaker-than-anticipated recovery in the global economy poses significant downside risks to growth. The prospect of a second peak of COVID-19 outbreaks that leads to the re-imposition of restrictive measures, along with more persistent weakness in labour market conditions, pose additional threats to the outlook. Adding to the balance of risks is the deterioration of the fiscal balance, amid rising expenditure to finance stimulus packages and lower revenue collection, in particular due to a fall in taxes and royalties from the energy sector.

Figure 1.11. **Industrial production index in Malaysia and Viet Nam, 2017-20**

Index, 2015=100
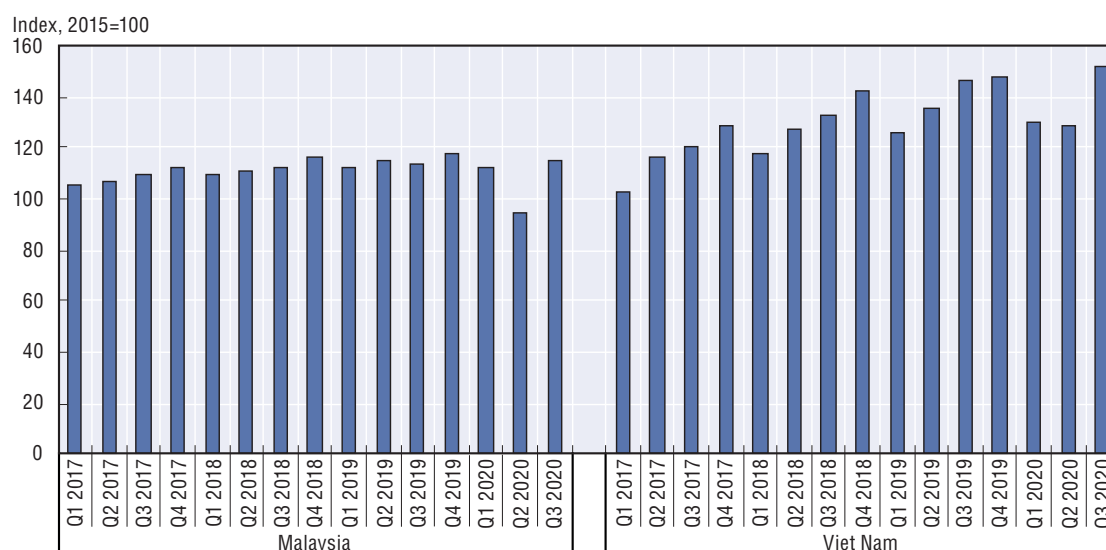
Note: Latest data for Malaysia are as of August 2020.
Source: CEIC and national sources.
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The continued implementation of the National Policy on Industry 4.0, aimed at boosting digital transformation in the Malaysian manufacturing sector and its related services (MITI, 2018), is likely to speed recovery from the implications of COVID-19 and improve Malaysia's competitiveness going forward. In addition, Malaysia is expected to derive some of the largest benefits from the RCEP trade agreement (Box 1.2). However, growing interlinkages between the sovereign and the banking sector represent a challenge that could have financial stability implications.

Figure 1.12. **Breakdown by holder sector of securities issued by the Malaysian government**
Q1 2018 to Q2 2020
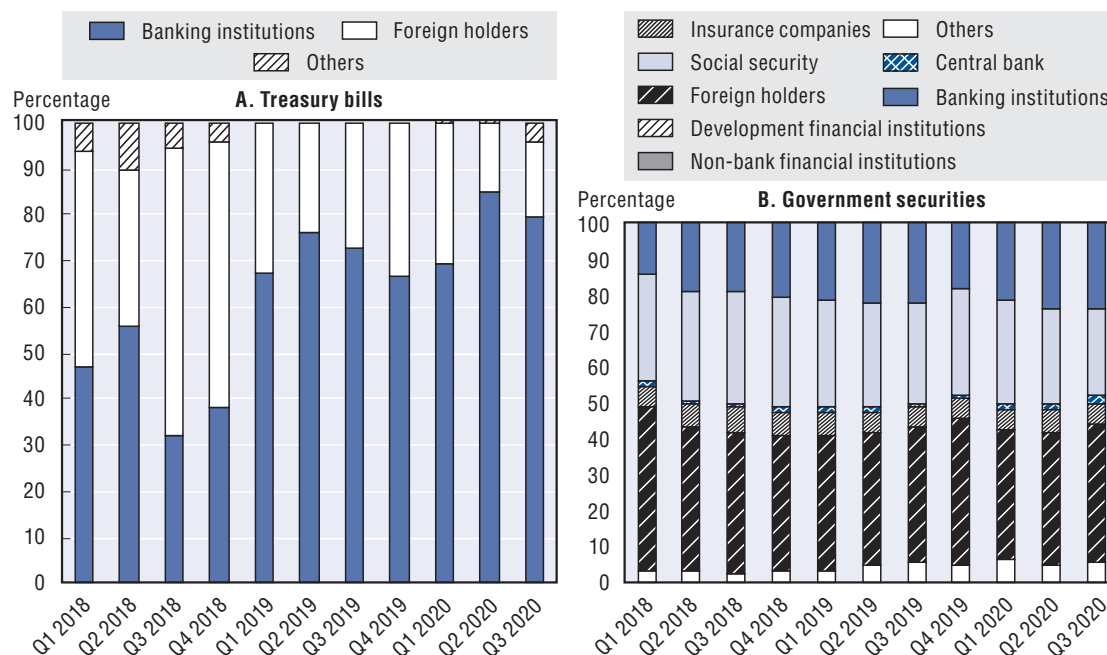
Note: The data refer to Treasury bills and government securities denominated in Malaysian ringgit (MYR).
Source: OECD Development Centre calculations based on data from CEIC.
StatLink ⟶ https://doi.org/10.1787/888934228476

Sovereign risk is transmitted to banks through various channels. This transmission can occur via the asset side of banks' balance sheets. A deterioration or improvement in the solvency of a state, as perceived by the markets, can lead to losses or gains in the sovereign debt portfolios of banks and can also affect the solvency of banks. As such, sovereign exposures do not differ conceptually from claims on any other debtor, but they are often significant, representing a sizeable portion of domestic public debt. In Malaysia, banks' holdings of domestic sovereign debt, in particular Treasury bills, have increased since the onset of the COVID-19 crisis (Figure 1.12). The impact of sovereign tensions on bank financing conditions is measured not only in terms of credit risks, but also in terms of liquidity and financing risks. Indeed, government bonds are generally used as collateral, for example via repurchase agreements concluded with wholesale banks. In addition to lowering the value of the collateral, a fall in the price of sovereign bonds can have significant repercussions through margin calls or rising safety margins, thereby reducing the amount of liquidity that can be obtained through a given nominal amount of sovereign bonds. The transmission from the sovereign to the banking sector also takes place via the link between the ratings of public and private issuers. The downgrading of the sovereign rating often leads to the downgrading of domestic banks.

While the lockdown measures imposed in the **Philippines** appear to be the strictest in the ASEAN region, latest data suggest that the virus continues to spread in the country, albeit at a slower pace. A gradual resumption of economic activities was authorised from early June to early August 2020. Faced with the risk of hospital saturation, local authorities enacted a return to stricter measures as of mid-August. In the third quarter of 2020, Philippine GDP fell by 11.5% year-on-year, after a drop of 16.3% and 0.2%, in the second and first quarter respectively. On the demand side, private consumption and investment

contracted markedly in the first three quarters of 2020, while government spending and exports made a positive contribution to growth (Figure 1.13). On the supply side, both services and manufacturing fell sharply in Q2, while the decline moderated in Q3 (Figure 1.14).

Figure 1.13. **Contribution to GDP growth in the Philippines, 2018-20**
Percentage points
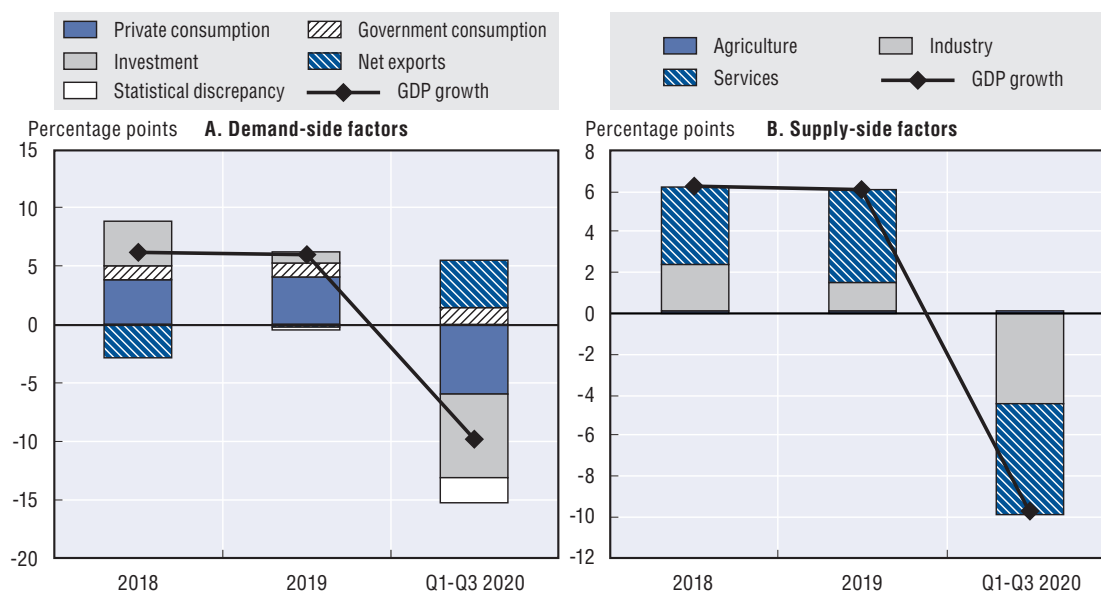
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink https://doi.org/10.1787/888934228495

Real GDP in the Philippines is projected to decline by 9.0% in 2020, the weakest performance in ASEAN, before increasing by 5.9% in 2021, from a low base. This severe contraction is mainly attributable to the strict containment measures imposed as early as mid-March. Private consumption is expected to remain weak under the combined effect of rising unemployment and the drop in remittances by the Philippine diaspora. Cumulative remittances for the first eight months of 2020 declined by 2.6%, reflecting lower transfers by both land-based and sea-based workers (BSP, 2020a). The recent promulgation of the Bayanihan to Recover as One Act, which provides for a new PHP 165.5 billion (Philippine peso) fund (PNA, 2020a), equivalent to approximately USD 3.4 billion, is expected to further mitigate the economic and social impact of the pandemic in the short term. The ability of public authorities to disburse the funds remains a real source of uncertainty. Indeed, the Philippine authorities have already experienced a certain delay in the distribution of emergency grants due to the difficulty of identifying beneficiaries and the financial exclusion of a large part of the population. Only 29% of Filipino adults owned a bank account in 2019, up from 23% in 2017 (BSP, 2020b).

Figure 1.14. **Manufacturing and services in selected ASEAN economies, 2016-20**

Year-on-year growth, percentage
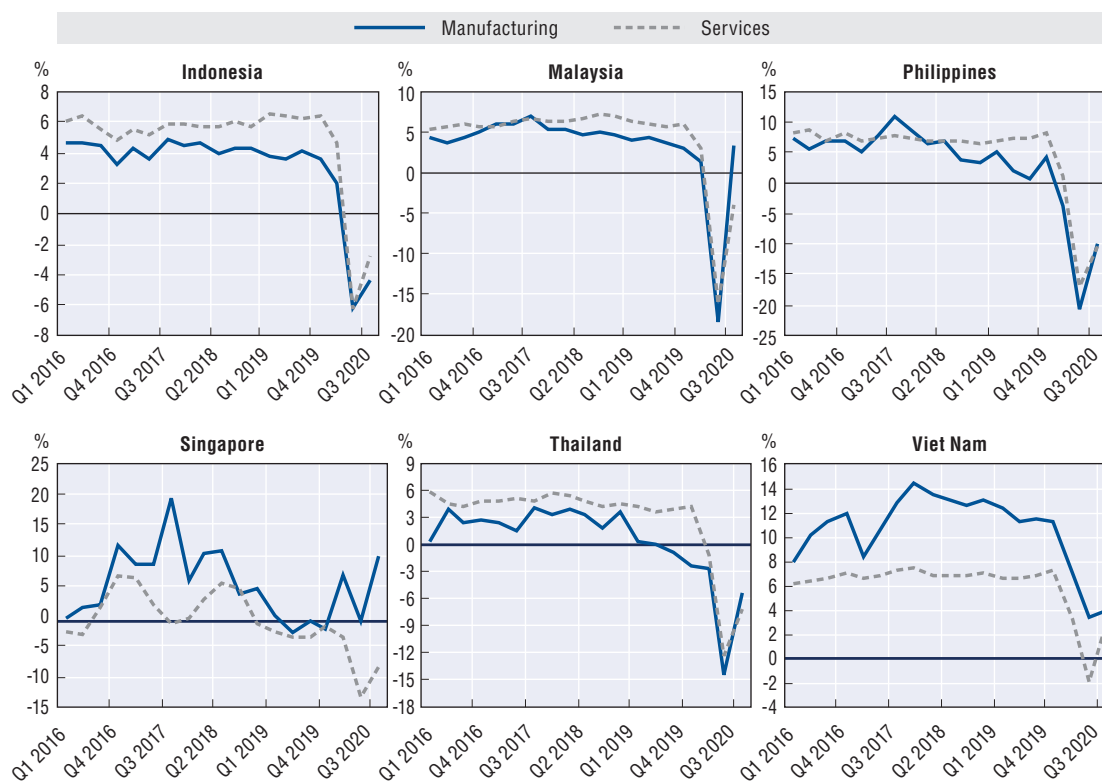
Note: Data for Viet Nam are year-to-date.
Source: CEIC and national sources.
StatLink https://doi.org/10.1787/888934228514

The "Build, Build, Build" public and private infrastructure investment programme is still perceived as the main driver of economic recovery. The list of priority areas has been revised to include more projects in the domains of food security, water supply, health care and digital infrastructure. Rising debt costs and the capacity of the government to service the debt remain a downside risk to the outlook. Sovereign risk is nevertheless mitigated by the composition of the public debt, mainly denominated in domestic currency, and by its maturity profile, with the bulk in the form of long-term debt.

While relatively spared on the health front, **Thailand** is suffering the full brunt of the economic consequences of the crisis, in particular due to the almost complete closure of its borders. Since the economy lost momentum at the end of 2019, the starting point for 2020 was already weak. The pandemic and the introduction of travel restrictions devastated Thailand's large tourism sector, causing one of Emerging Asia's steepest declines in second and third quarter GDP. Thai GDP contracted by 6.4% year-on-year in the third quarter of 2020, after a contraction of 12.1% in Q2 and 1.8% in Q1. This contraction is mainly due to the impact of the COVID-19 crisis on services and exports (Figure 1.15). Private consumption and investment also made a negative contribution to growth. Exports to ASEAN and the European Union were subdued, while exports to China and the United States started to pick up as of May (Figure 1.16, Panel A). A large proportion of Thai merchandise exports was affected by the crisis, especially automobiles and machinery and equipment, while electronics and machinery and equipment made a positive contribution to export growth in October (Figure 1.16, Panel B).

Figure 1.15. **Contribution to GDP growth in Thailand, 2018-20**
Percentage points
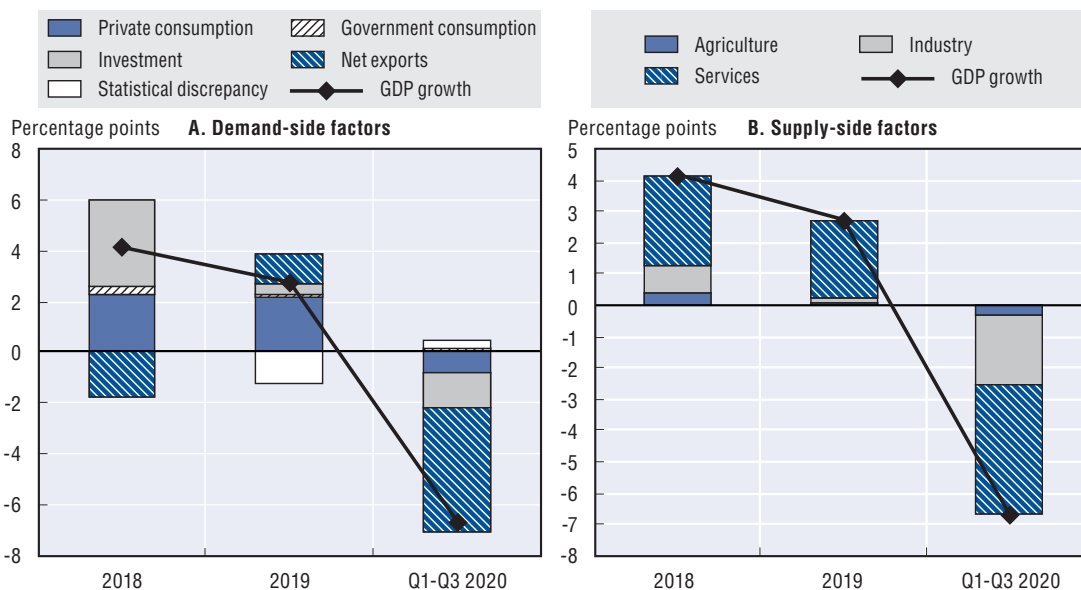
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink ᕫᗷ▱ https://doi.org/10.1787/888934228533

Figure 1.16. **Contribution to total export growth in Thailand, 2020**
Contribution to year-on-year growth, percentage points
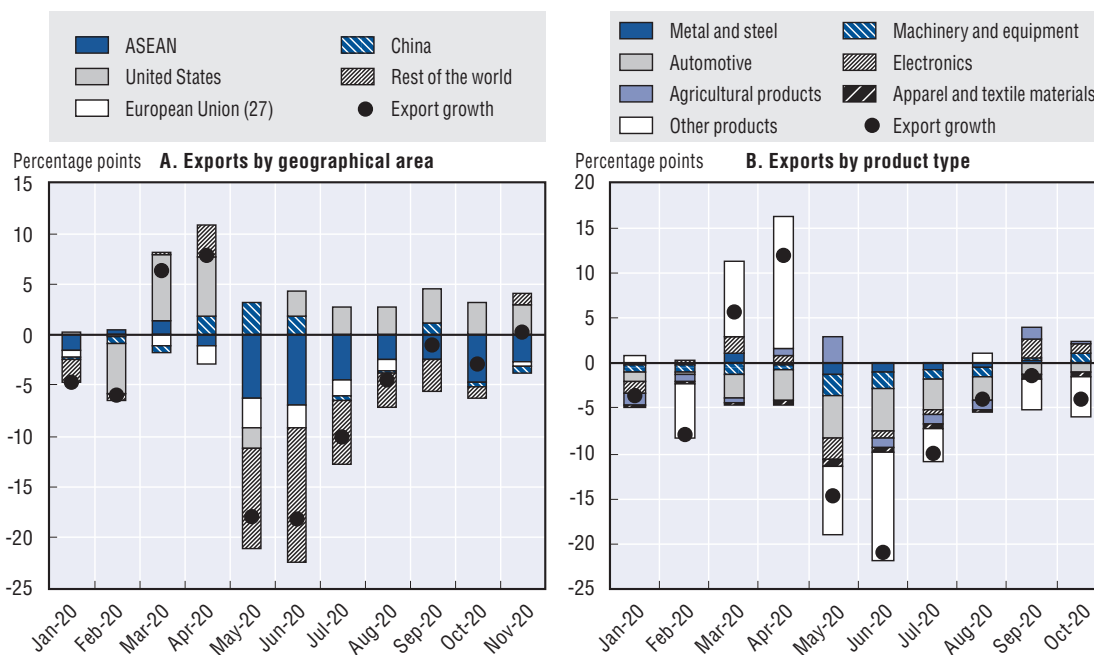
Source: OECD Development Centre calculations based on data from CEIC and national sources.
StatLink ᕫᗷ▱ https://doi.org/10.1787/888934228552

The estimated output growth rate in 2020 stands at -6.4%. The anticipated rebound for 2021, very dependent on the resumption of tourist flows, would be equal to 4.5%. The risks weighing on the Thai economy in 2021 are mainly related to a potential resumption of the pandemic. The recent spike in COVID-19 cases in Thailand could derail the continued

upturn in domestic activity and a hypothetical recovery in tourism. The reopening of the tourism sector was expected to commence with the Special Tourist Visa (STV) scheme in Q4, albeit under very strict arrangements (NNT, 2020). The domestic political context could also impact growth, with the large-scale protests that took place in the fourth quarter of 2020 further exacerbating uncertainty. The late implementation of the 2020-21 budget could delay the dynamics of public investment, while there is virtually no room for further policy rate reductions. The rapid appreciation of the Thai baht (THB) during Q4 2020 may affect the fragile recovery of the economy, prompting the Bank of Thailand to bring forward capital outflow rules to curb THB strength (BOT, 2020a). Finally, rising household debt, combined with a sharp rise in unemployment and underemployment, is likely to have a lasting impact on domestic consumption. On the upside, public-private partnership (PPP) projects related to the Eastern Economic Corridor (EEC) special development zone, and investment in the 5G network, are likely to help foster private investment in the medium term.

Looking further ahead, economic performance is anticipated to be influenced by structural issues facing the Thai economy. Thailand is very dependent on exports, in particular to China and the United States. In addition, the Thai education system is struggling to fill a growing shortage of skilled labour necessary for the deployment of the Thailand 4.0 strategy.

The economic performance of **Viet Nam** in 2020 will be relatively mildly affected by the pandemic, which has nevertheless put an end to the robust growth rates recorded in the past. Real GDP climbed by 2.7% year-on-year in the third quarter of 2020, after rising by a meagre 0.4% in Q2. While industry and services contributed fairly evenly to growth in 2019, services have played a smaller role in 2020, on the back of a relatively dim outlook for the region and the global economy (Figure 1.17). Manufacturers with highly integrated supply chains – in particular in the textile and garment industry, where nearly 60% of materials are sourced from China – suffered from major disruptions in the early months of 2020. Industrial production in Q2 and Q3 largely benefited from solid manufacturing activity, while mining and quarrying made a negative contribution to industrial activity (Figure 1.18). In parallel, lower demand from China has dealt a blow to Viet Nam's agriculture, forestry and fisheries sector.

Figure 1.17. **Contribution to GDP growth in Viet Nam, 2018-20**
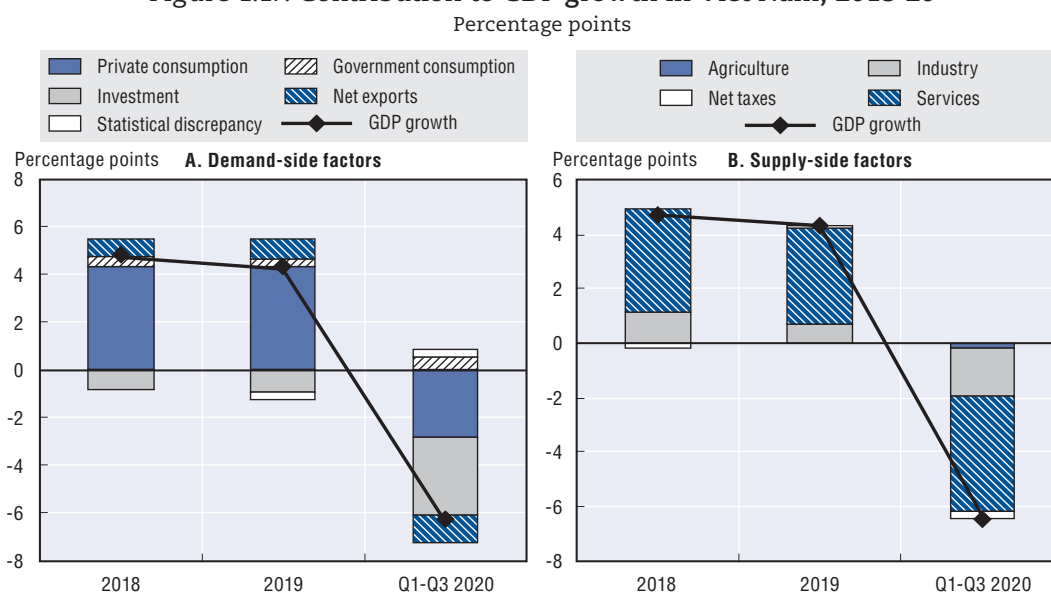
Percentage points

Source: OECD Development Centre based on data from CEIC and national sources.

StatLink 🔗 https://doi.org/10.1787/888934228571

Figure 1.18. **Contribution to industrial sector growth in Viet Nam, 2019-20**
Percentage points
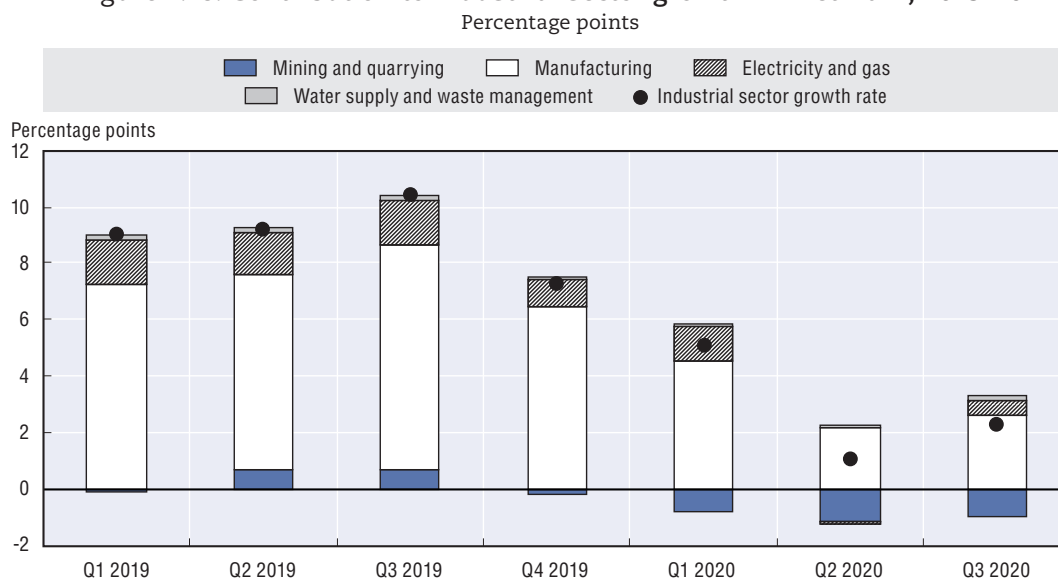
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink https://doi.org/10.1787/888934228590

In view of the ongoing global crisis, economic growth in Viet Nam is expected to slow in 2020, but to remain the strongest in Emerging Asia (+2.6%). The projection for 2021 points to a real GDP growth rate of 7.0%. The outlook for exports, which rebounded sharply over the past months, is particularly uncertain due to economic deterioration in some of Viet Nam's major trading partners. The labour market will remain under considerable pressure, with 31.8 million workers negatively affected by the pandemic, in the form of job losses, cuts in working hours or income reductions. The services sector has been the hardest hit, with 68.9% of workers affected, followed by the industry and construction sector, with 66.4% of workers affected (GSO, 2020). Adding to the balance of downside risks, the fiscal deficit is forecast to increase substantially in 2020, as the government has launched large stimulus packages to support businesses and consumers. At 56.1% of GDP in 2019, public debt is high by regional standards, increasing the risk of debt distress and limiting the room for fiscal manoeuvre. Another challenge stems from the US Section 301 investigation concerning Viet Nam's practices with respect to timber imports and currency undervaluation, which could potentially result in the imposition of tariffs (USTR, 2020).

The medium to long-term prospects are particularly benign, as Viet Nam is well positioned to benefit from the trade diversification trend, which was triggered by the US-China trade tensions. In addition to low production costs, other factors are expected to reinforce Viet Nam's attractiveness as an investment destination. These include participation in several free trade agreements, such as, CPTPP, RCEP and the recent one with the European Union having come into force in August 2020 (EC, 2020). Investments and exports are likely to expand steadily in the coming years if the relocation trend continues.

Brunei Darussalam and Singapore

Quarterly growth in Brunei Darussalam came in at 0.5% in the third quarter of 2020, after an increase of 3.0% in Q2 and a 2.3% rise in Q1. Net exports contributed the most to growth in the first three quarters of 2020 (Figure 1.19), due to strong growth of exports. Industry contributed the most to the increase during Q1-Q3, driven by construction works at a major petrochemical refinery slated for completion by 2022. Strong liquefied gas and

methanol production supported industrial activity in the first three quarters of last year (Figure 1.20). Nevertheless, high-frequency indicators point to a deterioration of the trade balance entering Q4. Exports fell by 24.2% year-on-year in July 2020, as both crude oil and liquefied natural gas (LNG) exports dwindled, by 36.1% and 47.6%, respectively. Export growth remained negative in August (-9.6%) and September 2020 (-3.5%).

Figure 1.19. **Contribution to GDP growth in Brunei Darussalam, 2018-20**
Percentage points
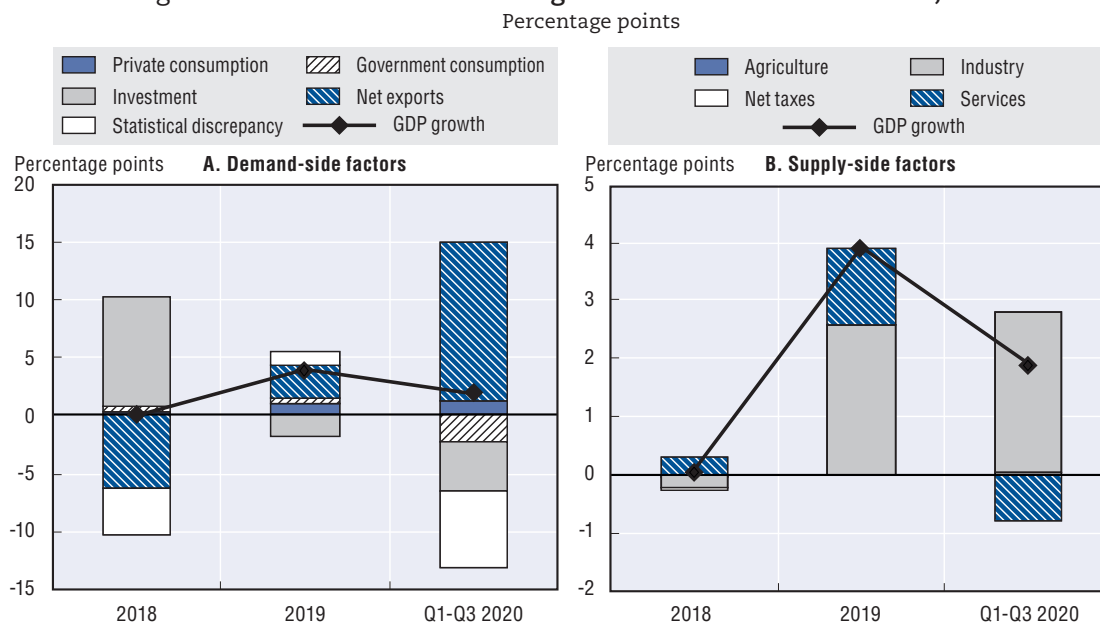
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink ᐧᐧᐧ https://doi.org/10.1787/888934228609

Figure 1.20. **Contribution to industrial sector growth in Brunei Darussalam, 2019-20**
Percentage points
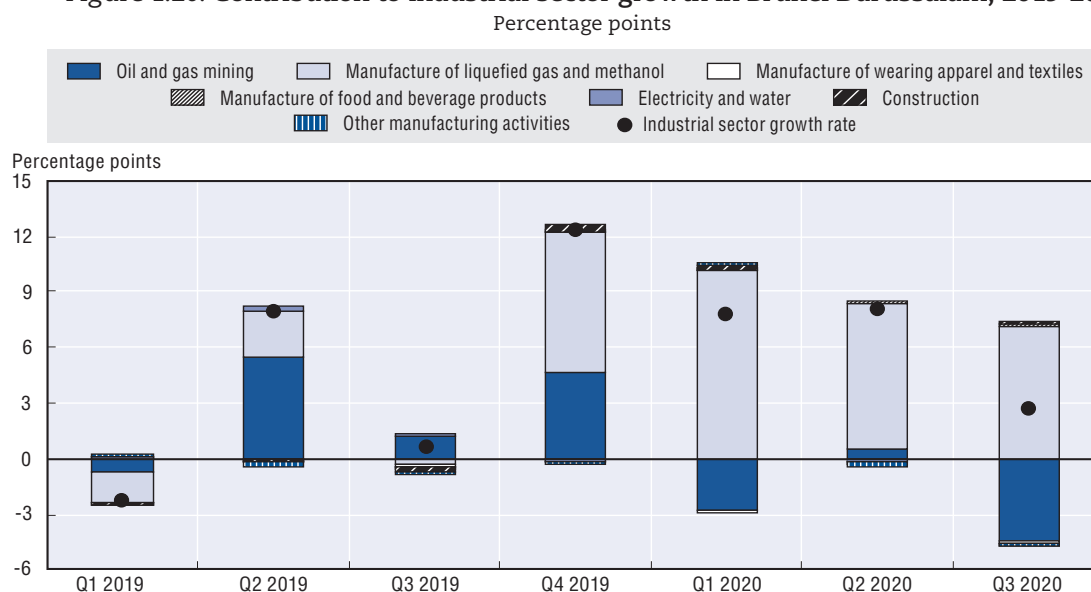
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink ᐧᐧᐧ https://doi.org/10.1787/888934228628

Output growth is forecast to be relatively solid in 2020, at 1.8%. It is anticipated that the growth rate will pick up pace in 2021 and settle at 3.1%. With the pandemic under control domestically, the unwinding of the remaining restrictions is anticipated to proceed at a steady pace. The government passed sizeable expansionary measures, whose impact is likely to be felt in 2021, bolstering consumption. The most significant economic drag stems from weak global energy demand and prices. Another downside risk is the possibility that trade tensions between China and the United States will escalate further.

Efforts by the government to diversify the economy away from oil and LNG exports, by accelerating investments in the manufacturing and services sectors, are expected to yield significant results in the medium-term. Several projects are underway, including a fertiliser plant, which is scheduled to commence operations in Q2 2021, and the completion of the second phase of the Hengyi petrochemical refinery by 2022. These are likely to boost job creation and investment considerably.

Amid continued slack in external economies, the **Singapore** GDP shrank by 5.6% year-on-year in Q3 2020, moderating from a 13.4% contraction in Q2. The contraction in the first three quarters of 2020 was driven mainly by a substantial fall in private consumption, but also by a decline in investment and net exports (Figure 1.21). The second quarter's sharp contraction was largely due to a decline in construction and travel-related services, which together account for approximately 8% of GDP. The construction sector was particularly affected by the implementation of Circuit Breaker measures and a rise in COVID-19 cases among foreign workers, which brought many construction sites to a near standstill. Wholesale and retail trade, business services, together with transportation and storage, mainly drove the contraction in services in the first three quarters of 2020 (Figure 1.22). Manufacturing was also affected, but less than the services sector, as the former benefited from a surge in the production of pharmaceutical ingredients and an expansion in petrochemical output.

Figure 1.21. **Contribution to GDP growth in Singapore, 2018-20**
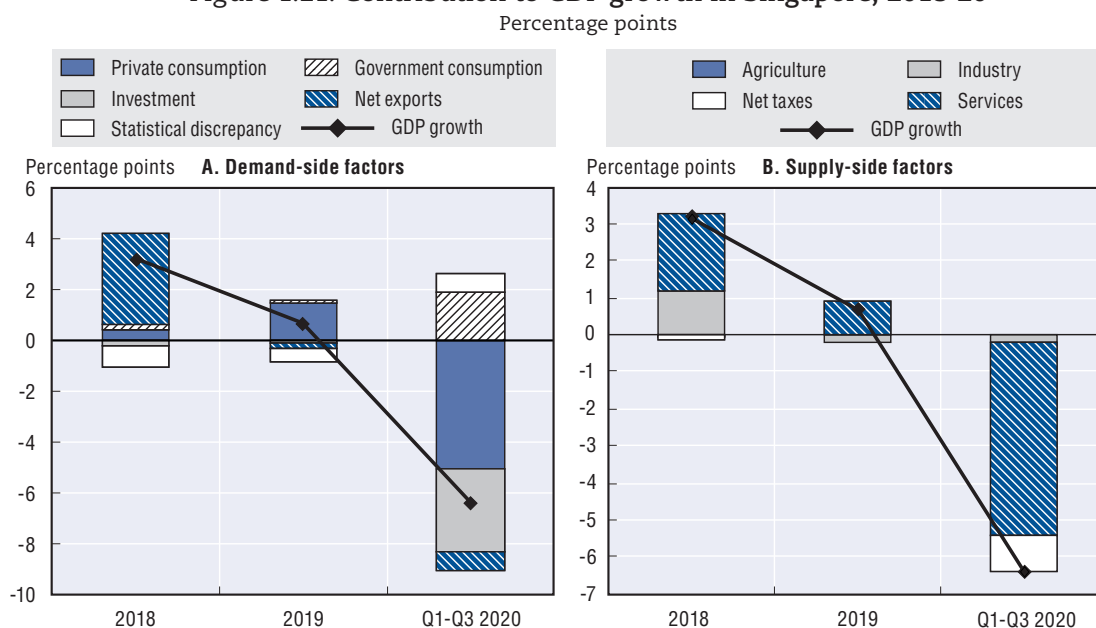
Percentage points

Note: Services include the ownership of dwellings.
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink ⟶ https://doi.org/10.1787/888934228647

Figure 1.22. **Contribution to services growth in Singapore, 2019-20**
Percentage points

Source: OECD Development Centre based on data from CEIC and national sources.
StatLink ⧉ https://doi.org/10.1787/888934228666
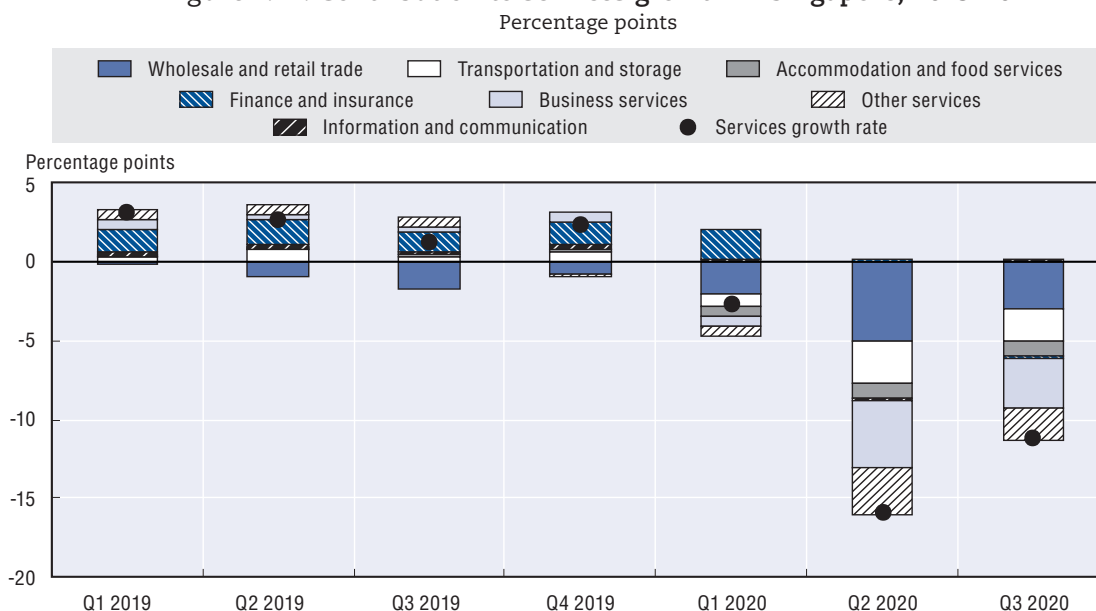
Economic activity is expected to fall in 2020 by 5.5% and return to growth (+5.0%) in 2021, from a low base. Singapore is being hit hard by the global downturn because of its high export dependence and specialisation in particularly volatile investment goods. Given the sustained fall in investment orders and continued spread of the pandemic globally, exports are likely to contract further in the course of 2021, though the rate of decline should gradually decelerate. Faced with a weak business outlook and a plunge in capacity utilisation, companies might further curtail investment spending. On the other hand, the squeeze of household disposable incomes will be partly compensated by higher transfer payments and tax relief measures adopted as part of the government's successive stimulus packages, which together amount to a total of approximately SGD 93 billion (Singapore dollars) or roughly USD 70 billion.

The financial sector in particular is well positioned to emerge stronger from the COVID-19 crisis. The Monetary Authority of Singapore (MAS) launched an SGD 125 million (approximately USD 94 million) package in April 2020 to support and enhance capabilities in the financial services and Fintech sectors (MAS, 2020a). The Fintech sector is expected to accelerate its development further; Fintech firms raised SGD 462 million (nearly USD 347 million) in equity funding in the first half of 2020, which represents a 19% increase from the previous year. Sustainable finance is also anticipated to expand at a steady rate in the coming years, as Singapore has become the largest market for green finance in ASEAN (MAS, 2020b).

Box 1.3. **Singapore aims to become green finance hub in Asia**

The Monetary Authority of Singapore (MAS) has launched several initiatives to support the development of green financing solutions. MAS unveiled its Green Finance Action Plan in November 2019, aimed at transforming Singapore into a leading centre for green finance in Asia and globally. This long-term strategy is articulated around three pillars: (i) strengthening resilience vis-à-vis environmental risks; (ii) developing markets for green finance, which includes the creation of a subsidy programme for green and sustainable loans; and (iii) mobilising innovation and technology, in particular through the creation of centres of excellence. In November 2020, MAS announced the launch of the Green and Sustainability-Linked Loan Grant Scheme (GSLS). The grant will enter into force in January 2021 and is the first of its kind in the world. The GSLS aims to support corporates of all sizes in obtaining green and sustainable financing by discharging the expenses of engaging independent service providers to certify the green and sustainability credentials of the loan. The scheme also encourages banks to develop green and sustainability-linked loan frameworks to render such financing options more accessible to small and medium-sized enterprises (MAS, 2020c). Another related initiative is the Sustainable Bond Grant Scheme, which encourages the issuance of green, social, sustainability and sustainability-linked bonds in Singapore (MAS, 2020d). Meanwhile, with seven other central banks around the world, the MAS has launched a network called the Central Banks and Supervisors Network for Greening Financial System. This network intends to promote green financing and share knowledge about it with other countries (Chang, 2019).

The private sector also plays an important role towards achieving this goal. Banks such as BNP Paribas, OCBC Bank and UOB have initiated systems that spell out clear and comprehensive criteria on how to evaluate green and sustainable finance transactions and projects, aligned with the environmental objectives of the UN Sustainable Development Goals. Many of these projects are characterised by a circular economy, where waste is recycled and resources are kept in use for as long as possible. Examples include renewable energy projects, energy efficiency activities and sustainable supply-chain processes (MAS, 2020e).

Figure 1.23. **Green bond issuance by new issuers in selected ASEAN economies, January-August 2020**
Billion USD
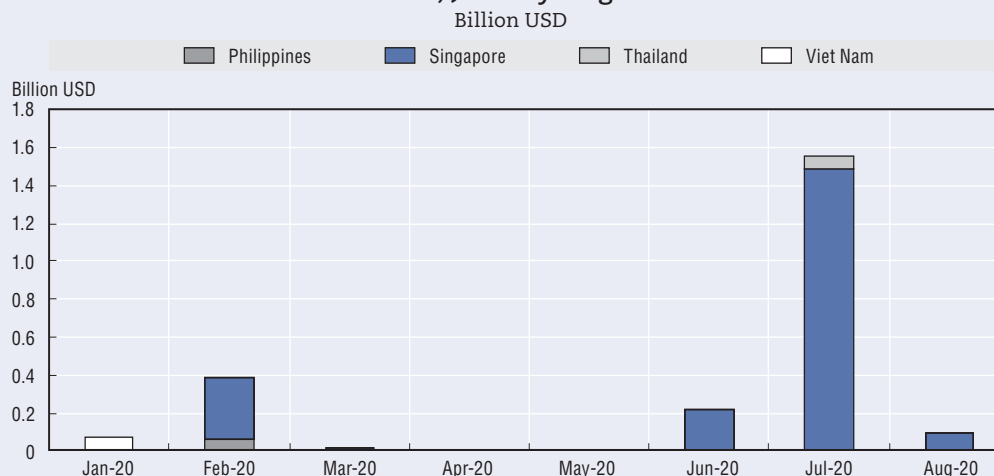
Note: Data refer to green bond issuance by new issuers entering the market. Subsequent issuances from repeat issuers are not included. Data capture issuance by all issuer sectors.

Source: OECD Development Centre based on data from the *Climate Bonds Initiative* (accessed on 24 December 2020).

StatLink ᴭᴤᴩ https://doi.org/10.1787/888934228685

> ### Box 1.3. **Singapore aims to become green finance hub in Asia** *(cont.)*
>
> In 2020, issuers based in Singapore took the lead for first-time green bond issuance in the ASEAN region (Figure 1.23). However, green bond issuance in Singapore started several years ago. In 2017, for instance, City Development Limited (CDL), a real estate development company and Development Bank of Singapore (DBS), a commercial bank, each issued a green bond, the country's first. The proceeds from the CDL green bond were distributed to finance the upgrading and restoring of commercial buildings in the city area, while the proceeds of the DBS green bonds were invested in renewable energy and climate projects (Chang, 2019).
>
> Through these initiatives, the Monetary Authority of Singapore together with banks aim to promote sustainable development in the region and to set standards of sustainable financial development. These plans have become an important part of the green finance network that Singapore is building to support Asia's important step towards a more sustainable future.

Cambodia, Lao PDR and Myanmar

In comparison with other ASEAN countries, **Cambodia** is particularly dependent on the tourism sector, which accounted for nearly 14% of its GDP in 2018. While international borders are officially open, entry conditions are drastic and the granting of tourist visas is suspended until further notice. International tourist arrivals declined by more than 95% year-on-year in October. Tourist arrivals plummeted in line with a sharp fall in the number of travellers from ASEAN and China (Figure 1.25). Estimates point to nearly 3 000 business closures and 45 000 job losses in the sector in the first half of 2020 (ADB, 2020a). Already weakened before the crisis, the textile industry was gripped by a twin supply-demand shock. On the one hand, supply bottlenecks led to a slowdown in production, with nearly one-third of factories in the garment, textile and footwear industry reported to have closed temporarily (ADB, 2020a). In parallel, international orders have been postponed or cancelled in the context of a general decline in demand.

Figure 1.24. **Contribution to GDP growth in Cambodia, 2017-19**
Percentage points
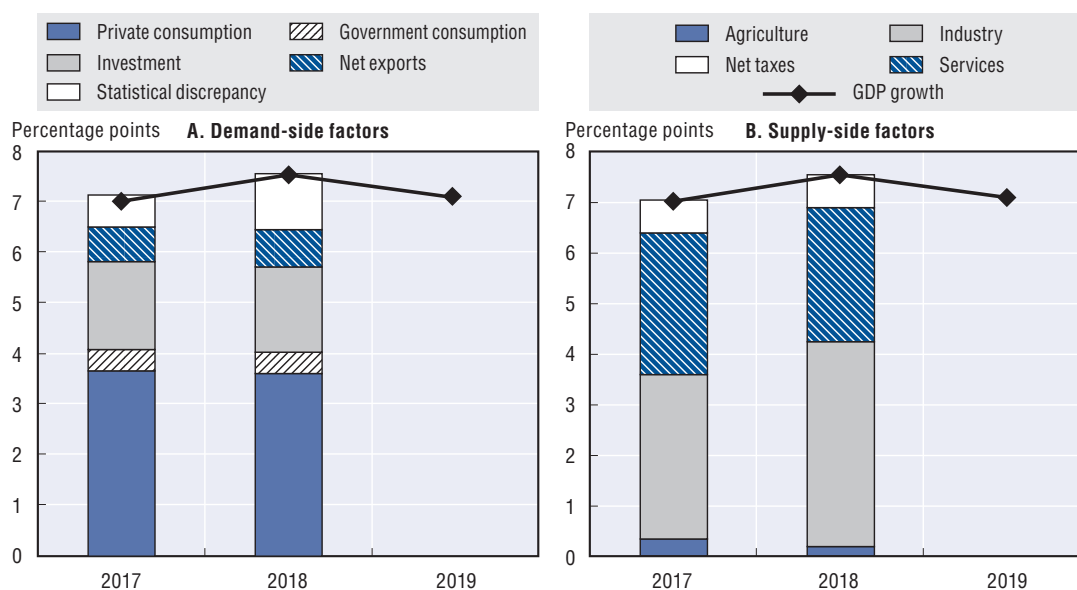
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink https://doi.org/10.1787/888934228704

Figure 1.25. **Contribution to growth in tourist arrivals in Cambodia, January-October 2020**

Percentage points

Source: OECD Development Centre based on data from CEIC and national sources.

StatLink ᐈ https://doi.org/10.1787/888934228723
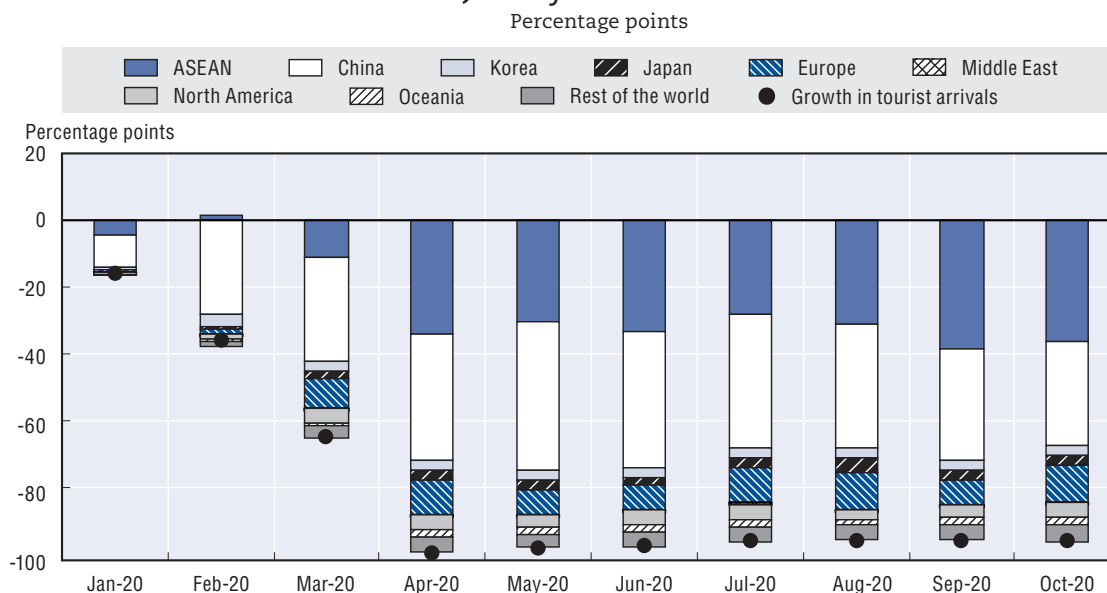
The economy of Cambodia is anticipated to register growth of -2.9% in 2020, the sharpest decline in decades. If restrictions continue into 2021 in one form or another, the tourism sector will experience a lasting recession. The outlook for private consumption is particularly lacklustre, as the ultimate impact of the crisis on the labour market has yet to be fully ascertained. The World Bank estimates that at least 1.76 million jobs are at risk in Cambodia because of the pandemic (World Bank, 2020a). The return of overseas workers to Cambodia will add to pressure on the domestic labour market and could lead to an increase in the overall poverty rate. Agriculture, the only sector to have been relatively spared from the economic consequences of the COVID-19 crisis, may not be able to absorb the laid-off workers from the tourism sector and the textile industry. The emergency measures put in place by the Cambodian government, such as tax exemptions, allowances for dismissed workers or the facilitation of access to credit with the creation of the Small and Medium Enterprise Bank of Cambodia (SME Bank), should enable a recovery in 2021 (+5.4%).

Real GDP growth in **Lao PDR** slowed in 2019. The slowdown largely reflects the contraction in the industrial and agricultural sectors (Figure 1.26). In 2020, the Lao economy was hit hard by the pandemic and the containment measures imposed to curb its spread. Private consumption expenditure was affected by adjustments in labour markets and worsening poverty. Exports fell by more than 15% year-on-year in the second quarter of 2020, in the midst of severe supply chain disruptions, which particularly affected the garment industry. The depreciation of the Lao kip (LAK) is exerting additional pressure on the domestic economy. Restrictions on the sale of foreign currency by commercial banks have forced many traders to buy foreign currency from the parallel market. The gap between the official and the parallel exchange rates widened in recent months, while the depreciation of the LAK led to pressure on importers and higher food prices in July 2020 (Figure 1.27).

Figure 1.26. **Contribution to GDP growth in Lao PDR, 2017-19**
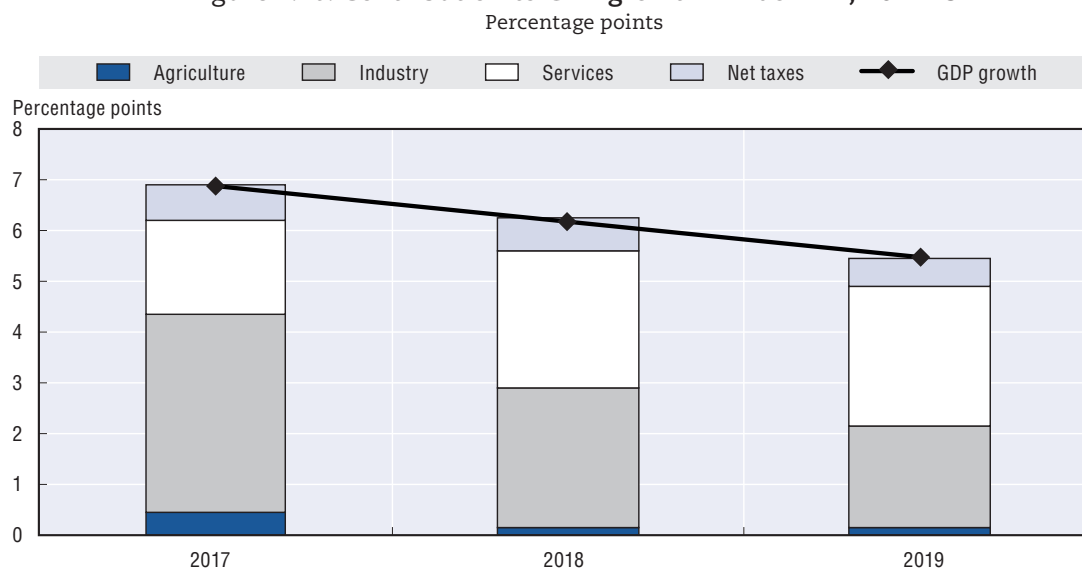
Percentage points

Source: OECD Development Centre based on data from CEIC and national sources.

StatLink ᘏᗩ https://doi.org/10.1787/888934228742

Figure 1.27. **Consumer price index for food and exchange rate against US dollar in Lao PDR, 2019-20**
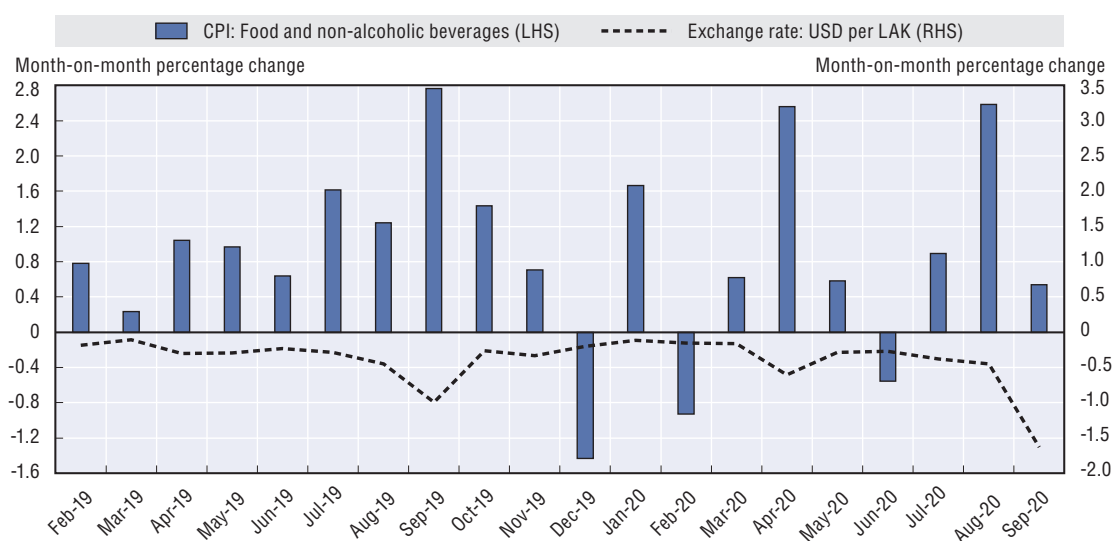
Note: Exchange rate is defined in terms of USD per Lao kip (LAK) and refers to monthly average.
Source: OECD Development Centre calculations based on data from CEIC and national sources.

StatLink ᘏᗩ https://doi.org/10.1787/888934228761

Real GDP growth for 2020 has been revised downwards, at 0.6%, while the projection for 2021 is of a 5.0% growth. However, risks remain tilted to the downside due to domestic vulnerabilities. The recent decision to continue suspending the issuance of tourist visas for travellers arriving from countries affected by the COVID-19 outbreak will drag on recovery in the important tourism industry. The fall in migrant remittances complicates matters further, hurting foreign exchange reserves and increasing the risk of poverty for as many as 214 000 people in Lao PDR (World Bank, 2020b). In addition, the non-performing

loan (NPL) ratio increased to 3.21% in Q2 2020, from 3.04% at the end of 2019. This will further weaken banks' balance sheets and could reinforce the downward momentum in Lao PDR's corporate sector.

The medium-term outlook is overcast by significant downside risks, mostly related to the government's ability to meet its debt service obligations. The credit rating agency Moody's recently downgraded the government's issuer rating from B3 to Caa2. According to the assessment underpinning the rating decision, the country faces serious liquidity problems due to unpaid amounts exceeding USD 1 billion per year in its external debt service until 2025, as well as to the limited financing options available (Moody's, 2020).

In **Myanmar,** several hundred cases of COVID-19 have been confirmed per day in recent weeks following months without any. In 2019, the economy grew by 6.8%, mostly driven by consumption and the services sector (Figure 1.28). The first half of 2020 was marked by an extended period of job losses as factories suspended operations and private consumption plunged during Q2. Although industrial production rebounded in August, the manufacturing sector has again been at a near standstill since the second half of September due to the closure of non-essential production sites in the face of rising infections. Exports fell by 13.5% in the first half of 2020, largely due to a contraction in garment exports. Imports, driven by capital goods, rose by 7.8% during the same period.

Figure 1.28. **Contribution to GDP growth in Myanmar, 2017-19**
Percentage points
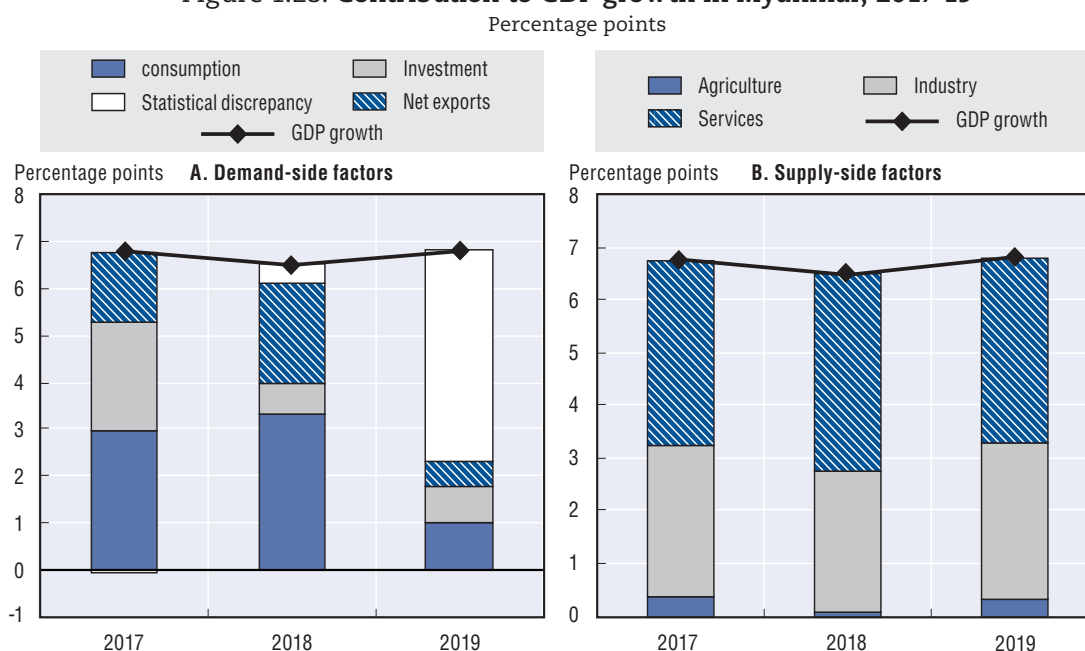
Note: Data relate to fiscal year ending in March.
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink ⟐ https://doi.org/10.1787/888934228780

Growth will decelerate sharply in 2020 (+1.7%) and is seen gathering pace in 2021 (+5.0%), provided the pandemic recedes globally. The outlook remains subdued, as COVID-19 movement restrictions will continue to disrupt economic activity, including agricultural activity. Recovery in manufacturing will likely be very gradual, partly reflecting a lack of momentum in demand. Lower gas prices, in line with the fall in global oil prices and external demand for gas, will also reduce export earnings for Myanmar. The government

will continue to provide loans at reduced interest rates, from the USD 70 million COVID-19 fund, extending an important lifeline to firms in the most affected sectors.

China and India

The number of daily confirmed COVID-19 cases has remained low in **China**, while swift and targeted measures to address localised outbreaks have shielded the economy from another imposition of nationwide restrictions. China is expected to record positive growth throughout 2020. The strong recovery in Q2 2020 (+3.1%) and Q3 (+4.9%) offset the sharp decline in the first quarter (-6.8%). The recovery is driven by investment and industry, rather than consumption and services, as shown by detailed analysis of the Q3 GDP figures (Figure 1.29). Consumption remained weak and made a negative contribution to year-on-year growth, while investment made a positive contribution. This bifurcated recovery is also reflected in the figures for industrial production and retail trade. The year-on-year industrial production growth rate has accelerated since April, reaching 6.9% in September. The rebound was fuelled in particular by the mining and utilities sectors. Retail sales growth was still negative (-7.2%) in the first three quarters of 2020.

Figure 1.29. **Contribution to GDP growth in China, 2018-20**
Percentage points
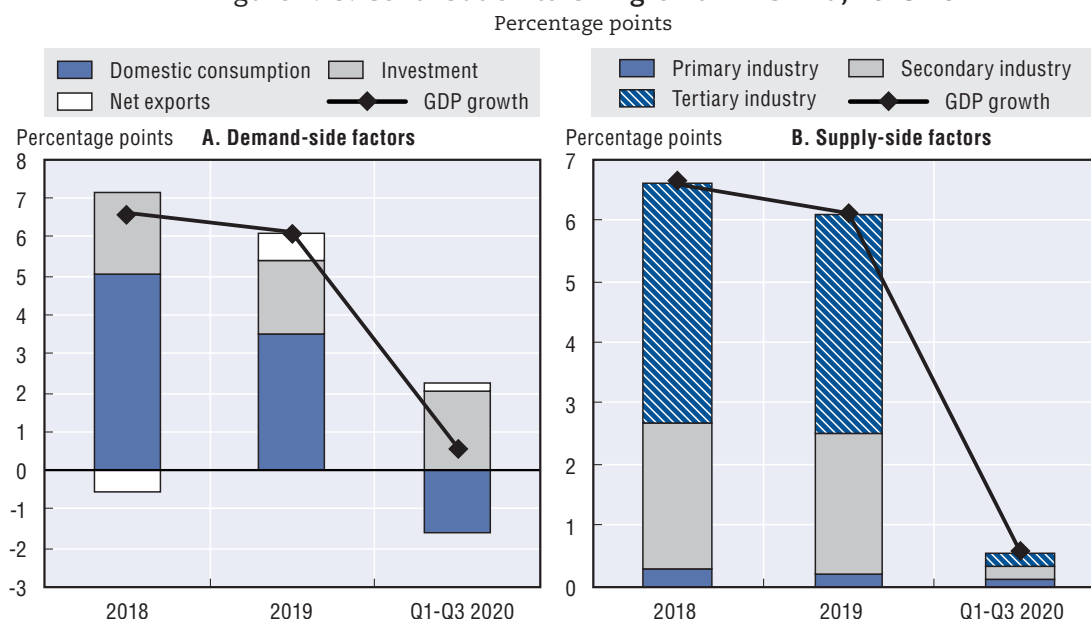
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink https://doi.org/10.1787/888934228799

Annual growth in China is expected to reach 1.8% in 2020 and return to its pre-crisis trend from 2021 onwards. Chinese exports have recovered strongly since April, most notably in November. This performance is explained not only by sales of medical products, but also by a strong demand for mechanical, electrical and electronics equipment (Figure 1.30). As restrictions were relaxed earlier than in other parts of the world, China has gained market share, particularly in Europe and the United States. Foreign reserves reached USD 3.1 trillion in September 2020, the level of public debt is relatively low and monetary policy still has some room to deliver cuts. One of the key challenges is related to the sluggishness of private consumption, which could limit the rebound of supply. Despite a rebound in sales of luxury items, labour market strains and falling disposable incomes will keep a lid on aggregate private consumption. In addition, strained relations

with the United States could increase market volatility. There are also growing concerns over stress in corporate credit that could leak to financial markets.

Figure 1.30. **Contribution to export growth in China, March-November 2020**

Contribution to year-on-year growth, percentage points
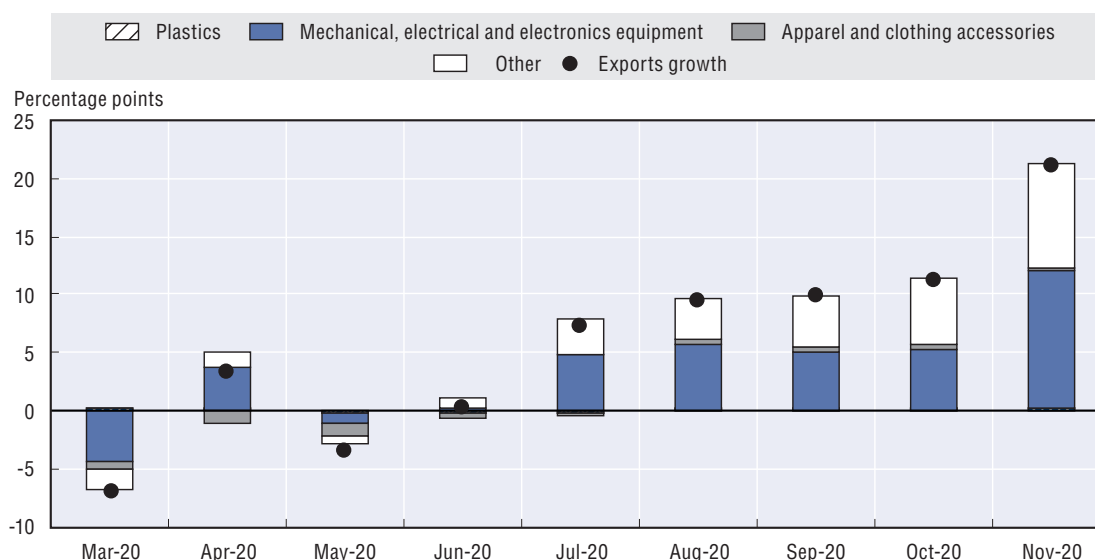
Source: OECD Development Centre calculations based on data from CEIC and national sources.

StatLink https://doi.org/10.1787/888934228818

China will continue to be a hub for investment, as demonstrated by the resilience of foreign direct investment (FDI) and portfolio inflows during the COVID-19 crisis. The outlook is nevertheless weighed down by the recent re-escalation of trade tensions with the United States.

India is anticipated to post a sharp GDP contraction as COVID-19 continues to spread throughout the country. Real GDP contracted more severely than anticipated in Q1 2020 (-23.9%), while the contraction in Q2 was more moderate (-7.5%). The first two quarters of fiscal year 2020/21 were characterised by a sharp compression in consumption (Figure 1.31) as unemployment skyrocketed after the implementation of a national lockdown. The unemployment rate stood at 6.5% in November 2020 (CMIE, 2020). Investment has also dwindled, while government consumption positively contributed to growth. Imports have fallen faster than exports as India continues to grapple with cases of COVID-19 and supply disruptions caused by regional lockdowns. On the supply side, the services sector recorded a deep contraction as retail trade, transport services and the hospitality industry were nearly brought to a halt by the nationwide lockdown measures. Industrial activity was also penalised by remaining COVID-19-related restrictions, while agriculture made a modestly positive contribution to growth.

Figure 1.31. **Contribution to GDP growth in India, 2018-20**

Percentage points

Note: Data relate to fiscal years.

Source: OECD Development Centre based on data from CEIC and national sources.

StatLink ᵃˢᵖ https://doi.org/10.1787/888934228837
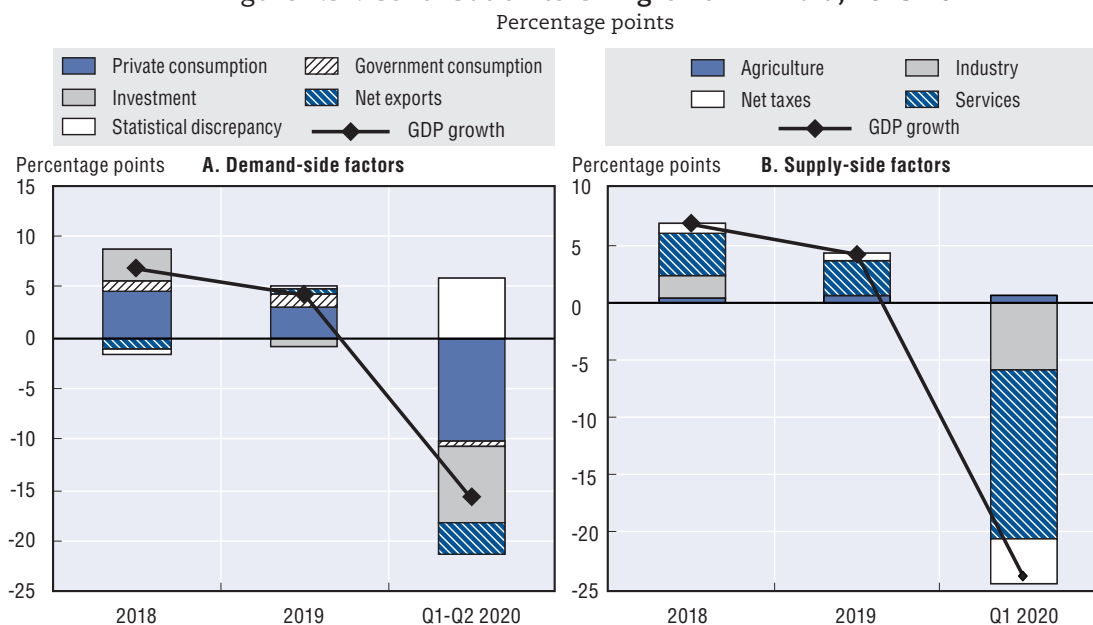
No tangible acceleration of growth is expected in the final quarters of 2020, and thus GDP growth for the year as a whole is forecast to be around -9.9%, the worst contraction among Emerging Asian countries. Indian GDP should return to positive growth in 2021 (+7.9%), from a low base, but the risk balance is mainly tilted to the downside. With the COVID-19 case curve yet to be flattened, recovery in the services sector will likely lag behind a rebound in manufacturing. Banks' NPL ratio, which stood at 9.1% on average at the end of 2019, is expected to increase, as small and medium-sized enterprises (SMEs) were heavily strained during the national lockdown. As a result, banks and non-bank financial intermediaries could tighten credit conditions at a time when access to credit is most needed to revive the economy. Weaker investment combined with mobility restrictions will continue to drag on the labour market. At the same time, and despite the improvement in overall financial market resilience, pockets of vulnerability remain. For instance, liquidity risks continue to be elevated in the debt-oriented mutual fund segment (Box 1.4). On the upside, foreign exchange reserves remain at comfortable levels (15.9 months of imports in November 2020), which would help the Reserve Bank of India (RBI) shield the rupee from depreciation.

> **Box 1.4. Liquidity risks and debt-oriented funds in India**
>
> Liquidity risks could remain elevated for debt-oriented mutual funds in India owing to concerns over the viability of the circulating debt papers. A sharp fall in prices could be accompanied by significant redemptions from investment funds. The vast majority of funds in terms of net assets under management are open-ended, suggesting growing preference towards funds that can accommodate continuous flow of capital with lower investment requirements. Open-ended funds are more prone to redemption risks than close-ended funds because the latter have long lock-up periods during which investors cannot redeem shares (Cortes et al., 2018).
>
> The Reserve Bank of India responded with a new credit facility that fund managers can tap into in order to avoid distressed asset sales and ease investor concerns. The RBI offered a credit facility of INR 500 billion (Indian rupees, USD 6.6 billion) that banks can use to lend to mutual funds or to purchase investment-grade debt held by the funds (RBI, 2020a). The scheme was initially available until 11 May 2020, with the RBI committed to reviewing the timeline and amount, depending on market evolutions. Market liquidity improved overall following RBI interventions, but further falls in asset prices or a sharp rise in market volatility could prompt renewed outflows from funds.

Due to concerns about inflation, which breached the upper tolerance band of the 6% target during July-August 2020, the RBI may not be able to implement further rate cuts until the target range is reached. This could add to the pressures on domestic liquidity as the government attempts to revive economic growth. The fiscal balance is expected to deteriorate as the restrictions induced by the pandemic continue to weigh on revenues, adding to concerns over the government's ability to implement its vast recovery plan, which amounts to 10% of GDP.

Financial markets have stabilised, but vulnerabilities persist

While a systemic financial meltdown was avoided due to parallel interventions by monetary authorities, vulnerabilities remain in several parts of the financial markets. Equity and bond markets have remained quite resilient despite the pandemic-related damage and the resurgence of infections around the world. Although favourable market-financing conditions have helped cushion the economic impact of the pandemic, they may also reveal disconnection of the financial sphere from the real economy. The banking sector remains fragile, with new concerns arising about the soundness of banks' balance sheets. A negative feedback loop could therefore arise from the real side to the financial side of the economy. Moreover, the large policy interventions have involved governments taking considerable financial risks and have led to deteriorating public finances, which are already under heavy stress due to the decline in economic activity related to COVID-19.

After firming up in the second quarter of 2020, most stock markets in Emerging Asia recorded a slight correction in Q3 and the beginning of Q4. The stock markets of countries that were relatively less affected economically by the pandemic shock, such as Viet Nam, recorded gains during the third quarter of last year, while those of severely affected economies, most notably Indonesia, Singapore and Thailand, underperformed. Throughout 2020, stock markets have been particularly volatile in the Philippines, Thailand and India, as reflected by the wide amplitude between minimum and maximum stock price changes between January and December (Figure 1.32, Panel A). A steady procession of adverse developments, from concerns over rising COVID-19 case tallies to fears of disinflation, has led to a downward revision of corporate profit forecasts. Average

price-to-earnings ratios have plunged close to multiyear lows in Indonesia (Figure 1.32, Panel B), in line with rising uncertainty over corporate earnings. The onset of COVID-19 also gave rise to a decline in initial public offerings (IPOs), with year-to-date volumes as of September 2020 sharply lower, particularly in Malaysia (-81.9%) and Indonesia (-53%). Yet IPO activity could see an uptick in Q4, as several deals were announced in sectors that were spurred by the crisis, such as e-commerce and food delivery, and communication and information technologies.

Figure 1.32. **Change in benchmark stock price indices and price-to-earnings (P/E) ratios in Emerging Asian countries**
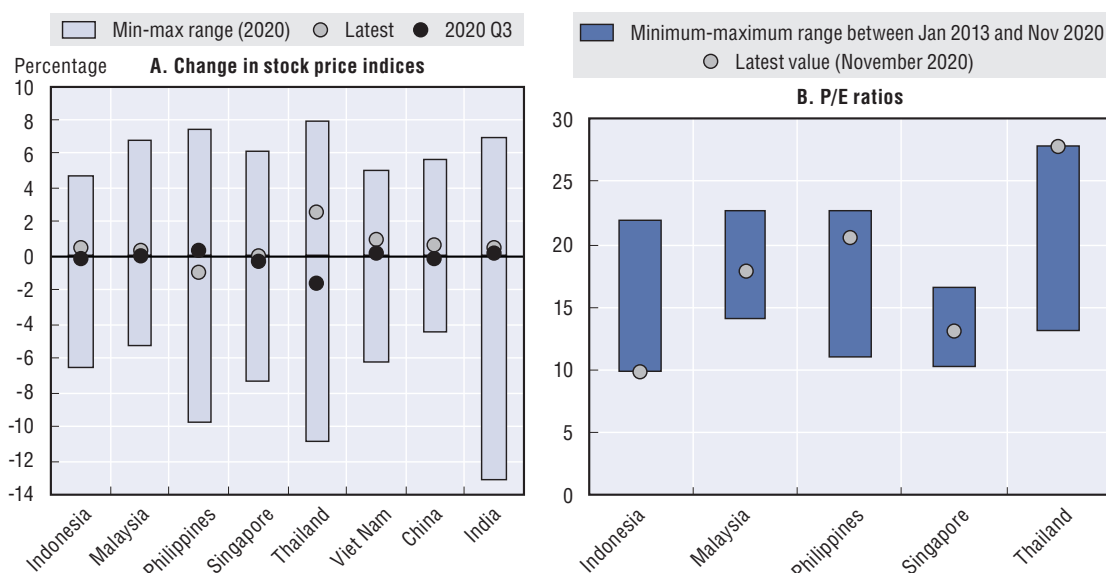
Note: Latest stock price data are as of 5 January 2021. Data for Q3 2020 are as of end-September. Data refer to the following stock market indices: SSE Composite (China), BSE Sensex 30 (India), JSE Composite (Indonesia), FTSE KLCI Index (Malaysia), PSEi Index (the Philippines), FTSE Straits Times Index (Singapore), SET Index (Thailand) and VNI Index (Viet Nam).
Source: OECD Development Centre based on data from Refinitiv Eikon, CEIC and national sources.
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Financing conditions have remained relatively favourable overall across Emerging Asia. Since August, benchmark long-term yields have fallen significantly in Indonesia, Singapore and China, leading to a compression of term premia (Figure 1.33, Panel A). By contrast, broader yield declines at the short-end of the curve in Malaysia, the Philippines and, to a certain extent Thailand, reflect investors' preference for short-dated securities amid rising risk aversion. Over the past few months, the spreads between Emerging Asia government bond yields and US Treasury yields have been broadly stable (Figure 1.33, Panel B), although they have yet to return to pre-pandemic levels in most countries. Both sets of yields staged marked declines in the third quarter of 2020, amid improving sentiment as economic activity showed signs of recovery in Southeast Asian countries and the United States. Conditions in short-term bank funding markets depict a rather mixed picture (Figure 1.34). The recent widening of spreads between three-month interbank rates and equivalent-maturity sovereign yields in Malaysia and the Philippines, seen as a proxy for risks in the banking sector, reflects concern over bank balance sheets as the pandemic exacts its toll on the economy. Inversely, spreads tightened in India, Indonesia and Singapore.

Figure 1.33. **Sovereign yield curve and spreads
in selected Emerging Asian economies, 2020-21**
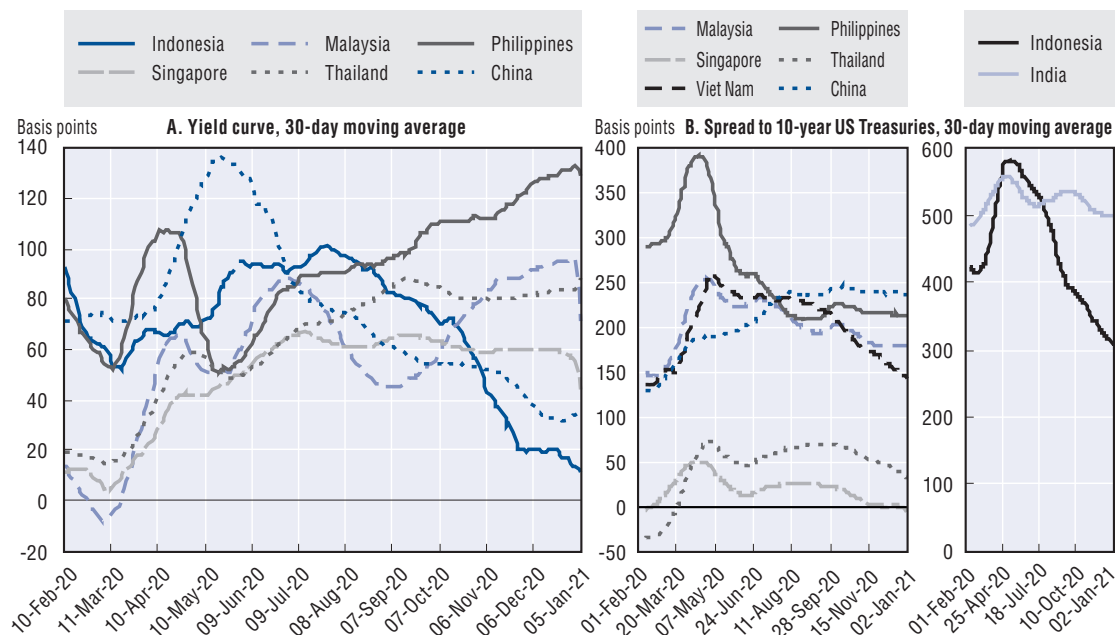
Note: Data as of 5 January 2021. The yield curve is calculated as the difference between the 10-year sovereign yield and the 1-year sovereign yield. Spreads of 10-year sovereign bonds of selected Emerging Asian economies on 10-year US Treasuries.
Source: OECD Development Centre based on data from Refinitiv Eikon.
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Figure 1.34. **Spread between three-month interbank rates and three-month
sovereign yields in selected Emerging Asian economies, January-December 2020**
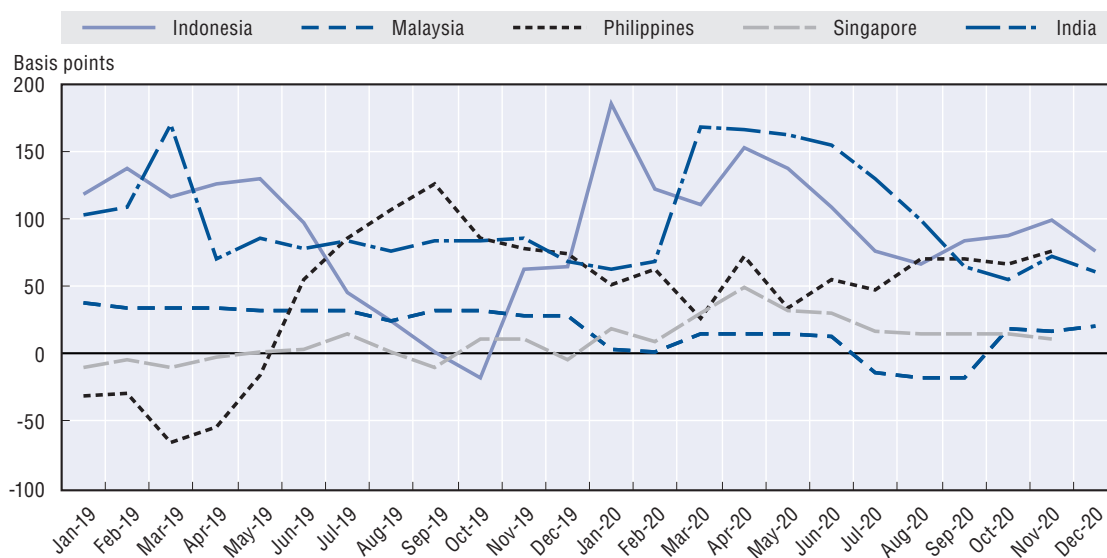
Note: Latest data for the Philippines and Singapore are as of end-November 2020.
Source: OECD Development Centre calculations based on data from CEIC and Refinitiv Eikon.
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Financial markets in Emerging Asia are expected to remain closely tied to developments outside the region. Overall, an unprecedented increase in the debt ratio of Emerging Asian countries is very likely in the coming months. The financial impact from the global downturn has yet to be fully felt, as corporate defaults will possibly continue increasing through 2021. As a result, financial market volatility could surge anew, especially in vulnerable countries where public finances are already under strain or where dependence on debt (public or private) in foreign currencies is high.

Pressure on bank balance sheets could intensify

The health crisis also highlights the vulnerability of Emerging Asian economies associated with the rise in debt levels. The level of debt increased between 2019 and the second quarter of 2020. Private sector debt grew alongside public debt, or even faster in the notable case of Thailand (Figure 1.35). When the current debt levels in the private sector are taken into account to complete the picture, Thailand seems to be more exposed to household debt, while Indonesia, Malaysia, Singapore and China are more concerned by the rise in corporate debt. The contraction in income linked to the drop in turnover and the overall deterioration of the market will increase the burden of debt on businesses and households.

Figure 1.35. **Level and change in private and public sector debt in selected Emerging Asian economies, 2020**

Note: Current level of debt-to-GDP ratios as of Q2 2020. "HHs" stands for households and "NFCs" stands for non-financial corporations.
Source: OECD Development Centre based on data from the Bank for International Settlements.
StatLink https://doi.org/10.1787/888934227982
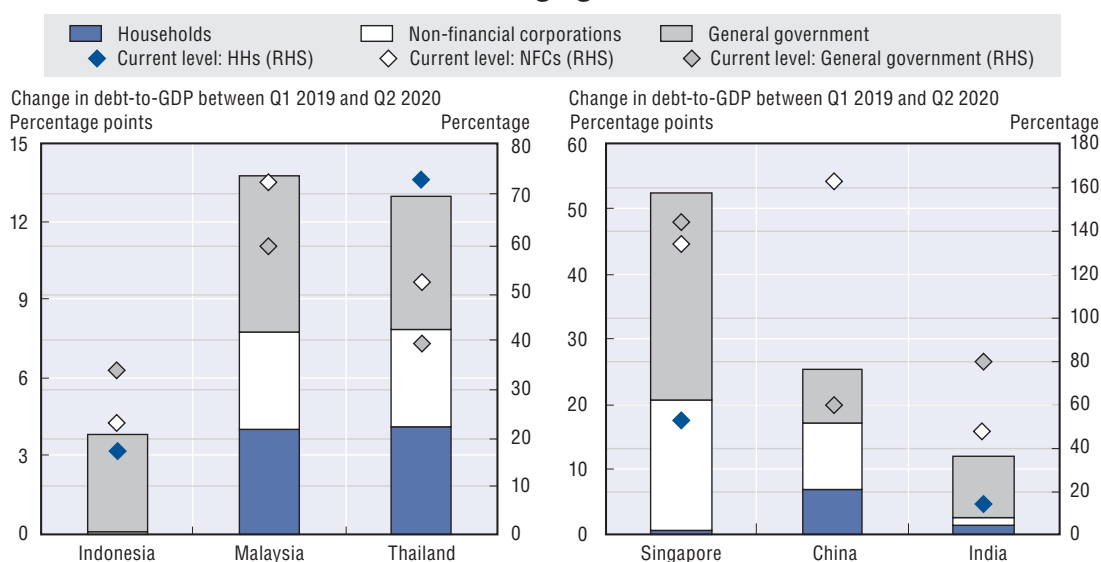
As a result of uncertainty about the quality of bank balance sheets in Emerging Asia, investors seem to be focusing increasingly on economic rather than regulatory capital. On this basis, the capital adequacy ratio demanded by markets as evidence of bank solvency appears to have moved well above regulatory minima (Figure 1.36, Panel A), which could have significant implications for bank lending activity. There are also downside risks to asset quality. For instance, the value of gross NPLs on bank balance sheets in Indonesia increased sharply in the second quarter of 2020, mostly driven by a spike in non-financial gross corporate NPLs (Figure 1.36, Panel B). The value of gross NPLs in the Thai banking sector also edged higher in Q2, mostly driven by non-financial corporations. Close monitoring, as well as prudent management of non-performing loans, will thus be required.

Figure 1.36. **Capital Adequacy Ratio (CAR) Tier-1, return on equity (ROE), NPL ratio levels and growth of gross NPLs in selected Emerging Asian economies, 2020**
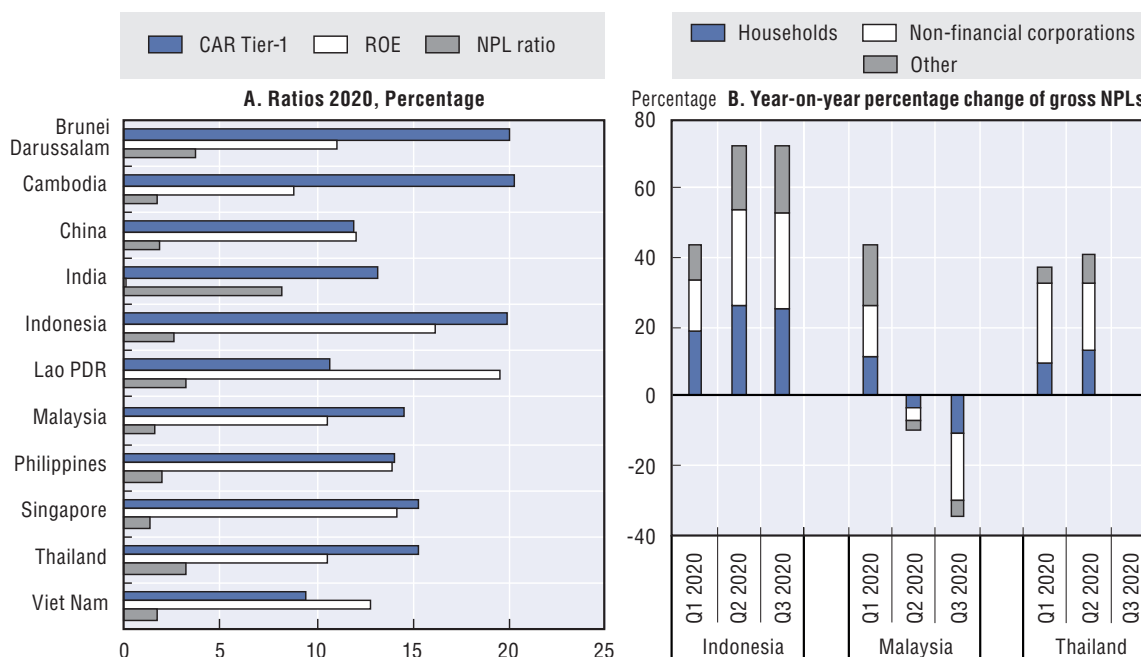
Note: In the Panel A, the data are as of Q1 2020, except for Lao PDR (Q2 2020), the Philippines (Q4 2019), Singapore (Q4 2019) and Viet Nam (Q2 2019). There are no data for Myanmar. In the Panel B, data for Indonesia refer to the change in the gross NPLs of commercial banks.
Source: OECD Development Centre based on data from CEIC and national sources and IMF Financial Soundness Indicators.

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Pressure on banks' balance sheets has increased, and the impact may become more acute once debt relief measures are withdrawn. As government support ends, banks could become more risk averse and tighten lending standards to the private sector. Weakening operating conditions, particularly in key sectors such as retail and hospitality, will likely lead to a deterioration in loan performance and profitability. India, and to a lesser extent Lao PDR and Thailand, are most exposed to the economic and fiscal consequences of a shock to the financial sector. Over the medium term, the soundness of the banking sector will be vital for its capacity to provide funding to the real economy.

Current account imbalances will widen as trade and tourism take time to recover

The pandemic will exact a heavy toll on the current account balances of Emerging Asian economies (Figure 1.37) through several channels, especially trade, tourism and remittances by migrant workers. The effects are expected to be particularly acute for major tourist destinations (Figure 1.38, Panel A) and exporters (Figure 1.38, Panel B). Countries with large tourism sectors are anticipated to experience considerable corrections of their current account balances. The collapse in remittance flows, which play a significant role in the domestic economy of many Emerging Asian countries, will be another major driver of deteriorating current account balances in 2020. Remittances by Southeast Asian migrants are forecast to decline by 19.8% in 2020 (ADB, 2020b), while the World Bank foresees a rebound of merely 6% in 2021 (World Bank, 2020c).

Figure 1.37. **Current account balances in Emerging Asia, 2020-21**
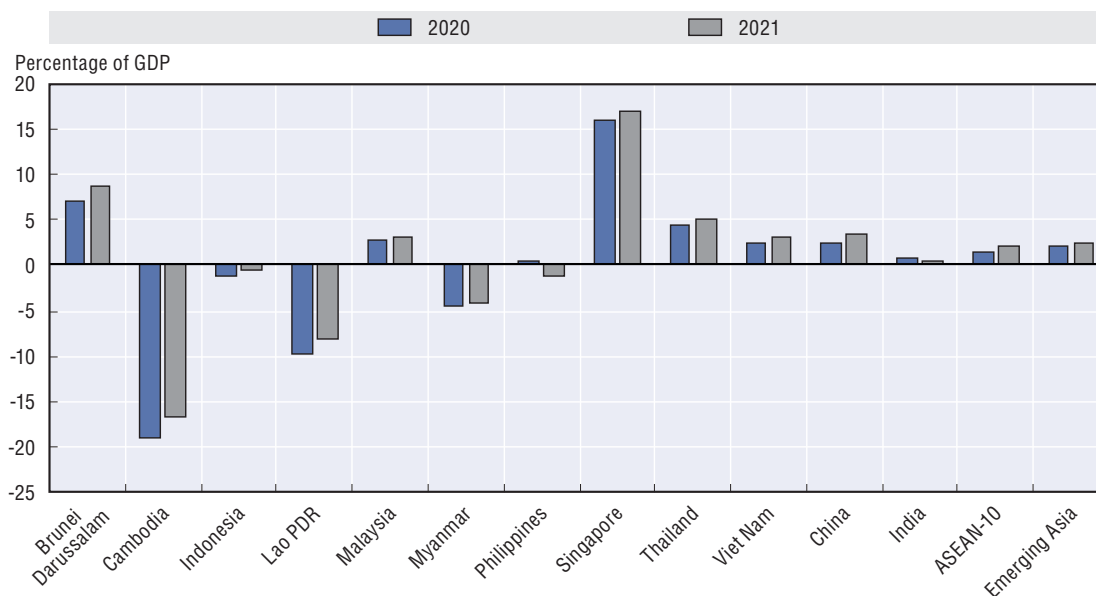
Note: Data are as of 5 January 2021. Data for India and Myanmar relate to fiscal years. The projections for China, India and Indonesia for 2020 and 2021 are based on the OECD Economic Outlook, December 2020.
Source: OECD Development Centre.
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Figure 1.38. **Change in current account balance, trade balance
and visitor arrivals in selected Emerging Asian economies**

**A. Change in current account balance
versus change in visitor arrivals**

**B. Change in current account balance
versus change in trade balance**
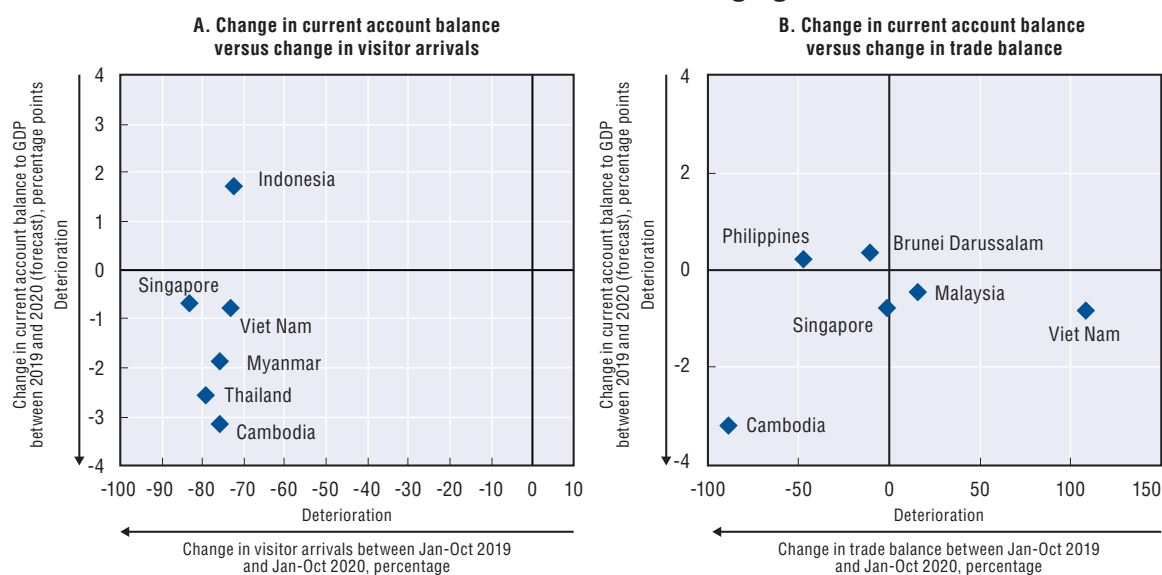
Note: Data on trade balance and tourist arrivals represent totals between January and October 2019 and, respectively, January and October 2020. Latest data on trade balances are as of September 2020 for Brunei Darussalam and August 2020 for Cambodia. Latest data on visitor arrivals are as of September 2020 for Malaysia and July 2020 for Myanmar.
Source: OECD Development Centre; CEIC; national sources; and IMF *World Economic Outlook* database (October 2020).
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Foreign direct investment flows into Emerging Asian countries are trending downwards (Figure 1.39). As net FDI tends to flow out of advanced economies towards emerging economies, the economic downturn in the former group of countries is the main driver of diminishing inflows in the latter. Although all industries have been affected, the impact will be stronger in several services sectors, including aviation and tourism, as well as in manufacturing industries that are intensive in global value chains (GVCs). FDI inflows in June hovered near multi-year lows in Brunei Darussalam, China, India, Indonesia, the Philippines and Thailand. By contrast, FDI proved to be more resilient in Viet Nam, where inflows in the first half of 2020 were roughly equal to those in 2019 over the same period.

Figure 1.39. **Foreign direct investment in Emerging Asia, 2018-20**

USD billion, annualised
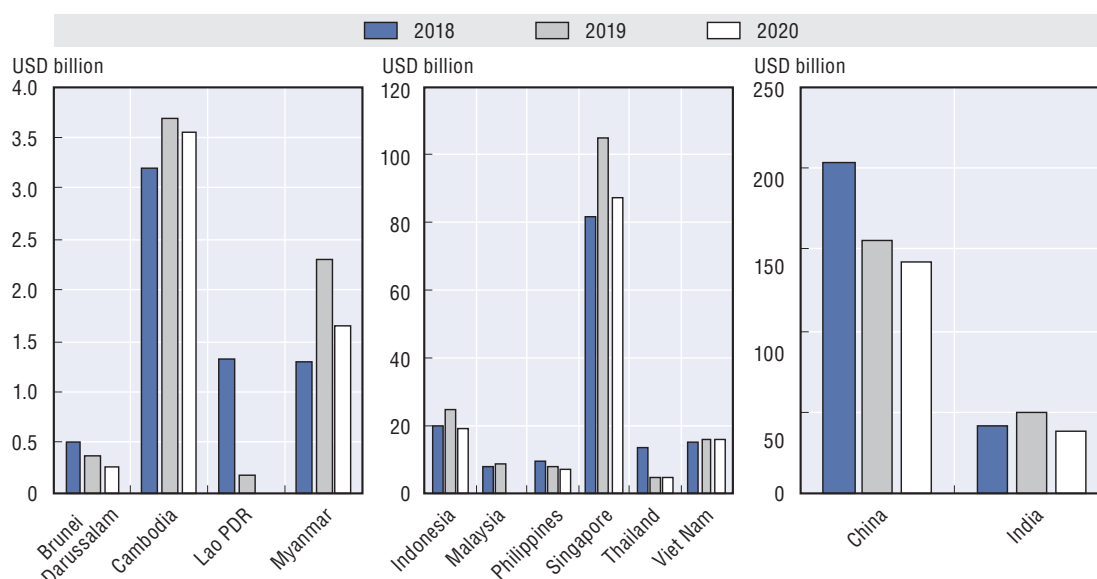
Note: All data are in calendar years. Quarterly data are annualised (i.e. four-quarter sum as of the period indicated). FDI inflows data refer to foreign investment minus foreign withdrawals (balance of payments, liability side).
Source: OECD Development Centre based on data from CEIC and national sources.
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As financing conditions remain less favourable than before the pandemic, some Emerging Asian countries might face greater challenges financing larger current account deficits. However, the unprecedented portfolio outflows during the sell-off triggered by COVID-19 seem to have stabilised in June, as most countries in the region recorded net inflows. The acute portfolio outflows recorded in the first quarter of 2020 seem nevertheless to have weakened domestic currencies. Overall, countries where the current account position is expected to deteriorate in 2020 have experienced much larger depreciations in nominal effective terms, while countries where the current account position is forecast to improve have seen their currencies appreciate (Figure 1.40, Panel A). Reserve accumulation increased in several countries in the region (Figure 1.40, Panel B), in line with the deterioration in current accounts, partially attenuating the strain induced by higher deficits. Despite the fact that accumulating reserves helps to cushion economies against foreign currency shocks, holding excessive levels of reserves could trigger price distortions in exchange rates.

Figure 1.40. **Current account balance, Nominal Effective Exchange Rate (NEER) and official reserves of selected Emerging Asian economies**

A. Change in current account balance versus change in NEER
Average of monthly year-on-year changes of the NEER between January and November 2020, percentage

B. Official reserve assets (end-period)
USD billion
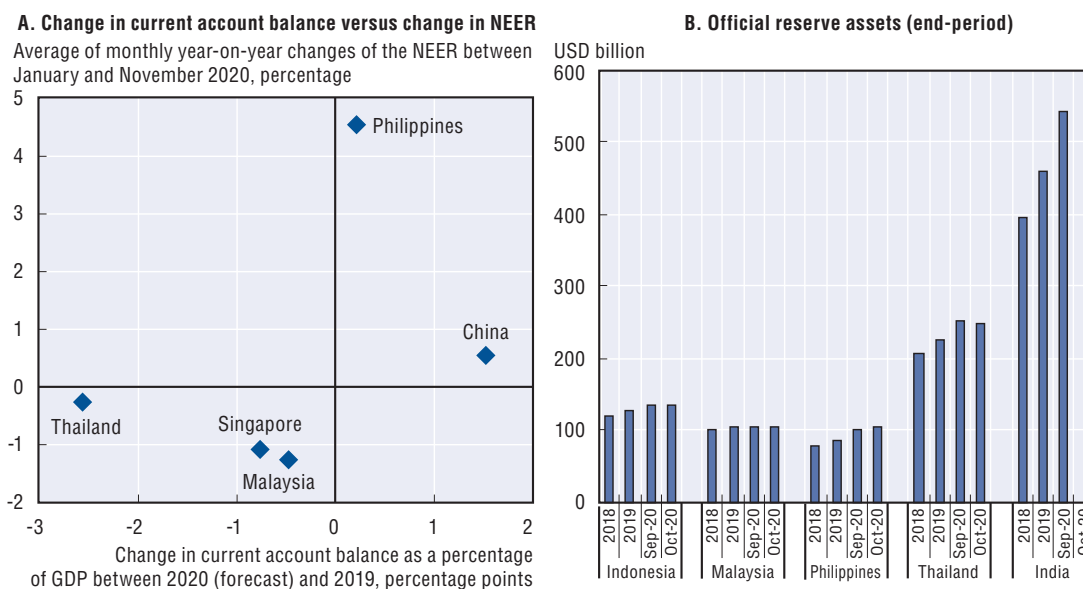
Source: OECD Development Centre and data from the Bank for International Settlements and the IMF *World Economic Outlook* database (October 2020).

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Looking ahead, economic stability in Emerging Asian economies could be undermined by renewed capital outflows and currency depreciations.

Rebound in Chinese economy benefits ASEAN exports

The net trade balances of Emerging Asian economies have started to improve in the second quarter of 2020, supported by increased demand from major trading partners. China and the United States have been the main drivers of export growth, while intra-ASEAN exports remained weak. In the first half of 2020, trade between ASEAN and China increased by 5.6% year-on-year and these trends are reflected in the growth of China's share in the total exports of several ASEAN countries between the first and the second quarters of 2020 (Figure 1.41). Exports to China recorded double-digit growth rates in several ASEAN member countries, in a context of falling trade volumes overall. Malaysia benefited the most from increasing Chinese demand, with exports to China inching 16.3% higher year-on-year in Q2, even as total exports fell by 15% over the same period. The expansion of ASEAN-China trade was partly supported by growth in agricultural trade, but also by exports of medical supplies and teleworking-related equipment.

Figure 1.41. **Total exports of selected ASEAN economies by destination, Q1-Q2 2020**
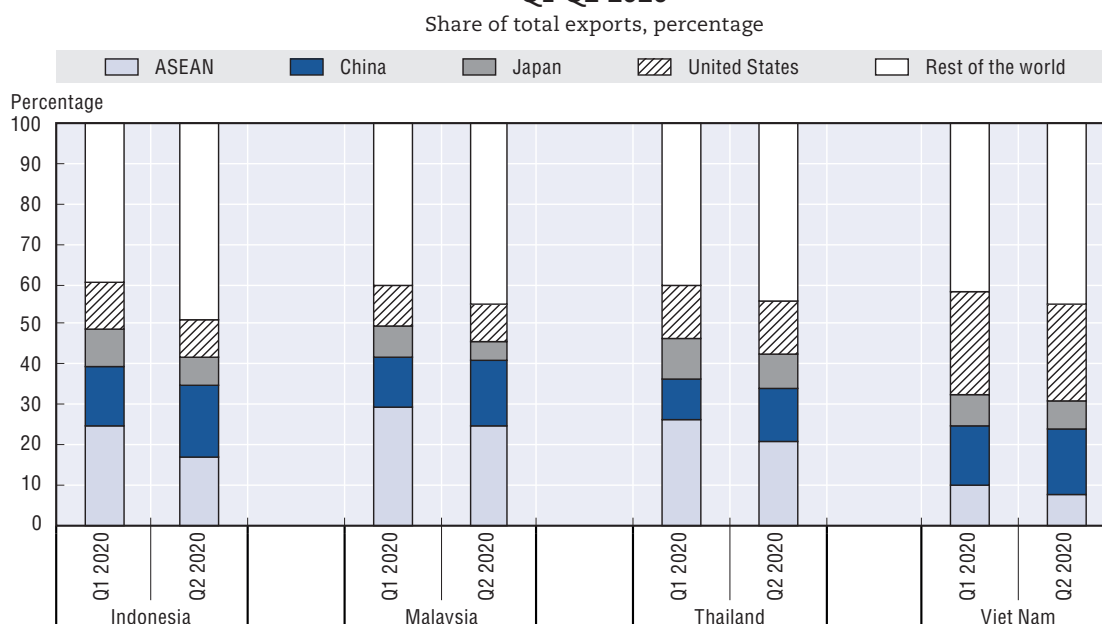
Share of total exports, percentage

Source: OECD Development Centre calculations based on data from CEIC and national sources.

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In several Emerging Asian countries, the slump in exports was very large during April-May 2020. A key factor for these cross-country differences is the sectoral composition of exports. Dwindling exports of machinery and transport equipment were the main driver of the contraction in goods trade in Malaysia in the early stages of the crisis, while they contributed to the rebound throughout June-October, together with vegetable oil and fats (Figure 1.42). For Indonesia, a sizeable drop in mineral fuel exports was partly offset by commensurate exports of manufactured goods, chemical products and food items (Figure 1.42). In Singapore, falling exports of crude materials had the largest contribution to the overall decline in the most recent months (Figure 1.42).

Figure 1.42. **Export growth by commodity group in selected ASEAN economies, March-October 2020**
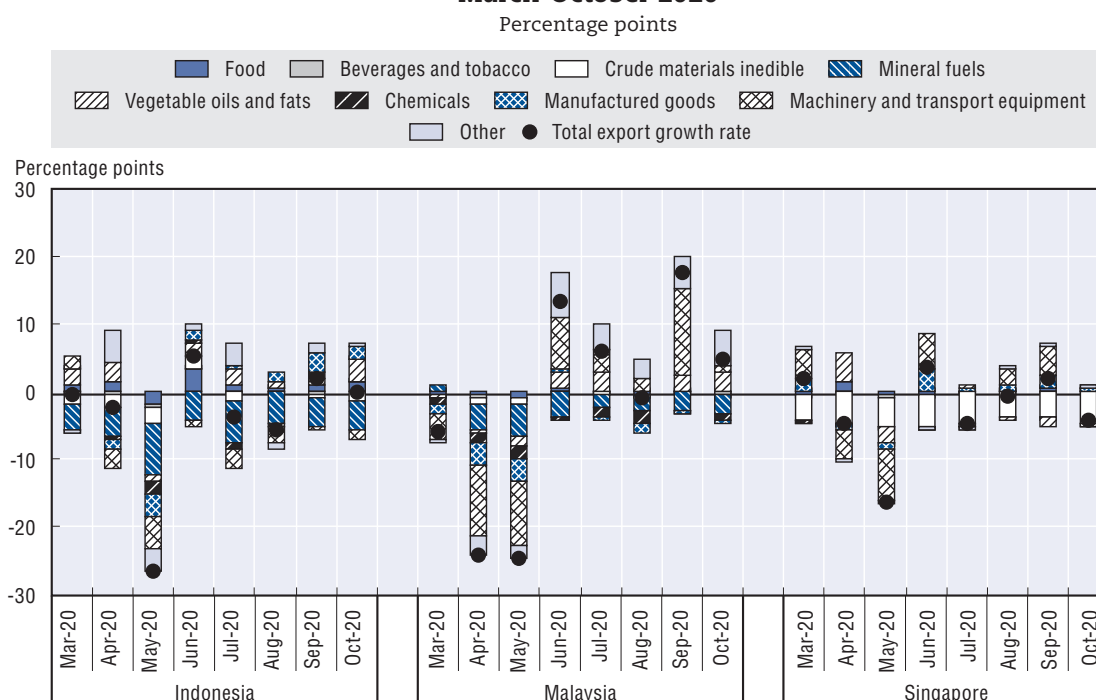
Percentage points

Source: OECD Development Centre based on data from CEIC and national sources.

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Export growth is anticipated to gain traction in the second half of 2020, in tandem with the recovery in the main trading partners of Emerging Asian countries. This notwithstanding, the COVID-19 crisis is set to weigh heavily on exports for the year as a whole and continue to exert a negative impact into 2021. Supported by pent-up demand, exports of goods are expected to outperform those of services. The latter will be dampened by a slow normalisation in hospitality and transportation services, as travel restrictions and income losses take their toll. Recovery in the medium term will be held back by the enduring global aftershocks of the crisis. On the upside, the RCEP and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) trade agreement are expected to deliver benefits to the most trade-oriented Emerging Asian countries over the next years (Box 1.2).

Inflationary pressures remain low due to ongoing slack in the economy

Inflationary pressures in Emerging Asian countries are subsiding as the pandemic-induced global recession leaves its mark on both global and domestic factors underpinning price developments. Headline inflation fell into negative territory in Malaysia, Singapore and Thailand, and has remained there since March, mostly driven by the substantial drop in core inflation (Figure 1.43). The marked decline in core inflation mostly reflects an easing in services inflation and falling demand for durable goods, as non-essential businesses were ordered to close during the lockdown period and households reduced discretionary spending. Energy prices also contributed to the decline, while food prices increased during the lockdown period, affected by supply chain disruptions.

Figure 1.43. **Contribution to headline inflation in selected ASEAN economies, March-November 2020**
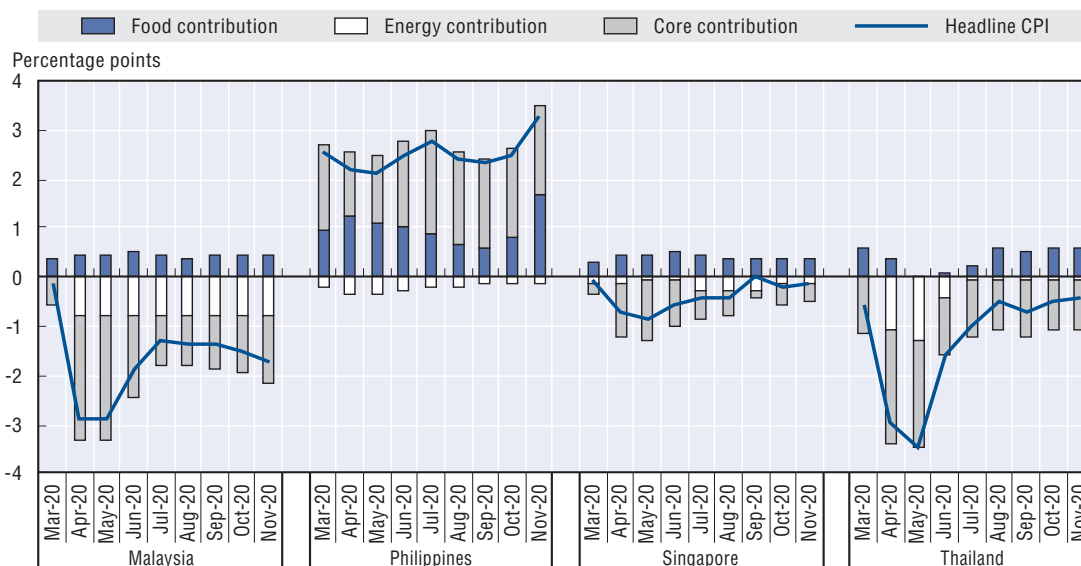
Source: OECD Development Centre calculations based on data from CEIC and national sources.
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The effect of the sharp weakening in activity is particularly visible in producer price inflation. Producer prices fell sharply in the second quarter of 2020 (Figure 1.44), on the back of sharply decelerating prices for energy inputs. However, the pace of the drop in producer price inflation seems to have slowed in Q3, suggesting an easing of downward pressures. Available survey data on input and output prices suggest that the general weakening of economic activity in Q2 2020 may have induced some revisions to pricing strategies in both the manufacturing and services sectors. Signs of rising agricultural prices are visible in Thailand, but they can be mainly attributed to a severe drought that battered the country's rice and aquaculture production (USDA, 2020).

Figure 1.44. **Producer price inflation in selected ASEAN economies, 2019-20**
Percentage
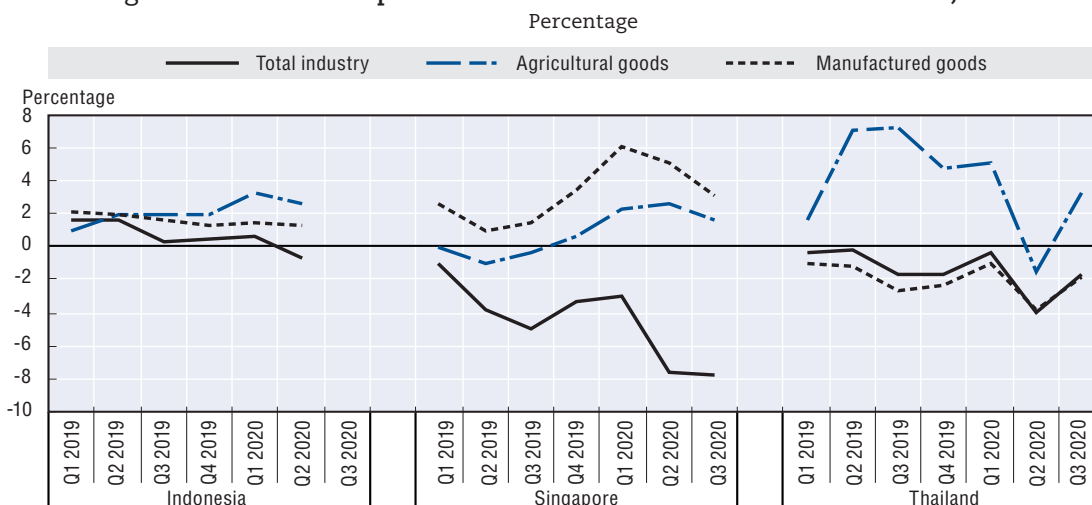
Note: Data for Malaysia refer to producer price indices for local production.
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink https://doi.org/10.1787/888934229046

With regard to the situation in individual Emerging Asian countries, inflation remains low in Indonesia due to weak domestic demand and continued exchange rate stability (BI, 2020a). In Malaysia, headline inflation declined slightly in August, mainly due to lower fresh meat and fuel inflation (Bank Negara Malaysia, 2020). Philippine headline inflation eased to the slowest rate in three months in August, owing to a deceleration in food prices, while core inflation inched up, driven by transportation and communication (PSA, 2020). In Thailand, headline inflation edged higher in September, as food prices increased because of supply-side factors, while core inflation firmed up due to the smaller than anticipated impact of government measures to reduce utility bills (BOT, 2020b). In Singapore, both headline and core inflation came in higher in August, the former due to a more gradual decrease in private transport costs, while the latter was primarily driven by smaller declines in the cost of services and electricity and gas (MAS, 2020f). China's CPI inflation also moderated in October due to lower food price inflation and in particular the rapid decline of pork prices. India's headline inflation breached the upper tolerance band of the target during June-August 2020, propelled by upside pressures stemming from supply chain disruptions and higher taxes on petroleum products (RBI, 2020b), and it accelerated in October on account of a further rise in food prices due to heavy rain and a hike in fuel taxes.

Risks to the inflation outlook appear broadly balanced. The outlook will continue to be affected by global oil and commodity prices. An increase in oil and commodity prices implies upward price pressures, but these are expected to be largely offset by downward pressure from the remaining slack in the economy. Notwithstanding market expectations of higher inflation as the new US administration has pledged more stimulus, external inflation is also forecast to remain at low levels, as negative output gaps are likely to persist in the major trading partners of Emerging Asian countries. However, core inflation could edge slightly higher in 2021, with demand for some domestic services anticipated to pick up gradually as remaining restrictions to curb the spread of the virus are removed.

Labour markets suffer biggest blow in decades due to health crisis

The labour market in Emerging Asia is undergoing a pronounced slowdown due to the COVID-19-related containment measures, with significant job losses occurring across many countries. The labour market response to the global slowdown varies considerably across Southeast Asian countries, with differences in the share of the most affected industries, pre-existing vulnerabilities, exposure to international trade, and public support policies in response to the pandemic. Recourse to teleworking and flexible working arrangements has also differed markedly across countries.

Compared to 2019, the most pronounced increases in unemployment are expected in the Philippines, Indonesia and India (Figure 1.45). Workers with weaker contracts and less experience have borne the brunt of the current downturn. In Malaysia, for instance, the unemployment rate for young people (15 to 24 years) increased by 2 percentage points (pps) in the second quarter of 2020, compared to the same period in 2019, above the 1.8 pps increase in the total unemployment rate, while the same tendency was observed in Q3 (Figure 1.46, Panel A). Similarly, the number of persons unemployed in the 25-29 age group in Thailand increased more than the figure for the total population in both the second and third quarters of 2020 (Figure 1.46, Panel B).

Figure 1.45. **Unemployment rate in selected Emerging Asian economies**
Percentage
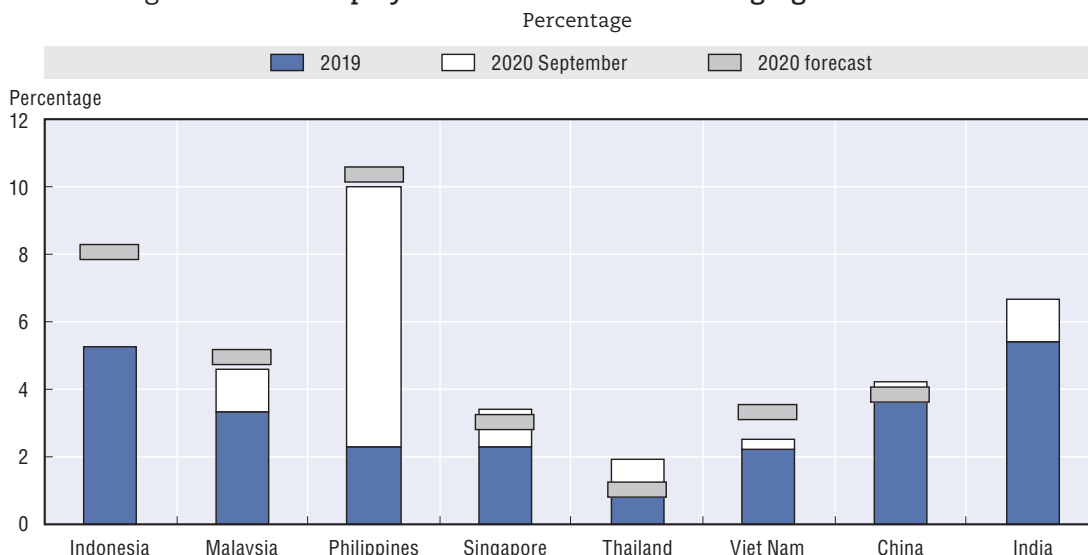
Note: The 2020 forecast for India is not available. The September 2020 unemployment rate for Indonesia is not available.

Source: OECD Development Centre based on data from CEIC, national sources and IMF *World Economic Outlook database* (October 2020).

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Figure 1.46. **Change in unemployment by age group
in Malaysia and Thailand, 2019-20**
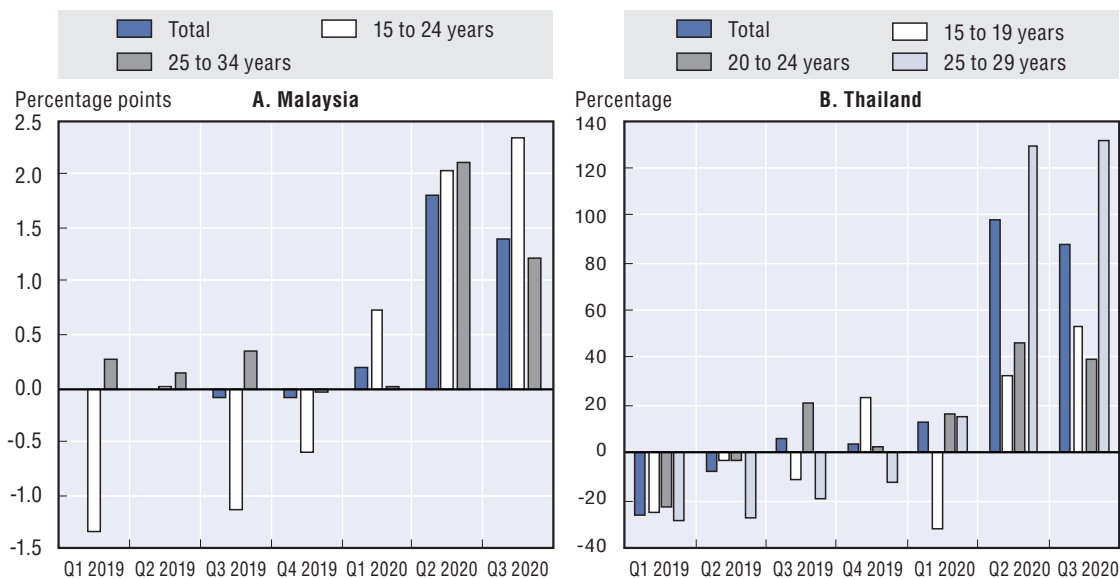
Source: OECD Development Centre based on data from CEIC and national sources.

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Looking at previous recessions can give clues about the extent to which the current labour market adjustment is congruent with past experiences. In previous recessions, unemployment spiked quickly but fell back during the year that followed the recession

(Figure 1.47). There is a striking contrast between the behaviour of unemployment during the recessions of the 1990s and late 2000s and the current downturn. Indeed, the unemployment rate in Malaysia, the Philippines and Thailand increased faster in the two quarters since the onset of the COVID-19 crisis compared to the same period of past crisis events. This reflects the unprecedented nature of the current crisis, and a key question is to what extent the actual increase in unemployment fully reflects the decline in output observed so far.

Figure 1.47. **Changes in unemployment around recession periods in selected ASEAN economies, 1991-2020**

Note: Recessions are defined as two consecutive quarters of negative real GDP growth. The horizontal axis reports the starting and ending quarter of the recession. Data on quarterly GDP growth for Malaysia are only available starting from Q1 2001. Data on the quarterly unemployment rate in Thailand are not available for the period Q2 1997 to Q4 1998, which has also been identified as a recession. "Change in unemployment rate during the recession" refers to the difference between the unemployment rate prevalent in the ending quarter of the recession and the unemployment rate prevalent in the starting quarter. "Change in the unemployment rate during the year following the end of the recession" refers to the difference between the unemployment rate four quarters after the end of the recession and the unemployment rate prevalent in the ending quarter of the recession. The 1991 Philippine recession was triggered by a combination of fiscal imbalances and exogenous shocks, including worldwide interest rate increases and an unprecedented succession of natural disasters.
Source: OECD Development Centre based on data from CEIC and national sources.
StatLink https://doi.org/10.1787/888934228020

Given the crucial role of the labour market for a sustained recovery to materialise, a major challenge is to halt the worsening of labour market conditions. With substantial restructuring across certain sectors to be expected in some Emerging Asian countries, part of the challenge will be to reduce the skills mismatch and facilitate the reintegration of displaced workers into employment. The provision of government support to pay for a portion or the entirety of such training schemes could be an option. For instance, as part of its COVID-19 stimulus, Singapore is offering a 6-12 month training programme, which includes monthly allowances to cover participants' living expenses (SSG-WSG, 2020). The implementation of this type of measure will undoubtedly take time, but decisions taken early will help to anchor expectations and underpin the recovery.

Box 1.5. **Consumer behaviour in times of large external shocks:**
Evidence from natural disasters

Several studies have investigated whether large external shocks, such as natural disasters or extremely disruptive civil conflicts, have an effect on consumption. In particular, Miguel and Roland (2011) explore the long-run impact of the war in Viet Nam on local economic conditions. The authors find a moderate negative effect of the conflict on consumption levels through 1992-93, but also faster consumption growth between 1992-93 and 2002. In a similar vein, Gignoux and Menendez (2016) study the short and long-term effects on individual economic outcomes of a set of earthquakes in rural Indonesia since 1985. The empirical estimates show that an earthquake reduces household per capita consumption in the short run (i.e. between year t and year t-1), but that this negative effect fades away and eventually turns out to be positive and statistically significant in the long term. These results suggest that any negative short-run impact from the large external shock on consumption dissipated over time, consistent with the permanent income hypothesis posited by Milton Friedman (1957). Moreover, the impact of natural disasters largely depends on the intensity and duration of the disaster. For instance, Baez et al. (2015) investigate the causal consequences of tropical storm Agatha (2010) on household welfare in Guatemala. The authors find that households reduced food consumption by 10% on average, with a larger impact among urban households, for which average per capita consumption dropped by 12.6%. This difference is attributed to the strength of the shock itself, excessive precipitation being much stronger in urban areas.

Analysis of consumer behaviour in the aftermath of selected natural disasters in the Philippines and Thailand shows that consumption fell within the quarter immediately following the disaster in both countries, though the level of reduction varied by countries (Figure 1.48, for more details, Tanaka, Ibrahim and Hean, 2021). However, in line with the literature (Miguel and Roland, 2011; Gignoux and Menendez, 2016) and the permanent income hypothesis (Friedman, 1957), the study finds that private consumption returns to pre-disaster levels after the event for both countries.

Figure 1.48. **Private consumption behaviour in the aftermath of selected natural disasters in the Philippines and Thailand**

Note: The data represent quarterly household consumption. "THB" stands for Thai baht and "PHP" stands for Philippine peso.
Source: OECD Development Centre , based on Tanaka, Ibrahim and Hean (2021).
StatLink ⧉ https://doi.org/10.1787/888934227944
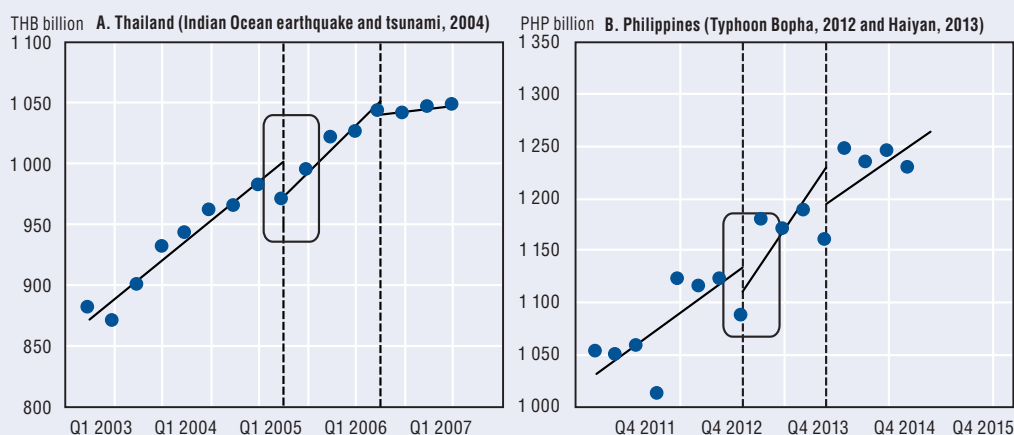
Box 1.5. **Consumer behaviour in times of large external shocks: Evidence from natural disasters** *(cont.)*

The change in consumption behaviour in crisis times is asymmetric across different categories of goods. It is well documented that purchases of non-essential goods can be easily postponed, but when the reason for postponement wanes some portion of the missing demand tends to recover (Hai et al., 2013). For instance, Forbes (2017) studied short-term consumption patterns in the aftermath of the 2011 earthquake in Christchurch, New Zealand. The study shows that immediately after the event, namely within the first week, consumers mostly purchased essential items, such as water, non-perishable food, products providing communication services and cleaning products (Forbes, 2017). Anttila-Hughes and Hsiang (2013) assess the economic effects of typhoons in the Philippines. They conclude that the typhoon-induced income losses translate into a 7.1% decrease in household expenditures, with the sharpest adjustments on items that most closely resemble human capital investments, such as medicine, education and high-nutrient food. By contrast, expenditure declines much less on pure consumption goods, namely recreation, alcohol and tobacco.

A growing number of studies explore the consumption effect of the COVID-19 outbreak on different expenditure items in advanced economies and, to a lesser extent, in Emerging Asian countries. For instance, Baker et al. (2020) use card transaction data for the United States. The authors show that spending increased sharply at the beginning of the pandemic, particularly in retail, credit-card spending and food items, while spending on restaurants, air travel and public transport fell sharply in mid to late March (Baker at al., 2020). As for Emerging Asia, Mishra and Dhanerwal (2020) assess the impact of the COVID-19 pandemic on consumption demand for non-essential commodities in India. The empirical findings indicate that people deferred the consumption of goods classified as discretionary (i.e. domestic tourism, automobiles or real estate) by a few months.

Digital transactions in Emerging Asia surpass expectations

E-commerce markets in Emerging Asia have maintained double-digit growth since 2015, and this trend is likely to continue in the medium term. ASEAN's e-commerce market is expected to see a compound annual growth rate (CAGR) of 20%, with this market in China and India growing by 12.5% and 17.7%, respectively. By the end of 2020, the combined e-commerce revenue of Emerging Asia will account for half of that of the global market, increasing from a combined share of 43% in 2017.

The outbreak of COVID-19 has driven digital transaction growth, which is expanding much more quickly than forecast in 2017 (Figure 1.49). With the implementation of physical distancing and lockdowns, e-commerce has provided effective solutions for the support of daily life. This is changing the behaviour of both consumers and producers. In Indonesia, Lao PDR and Myanmar, for example, the e-commerce market will increase by nearly 50% between 2019 and 2020.

Figure 1.49. **Projected e-commerce revenue in Emerging Asia, 2015-24**
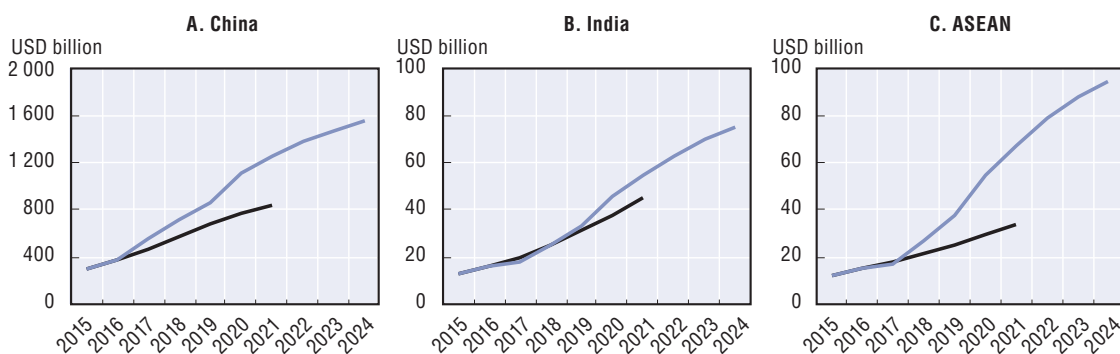
Note: The black lines show the forecasts until 2021, as published in 2017; the blue lines show the statistics until 2019 and the forecast until 2024, including the expected COVID-19 impact.
Source: OECD Development Centre based on data from Statista.
StatLink 🔗 https://doi.org/10.1787/888934229103

The year-on-year (YoY) increase in e-commerce revenue between 2019 and 2020 is projected to reach USD 17 billion in ASEAN, USD 253 billion in China and USD 13 billion in India. In comparison, the YoY increase from 2018 to 2019 stood at USD 11 billion in ASEAN, USD 142 billion in China and USD 8 billion in India. From 2020 to 2021, it is expected to amount to USD 13 billion, USD 143 billion and USD 9 billion, respectively. The ASEAN market is expanding rapidly, with total e-commerce revenue surpassing India's in 2018 and the gap expected to narrow over time with China, the world's largest e-commerce market.

Indonesia is ASEAN's largest and fastest growing e-commerce market, contributing to more than half of the region's e-commerce revenue since 2018. Thailand and Viet Nam follow as the second and third largest e-commerce markets. The ranking is not likely to change in the next five years, but Indonesia's market share is expected to expand to 57% in 2024, while the combined share of Thailand and Viet Nam is projected to decrease from 25% in 2019 to less than 22% in 2024. Myanmar, the Philippines, Malaysia and Lao PDR are projected to maintain growth, with a CAGR higher than 20%. The distribution of e-commerce revenue in ASEAN is not strictly proportional to the distribution of e-commerce users (Figure 1.50).

Figure 1.50. **ASEAN e-commerce revenue and users by country, 2019**
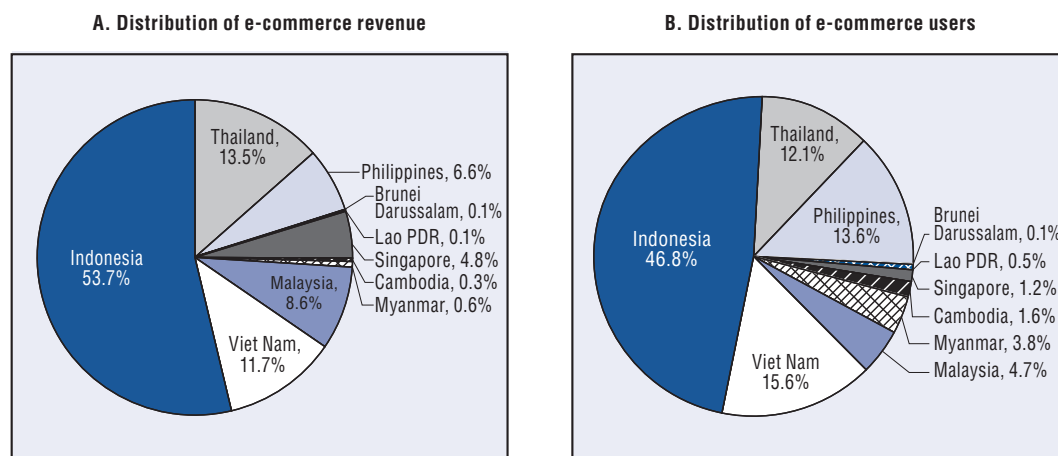
Source: OECD Development Centre, based on World Bank *World Development Indicators* database and Statista.
StatLink 🔗 https://doi.org/10.1787/888934229122

E-commerce penetration is rising across the region

From 2019 to 2020, the number of e-commerce users is projected to increase by 37 million in ASEAN, 71 million in China and 50 million in India. Figure 1.51 displays the increasing number of e-commerce users and the changes in per-user online spending between 2019 and 2020. By the end of 2020, more than 60% of the Chinese population will have shopped on line at least once. E-commerce penetration in ASEAN will increase to nearly 44% in 2020 from 38% in 2019, while in India it will increase to 40% from 36%.

Figure 1.51. **Increasing e-commerce penetration and average revenue per user, 2019-20**
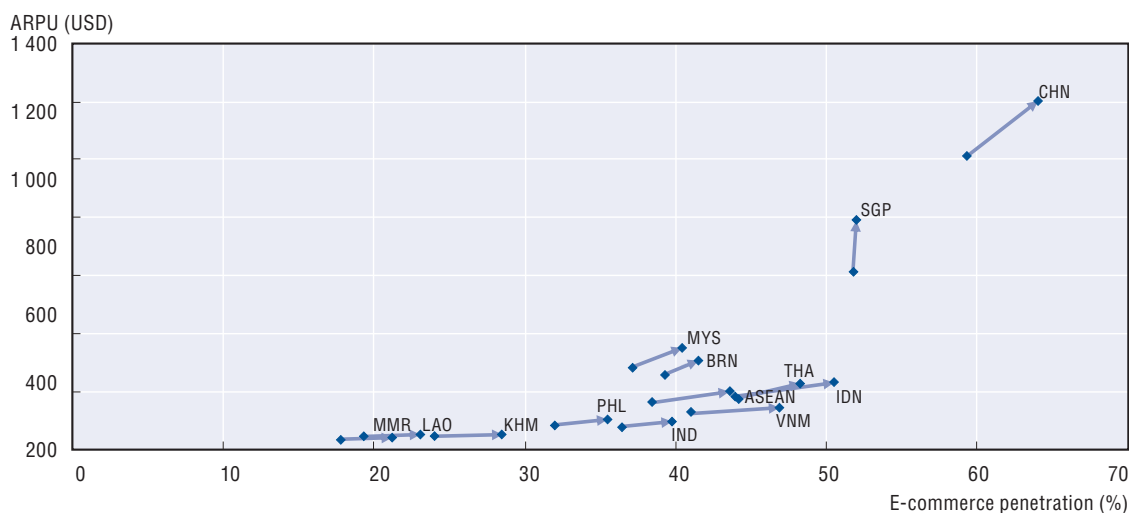
Note: "ARPU" stands for average revenue per user. E-commerce penetration is defined as the percentage of individuals in the respective country that have purchased goods and services on line at least once within the past 12 months.
Source: OECD Development Centre based on World Bank *World Development Indicators* database and Statista.
StatLink ⧉ https://doi.org/10.1787/888934228039

The reason for the increasing value of average revenue per user (ARPU) could be that consumers are purchasing higher-value products on line, but it is more likely that users are shopping on line more often. Assuming there is no significant change in the price index of products traded on line between 2019 and 2020, the frequency of each user's online shopping is projected to increase by 17% to 30%.[1]

In both ASEAN and India, most goods sold on line are electronics and media products or fashion items, while in China the top two groups are fashion items and toys, hobby and DIY (Table 1.3).

Table 1.3. **Goods sold on line in Emerging Asia, 2019**

	Electronics and media	Fashion	Food and personal care	Furniture and appliances	Toys, hobby and DIY
ASEAN	27.0% (25.0%)	26.7% (27.1%)	16.0% (17.7%)	14.7% (14.6%)	15.6% (15.6%)
China	20.2% (18.3%)	25.2% (25.5%)	17.1% (19.3%)	12.8% (11.9%)	24.7% (24.9%)
India	33.9% (32.1%)	28.4% (28.7%)	20.3% (22.8%)	6.1% (5.7%)	11.4% (10.6%)

Note: The figures in parentheses are the estimated values for 2020. DIY stands for "do it yourself".
Source: Statista.

However, food and personal care products are expected to increase their online market share. This market, worth USD 160 billion in 2019, is projected to expand by nearly 50% to reach nearly USD 240 billion by the end of 2020, a growth rate higher than the other product groups (Table 1.4). In Thailand, food and personal care products are expected to take as

much market share as electronics and media in 2020. One possible driver is that improved e-commerce connectivity and services make it easier for consumers to place orders and get products delivered on time. Another could be changes in consumer behaviour due to lockdowns and physical distancing during the COVID-19 pandemic.

Table 1.4. **E-commerce revenue, year-on-year changes 2019-20**

	Electronics and media	Fashion	Food and personal care	Furniture and appliances	Toys, hobby and DIY
ASEAN	**1.34**	**1.46**	**1.60**	**1.43**	**1.45**
Brunei Darussalam	1.26	1.27	1.33	1.26	1.25
Cambodia	1.33	1.42	1.52	1.47	1.38
Indonesia	1.38	1.51	1.61	1.48	1.52
Lao PDR	1.39	1.49	1.63	1.53	1.47
Malaysia	1.34	1.44	1.38	1.37	1.30
Myanmar	1.41	1.50	1.66	1.54	1.47
Philippines	1.37	1.28	1.64	1.46	1.48
Singapore	1.30	1.31	1.37	1.31	1.31
Thailand	1.23	1.35	1.74	1.37	1.42
Viet Nam	1.32	1.37	1.46	1.34	1.35
China	**1.17**	**1.31**	**1.47**	**1.20**	**1.31**
India	**1.31**	**1.39**	**1.55**	**1.30**	**1.30**

Source: Statista.

Cross-border digital transactions are growing, and e-payment is increasingly popular

Domestic e-commerce still dominates in all markets, but cross-border e-commerce is steadily increasing its share, particularly in China (Figure 1.52). By the end of 2019, cross-border e-commerce accounted for around 6% of total e-commerce revenue in India and 1.6% in China. The cross-border e-commerce market is projected to expand by 150% in India and nearly 300% in China in 2024.

Figure 1.52. **Cross-border e-commerce in China and India**
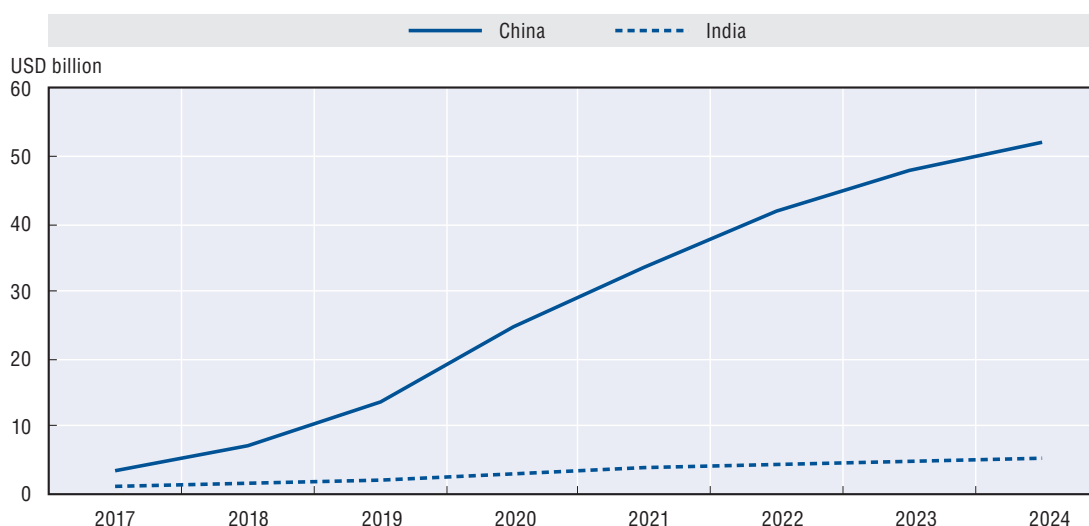
Source: OECD Development Centre based on eCommerceDB, https://ecommercedb.com/ and Statista.
StatLink https://doi.org/10.1787/888934229141

At the same time, the use of e-payment tools is becoming increasingly popular in the region (Figure 1.53). Consumers in China, India and Indonesia are using the e-wallet as their preferred form of payment for e-commerce. By the end of 2019, nearly two-thirds of online

purchases in China were made via e-wallet, while the share in India increased from 26% in 2017 to 43% in 2019 and is projected to increase to 70% by 2022. In comparison, the share of cash on delivery is shrinking rapidly, especially in India, the Philippines and Indonesia.

Figure 1.53. **Forms of payment used in selected Emerging Asian countries**
Percentage
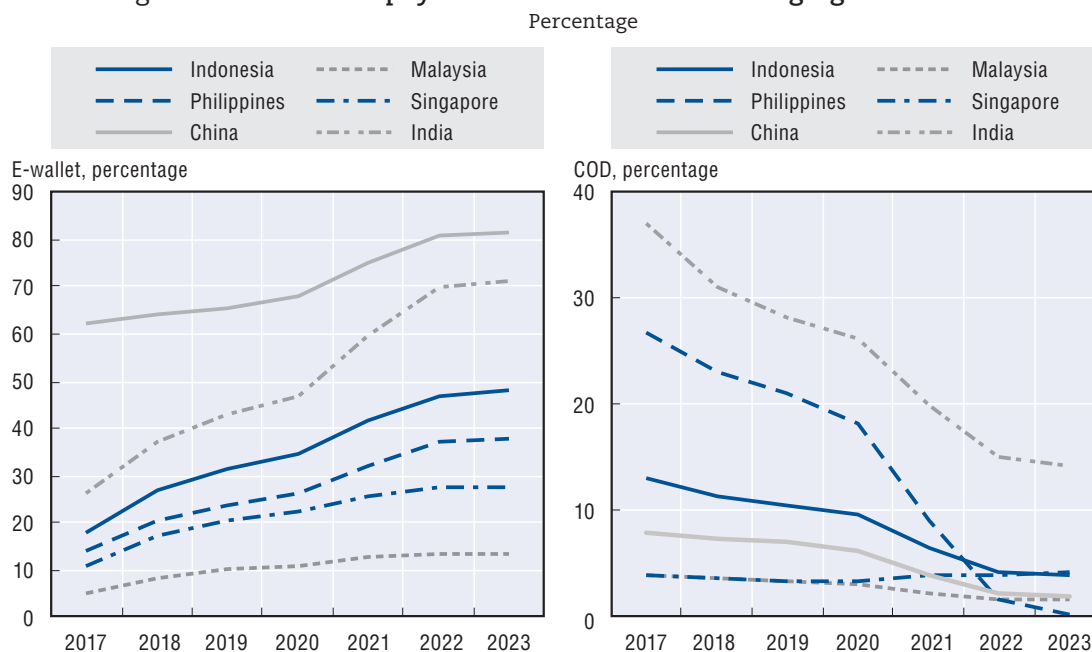
Note: "COD" stands for cash on delivery.
Source: Statista.
StatLink 🔗 https://doi.org/10.1787/888934229160

Governments have encouraged people to choose cashless payment during the pandemic in order to minimise physical contact and lower the chance of viral transmission. This has accelerated the decline of cash-on-delivery and reinforced increased use of e-wallets.

Comprehensive strategies are needed to maximise the use of e-commerce

The global boom in e-commerce and its acceleration during the COVID-19 crisis is changing mindsets, for example by helping micro, small and medium sized enterprises (MSMEs) to maintain their business operations during lockdowns. To maximise the use of e-commerce, Emerging Asia needs more holistic strategies at both the national and regional levels. Governments should adopt digital tools to improve the coverage and quality of online public services. They should also create better conditions for self-learning. Partnerships with the private sector should be particularly encouraged. In addition, policy makers need to ensure that antitrust rules are fit for the digital age.

Risks to growth and policy challenges in light of COVID-19

Overall, Emerging Asian economies are anticipated to initiate a recovery over the medium and near term as the COVID-19-induced downturn gradually dissipates. However, several risks could derail the growth momentum:

- Given the potential for new local and national surges in COVID-19 cases, policy makers in Emerging Asia need to strengthen their **health care management strategies** continuously and, most notably, guarantee the quick and large-scale deployment of COVID-19 vaccines as soon as these become available.

- Although the scope for additional monetary policy rate cuts is limited in most Emerging Asian countries, the focus of **monetary policy** will likely need to shift to improving policy transmission. Several policy options could be envisaged in this regard.
- On the **fiscal front**, the most pressing challenge is to continue to develop policy programmes that address the legacy of the crisis, while restoring fiscal rectitude.

Current health situation and challenges in the fight against COVID-19

The emergence of the COVID-19 pandemic came unexpectedly and posed new challenges for the region and the world at large. It also highlighted pre-existing challenges that had been identified and addressed over the years, particularly in the health care field. Each country's initial government response to the pandemic provides an insight into the level and sophistication of the policy tools implemented to face these challenges. Amid the spread of the coronavirus, and an increasingly enhanced scientific understanding of its nature, governments were able to adapt their policy tools to contain the virus while attempting to minimise the negative socio-economic effects as much as possible. This careful balancing act has been challenging for every country in the region. But with vaccine deployment efforts on the horizon, governments will gradually be able to reduce containment restrictions and position their countries for a sustainable economic rebound.

Moving forward, it is important to implement optimal health responses to the current situation and to understand the vulnerability of Emerging Asian countries post-COVID in the face of many uncertainties. Short-term health policy responses to help the region in the aftermath of the crisis include: *i)* scaling up current good practices; *ii)* better allocation of resources; and *iii)* safe and efficient distribution of a vaccine.

Policy makers need to scale up health responses to the pandemic

The pandemic is forcing governments to make quick decisions and take drastic actions to protect the region. Despite differing levels of health preparedness across countries, overall health policy responses from Emerging Asia have been efficient and effective in limiting the virus from spreading. Public health responses relying on human behaviour are economical and easy to implement: wearing masks, washing hands, covering the mouth and nose when coughing or sneezing, disinfecting surfaces and physical distancing. Policy makers should therefore keep raising public awareness about personal hygiene through government campaigns, the news media and social media.

Singapore's Ministry of Health has published multiple easy-to-implement action infographics in the English, Chinese, Malay and Tamil languages (MOH, 2020a). The infographics highlight a variety of actions that can be taken to suppress the spread of the virus. These include public service announcements on how to maintain personal hygiene and physical distancing, and more general health information. The Health Ministry has also published videos of the prime minister and experts talking about the current COVID-19 situation. Similar awareness-raising actions have been widely introduced, including COVID-19 related governmental info webpages, hotlines and guidelines.

Given the risk of lockdown fatigue, governments need to demonstrate a continuous commitment to prevention and control measures, and must urge the public to stay vigilant to any potential resurgence until a vaccine or effective treatments are widely available. Some countries have started to lift restrictions on social and economic activities. The reopening should be gradual and closely monitored to avoid repeated waves. Continued adherence to safe management measures should be promoted, such as pre-event testing, regular temperature scans and a limit on the number of attendees at public events.

Reopening measures and the lifting of restrictions vary among Emerging Asian countries. Almost every country in the region closed its borders at some point (IMF, 2020). Larger countries like Malaysia, Thailand and Viet Nam introduced very strict policies for opening their borders to foreign citizens after closing them at the outset of the pandemic. Foreigners meeting certain conditions may enter Thailand; Malaysia has kept its borders closed, with very limited exceptions; and Viet Nam has kept its borders closed to all foreign tourism (DDC, 2020; IMF, 2020). In contrast, Singapore has kept its borders open because its economy very heavily depends on this. Singapore's published roadmap on lifting restrictions includes guidelines on testing, contact tracing and safe distancing, among other measures that will be used while moving back to the pre-pandemic situation. The Philippines introduced a roadmap for the COVID-19 vaccine rollout in November (PNA, 2020b).

With COVID-19 still posing a huge threat to communities, an effective regime of testing, contact tracing and case management needs to be prioritised to cope with high case numbers and to prevent new clusters from forming. Sufficient testing is needed to detect both symptomatic and asymptomatic individuals. In cases of a community outbreak, a spike in testing may occur, with a potentially long wait between a positive test result and directing close contacts to quarantine. Relevant authorities should thus try to maximise the likelihood of self-quarantine of people awaiting results. After the results are verified, the confirmed cases should be contacted rapidly and ordered into immediate isolation at home or in a supervised facility. Contact tracing is another key strategy to contain the virus.

The World Health Organization (WHO, 2020a) suggests that extensive testing is a key to suppressing the virus. The countries in the region differ in how they report daily tests, and some countries do not report the extent of testing at all. In general, richer countries tend to test more than poorer countries (Hasell et al., 2020). Extensive testing also helps track the virus, and it has been mentioned as a way of keeping societies open if all the new cases can be found and the patients can be quarantined.

Several concerns have been raised following an increase in testing numbers, most notably compliance with proper testing standards. In April 2020, the Philippines, similarly to other ASEAN countries, quickly established guidelines for clinics to secure a license in order to operate COVID-19 testing laboratories. The guidelines were originally implemented for ensuring the safety of patients and the quality of the tests, while also providing a strategy to expand testing capacity (Philippines Department of Health, 2020b). In November 2020, the Department of Health had to issue an advisory on health facilities offering COVID-19 testing services, reminding them that health facilities must be licensed and that offenders would be subject to penalties. The advisory was issued in response to evidence that some health facilities were not following the mandatory guidelines (Philippines Department of Health, 2020c). This development is a reminder of both the pressing need for better enforcement of the testing guidelines as testing capacity increases, and of the need for governments to continue to have an active role in guiding both patients and health care providers during the pandemic.

Resources can be reallocated to prevention as the health crisis stabilises

COVID-19 has created opportunities to reform health care systems in ways that were rarely possible during ordinary times. A government has the obligation to ensure the provision of health care for all, which cannot be achieved without adequate staffing and sufficient medical equipment. There is still a real need for health professionals in hospitals, both in big cities and in rural or remote areas, where health staff is typically sparser. The workforce needs to be expanded and ongoing investment in training and education of health professionals should be provided for a more sustainable health care system.

With the stabilisation of the COVID-19 situation in more countries, the health care focus could be shifted from treatment back to prevention. Persistent shortages of critical medical supplies, such as personal protective equipment (PPE), present a danger not only to the public but also to doctors and nurses. Health care workers are more vulnerable than the general population due to their frequent contact with infected individuals and long working hours under stressful conditions. Health care systems were overstretched in the early stages of the pandemic. As the crisis eases, policy makers need to maintain a skilled and qualified workforce by ensuring adequate supplies of PPE, including face masks, goggles, face shields, gloves and protective suits.

As the number of cases soars in some countries within the region, hospital capacity is another important policy focus. During a pandemic, hospital beds are used as an indicator of health care service availability. In the event of an outbreak, the influx of patients can rapidly lead to hospital saturation. More hospitals thus need to be planned and built, and this requires the readying of space, human capital and equipment. Demand for critical care resources, such as ventilators and beds in intensive care units, can be high during disease outbreaks, especially in rural areas and smaller hospitals. Individuals should have equal access to health care facilities regardless of location of residence.

Emerging Asian nations have performed traditional and modernising proactive measures to address the overstretching of health care systems and to confirm the availability of resources. For example, Lao PDR has budgeted nearly USD 2.6 million for protective gear and received more than USD 11.2 million in donations, both in kind and in cash (IMF, 2020). Malaysia responded to the lack of accurate data and inefficient resource allocation by publishing an e-COVID19 system, which shares real-time data and ensures efficient reporting and usage of information among government officials (MAMPU, 2020).

As the Philippines eased lockdown measures, the government recognised that it should allocate substantial resources to draft and apply policies that encourage physical distancing as a primary preventive tool. It enacted an administrative order with guidelines on the proper use of transportation during and following the COVID-19 pandemic, with a broad multilateral approach including the departments of Health, Transportation, Interior and Local Government, Public Works and Highways (Government of the Philippines, 2020). The guidelines address challenging issues like maintaining physical distancing inside a public bus or tram, and they promote alternative modes of transport such as cycling and walking, with instructions for local governments and agencies on building more adequate walking and cycling infrastructure networks.

Thailand is making substantial efforts to attract foreign investment to increase its industrial base for medical supplies in an attempt to address the COVID-19 situation and to develop the country's potential as a hub for medical products. According to the government, Thai and international investors filed 50 project applications for the medical sector during the first half of 2020, at a total value of USD 400 million. The projects include the production of medical devices or supplies, including masks and gloves (Government of Thailand, 2020a). This will also allow the country to build its preventive capacity by ensuring a stable supply of PPE. The Thai government has even dispatched millions of masks to citizens of neighbouring countries, notably Myanmar in October (Government of Thailand, 2020b). These developments are a testament to Thailand's engagement within ASEAN, and they provide a glimpse of the country's future engagements following its current increase in PPE production.

Japan is increasing its allocation to technological advances in its quest to stop COVID-19, envisaging greater use of its supercomputing capabilities. Fugaku, the fastest supercomputer in the world, is expected to play a prominent role in the global fight against the coronavirus. The computer is currently in the process of being built and is planned to be fully operational by 2021. Its capabilities will be focused on solving societal problems such as disaster prevention and environmental protection (Government of Japan, 2020).

The trial version of the computer was used for COVID-19 research, initially coming to the conclusion that masks are indeed an effective tool for helping curb the spread of the virus. The computer was also used for COVID-19 drug research, where it demonstrated its impressive calculation speeds by analysing 2 128 potential drugs and narrowing them down to a few dozen. The government of Japan believes that Fugaku will play an increasing role in preventing outbreaks and combatting COVID-19 in the near future (Government of Japan, 2020).

Obtaining and distributing a vaccine is a challenging priority

Researchers around the world are racing to develop, test and produce a vaccine against COVID-19. Vaccines produced by Indonesia's Bio-Farma working with China's Sinovac are in the final stage of clinical trials. Singapore and Viet Nam are also at various stages of vaccine development. Although developed countries may have a higher success rate in finding a vaccine, Emerging Asian countries can potentially operate as a manufacturing hub to facilitate production and distribution in order to meet global needs. China is the global leader, with five final-stage vaccines. Indonesia and Singapore are developing vaccines in co-operation with global pharmaceutical companies, while Viet Nam and Thailand have co-operation projects as well as sovereign projects.

As of mid-December no vaccine had received WHO authorisation for use, but the first approvals were expected in late December or in early 2021. Three vaccines have been approved by national authorities, and two more have been proven efficient and safe in clinical research (WHO, 2020b). The Pfizer vaccine was approved by the Singaporean Health Sciences Authority in mid-December (HSA, 2020). China reports that it has been vaccinating Chinese citizens since July, with Sinopharm reporting that it has vaccinated one million people in China (Nature, 2020).

With governments under pressure to secure vaccines for their population, it is important that countries in the region work together to maintain a steady and affordable supply. Singapore called for "vaccine multilateralism" and decided to contribute USD 100 000 to the COVID-19 ASEAN Response Fund. India announced USD 1 million in aid to the fund, which aims to help the region tackle the pandemic. China has promised priority access to underdeveloped and developing countries to strengthen vaccine security. A total of 92 low-income countries globally are set to get access to the vaccine through the COVAX Advanced Market Commitment (AMC) of Gavi, The Vaccine Alliance. A country is eligible for the programme if it has a Gross National Income per capita below USD 4 000 or is eligible according to the World Bank International Development Association (GAVI, 2020a). In ASEAN, Cambodia, Indonesia, Lao PDR, Myanmar, the Philippines and Viet Nam have so far been confirmed as part of AMC (GAVI, 2020a).

The distribution of a vaccine requires a substantial and developed logistical infrastructure with cold-storage facilities. In order to be effective, the COVID-19 vaccine requires cold temperatures, essentially between -80 and +8 degrees Celsius, during both transportation and storage. This can be provided through so-called cold chain equipment, which provides a temperature-controlled supply chain that runs from the time of production to final delivery and injection. Deficient power supplies or a power outage can break this chain and result in the vaccine becoming ineffective. A WHO report estimated that roughly 2.8 million vaccine doses were lost in 2011 due to inadequate cooling during transportation or storage (WHO, 2014). As of 2014, only a quarter of GAVI-eligible countries surveyed had optimal or adequate cold chain equipment.

Several Emerging Asian nations are addressing the cold supply chain issue. Cambodia is working with the WHO to build a National Deployment and Vaccination Plan (WHO, 2020c). Indonesia, which lies along the Equator and has more than 17 000 islands, faces unique challenges in maintaining cold supply chains. Starting before the pandemic, Indonesia developed a digitalised cold supply chain vaccination system, SMILE, in co-operation with the

United Nations Development Programme. The system was developed to ensure all children had access to safe and efficient vaccinations (GAVI, 2020b). Based on its successful experience, Indonesia could use the SMILE programme to deploy its COVID-19 vaccination strategy. India is strengthening its readiness for vaccine distribution by augmenting cold chain and other vaccination product stocks. A National Expert Group on Vaccine Administration set up by the government is working to implement vaccination of priority groups when the vaccine is released (PIB, 2020). Singapore, as a centre of trade with strong logistic capabilities of handling pharmaceutical supplies, is well prepared to supply the vaccine to its population.

Another issue countries are facing is the efficient and fair distribution of the vaccine. When supply is insufficient, resources should be allocated based on an ethical framework and epidemiological models, depending on the situation in each country. A US study by Buckner et al. (2020) found that the optimal prioritisation strategy is to target elderly essential workers. However, depending on a country's policy objective, younger essential workers could be prioritised to curb infections, or elderly people to curtail mortality. Overall, the study's findings suggest that an optimal prioritisation outperforms non-targeted strategies by up to 18%.

In Indonesia, where supplies of the vaccine are likely to remain insufficient to immunise the whole population in 2021, the government has published a vaccination plan giving priority to citizens according to their contribution to combatting the virus (Table 1.5). Singapore's Expert Committee on COVID-19 vaccination is planning a strategy consistent with the priority group guidelines of the WHO Strategic Advisory Group of Experts on Immunisation (SAGE) and has promised to make this strategy public by the end of 2020. Groups at highest risk, such as frontline health care workers and vulnerable groups determined by age and health, will be among the top priorities (WHO, 2020d; MOH, 2020b). The government of the Philippines is implementing a vaccine rollout strategy with hopes of launching nationwide vaccination programmes in the first quarter of 2021 (Table 1.6).

Table 1.5. **Priority groups for COVID-19 vaccination in Indonesia**

Priority group	Description
1	• Frontline health care workers involved in COVID-19 handling • Personnel of the Indonesian National Defence Forces and the Indonesian National Police, law enforcement officials • Public servants
2	• Community members • Religious leaders • Regional apparatus in districts, villages and neighbourhood units
3	• Teachers and educators from early childhood level to universities
4	• Central and regional government officials, legislators
5	• Beneficiaries of the premium subsidy of the Social Security Agency for Health Care (BPJS Kesehatan)

Source: CSI (2020), Gov't working on road map for COVID-19 vaccination: Coordinating minister" (news release), 12 October.

Table 1.6. **Vaccine rollout strategy in the Philippines**

Roadmap phase	Action	Responsible authority
First phase	Scientific evaluation and selection of the vaccines	Department of Health (DOH), Department of Science and Technology (DOST)
Second phase: guarantee of access	Acquisition of vaccines	Department of Foreign Affairs, Department of Finance (DOF)
Third phase	Cost- and time-efficient vaccine procurement process	Procurement Service of the Department of Budget and Management (PS-DBM), DOF, TaskGroup Resource Management & Logistics (TGRML)
Fourth phase	Distribution and deployment of the vaccine	PS-DBM, TGRML
Fifth phase	Nationwide implementation of the vaccination plan	DOH, national and local government agencies, local government units
Sixth phase	Assessment, evaluation and monitoring of the vaccine rollout	DOH, DOST, University of the Philippines-National Institute of Health

Source: DOH (2020) , NTF reveal national COVID-19 vaccine roadmap from evaluation & acquisition to distribution" (press release).

A number of surveys in recent decades have found that trust in vaccines is declining (Wellcome, 2019). This can lead people to refuse taking a vaccine. Policy makers and health authorities need to tackle this important issue, not only to increase the percentage of the population that is vaccinated, but for public health as a whole. Wellcome's survey showed that, among ASEAN populations, Indonesians are least likely to strongly or somewhat agree that vaccines are effective.

On 24 November 2020, Malaysia became the first Southeast Asian country to sign an initial COVID-19 vaccine purchase agreement with the American pharmaceutical company Pfizer. Its purchase of 12.8 million doses will be sufficient for 6.4 million people, or approximately 20% of the Malaysian population. The agreement ensures a supply of 1 million doses for the first quarter of 2021, followed by 1.7 million doses in Q2, 5.8 million in Q3 and a final 4.3 million in Q4. Priority will be given to high-risk groups, including frontline health care workers, and will subsequently move down to lower-risk groups (PMO of Malaysia, 2020a). On 27 November, Prime Minister Muhyiddin declared that vaccines will be free for Malaysians but that foreigners will have to pay a charge set by the Ministry of Health (PMO of Malaysia, 2020b). The Pfizer vaccine requires a cold supply chain infrastructure, which will pose a challenge for a country with a tropical climate.

Indonesia is slated to deploy vaccines manufactured by China's Sinovac Biotech as early as the end of January 2021. Some 1.2 million doses are carefully stored for clinical trials at a biopharmaceutical storage facility in Bandung and are scheduled to be examined by the Food and Drug Supervisory Agency. The inspection is expected to take 3-4 weeks. Although distribution of the vaccine will be challenging for the archipelagic country, Sinovac's vaccine's does not need to be transported and stored at below-zero temperatures, as it requires temperatures between 2 and 8 degrees Celsius (Information Portal of Indonesia, 2020). This is advantageous compared to Pfizer's recommended storage temperature conditions of -70 ±10 degrees Celsius (Pfizer, 2020). However, Indonesia is currently in talks to purchase Pfizer vaccines as well. These vaccines would be administered in larger hospitals near large urban areas and are not expected to be transported to remote areas of the country.

Unlike other countries that are purchasing vaccines from elsewhere, Viet Nam is opting to develop its own. As of December 2020, Nanogen Biopharma in Ho Chi Minh City was in the first phase of testing its leading vaccine product on 60 volunteers. Viet Nam's Ministry of Health is providing support and evaluations in order to ensure that the vaccine is safe and meets required standards (Viet Nam Ministry of Science and Technology, 2020).

Monetary policy has entered unconventional territory

Over the past seven months, Emerging Asian authorities have implemented various measures through a broad range of tools to counteract market dysfunctionality, including policy rate cuts, interventions in foreign exchange (FX) markets and liquidity provision. Central banks have brought down key policy rates and reserve requirements for banks in several steps. The central banks of China, India, Indonesia, Malaysia, Myanmar, the Philippines, Thailand and Viet Nam lowered policy rates by between 30 and 300 bps (Figure 1.54, panel A). For its part, the Monetary Authority of Singapore has kept its exchange rate-based monetary stance unchanged since April. China, India, Indonesia and the Philippines also implemented reductions in reserve requirement ratios applicable to banks (Figure 1.54, panel B).

Figure 1.54. **Monetary policy actions in selected Emerging Asian economies, 2020**
Basis points

Note: For China, policy rate relates to the one-year loan prime rate; RRR cuts for small and medium banks in China that specialise in lending to priority sectors are even larger. For India, SLR means statutory liquidity ratio and CRR means cash reserve ratio. For Indonesia, the first local-currency RRR cut was announced in December 2019, effective January 2020. In March 2020, Indonesia lowered the foreign currency RRR by 400 bps and the RRR of banks engaged in import and export financing by 50 bps. For the Philippines, RRR covers commercial banks' local currency deposits. The data are from 1 January 2020 to 4 December 2020.
Source: OECD Development Centre calculations based on data from CEIC and national sources.
StatLink 🔗 https://doi.org/10.1787/888934228058

The successive policy rate cuts have narrowed monetary space across Emerging Asian countries. Policy rates have been brought closer to the zero lower bound, with Thailand a case in point. The monetary arm of the response has therefore entered unconventional territory in order to preserve monetary space and avoid further deepening of the economic downturn. To further ease financing conditions, policy makers have designed a variety of unconventional monetary policy tools, including "lower-for-longer" forward guidance, large-scale asset purchases, large-scale liquidity injections to alleviate financial institutions' liquidity problems or the expansion of collateral acceptance.

Several countries launched purchases of government bonds denominated in domestic currency to rectify market dislocations and act as buyers or dealers of last resort. Indonesia is one of the largest emerging market economies to have called upon the central bank to support the economy through unconventional measures. Bank Indonesia (BI) announced in October 2020 that it had purchased a combined total of IDR 60.18 trillion (Indonesian rupiah, USD 4.3 billion) of tradable government securities in the primary market through auction schemes, greenshoe options and private placements since April (BI, 2020b). The Bangko Sentral ng Pilipinas (BSP) also acquired government securities from banks in the secondary market via a daily purchase one-hour window (BSP, 2020c). For its part, the Bank of Thailand (BOT) purchased government bonds in several rounds in March and April 2020, amounting to a total of THB 88.3 billion (Thai baht, USD 2.9 billion) (BOT, 2020c).

Figure 1.55. **Central bank government bond purchases, 10-year sovereign yields and exchange rates in Indonesia and Thailand, 2020**
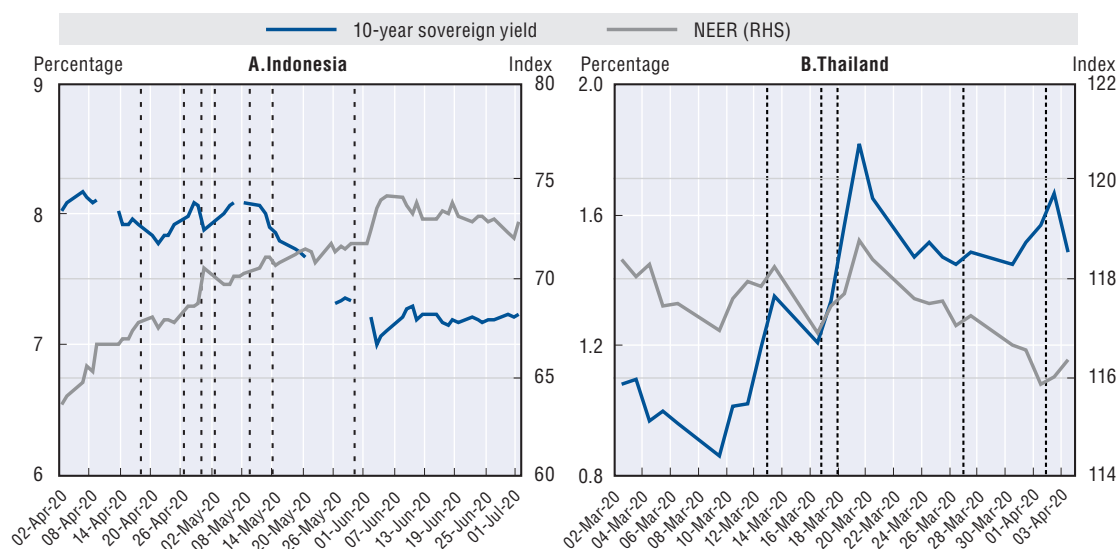
Note: "NEER" stands for nominal effective exchange rate. "RHS" means right-hand side. The vertical lines correspond to the dates when the central banks of Indonesia and Thailand purchased domestic government bond securities.
Source: OECD Development Centre based on data from BIS, national sources and Refinitiv Eikon.
StatLink 🔗 https://doi.org/10.1787/888934229179

The impact of unconventional measures on local financial markets appears to have been positive overall. In particular, government bond purchases by the central banks of Indonesia and Thailand have helped bring down sovereign bond yields, without leading to a substantial depreciation of the domestic currency (Figure 1.55). On the other hand, a major concern with unconventional policies is related to the unintended consequences they could have. By narrowing credit and term spreads, unconventional monetary measures lead to a flattening of the yield curve, reducing banks' profitability and resilience (Borio and Gambacorta, 2017). The flattening of the yield curve could prompt investors to seek higher yields, which could result in an accumulation of risk on their balance sheets (Chami et al., 2020). Low long-term bond yields could also have an adverse impact on financial intermediaries with long-term liabilities, such as insurance companies (ECB, 2015) and pension funds. A careful assessment and a deeper understanding of the undesired effects of unconventional policies is therefore warranted.

Narrowing monetary space calls for alternative policy options, such as asset purchase programmes

Quantitative easing (QE) lowers bond yields, thereby reducing the cost of borrowing, and boosting the price of financial assets, generating a wealth effect. Central banks could maximise the effectiveness of their asset purchase programmes (APP) in several ways. As shown by Andrade et al. (2016), an increase in the average duration of the sovereign bonds purchased through the APP would be desirable for enhancing the impact of the asset valuation channel. Their results suggest that an increase in the average maturity of purchased assets from 8 to 11 years would lead to an additional increase in peak inflation by 10 basis points. Another option to enhance the impact of the asset valuation channel is to purchase riskier bonds. Model simulations suggest that the purchase of private securities included in the 2015 European Central Bank (ECB) asset purchase programme played a disproportionately large role in terms of the macroeconomic impact of the APP (Andrade et al., 2016).

The central banks of Indonesia, the Philippines and India have resorted to quantitative easing, as narrowing monetary space called for alternative forms of balance sheet expansion (Figure 1.56). At the onset of the pandemic, Bank Indonesia received provisional authority to purchase sovereign bonds in the primary market to assist the government in managing the impact of the crisis. The Reserve Bank of India (RBI) resorted to buying long-tenor government bonds and selling short ones to drive market yields lower (RBI, 2020c).

Figure 1.56. Total assets held by the central banks of Indonesia, the Philippines and India, 2017-20
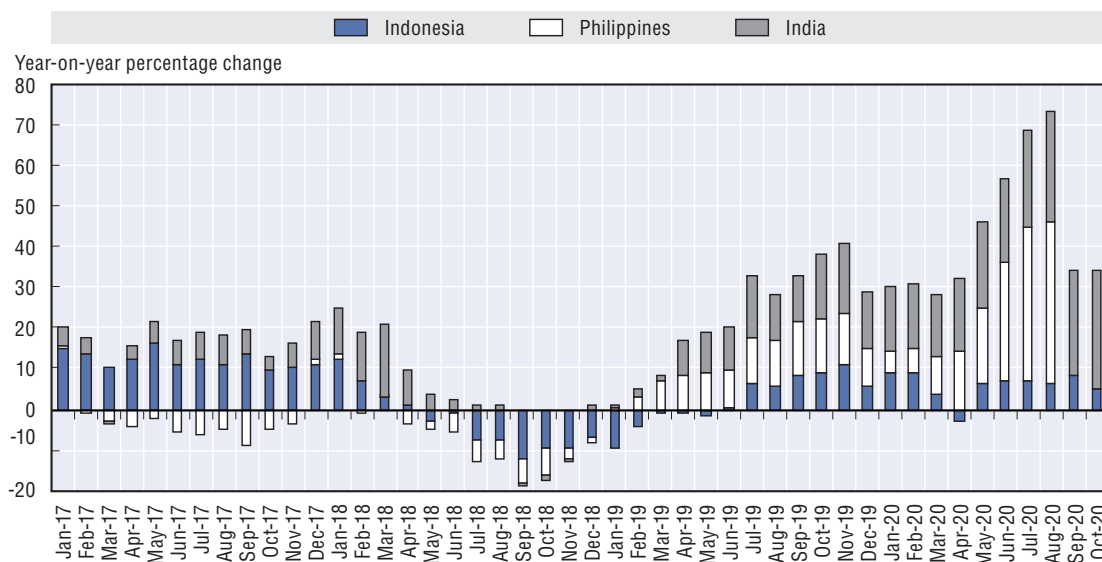
Note: September and October 2020 data are not available for the Philippines.
Source: OECD Development Centre based on data from CEIC and national sources.
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However, central banks may be confronted with difficulties in their sovereign bond purchases. Central banks could expand the range of assets they buy under QE. In general, in the United States, QE was limited to government bonds and mortgage-backed securities (MBS), whereas in the euro area the ECB also purchased corporate bonds. For its part, the Bank of Japan (BoJ) is also buying equity and real estate under its QE programme (Shirai, 2018).

Yield curve control could be an alternative option, but also riskier

Yield curve control (YCC) makes quantitative easing more sustainable. In terms of implications for markets, yield curve control would likely reduce the volatility of interest rates and exchange rates. The central banks of Japan and Australia have implemented a sovereign yield-curve control scheme. Indeed, the BoJ has kept the 10-year sovereign interest rate at 0% since September 2016 (BoJ, 2016). For its part, the Reserve Bank of Australia set the 3-year interest rate at 0.25% in March 2020 following the COVID-19 outbreak (Lowe, 2020). With an YCC policy, a central bank can convey its monetary policy decisions more clearly and provide financial markets with greater certainty. In addition, YCC could be a more efficient tool than the current sovereign asset purchases. More precisely, if investors were convinced of the central bank's intention and ability to maintain an interest rate at a given level, then the central bank could achieve its goal with a less active participation in the sovereign-bond market. For example, the effects of BoJ's yield-curve control policy were quickly evident in financial markets. Ten-year sovereign yields settled close to the target and remained remarkably stable over the two years after the YCC policy was implemented.

At the same time, yield curve stability has come with a marked decline in the pace of BoJ asset purchases (Higgins and Klitgaard, 2020).

On the other hand, a YCC policy may put a central bank in a precarious situation because exiting the rate targeting policy could pose challenges. Furthermore, the process of unwinding YCC could also pose considerable challenges. For example, the withdrawal of the US Federal Reserve from the YCC scheme in the early 1950s proved more complicated than initially anticipated and the US Treasury had to intervene in order to absorb part of the associated losses (FOMC, 2003). In addition, YCC has the potential to create a powerful nexus between monetary and fiscal policy, posing a risk to central bank independence. In the absence of a YCC control policy, unexpected changes in the supply of government debt can influence sovereign yields. If higher government borrowing rates are passed on to other market rates, then this increase in government borrowing could reduce or "crowd out" private spending by households and firms (Bundick and Smith, 2020).

Adjusting the monetary regime in response to COVID-19

Adjustments to the monetary regime through a potential switch to "average inflation targeting" or the implementation of a tiered interest rate system are potentially more promising avenues than QE and YCC.

The relationship between economic slack and inflation has changed considerably since the 2000s (Milani, 2010; Forbes, 2019), when inflation targeting became a widely adopted monetary policy framework in both advanced and emerging economies. In Emerging Asia, inflation-targeting regimes are currently in place in Indonesia, the Philippines, Thailand and India (Table 1.7). However, over the past few years the central banks of some countries have struggled to maintain headline inflation within the target range (Figure 1.57). In an attempt to raise prices, central banks kept policy rates relatively low throughout 2019, limiting their room for manoeuvre when the pandemic disrupted the economy at the beginning of 2020.

Table 1.7. **Overview of inflation-targeting regimes in Emerging Asia**

Country	Date of adoption	Current target range	Measure of inflation subject to target
Indonesia	July 2005	3% ± 1% deviation	Headline
Philippines	January 2002	3% ± 1 percentage point	Headline
Thailand	May 2000	1-3%	Headline
India	May 2016	2-6%	Headline

Note: Information as of 5 January 2021.
Source: OECD Development Centre based on BIS (2019), and national sources.

Figure 1.57. **Headline inflation and target inflation range in inflation-targeting Emerging Asian countries**

Source: CEIC and national sources.

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With the outlook for inflation highly uncertain in the aftermath of the health crisis, a strategy shift, for instance in the form of average inflation targeting, could represent an appropriate policy reaction going forward. Average inflation targeting may indeed be an effective tool in the current economic environment, where sluggish price increases have obliged central banks to implement hefty policy rate cuts, thus narrowing monetary space. The US Federal Reserve, for example, has recently revised its monetary policy framework. The Fed unveiled a new approach, centred on "average inflation targeting" (Powell, 2020). In other words, inflation would be allowed to exceed the 2% target to make up for periods where it falls below 2%. This marks a shift from the policy orthodoxy of past decades and could become the new norm in the fight against the COVID-19-related economic fallout.

In order to launch average inflation targeting, a central bank would need to define several parameters. The length of the inflation averaging period could be fixed (such as the most recent five years), or it could be allowed to vary over time, namely setting the starting point at the last business cycle peak and continuing it through the present business cycle.

Furthermore, the central bank would need to determine how quickly it would intend to move average inflation back to target (Reifschneider and Wilcox, 2019). Research shows that an average inflation-targeting framework that aims for above-target inflation is more effective than classical inflation targeting in the presence of a low natural rate of interest and a lower bound on interest rates (Mertens and Williams, 2019).

In addition, the COVID-19 crisis, accompanied by lacklustre growth, weak investment and high unemployment has drawn renewed attention to the natural rate of interest as a potential benchmark for monetary policy makers (Box 1.6).

Box 1.6. **The natural rates of interest in Emerging Asian countries**

The natural rate of interest is a theoretical concept that has received various definitions. In a nutshell, the natural rate of interest can be defined as the rate that would prevail when actual output equals its potential. The natural rate of interest of an economy depends on several real economic factors, including productivity; demographic change; the effectiveness of financial intermediation; and other structural factors.

Estimating the natural rate of interest in emerging economies is challenging due to the limited length of data series and ongoing structural changes (Goyal and Arora, 2013). However, some studies have tried to provide estimations for Asian countries. Perrelli and Roache (2014) document the sizeable decline in the natural rate of interest in 24 emerging economies, including Asian economies. The authors reveal that in emerging economies, the likely ranges for the natural rate of interest plummeted by more than 200 basis points between 2002 and 2013. Similarly, Zhu (2016) shows that, with the exception of China, the natural rate of interest in Emerging Asian economies has fallen by more than 4 percentage points in recent decades, mostly due to low-frequency demographic and global factors. Other estimates show that the natural rate in ASEAN has been declining since the start of the new millennium, suggesting that country-specific factors, like saving and investment rates, cannot alone explain the change in the natural rate of interest. Global factors that are also likely to have contributed to the decline include lower global interest rates, lower public debt, reduced sovereign risk and an increased supply of savings that have translated into financial deepening (Maybank, 2018).

Figure 1.58. **Natural rates of interest of Indonesia and Thailand**
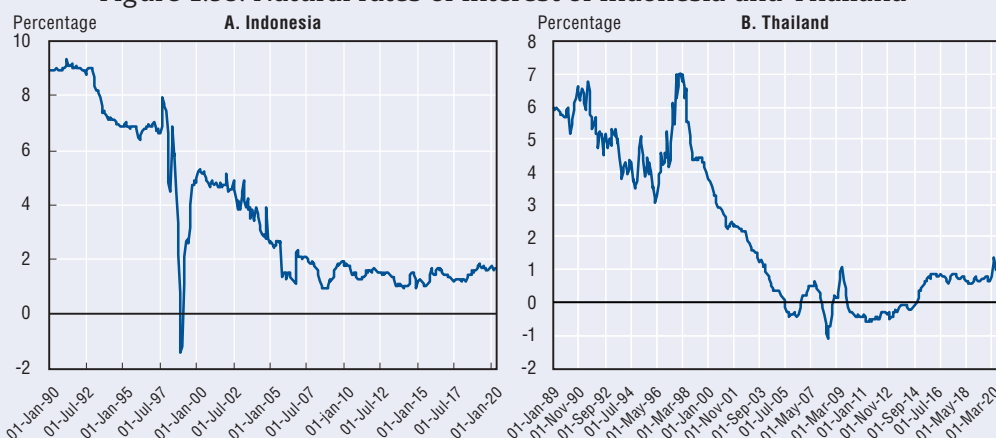
Source: OECD Development Centre, based on Tanaka, Ibrahim and Brekelmans (2021).
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Box 1.6. **The natural rates of interest in Emerging Asian countries** (*cont.*)

Given the importance of the natural rate of interest as a reference for monetary policy and potentially as an indicator of the monetary stance, Tanaka, Ibrahim and Brekelmans (2021) estimate the natural rate of interest for several countries in Emerging Asia; namely Indonesia, Malaysia, the Philippines, Singapore and Thailand. For this purpose, we use the method outlined by Jorda et al. (2020) to estimate the impact of the Asian financial crisis of 1997-98 (AFC) and global financial crisis of 2007-08 (GFC) on the natural real interest rate of the five Emerging Asian countries included in the sample. Their findings point to a decline in the real natural rates of interest over the period under analysis (Figure 1.58).

Figure 1.59. **Average impact of the AFC and GFC on the natural rates of interest of Indonesia and Thailand**

Note: The dotted lines are the error bands (90% confidence intervals) around the projection estimate. LB stands for lower bound and UB stands for upper bound. The blue line in the middle is the projection estimate (IRF standing for impulse response function). The vertical axis refers to the natural rate of interest and the horizontal axis to the months after the shocks.
Source: OECD Development Centre, based on Tanaka, Ibrahim and Brekelmans (2021).
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Natural rates of interest tend to decline significantly during crises. The decline of natural rates of interest in Emerging Asian countries was already in progress in the early 1990s, a trend exacerbated by the AFC and GFC. Figure 1.59 shows that the decline was of larger magnitude in Indonesia, but more persistent in Thailand.

Low and negative interest rates boost the economy by keeping borrowing costs low and encouraging banks to lend. However, they have harmful side effects as they squeeze bank profitability. Central banks could commit to keeping rates lower for longer by making low or negative rates more sustainable. A tiered system could also facilitate the transition towards monetary policy normalisation. Tiered interest rates have been implemented in several economies and refer to the situation whereby low or negative rates are limited to only a part of a bank's overall balance sheet.

For instance, the ECB introduced a two-tier system for reserve remuneration, which exempts parts of credit institutions' excess liquidity holdings (i.e. holdings in excess of minimum reserve requirements) from negative remuneration at the rate applicable on the deposit facility. More precisely, the exempt tier will be remunerated at an annual rate of 0%, while the non-exempt tier of excess liquidity holdings will continue to be remunerated at

0% or the deposit facility rate, whichever is lower. The goals of the ECB's two-tier policy were twofold. On the one hand, the two-tier policy aimed to support bank-based transmission of monetary policy. On the other, the policy attempts to preserve the positive contribution of negative rates to the accommodative stance of monetary policy and the convergence of inflation to ECB's aim (ECB, 2019).

Policy makers need to be mindful of the capital flow implications of monetary policy

Capital flow volatility is a key area of concern and vulnerability for emerging market economies. Surges in capital flows are often followed by sudden drops. This volatility is often the result of changes to the monetary policy stance and other developments in advanced economies, and may not necessarily be related to domestic factors. Low interest rates in advanced economies encourage a yield-search behaviour, triggering outflows from these economies into emerging market economies. A large number of studies have documented the importance of global factors, such as advanced-economy interest rates, in affecting capital flows to emerging market economies (Forbes and Warnock, 2012; Ahmed and Zlate, 2014; Kiendrebeogo, 2016). The room for manoeuvre has narrowed considerably as higher capital mobility confronted central banks with corner choices in implementing monetary policy.

Some studies support the view that inflation targeting corroborated with a free-floating exchange rate regime is an appropriate response to capital flows (Eichengreen, 2002). Long-term capital flows, in particular FDI flows, can also influence the conduct of monetary policy under an inflation-targeting framework. For instance, high levels of foreign investor participation in the banking sector have the potential to alter the functioning of the credit channel in the monetary transmission mechanism, given that domestic banks have access to funding sources in foreign parent institutions. However, for an inflation-targeting regime to tackle capital flow volatility effectively, several prerequisites are necessary. For instance, Pruski and Szpunar (2008) assess the experience of Poland with inflation targeting. The authors conclude that an inflation-targeting regime encompasses several important features, namely: central bank instrument independence; an adequately developed financial system, with an interbank deposit market as the key ingredient; sufficient money market infrastructure (i.e. effective interest-rate setting, reflecting market conditions); and efficient liquidity management by the central bank (i.e. monetary operations).

Fiscal stimulus will be the primary driver of growth at the expense of budgetary strength

Southeast Asian countries have announced stimulus packages amounting to approximately 0.1% to 15% of their respective GDPs. The launch of these large-scale packages will lead to a significant worsening of fiscal balances, with a double-digit deterioration anticipated in Singapore (Figure 1.60). The size of the fiscal response tends to be greater in countries with large SME sectors (Figure 1.61).

Figure 1.60. **Total amount of fiscal packages and estimated impact on the fiscal balance of selected ASEAN economies**

Total amount of fiscal stimulus ● Difference between fiscal balance in 2020 (forecast) and 2019

Note: The cut-off date for the fiscal stimulus data is 30 November 2020. Data on amount of fiscal stimulus are not available for Brunei Darussalam. Data on fiscal balance refer to the general government. The 2019 data on fiscal balances are based on the IMF *World Economic Outlook* database, October 2020. The 2020 forecasts of the fiscal balance for Cambodia, Lao PDR, Myanmar and Singapore are based on the IMF *World Economic Outlook* database, October 2020. The 2020 forecast of the fiscal balance for Indonesia is based on the OECD Economic Outlook, December 2020.

Source: OECD Development Centre; *OECD Economic Outlook*, December 2020; ADB COVID-19 Policy Database; and IMF, *World Economic Outlook* database, October 2020.

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Figure 1.61. **Population covered by social protection, contribution of SMEs to domestic GDP and size of fiscal stimulus in selected Emerging Asian economies**
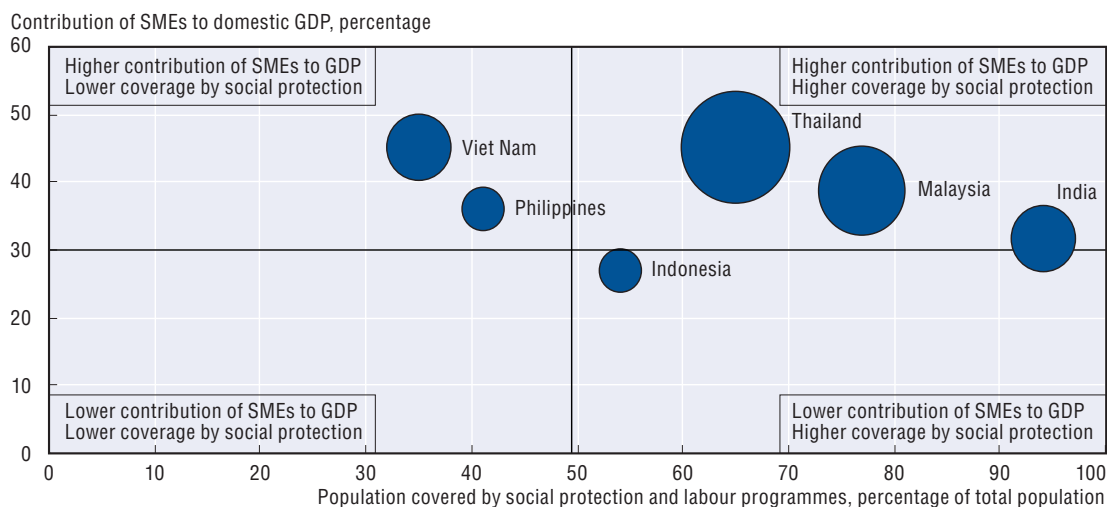
Note: Fiscal stimulus data as of 30 November 2020. Data on coverage by social protection and labour programmes refer to 2013 for Malaysia and the Philippines; 2015 for India; 2016 for Thailand; and 2017 for Indonesia and Viet Nam. Data on contribution of the SME sector to domestic GDP refer to 2016 for India and the Philippines; 2018 for Indonesia, Malaysia and Viet Nam; and 2019 for Thailand. The bubble size indicates the total fiscal stimulus amount as a percentage of GDP.

Source: OECD Development Centre based on ADB (2020c), *ADB COVID-19 Policy Database*; World Bank, *The Atlas of Social Protection – Indicators of Resilience and Equity*; OECD; ILO and various national sources.

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The fiscal policy response to the COVID-19 crisis to date has been a patchwork of increased allocations to health care systems and spending on pandemic-related equipment, transfers to households and transfers to firms (Table 1.8). In regard to household support, the main theme across countries has been to provide immediate relief to the most vulnerable, while some countries also sought to ensure food security. Indonesia, for example, expanded its social welfare programme to include food assistance. As for measures aimed at the corporate sector, the initial response in most countries focused on shielding vulnerable SMEs and companies operating in the most affected sectors, namely tourism, transport and travel. The most common approaches have been to reduce labour and corporate taxation. Corporate tax reductions have had a temporary character across all countries in the region, except for Indonesia, where corporate income tax rates will be lowered from 25% to 22% for fiscal years 2020 and 2021, and to 20% for fiscal year 2022 onwards.

Table 1.8. **Examples of fiscal stimulus measures in Emerging Asia in response to the COVID-19 pandemic**

	Increased health care spending	Direct support to household income	Wage subsidies/labour tax reductions		Corporate tax exemptions/ reductions	
			Temporary	Permanent	Temporary	Permanent
ASEAN-5						
Indonesia	●	●			●	●
Malaysia	●	●	●			
Philippines	●	●	●		●	
Thailand	●	●				
Viet Nam	●	●	●		●	
Brunei Darussalam and Singapore						
Brunei Darussalam		●	●			
Singapore	●	●	●			
CLM countries						
Cambodia	●	●	●		●	
Lao PDR	●	●	●		●	
Myanmar	●	●	●		●	
China and India						
China	●	●	●		●	
India	●	●	●		●	

Note: The cut-off date is 30 November 2020. The information provided in this table is for illustrative purposes only and is not intended to be exhaustive.
Source: OECD Development Centre based on data from ADB (2020c), *ADB COVID-19 Policy Database,* https://covid19policy. adb.org/ and national sources.

Narrowing fiscal space calls for more targeted fiscal spending

In the current context of large-scale fiscal actions, and with monetary space significantly reduced, GDP growth in Emerging Asian countries will be primarily driven by fiscal policy. With rising public debt and fiscal deficits, fiscal space has narrowed appreciably in the region. Governments may therefore not be able to maintain the same level of fiscal spending in 2021 as in 2020. Consequently, the priority for policy makers should be to render fiscal spending more targeted, for instance, to the area of health and education (see Chapter 2 for more detailed discussion). Theoretical arguments support the effectiveness of targeted fiscal policy (Elmendorf and Furman, 2008). In general, targeting fiscal stimuli to areas where demand and supply are most likely to be responsive will lead to the largest increase of fiscal multipliers. For instance, measures targeted at lower-income households or those that are liquidity-constrained should produce larger fiscal multipliers, as these households have a higher marginal propensity to consume (Brinca et al., 2016).

The effect that fiscal stimuli will have on growth depends on several factors, among them the composition and duration of the stimuli and the degree to which the economy is credit constrained. The impact of government shocks could also differ substantially across countries, depending on the level of development, exchange rate regime, openness to trade and public indebtedness (Ilzetzki et al., 2013). In general, the GDP effects of fiscal stimuli that take the form of public spending shocks (i.e. government consumption and investment) tend to be larger than those involving tax reductions or direct transfers to households (Barrell et al., 2012). However, when monetary policy is accommodating, the impact of transfers on GDP is considerably larger (Coenen et al., 2010). The impact of a given stimulus also depends on whether the shock is temporary or not. A temporary corporate tax rate cut would arguably have little impact, as firms calculate the tax burden related to a new investment project over its entire life cycle, while the effect of a permanent reduction could be more substantial (Zellner and Ngoie, 2015).

Box 1.7. **Fiscal multipliers in Emerging Asian countries**

The variability of fiscal multipliers across advanced economies (AEs) and emerging markets (EMEs) has been widely documented in the literature. In particular, Kraay (2010) and Ilzetzki et al. (2013) demonstrate that, in developing countries, the response of output to government consumption is relatively brief, often negative and not statistically different from zero. Comparatively fewer studies provide insights on fiscal multipliers in Emerging Asian economies. Using an SVAR model, similar to Blanchard and Perotti (2002), Tang et al. (2010) show that in all ASEAN-5 countries the overall impact of government spending on output is largely benign, with the impact fiscal multiplier below one and statistically insignificant. In the case of tax measures, output is shown to expand in line with fiscal contraction, but the results are only statistically significant in Indonesia and Thailand. Relatedly, Beyer and Milivojevic (2019) show that changes in tax revenue have no significant impact on economic activity in South Asia, in line with Tang et al. (2010).

A large number of studies have sought to explain the lower fiscal multipliers in EMEs in various ways (Tanaka, 2021, for more details). A first set of explanations relates the lower fiscal multipliers to leakages through higher imports or the heterogeneous responses of exchange rates (Corsetti et al., 2006; Ilzetzki et al., 2013; Sheremirov and Spirovska, 2019; Miyamoto et al., 2019). This is particularly true for small and highly open economies, such as Singapore, Malaysia and Thailand and, to a lesser extent, the Philippines and Indonesia (Tang et al., 2010). Another type of explanation points to fiscal strength as a key factor behind fiscal policy effectiveness (Corsetti et al., 2012; Huidrom et al., 2020). Among ASEAN-5 countries, many have run a persistent budget deficit, with well-known fiscal weaknesses in Indonesia and the Philippines (Tang et al., 2010). Other explanations for lower fiscal multipliers include the combination of low financial depth and a largely liberalised interest rate environment (Tang et al., 2010), lower institutional quality (Avellan et al., 2020) or poor data availability and quality (Batini et al., 2014). As for the persistence of fiscal multipliers, the duration of the effect varies depending on several factors, including the persistence of the fiscal shock; the type of fiscal instrument; and conjunctural factors such as the cyclical position and whether monetary policy responds to the fiscal shock (Coenen et al., 2012; DeLong and Summers, 2012, Batini et al., 2014).

Substantial fiscal response to the economic fallout narrows fiscal space

Prior to the onset of the pandemic, Emerging Asian economies had room to expand their primary balance deficits in response to the economic fallout triggered by the health crisis (IMF, 2018; AMRO, 2020). Debt levels are comparatively lower than in most OECD countries, while prudent fiscal management had translated into overall stable budgetary

balances. Nevertheless, the COVID-19 crisis will leave a lasting mark on public finances in the region. In addition to substantial fiscal stimulus, the declining revenue-to-GDP and rising expenditure-to-GDP ratios through the operation of tax breaks and revenue shortfalls also contribute to explaining the unfavourable fiscal outlook. Government debt levels and budget deficits are projected to increase across the board in 2020 (Figure 1.62). However, the situation tends to differ substantially across countries. As such, the increase in the level of government debt to GDP in 2020 will range from roughly 0.6 percentage points in Brunei Darussalam to 17 percentage points in India. At the same time, fiscal deficits are projected to widen by between 1.4 percentage points in Lao PDR and 14.6 percentage points in Singapore.

Figure 1.62. **Government debt and budget deficits in ASEAN countries, 2019-20**
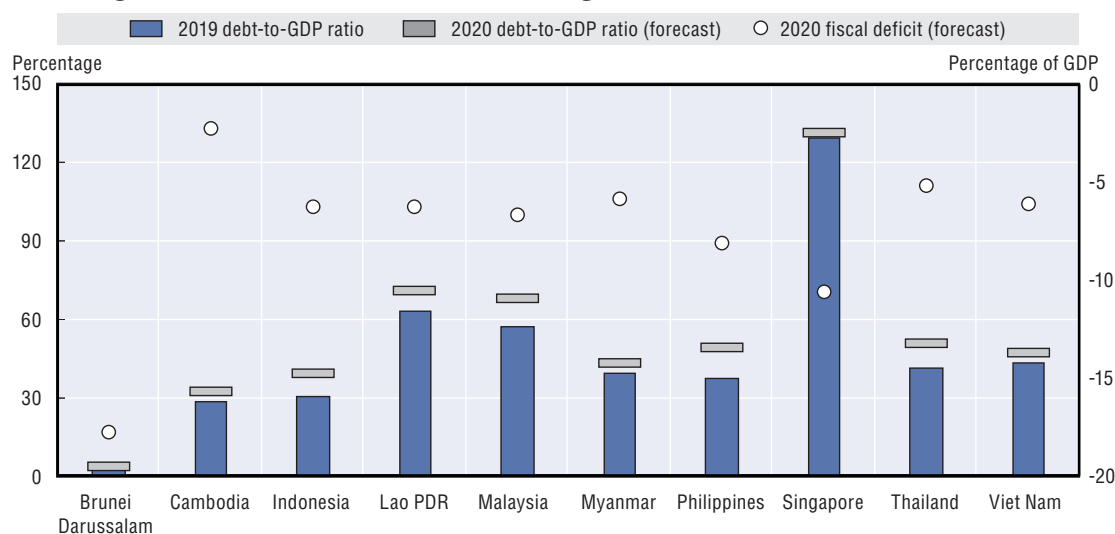
Note: Data refer to general government gross debt. For Cambodia, Lao PDR and Viet Nam, 2019 debt-to-GDP and fiscal balance to GDP ratios are estimates. The 2020 fiscal deficit forecasts for Brunei Darussalam, Cambodia, Lao PDR, Myanmar and Singapore are based on the IMF *World Economic Outlook* database, October 2020. The 2020 fiscal deficit forecast for Indonesia is based on the OECD Economic Outlook, December 2020.
Source: OECD Development Centre; OECD Economic Outlook, December 2020; and IMF *World Economic Outlook* database, October 2020.
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The residual maturity of public debt is an important factor affecting government refinancing conditions. A large share of debt with a short residual maturity implies that this part must be renewed within a relatively short period, which could turn out to be more costly in times of weak investor sentiment (Al Amine and Willems, 2020). The share of securities with a residual maturity of one year or less currently ranges from 3.6% in Cambodia to 14.9% in China (Figure 1.63, panel A). The current share of short-term debt instruments is high when compared to post-global financial crisis averages in the countries considered. Furthermore, a country's financial vulnerability to a significant deterioration in its fiscal position depends on the share of public debt held by foreign investors. Some governments make use of foreign borrowing to avoid crowding out domestic borrowing by lifting bond yields. One of the main risks associated with foreign borrowing is that, as interest costs rise over time, servicing foreign debt exerts substantial deflationary pressures on the domestic economy (Hawkins and Turner, 2000). The share of public debt held by external creditors in 2020 varies greatly across countries, roughly from 9.1% to 53.4% (Figure 1.63, panel B).

Figure 1.63. **Sovereign debt maturity profile and government debt held by external creditors in selected Emerging Asian economies**

☐ Short-term instruments (latest)
◇ Average share of short-term instruments between Q4 2008 and Q4 2019

▨ Share of external creditors (latest)
◇ Average share of external creditors between Q4 2008 and Q4 2019

A. Sovereign debt maturity profile
Percentage of total debt instruments outstanding

B. Sovereign debt held by external creditors
Percentage of total debt instruments outstanding
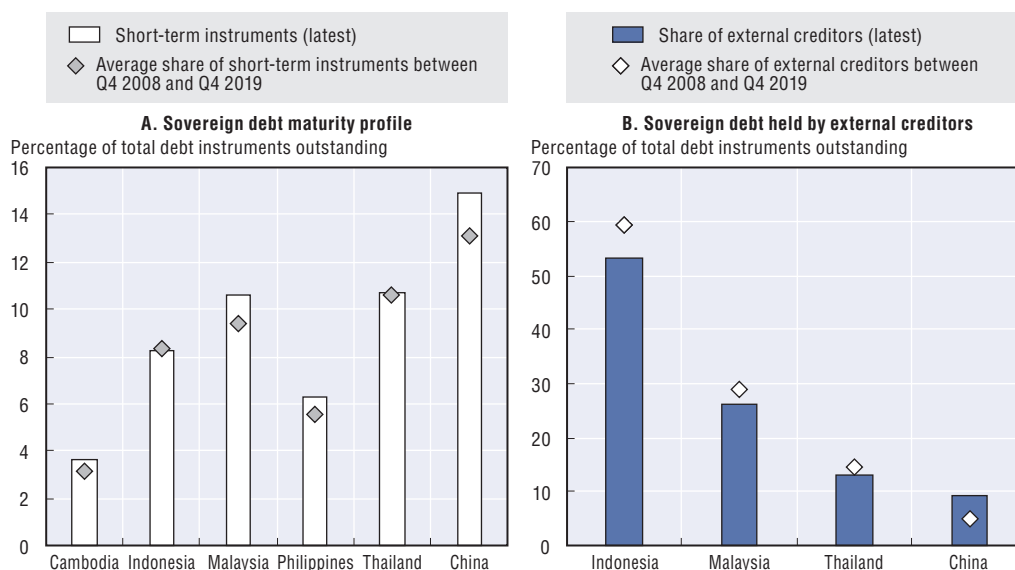
Note: The share of "short-term instruments" is determined by summing the share of instruments with initial maturity of one year or less and the share of long-term instruments with residual maturity of one year or less. Data in the Panel A are as of Q2 2020, except for Cambodia (Q4 2019), China (Q1 2020) and Malaysia (Q4 2018). These data capture central government debt, except for Cambodia and Malaysia (budgetary central government). Data in the Panel B are as of Q2 2020, except for Cambodia (Q4 2019), China (Q1 2020) and Malaysia (Q1 2020). These data capture central government debt, except for Cambodia and Malaysia (budgetary central government).
Source: OECD Development Centre based on World Bank, *Quarterly Public Sector Debt* database.
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In the aftermath of the global financial crisis, low deficit and debt levels strengthened confidence in Emerging Asian countries' fiscal sustainability, broadly compressing credit default swap (CDS) spreads (Figure 1.64). While the spike in spreads at the early stages of the COVID-19 crisis has been largely reversed, the recent relative calm in Emerging Asian financial markets may breed complacency in terms of fiscal consolidation. A high level of public debt tends to increase investors' concerns about holding government securities, as demonstrated by the surge in government bond spreads during the global financial crisis of 2007-08. Any associated wavering in the credibility of public finances harbours the potential to increase uncertainty and, at the limit, to trigger negative rating actions on sovereigns, with adverse feedback loops to the financial sector (Gennaioli et al., 2014). Such developments could potentially have an adverse impact on recovery and on the potential growth rate of the economy, which may subsequently dampen the prospects for the financial system (Das et al., 2010; Jorda et al., 2016).

Figure 1.64. **Sovereign CDS spreads in selected Emerging Asian economies, 2008-20**

Basis points

Note: Data refer to CDS quoted for 5-year sovereign bonds denominated in USD.
Source: Refinitiv Eikon.
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To some extent, sovereign financing needs could be smoothed via recourse to existing financial assets (Henao Arbelaez and Sobrinho, 2017). Globally, the utilisation of financial assets for mitigating governments' financing needs depends on their liquidity, which is arguably inversely related to sovereign stress. As at the end of 2019, Indonesian government's total holdings of financial assets equalled 27.1% of GDP, while government's financial asset holdings amounted to 48.5% of GDP in Thailand at the end of 2018 (Figure 1.65). Short-term liquid assets, such as currency and deposits, can be more easily used to cover short-term financing needs. Currency and deposits amounted to 3.7% of GDP in Indonesia in 2019 and 8.5% of GDP in Thailand in 2018. Equity and investment fund shares accounted for the largest part of financial assets in Indonesia (19.6% of GDP in 2019), while in Thailand the bulk of the government's financial assets are held in the form of debt securities (26.3% of GDP in 2018). Another major component of financial assets is the other accounts receivable, which incorporate various claims of the general government vis-à-vis the rest of the economy. This component, whose degree of liquidity can vary considerably, ranged from 2.8% in Indonesia in 2019 to 5.1% in Thailand in 2018. Overall, financial assets of governments are an important element in assessing sovereign liquidity and debt sustainability issues.

Figure 1.65. **Breakdown of governments' financial assets
in Indonesia and Thailand, 2016-19**
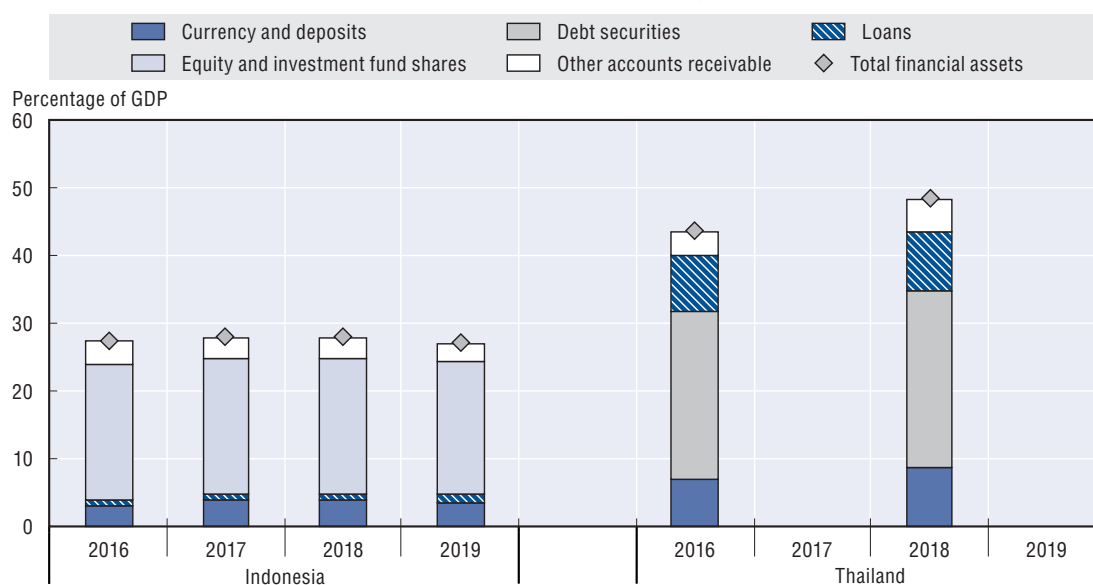
Note: Data refer to the central government and stock positions in each asset class. Data for 2017 and 2019 are not available for Thailand.
Source: OECD Development Centre based on data from IMF *Government Finance Statistics* database.
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The fiscal situation is likely to remain challenging in Emerging Asian countries. Concerns over the ability of governments to restore sustainable public finances over the medium to long term are likely to persist. Increasing debt-to-GDP ratios suggest that sufficiently large primary surpluses need to be created and then maintained by governments over an extended period to put the debt ratio on a decreasing track (Abbas et al., 2013). In the current context, lower potential growth after the COVID-19 crisis could mean that the primary surpluses necessary to stabilise government debt ratios would need to be higher than in the past. Uncertainty surrounding governments' ability to bring debt levels back to a sustainable path could cast doubts over the resilience of corporates in affected sectors that are most reliant on government support. At the same time, the high refinancing needs facing some countries over the next one or two years exacerbate the risk of an adverse feedback loop between the public and corporate sectors, as public finance needs might crowd out private sector issuance.

In the context of narrowing policy space at the country level, regional co-operation could provide an important complement to domestic policies in supporting post-pandemic recovery. The ASEAN Comprehensive Recovery Framework (ACRF) lays the ground for the launch of cross-border initiatives in a number of strategic areas, including health care, trade and digitalisation (Box 1.8).

> **Box 1.8. ASEAN Comprehensive Recovery Framework (ACRF)**
> **lays the foundation for a sustainable recovery in the region**
>
> On the occasion of the ASEAN Summit in November 2020, ASEAN member states adopted the *ASEAN Comprehensive Recovery Framework* (ACRF). The ACRF is comprised of a set of the broad strategies and key priority measures to be employed for ASEAN recovery and long-term development post-COVID-19 (ASEAN, 2020b). The ACRF is accompanied by an implementation plan, which identifies specific initiatives to be undertaken towards recovery. ASEAN adopted the ACRF to guide the region through the different phases of the post-pandemic recovery, towards long-term resilience. The strategic response is adapted to the three phases of the recovery. First is the "Reopening" phase where the member countries are still at different stages of curbing the spread of the virus, and strive to strike a balance between minimising a resurgence in cases and restarting the economy. The second phase is "Recovery", when economic activity returns to its pre-COVID-19 level. Support will need to be targeted for sectors or groups that have been strongly adversely affected by the pandemic. The third and final phase is "Resilience", which entails a convergence towards ASEAN's shared vision of long-term regional resilience. At this stage, preparations will take into account emerging trends and challenges, including the risk of future pandemics (ASEAN, 2020b).
>
> The ACRF identifies five broad strategies that would guide ASEAN member states through the recovery process. These broad strategies and their key priorities are the following: (1) Broad Strategy 1: Enhancing Health Systems; (2) Broad Strategy 2: Strengthening Human Security; (3) Broad Strategy 3: Maximising the Potential of Intra-ASEAN Market and Broader Economic Integration; (4) Broad Strategy 4: Accelerating Inclusive Digital Transformation; and (5) Broad Strategy 5: Advancing towards a More Sustainable and Resilient Future. One of the early initiatives of the ACRF was the signing of the Memorandum of Understanding on the Implementation of Non-Tariff Measures (NTMs) on Essential Goods under the Hanoi Plan of Action on Strengthening ASEAN Economic Cooperation and Supply Chain Connectivity in Response to the COVID-19 Pandemic (ASEAN, 2020c; ASEAN, 2020d). Another initiative was the adoption of the ASEAN Declaration on an ASEAN Travel Corridor Arrangement Framework (ASEAN, 2020e).

Conclusion

With Emerging Asian economies still in the grip of the COVID-19 pandemic, a multitude of supply and demand shocks continue to shape economic activity. The growth slowdown in the region will be significant relative to previous crisis episodes, but will still be moderate compared to the slowdown in other regions. The outlook varies vastly across countries due to differences in the length and severity of lockdowns and differing economic structures, as well as differences in government capacity to offset the loss of income for households and firms. The new restrictions imposed since August amid a resurgence of infections are anticipated to weigh on economic activity and sentiment in the short term. Nevertheless, the impact is expected to be less acute than in the March-April period, as the approach has been more targeted.

Overall, the impact on GDP components in the first three quarters of 2020 has been broad based. The impact of the pandemic on private consumption was particularly severe, while on the supply side the services sector was heavily disrupted by the lockdown measures. Financial markets have held up well over the past few months, mainly due to central banks' massive liquidity provision, but vulnerabilities remain in specific segments.

As debt burdens are increasing and incomes are dwindling, the impact on bank balance sheets could become more acute going forward. In addition, current account balances are anticipated to deteriorate, as most components are forecast to contribute less than in 2019. Trade has slightly recovered over the past months, mostly due to strong demand from China, while the agreement on the RCEP, together with the CPTPP, are anticipated to support the recovery. The pandemic has put labour markets under severe strain, with unprecedented job losses during the first three quarters of 2020. Consequently, downward pressures on prices are set to dominate the inflation outlook. Another major trend observed during the pandemic is a substantial rise in e-commerce and e-payment transactions.

There are many threats that could cloud the outlook. First, potential new waves of COVID-19 cases could prevent a timely withdrawal of social restrictions and a return to normal economic conditions. This risk will likely remain elevated until an effective vaccine or treatment against COVID-19 has become widely available across Emerging Asian countries. Second, governments in Emerging Asia have much less room for manoeuvre to ramp up countercyclical policy if growth momentum weakens. After broad-based monetary easing during 2020, real interest rates are at historical lows. Policy makers may turn to unconventional policy, a trend that has gained traction throughout 2020. Additionally, the focus of monetary policy will likely shift from lowering policy rates to improving policy transmission. Third, fiscal policy is expected to remain an important growth driver. For many governments, the key focus in 2021 will be to stabilise budget deficits and debt burdens. Fiscal stimuli will therefore need to become more targeted in order to achieve the dual goal of tackling the legacy of the crisis while restoring fiscal rectitude.

Note

1. Δ Total e-commerce revenue = Δ ARPU + Δ the number of e-commerce users + Δ frequency of shopping on line.

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Chapter 2

Reallocating resources for digitalisation in response to COVID-19: Health, education and Industry 4.0

The COVID-19 pandemic spurred rapid digitalisation worldwide, especially in the delivery of health and education services. This chapter explores the digitalisation of the health and education sectors in Emerging Asia. Country-level responses are examined, as are the challenges countries still face in this process, which will likely not be met for some time. Such challenges include poor infrastructure and affordability of access to digital services, which can exacerbate existing inequalities, or skill deficiencies in medical and educational staff that prevent the full potential of these technologies from being realised. The chapter explores possible solutions to these challenges, including the positive contribution of TVET to lifelong learning. The chapter also stresses the need for regional co-operation on cybersecurity and data privacy regulations to foster trust in digital systems. Finally, the chapter reviews each country's state of play regarding Industry 4.0 and provides policy recommendations for completing the implementation process.

Introduction

Digitalisation is transforming the world economy into a more integrated, complex and dynamic system. This presents both challenges and opportunities. During the COVID-19 crisis, digitalisation has proved critical for ensuring the continuity of essential services. The use of e-commerce, telemedicine and online education all accelerated sharply during the pandemic in Emerging Asia – the ASEAN-10, China and India.

Digitalisation of health and education requires the most urgent attention in the region. With a surge in demand for health care and a shortage of physicians in Southeast Asian countries, the digital health revolution has provided innovative solutions during the pandemic, but incorporating digital tools into health care systems requires a radical shift from the traditional clinical approach. Health care workers also need to be retrained to strengthen their digital skills. Likewise, the use of online education has allowed teaching and learning to continue despite restrictions on movement, but digital education requires efforts to ensure that students continually receive quality instruction that does not jeopardise their well-being and career prospects. Lifelong learning programmes and technical and vocational education and training (TVET) can contribute to strengthening digital skills, but these initiatives also face similar challenges.

The pandemic has also accelerated the digital transformation of firms, which are adopting new technologies to survive during this difficult period. Insights from countries in the region show how the adoption of Industry 4.0 solutions can increase agility and flexibility, boosting business resilience amid restrictions on movement. However, Industry 4.0 – the automation of industrial practices – is inhibited by country-specific challenges in the region given differences in economic structure and Industry 4.0 readiness.

This chapter begins with a discussion on digital transformation in the health and education sectors, particularly in the context of the COVID-19 crisis. It concludes with a review of the impact of the pandemic on the progress of Industry 4.0 in the region.

Digital health tools are helping the response to the pandemic

Technology continues to play a major role in providing innovative solutions to the health care industry. Even before COVID-19, digital health was an emerging policy priority, and the pandemic has intensified its importance. With a surge in demand for health care and a shortage of physicians in Emerging Asian countries, innovative digital health solutions reduce hospital attendance, enable rapid delivery of diagnoses and treatments, and provide equality of access to health care. According to the World Bank, in six out of ten ASEAN countries, more than 50% of the population live in rural areas with limited access to health facilities, doctors and health care workers (Word Bank, 2018). Digital health allows patients with only mild symptoms or who live in remote areas to avoid travel to hospitals, such that, for instance, emergency rooms and hospital beds can be reserved for more urgent patients. Beyond its convenience, digital health also reduces the risk of spread of the virus in hospitals.

Digital health tools have helped health care professionals to increase productivity and optimise resource management during the pandemic, and the digital health services have turned out to be more robust and safer for the people using them, as they minimise physical contact (Fagherazzi et al., 2020). These services also reduce costs through improvements such as patient self-management and digital health records. In Australia, medication misadventure costs AUD 1.2 billion (Australian dollars) each year and digital health records were able to reduce duplicate pathology tests by 18% per week (Biggs et al., 2019).

Digital health tools could also reshape the distribution of health workers in rural and urban areas. Health workers' preference to work in an urban environment and a lack of training opportunities in rural regions are two well-documented reasons for imbalances in the distribution of the health care workforce. Among efforts to reduce inequality of

access to health workers, digital health has been increasingly explored as a mechanism to improve conditions in underserved regions (WHO, 2010). Through telehealth platforms, doctors can collaborate with their colleagues regardless of their physical location.

Furthermore, digital health helps to increase productivity by gathering large amounts of data on patients to build personal health profiles and even predict their probability of acquiring certain diseases and the evolution of existing conditions. It can therefore be argued that digital health could foster a shift from treatment to prevention. Indeed, health professionals can use this vast knowledge base to offer preventive care, increase the precision of diagnoses and design targeted treatment. The saved time and reduced cost allow health professionals to divert focus to more urgent issues.

Digital health solutions protect patients and improve access to health care

The COVID-19 pandemic has caused shortages of both human and physical capital in health care. At the same time, strict quarantines and physical distancing measures have made it difficult for patients to access health facilities. Long waits for diagnosis and treatment and limited availability of hospital beds pose health risks, while public transportation and onsite appointments increase the risk of exposure to the virus. Measures aimed at enhancing digital health solutions have helped to address these challenges. In Australia, for example, health professionals were encouraged to shift to a digital workspace to protect patients and health care providers from the risk of exposure to the virus. Digital tools facilitated this arrangement, which has proven to be both popular and efficient (Box 2.1).

Box 2.1. **Adapting to telemedicine: The case of Australia**

Digital health tools can help people with minor medical needs to avoid medical facilities and preserve resources for more severely ill patients. Australia granted access to telehealth services to all Australians with a Medicare card to help reduce the risk of community transmission of COVID-19 and to protect patients and health care providers. The year-long initiative commenced on 13 March 2020 under the government's Medicare Benefits Schedule (Australian Department of Health, 2020). As a result of this measure, face-to-face visits to general practitioners (GPs) decreased by more than two million from March to April 2020, with more than four million telehealth GP consultations conducted in April. Some access to telehealth services should be maintained after the pandemic, especially as a means of maintaining health care access for otherwise underserved communities. (Figure 2.1).

Figure 2.1. **Number of requested Medicare items processed for GP attendances in Australia**
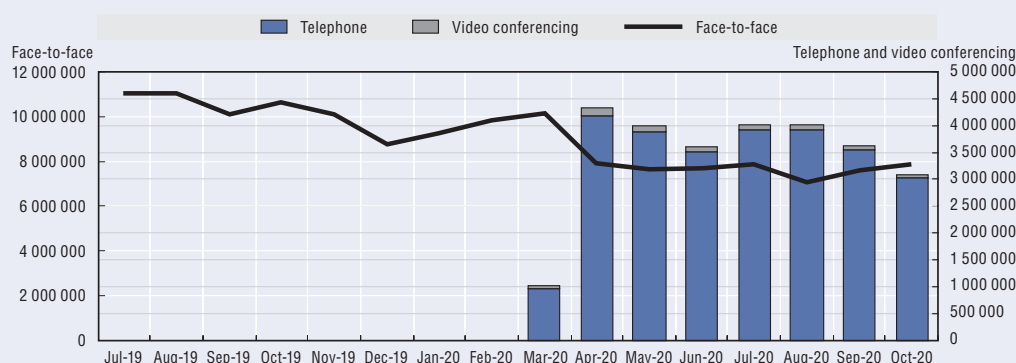
Source: Australian Department of Health and Australia Medicare Benefit Schedule.
StatLink 🔗 https://doi.org/10.1787/888934229331

Rural communities are heavily disadvantaged by limited medical resources despite having a greater need for health care and services. In many Asian countries, younger people often choose to work in metropolitan areas, leading to a higher proportion of older people with chronic conditions in rural regions.

Reducing pressure on intensive care units (ICUs) has been a primary public health concern during the pandemic. To improve timely health care access in rural and remote areas and bridge the demand-supply gap, remotely monitored intensive care units (electronic ICUs, or eICUs) were established in several countries even before the pandemic. An example of an eICU is a seven-bed critical care unit in Dehradun, India that is remotely controlled from a command centre in New Delhi. The eICU facility delivered tangible benefits in terms of reducing mortality: the 30-day mortality rate of 16.4% among 134 patients with cardiovascular diseases in the pre-eICU period was reduced to 4.8% among 145 patients admitted during the eICU phase (Gupta et al., 2014). In Thailand, the state-owned Nopparat Rajathanee Hospital has partnered with a communication conglomerate holding the country's largest Internet provider, and the country's largest mobile operator. Together, they aim to offer 5G-powered medical services through the initiative "ER new normal". This service will use a range of aids, such as MedTech ambulance equipment that will facilitate communication with doctors, so that incoming patients can be more effectively treated. Temi Connect and CareBot will also be launched in order to facilitate remote physician consultation and to smooth the delivery of medical treatment and documents (OpenGovAsia, 2020).

During the COVID-19 pandemic, artificial intelligence (AI) has also been used in some OECD countries to carry out specific tasks, such as pre-hospital triage for COVID-19. The Boston-based hospital Mass General Brigham (formerly Partners HealthCare) implemented an automated pre-hospital triage solution to direct patients with mild symptoms of COVID-19 to the appropriate care setting instead of the emergency department (Lai et al., 2020). Duke University in North Carolina has developed *Innovations in Healthcare* which aims to highlight and promote promising innovations from diverse global organisations, including corporations and foundations committed to strengthening and increasing the scale of health care innovations (IHC, 2020).

From a patient perspective, digital health platforms can support the entire cycle from pre-treatment diagnosis to post-care management. Digital platforms allow patients to book appointments on line, go through a faster triage process and receive electronic prescriptions. This mode of service can improve patients' experiences by providing convenient and easily accessible care, just like online shopping and online banking. It also reduces direct contacts between health workers and patients, thus decreasing the risk of hospital contagion and preserving personal protective equipment (PPE) for health workers. A market study of the European Economic Area (EEA) countries (i.e. EU 27, the United Kingdom, Iceland, Norway and Liechtenstein) conducted by the European Commission found there are societal and economic benefits to reap from telemedicine. With an average patient consultation taking approximately 14 minutes among the investigated countries, it usually costs the patient one third to one half of a day in productivity to undergo the consultation from start to finish, including travel and waiting. This in turn results in economic activity losses for society. With telemedicine solutions, these economic activity losses can be reduced down to only 30 minutes' worth, which would alleviate a large burden on societies (European Commission, 2018).

Many digital health apps have integrated a special channel to educate the public on COVID-19 symptoms and precautionary measures. In care for COVID-19 patients, digital health tools could, for instance:
- monitor health conditions, provide consultation to quarantined patients and provide follow-up mental health support if needed;
- detect and track confirmed and suspected cases for building epidemiological models to guide policy interventions;
- analyse big data from COVID-19 cases to speed the development of effective treatments.

Most importantly, digital health can help to overcome care disparities in rural areas with inadequate health care resources, and thus potentially contribute to achieving universal health coverage (Box 2.2). No longer constrained by geographical inaccessibility and a limited choice of hospitals and doctors, patients can acquire professional advice through videoconferencing.

Box 2.2. **Universal health coverage in Emerging Asia**

Most ASEAN countries have implemented some sort of universal health coverage (UHC) initiative, but with varied degrees of success (Figure 2.2). According to the World Health Organization (WHO), achieving UHC includes financial risk protection in terms of health care; access to quality essential health care services; and access to safe, effective, quality and affordable essential medicines and vaccines for all citizens (WHO, 2020b). Joint measures have been initiated in the region to achieve UHC. In August 2019, health ministers from all ASEAN countries met and reiterated their commitments to attain the UHC goal by 2030 (ASEAN, 2020). The ability of health care systems to cope with the pandemic and the progress in implementing UHC varies by country.

Figure 2.2. **UHC service coverage index, 2017**
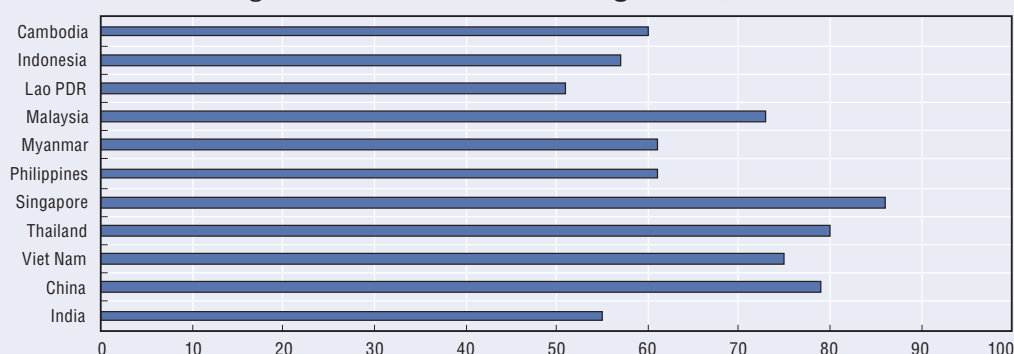
Note: Coverage index for essential health services (based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access). It is presented on a scale of 0 to 100.
Source: World Health Organization, Global Health Observatory Data Repository.
StatLink ᴍˢᵖ https://doi.org/10.1787/888934229350

Among ASEAN countries, Viet Nam has one of the best track records in terms of health coverage and has also taken effective action in tackling and curbing the spread of the virus. The country launched its first national social health scheme in 1992. Between 2000 and 2017, the proportion of covered citizens rose from 13% to 87% (WHO, 2020b). Thailand is another country that can boast a well-developed social health care system. The country launched a UHC policy in 2002, which currently covers 75% of the population. The system is funded by general taxes and is administered by the National Health Security Office (NHSO). Still today, the country adheres well to the UHC standards and according to WHO, the proportion of health costs requiring out-of-pocket expenditure has declined from 34% in 2001 to 11% in 2017 (ADB, 2020b). In Lao PDR, the government is working towards reaching the UHC goal by 2025 through a gradual extension of its current National Health Insurance (NHI) scheme. However, the country is battling widespread social protection gaps which leave many households particularly vulnerable to the impacts of health issues and accidents (ILO, 2020b).

Countries in Emerging Asia increase use of digital tools as part of their pandemic responses

Emerging Asian countries quickly recognised the benefits of introducing digital health tools to improve access to health care during the COVID-19 pandemic. Governments across the region have endorsed initiatives to develop telemedicine services, such as the promotion of telemedicine providers and the development of self-assessment tools to lighten the burden on hospitals and clinics. Health care facilities have benefited from digital platforms that provide a more thorough patient classification system, allowing medical practitioners to prioritise patients who are most in need of direct attention.

Although digital health tools have been used for a while in some countries, their wide adoption did not start until the pandemic began. For instance, in China, the booming telehealth market connects doctors and patients effectively and offers a unique method for patient screening, triage and treatment. Ping An Good Doctor offers hospital referrals, doctor appointments and online consultations. As of June 2020, there were 346 million registered users, and the number of monthly active users reached 16 million. Other popular platforms include haodf, WeiMai, WeDoctor, Chunyu Doctor, Dingxiang Doctor and Careate Medical.

Telehealth is also transforming the way people interact with health care workers in Indonesia, Singapore and Malaysia. The Indonesian government has directed its citizens to telehealth firms, such as Alodokter, Halodoc and KlikDokter, for a wide array of services including verified medical guidance and prescriptions. Alodokter reports that it has approximately 27 million monthly users. Singapore's telemedicine start-up Doctor Anywhere is a well-established player in the market and has expanded to Viet Nam, Thailand and Malaysia. In addition to standard telehealth services, Doctor Anywhere launched an online mental health consultation service in October 2020. Malaysia's first and largest digital health care platform, DoctorOnCall, partnered with the Ministry of Health to develop a customised channel to address public concerns about COVID-19.

These digital health initiatives are progressively evolving as technology improves in the wake of the pandemic. Indeed, the use of digital health tools in the region is booming (Figure 2.3).

Figure 2.3. **Daily active users of telemedicine platforms in Indonesia and Singapore**

March 2020 percentage increase versus 2019 average
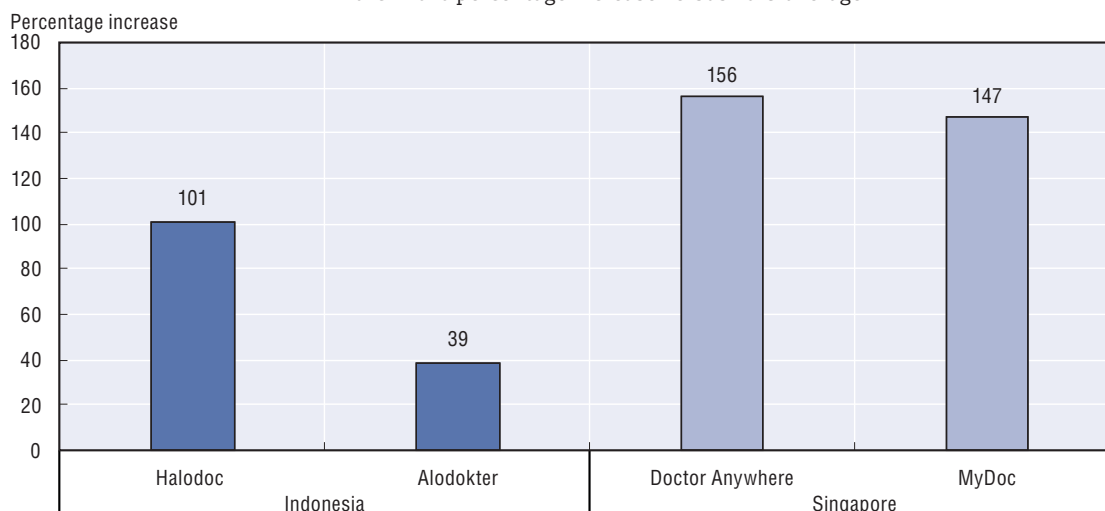
Source: Kapur and Boulton (2020).

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Digital health tools provide remarkable ways to overcome barriers to care, especially in archipelagic countries such as Indonesia, the Philippines and Malaysia. In all these countries, plus Thailand, the rise of interest in telehealth followed the rise of cumulative confirmed cases of COVID-19 (Figure 2.4). The COVID-19 pandemic has also brought a rise in online pharmacies. In India, the popularity of e-pharmacies has soared during the pandemic (FICCI, 2020), as residents stockpiled medicines for emergencies in response to lockdowns.

Figure 2.4. **Interest in telehealth and cumulative confirmed cases of COVID-19 in selected ASEAN economies, February-November 2020**

Source: OECD Development Centre based on data from Johns Hopkins University and Google Trends (accessed on 8 December 2020).
StatLink https://doi.org/10.1787/888934228153
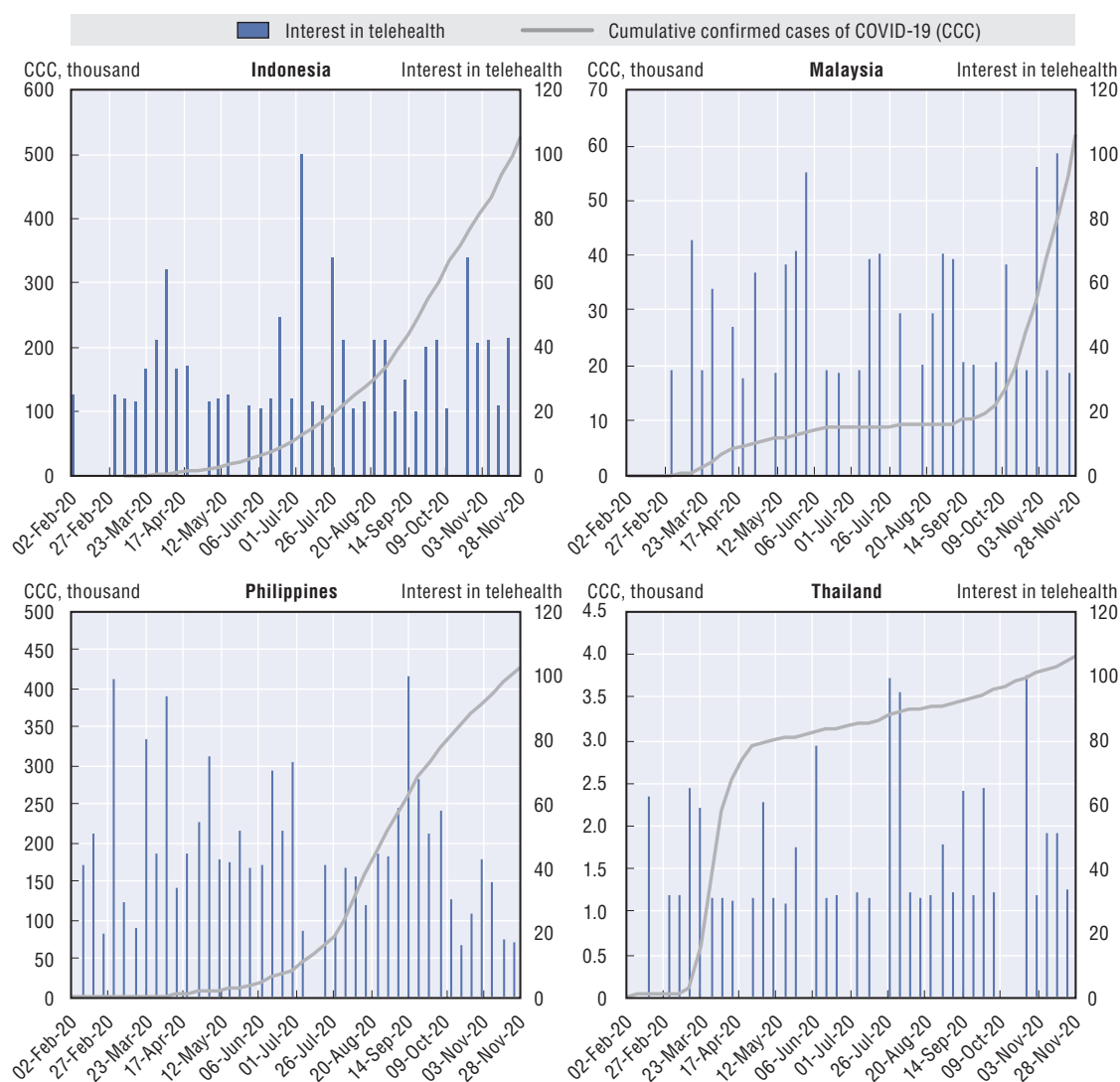
What follows is a review of digital health initiatives taken by various countries to combat the pandemic, while Table 2.1 summarises some of the key initiatives undertaken in Emerging Asian countries to enhance the telemedicine sector, with a focus on government-led initiatives.

In **Indonesia**, the pandemic has triggered an increase in telemedicine usage over a wide array of pre-existing platforms and companies. (UNDP, 2020a). In April 2020, the Indonesian Medical Council issued KKI Regulation 74 on the use of medical treatment through telemedicine during the crisis, while the Ministry of Communication and Information Technology published a COVID-19 tracing application, Peduli Lindungi, which warns users in real time when they enter into contact with a patient under surveillance or observation. The Ministry of Health also partnered with the ride-hailing firm Gojek and the telemedicine provider Halodoc for the provision of quick COVID-19 diagnostics in rural areas (see Table 2.1).

In **Malaysia**, the government launched an "e-COVID19" strategy through co-operation between the Ministry of Health, the National Security Council and the Communications and Multimedia Commission. The e-COVID19 application was created to ensure that data are reliable and accurate, and to improve reporting and resource allocation (MAMPU, 2020a). In February 2020, the Ministry of Health (MOH) and the telemedicine platform DoctorOnCall have established a Virtual Health Advisory portal to provide free public access to consultations with MOH family medicine specialists or medical officers and address any uncertainties regarding COVID-19 (DoctorOnCall, 2020). The government also published the MySejahtera self-assessment application and a contact-tracing application, MyTrace Malaysia, which uses Bluetooth technology to inform users when they have been in contact with an infected person (MAMPU, 2020b, 2020c). Further efforts may be needed to ensure willingness to use the tools (Box 2.3).

Box 2.3. **Attitudes towards digital health in Malaysia**

Malaysia is one of the most technology savvy countries in ASEAN, and is therefore expected to benefit from m-health services. The country's Internet and broadband penetration rates over 100% signal that many Malaysians have more than one way of accessing the Internet. It also lays a good foundation for the country to reap the benefits of a well-developed digital health care structure. Digitalisation also continues to be a top priority for the Malaysian Government. In the recently announced Federal 2021 Budget, a total of USD 242.5 million is to be distributed among Cybersecurity, Connectivity, Internet of Things, Digital talents, and Digital Transformation of Malaysian SMEs (International Trade Administration, 2020). Even before the COVID-19 pandemic, the country had also established the National Fiberisation and Connectivity Plan (NFCP) with the aim to "put in place robust, pervasive, high quality and affordable digital connectivity throughout the country" (Malaysian Communications and Multimedia Commission, n.d).

The success and implementation of any m-health programme depends upon the acceptance of users and health care professionals. A survey conducted before the COVID-19 pandemic showed that 62.7% of respondents disagreed or strongly disagreed with the idea of using mobile devices to manage their health, and that 37.6% of respondents felt uncomfortable with the idea of health care professionals monitoring their health using mobile health devices (Figure 2.5). In addition, the MAera platform (Malaysian Alliance for Embedding Rapid Reviews in Health Systems Decision Making) has been developed in order to promote the utilisation of rapid review outcomes in health system decision making. The goal of the platform is to document policy responses of the Ministry of Health (MOH) and how the government generally handles the COVID-19 pandemic. This is done by keeping an up-to-date record of the government's actions and in order to promote transparency (Maera, 2018).

Box 2.3. **Attitudes towards digital health in Malaysia** (cont.)

Figure 2.5. **Malaysian residents are wary of digital health tools**
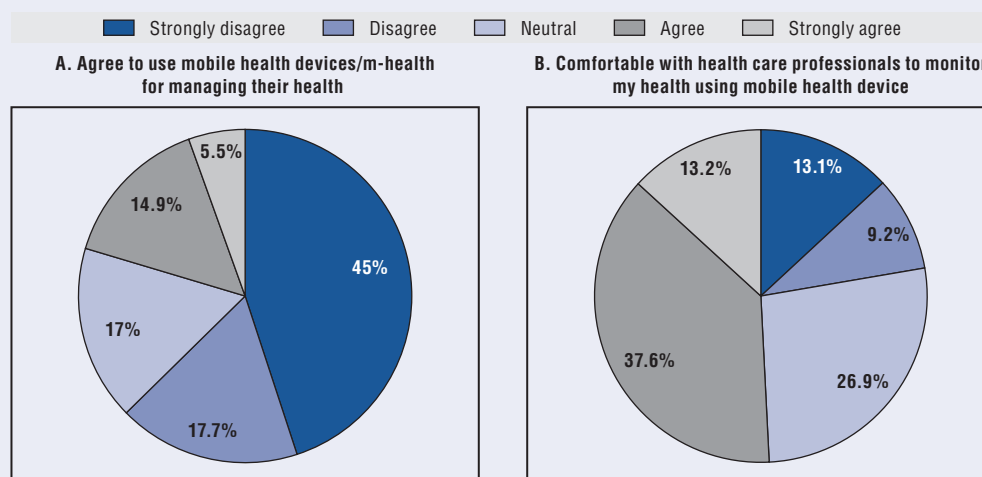
Note: Survey based on a total of 4 504 respondents who were randomly sampled in public areas, parks, government hospitals, primary care clinics and public and private universities in the Klang and Petaling district in the state of Selangor from November 2015 to January 2017.
Source: Lee, Wong and Lee (2020).
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In a survey conducted in the Malaysian state of Selangor, digital health care was more accepted among younger individuals, aged 39 and below. People with higher education and who owned two or more mobile devices were also more inclined to adopt and use m-health and health associated applications in their daily lives. Among the most common applications used were the medication reminder, tele monitoring and the teleconsulting services. Despite the more accepting attitude towards m-health and mobile health services among millennials and younger generations, the results still indicated that only half of the millennials were willing to use digital health services. Since this generation is younger and healthier than baby boomers, it could help explain the rather slow adoption of m-health services among Malaysians. For the baby boomer generation, the low tendency to use m-health was more expected as respondents considered digital health tools to be unable to improve their health compared to traditional methods.

Among respondents, there was a general tendency to consider lack of ICT skills as an obstacle to use digital health tools. Many respondents reported that they would be more inclined to use a mobile health device if education was provided, or if the health device was easy to using. Almost half of the respondents answered they were comfortable to share their health information with their health care professional or family members. In general, respondents were somewhat optimistic about mobile technology, such as receiving doctor's instructions and consultations. However, concerns were raised among participants regarding the accuracy of the data as well as data privacy.

Source: International Trade Administration (2020), Lee, Wong and Lee (2020), MCMC (2020).

The **Philippines** was promoting the use of digital health tools long before the current crisis, and the pandemic led to increased government efforts to further digitalise health care and government services. As early as 2014, the Department of Health (DOH) instituted an eHealth Strategic Framework and Plan (DOH, 2014). When the number of COVID-19 cases soared, the DOH asked telehealth companies and providers to give free primary case teleconsultation (DOH, 2020). Furthermore, the government released an open-data COVID-19 tracker, and certain telecommunication service providers began giving free access to official websites with information about the pandemic. The DOH also published COVIDKAYA, an app to collect data and provide information about the virus that was developed by the World Health Organization in co-ordination with the Department of Information and Communications Technology (PIA, 2020a). The DOH also partnered with Quezon City to deploy the country's first end-to-end telemedicine project. In October 2020, the DOH announced a partnership with Smart Clinic to provide telemedicine consultation in the COVID-19 response (PIA, 2020b).

The Ministry of Public Health in **Thailand** announced its first "eHealth Strategy" in 2017 under the country's 4.0 policies (MPH, 2017). Since then the government has launched multiple eHealth applications, such as H4U, Smart Health ID and Primary Care Cluster App. Moreover, the Ministry of Public Health has partnered with the Thailand Tech Startup Association and private telemedicine providers, such as Doctor Raksa to make telehealth services available to the general public and health care professionals during the COVID-19 pandemic (TCDC, 2020). As regards the implementation of track-and-trace systems, the tracing app, Thai Chana, uses QR codes that the user must scan when entering public places. Its usage is widely promoted and people entering the country may be forced to download it. Thailand also developed a "new normal" medical services model to help health care facilities and personnel strengthen their response to COVID-19.

Viet Nam is in a good position to adapt to digital health platforms. While the latest National Health Programme is general in its nature and does not include digital health tools, the government has taken notable steps to build necessary digital infrastructure in the past couple of years. The main costs and challenges are attributed to the process of digitalising hospital systems and digitising patient records (Austrade, 2019). To combat the pandemic, the Ministry of Information and Communications and the Steering Committee for COVID-19 Prevention and Control published an app, NCOVI, which allows citizens to update their daily health status and receive government health updates (MIC, 2020). Furthermore, the Ministry of Health (MOH) in co-ordination with the Ministry of Information and Communications (MIC) launched a telehealth programme. The programme has been developed by Viettel Group, Viet Nam's largest telecommunications service company, and it provides remote health care services by connecting patients and doctors through a virtual platform, called Viettel Telehealth (Viettel, 2020).

Table 2.1. **Examples of government-led initiatives in Emerging Asia to develop digital health tools during COVID-19**

Country	Endorsement of private initiatives/partnerships with private telemedicine providers	Development of COVID-19 self-assessment tools/track-and-trace systems
Indonesia	The Ministry of Health partnered with the ride-hailing firm Gojek and the telemedicine provider Halodoc for the provision of quick COVID-19 diagnostics in rural areas.	The Ministry of Communication and Information Technology published Peduli Lindungi, a COVID-19 tracing application that warns users in real time when they enter into contact with a patient under surveillance or observation.
Malaysia	In February 2020, the Ministry of Health (MoH) and the telemedicine platform DoctorOnCall have established a Virtual Health Advisory portal to provide free public access to consultations with MoH family medicine specialists or medical officers and address any uncertainties regarding COVID-19.	The government published the MySejahtera self-assessment application and a contact-tracing application, MyTrace Malaysia, which uses Bluetooth technology to inform users when they have been in contact with an infected person. MySejahtera also provides users with a Virtual Health Advisory, which contains links to the telemedicine platform DoctorOnCall.
Philippines	In October 2020, the Department of Health (DOH) announced a partnership with Smart Clinic to provide telemedicine consultation in the COVID-19 response.	The government released an open-data COVID-19 tracker, and certain telecommunication service providers began giving free access to official websites with information about the pandemic. The DOH also published COVIDKAYA, an app to collect data and provide information about COVID-19.
Thailand	The Ministry of Public Health has partnered with the Thailand Tech Startup Association and private telemedicine providers, such as Doctor Raksa to make telehealth services available to the general public and health care professionals during the COVID-19 pandemic.	The Medical Council developed a tracing app, Thai Chana, which uses QR codes that the user must scan when entering public places. Its usage is widely promoted and may also be mandatory for people entering the country.
Viet Nam	The government collaborated with Viettel Group, the largest telecommunications service company in Viet Nam, to develop the Viettel Telehealth platform. The platform enables remote medical consultation, surgery consultation, training and technology transfer.	The Ministry of Information and Communications and the Steering Committee for COVID-19 Prevention and Control published an app, NCOVI that allows citizens to update their daily health status and receive government health updates.
Singapore	The Infocomm Media Development Authority (IMDA) and Enterprise Singapore (ESG) expanded a range of pre-approved digital solutions to help health care SMEs deal with the COVID-19 pandemic by providing virtual health consultations to serve the rise in demand. These solutions include significant subsidies and grants.	The government of Singapore launched an app called TraceTogether, which uses Bluetooth signals to alert people who have been near a person known to be infected with COVID-19. Stay-home notices (SHN) in Singapore are enforced using phones. People who were issued an SHN receive text messages several times during a day and are then required to update their location within an hour through their phone's GPS location.
China	According to a study conducted by the National Centre for Biotechnology Information (NCBI), 29.2% of Internet hospitals were initiated by the government, while 70.8% were initiated by the private sector.	China is using a national QR code developed by technology firms Alibaba and Tencent to quickly collect data on a person's movements and generate decisions on whether the respective individual should be quarantined. The QR code can be scanned at entries to various places, with entry being granted only if the code is green.
India	N/A	The Ministry of Electronics and Information Technology launched the Aarogya Setu tracing app, which uses Bluetooth technology for contact tracing, mapping of likely hotspots and dissemination of relevant information about COVID-19.

Source: OECD Development Centre based on various national sources.

Singapore is experiencing rapid growth in start-up companies developing digital health tools. In January 2020, the Ministry of Health (MOH) announced that the telemedicine sector would officially be licensed before the end of 2022. The Infocomm Media Development Authority (IMDA) and Enterprise Singapore (ESG) expanded a range of pre-approved digital solutions to help health care SMEs deal with the COVID-19 pandemic by providing virtual health consultations to serve increased demand. These solutions include significant subsidies and grants. It is widely believed in Singapore that the push to improve digital health capabilities will continue in the wake of the pandemic, with more benefits to come in the future (IMDA, 2020).

In **Myanmar**, the private sector has taken substantial steps to promote digital health tools to help the population. In January 2020, a partnership between Prudential Corporation Asia and MyanCare, a telemedicine company, sought to improve health care access by initially allowing 5 000 families to set up appointments and consult general

practitioners listed on the MyanCare app, with fees covered by Prudential (Mobile Health News, 2020). Prudential Myanmar intends to expand this project by including more families. More digital health initiatives could help boost the inadequate supply of health care throughout the country and ease financial and other barriers to medical care. The COVID-19 pandemic highlighted the need for greater access to health care, and more initiatives from the private sector are likely to be unveiled as a result.

In May 2020, **China** encouraged provincial governments to establish their own online regulatory platforms to oversee and regulate individual online medical providers and to accelerate the market access of Internet-based hospitals (Han et al., 2020). China also strengthened an information service system which aims to aid county-level hospitals that are located in high-poverty areas to provide telemedicine services. China increased fibre optic coverage in the country's rural poor areas from less than 70% in 2016 to 98% in November 2020 (China SCIO, 2020). In addition to government-led initiatives, the private sector has developed many telemedicine offerings. While 29.2% of Internet hospitals were initiated by the government, 70.8% were initiated by the private sector (Han et al., 2020). Although the initiatives come from two different sources, the dominant platform entails an integration of the private sector-led hospital initiatives into the public health system (Han et al., 2020). E-health innovations are often developed and tested first by private sector health care providers before implementing them wider to more financially constrained public hospitals and health care centres (JASEHN, 2018).

India launched a National Digital Health Mission in August, the country's National Health Portal (NHP) reported. The mission's core building blocks will be monitored by the government. The mission aims to provide Digital Health cards to each citizen, which would entail a paradigm shift to the country's health administration in the wake of the COVID-19 pandemic. The digital cards will initially contain details of doctors, including their qualifications and availability. Doctors will be able to easily access their patients' entire medical histories (Ministry of Special Services and Features, 2020). During the same month, the National Health Mission instated an Electronic Vaccine Intelligence Network (eVIN), which is an innovative solution for strengthening existing immunisation supply chain systems across India. The network will provide real-time information on vaccine stocks and flows, while also providing information on storage temperatures and other conditions. This platform will be particularly useful during the upcoming COVID-19 vaccine rollout (Ministry of Health and Family Welfare, 2020a).

Figure 2.6. **Openness to telehealth services increases in India**
Willingness to book telehealth visits in India by age group, September 2020
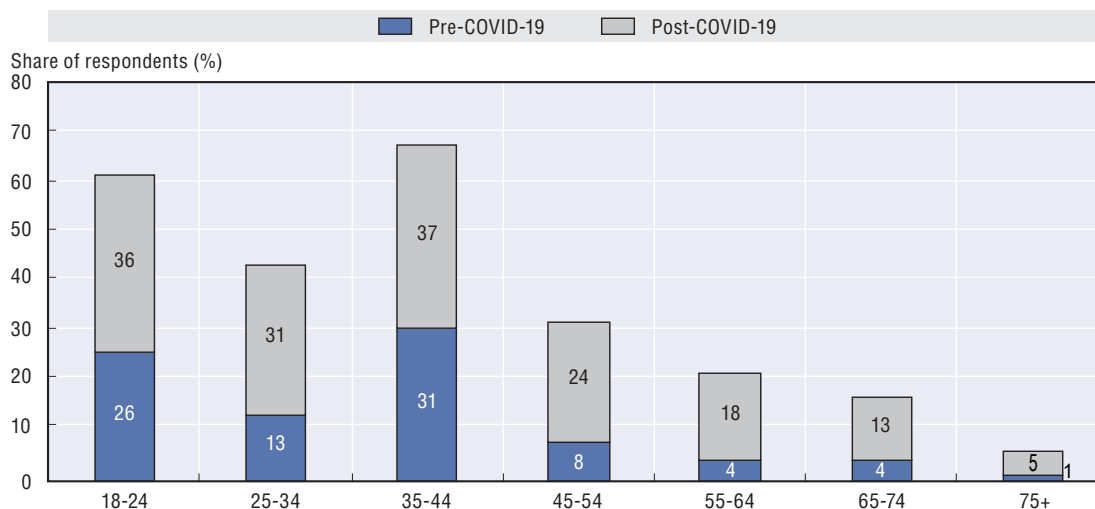
Source: EY & IPA (2020).

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India's new platform is intended to foster development in the digital health field, particularly with linkages to e-pharmacies and telemedicine (NHP, 2020). Willingness to use telehealth services increased considerably among all age groups (Figure 2.6); and the number of Indian households using online pharmacy services reached 9 million in May 2020, compared to 3.5 million in fiscal year 2020. Owing to the increased availability of these services, the number of new households onboarded from non-metropolitan cities increased by 50% during the lockdown (FICCI, 2020).

Box 2.4. India's eSanjeevani initiative takes off during the pandemic

The Indian digital health platform eSanjeevani was launched in November 2019 and conducted more than 300 000 teleconsultations within six months, with the majority of demand coming from the states of Tamil Nadu, Uttar Pradesh and Kerala. Today, the platform has been implemented by 23 states and approximately 75% of the Indian population. It offers two types of telemedicine services: doctor-to-doctor consultation (eSanjeevani), and a patient-to-doctor service (eSanjeevani OPD), which was launched as a response to the COVID-19 pandemic and has been successful in curbing the spread of the virus by providing care while maintaining physical distance (Press Information Bureau India, 2020a).

Almost 5 000 doctors have been trained on eSanjeevani OPD and approximately 6 000 consultations are conducted daily. The region of Tamil Nadu, which was severely affected by the pandemic, accounts for most completed consultations, with more than 319 000 consultations as of 14 December 2020 (Ministry of Health and Family Welfare, 2020b). The promotion of digital health is especially encouraging in the rural parts of the country where access to health care has often been very limited. With eSanjeevani OPD, residents can contact a doctor using their smartphone or computer and Internet connection (Press Information Bureau India, 2020b).

The promotion of eSanjeevani is part of the government's Digital India campaign, which was introduced in July 2015. The campaign aims to ensure that digital access to government services is available to all citizens by improving Internet connectivity and online infrastructure.

Policy makers need to ensure regulations governing telemedicine are fit for purpose

The COVID-19 pandemic has shown the importance of technology and digital infrastructure for providing access to health care services. It is primordial for governments to encourage the sector by removing any regulatory uncertainties. As the digital health industry rushes to expand during the pandemic, rules and regulations are necessary to ensure that the population receives reliable quality care. Medical licensing authorities at various levels of government should collaborate to provide guidelines that support innovation without compromising safety. Telemedicine frameworks are currently at different levels of development in Emerging Asian countries, and various amendments have been implemented in response to the pandemic. While India, Indonesia, Malaysia, the Philippines and Viet Nam have specific regulations governing the telemedicine sector, the provision of telemedicine services in the other Emerging Asian countries is primarily regulated through general codes or guidelines (Table 2.2).

Several initiatives have been undertaken since the onset of the pandemic to either address the legal vacuum or implement COVID-19-specific amendments in cases where telemedicine regulations already existed prior to the pandemic. In March 2020, the Department of Health (DOH) and the National Privacy Commission (NPC) of the Philippines issued a joint memorandum on the use of telemedicine in the COVID-19 response, with the objectives of alleviating surges in confirmed cases and minimising risks posed by

unnecessary patient traffic in health care facilities, among others (DOH-NPC, 2020). Also in March 2020, India issued guidelines for the practice of telemedicine allowing any registered medical practitioner to provide telemedicine services to patients from any part of India, while upholding the same professional and ethical norms and standards applicable to traditional in-person care (BoG-MCI, 2020). The guidelines state that in emergency cases, the patient must be advised to have an in-person interaction with a registered medical practitioner; teleconsultation is permitted if it is the only option for providing timely care. Practitioners are advised to use professional judgement to decide whether telemedicine is appropriate in a given situation or whether in-person care is needed (Kapoor et al., 2020). In April 2020, the Malaysian Medical Council published a telehealth advisory, guided by the professional code of conduct, to ensure the well-being and care of telehealth patients, while the Medical Council of Thailand issued a Telemedicine Guideline as a criterion for health care providers to ensure the safety of patients (Lexology, 2020).

Table 2.2. **Status of telemedicine regulation in Emerging Asian economies**

Country	Pre-COVID-19 status of telemedicine regulation		Amendments to the existing legal framework/development of COVID-19-specific guidelines
	Existing regulation for telemedicine	Specific provisions on data privacy related to telemedicine	
Brunei Darussalam	Currently there is no law or administrative regulation specific to telemedicine.	Currently there is no privacy/ data protection law that applies specifically to the provision of telemedicine services.	N/A
Cambodia	Currently there is no law or administrative regulation specific to telemedicine.	Currently there is no privacy/ data protection law that applies specifically to the provision of telemedicine services.	N/A
Indonesia	Telemedicine is regulated under Regulation of Minister of Health of the Republic Indonesia Number 20 of 2019 regarding the Organisation of Telemedicine Services through Health Service Facilities.	Under the Regulation of Minister of Health of the Republic Indonesia Number 20 of 2019 Health Service Facilities are required to protect patients' data.	In April 2020, the Indonesian Medical Council issued KKI Regulation 74 on the use of medical treatment through telemedicine during the COVID crisis.
Lao PDR	Currently there is no law or administrative regulation specific to telemedicine.	Currently there is no privacy/ data protection law that applies specifically to the provision of telemedicine services.	N/A
Malaysia	The provision of telemedicine services is regulated through the longstanding Telemedicine Blueprint issued by the Ministry of Health in 1997.	Currently there is no privacy/ data protection law that applies specifically to the provision of telemedicine services.	In April 2020, the Malaysian Medical Council published a telehealth advisory, guided by the professional code of conduct, to ensure the well-being and care of telehealth patients.
Myanmar	Currently there is no law or administrative regulation specific to telemedicine.	Currently there is no privacy/ data protection law that applies specifically to the provision of telemedicine services.	N/A
Philippines	Several pieces of legislation have been enacted to define the practice of telemedicine. These include the Telehealth Act of 2012, the Telehealth Act of 2014 and the Senate Bill No. 1618 (The Philippine eHealth Systems and Services Act).	The Department of Health (DOH) collaboration with the National Privacy Commission (NPC), enacted in March 2020, is expected to allay concerns on data privacy and confidentiality.	In March 2020, the Department of Health (DOH) and the National Privacy Commission (NPC) issued a joint Memorandum on the use of telemedicine in the COVID-19 response.
Singapore	There is no all-encompassing legislation governing telemedicine, but the upcoming Healthcare Services Act is expected to regulate the sector by 2022. Telemedicine is currently regulated through various codes, guidelines and regulations.	Telemedicine providers need to ensure that tighter security arrangements are put in place to protect personal data, especially where the impact to an individual would be significantly more adverse if data were inadvertently accessed.	N/A

Table 2.2. **Status of telemedicine regulation in Emerging Asian economies** *(cont.)*

Country	Pre-COVID-19 status of telemedicine regulation		Amendments to the existing legal framework/development of COVID-19-specific guidelines
	Existing regulation for telemedicine	Specific provisions on data privacy related to telemedicine	
Thailand	Currently, the provision of telemedicine is only regulated through the Notification No. 54/2563 (2020) issued by the Thai Medical Council, effective from 21 July 2020.	Currently there is no privacy/ data protection law that applies specifically to the provision of telemedicine services.	The Medical Council of Thailand issued a Telemedicine Guideline as a criterion for health care providers to ensure the safety of patients.
Viet Nam	Circular 47/2017 issued by the Ministry of Health regulates telemedicine in Viet Nam, allowing physicians to offer telemedicine services to patients, subject to certain requirements.	Currently there is no privacy/ data protection law that applies specifically to the provision of telemedicine services.	N/A
China	Currently there is no law or administrative regulation specific to telemedicine.	Currently there is no privacy/ data protection law that applies specifically to the provision of telemedicine services.	N/A
India	There was no legislation prior to the guidelines for the practice of telemedicine issued in March 2020, in response to the COVID-19 pandemic.	The guidelines for the practice of telemedicine issued in March 2020 state that professional norms for protecting patient privacy and confidentiality must be upheld and practiced.	In March 2020, the government issued guidelines for the practice of telemedicine allowing any registered medical practitioner to provide telemedicine services to patients from any part of India.

Source: OECD Development Centre based on Bodulovic et al. (2020), WHO (2020a) and various national sources.

Privacy and data concerns can deter patients from accessing digital health. A data protection framework is a building block for the sustainability of digital health, but some ASEAN countries lack any legislation on privacy and data protection or have only draft legislation (UNCTAD, 2020). In 2019, the Global Digital Health Index assessed countries' digital health preparedness and adoption and measured the readiness of the wider health system to adopt digital health interventions (Figure 2.7). Within ASEAN, the index shows that many countries lack a legal framework for data security; laws or regulations on privacy, confidentiality and access to health information; a protocol for regulating or certifying devices and digital services; and rules on cross-border data security and sharing. The Philippines and Lao PDR are at Phase 2, Indonesia and Thailand are at Phase 3 and Malaysia is relatively advanced at Phase 4. The measures announced in response to the pandemic (Table 2.2) should nevertheless translate into improved performance in some of these countries.

Figure 2.7. **Digital Health Index for selected ASEAN countries**
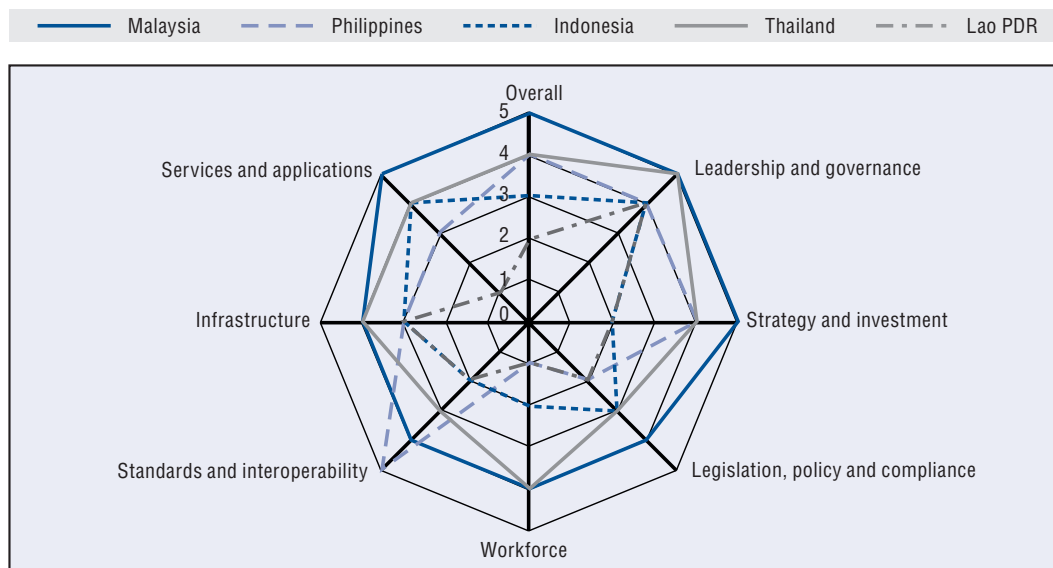
Note: Information on GDHI indicators and indicator groupings can be found at http://index.digitalhealthindex.org/indicators_info.
Source: Global Digital Health Index, 2019.
StatLink 🔗 https://doi.org/10.1787/888934229407

Governments should strive to protect personal health data by clarifying ambiguities within data governance frameworks. The following steps are important:

- licensing telehealth service providers;
- mandating data encryption and password protection on telehealth platforms;
- utilising insider threat monitoring;
- ensuring continuous investment in consumer data protection.

The platforms need to ensure that patients who have consented to use a digital health service are aware they can opt out of future contacts at any time. Canada is considered an early adopter of data protection legislation for telemedicine. Canada issued guidelines on the privacy and security requirements that an interoperable electronic health record (EHR) must meet in order to fully protect patient privacy and maintain the confidentiality, integrity and availability of their data (Canada Health Infoway, 2004). With the notable exception of India, Indonesia, the Philippines and Singapore, in most Emerging Asian countries there is no specific data protection or privacy law that applies to the provision of telemedicine services (Table 2.2), but rather the general rules on data protection are applicable to those services. From a technical perspective, patient privacy could be preserved through methods that use artificial intelligence (AI) and deep-fake technology to "swap" faces in order to conceal the identity of patients while still preserving facial aspects, such as movements, that may provide important medical information (Zhu et al., 2020).

Furthermore, expanding reimbursement of telemedicine is another key determinant of access to care and disease monitoring (Webster, 2020). For example, consumers in Singapore attach great importance to whether treatment is covered by insurance or not. Approximately 70% of respondents to a survey found it to be a very important or critically important factor in determining their satisfaction with health care services (Accenture, 2019). In response to the COVID-19 pandemic, the Chinese national health insurance system began reimbursing care providers for patients' virtual visits, which

contributed to a significant increase in their use (Ortega et al., 2020). Similarly, India eased previous restrictions on virtual care, allowing for the development of new care models (BoG-MCI, 2020). Furthermore, the financial sustainability of telemedicine requires reimbursement on par with that of in-person consultations. For instance, in the United States, 37 states have adopted telemedicine parity laws, which stipulate that telemedicine encounters are to be reimbursed at the same rate as in-person encounters (Talal et al., 2020). Either fee-based or value-based reimbursement schemes could be envisaged, depending on how telemedicine services are produced and consumed. For instance, value-based care and reimbursement is considered to provide more incentives for cost-efficient health care practices (Abbasi-Feinberg, 2020).

Health care workers need ongoing training to master the use of digital tools

An urgent need to upskill health care workers to cope with new digital health technologies has become apparent during the COVID-19 pandemic. A majority of ASEAN countries are suffering from shortages of doctors and trained medical personnel. The WHO advises a minimum of 4.45 skilled medical workers (doctors, nurses and midwives) per 1 000 population, and many of the Southeast Asian countries are below or just above that benchmark (WHO, 2019). Thorough training on operating technologies and use of digital services must be provided before health care providers face patients in this manner. Best practices involve short-term intensive training, such as workshops and seminars, or subsidised online vocational education. Certificates can be delivered to demonstrate the qualification of health workers to use digital platforms. In a Dutch study from 2017, researchers developed a methodology to improve the assessment of digital health skills of physicians, not only in terms of gathering data (so-called Health 1.0 skills) but also in terms of interactivity with patients on the web (referred to as Health 2.0 skills). The study develops the Digital Health Literacy Instrument (DHLI) that measures operational skills, navigation skills, information searching, evaluating reliability, determining relevance, adding self-generated content, and protecting privacy. The results of the study showed that the instrument proved to be efficient in measuring more interactive Health 2.0 skills in all seven mentioned aspects above (van der Vaart and Drossaert, 2017).

Additionally, it has been argued that one of the main barriers for successfully implementing technology into health care has been the lack of user-centred design. It has been found in studies that the ability for physicians to successfully integrate technology in their health care operations rests heavily upon this design principle. Often, the success rate of implementation fell as the primary purpose of the technology itself got lost in the design or implementation process (Ludwick and Doucette, 2009). Technologies should be reliable and easy to learn and use. In a study involving private clinicians in Malaysia, San and Yee (2013) show that when technology is easy to understand and use, clinicians' intention to use it increases regardless of their burdensome daily workloads.

Another challenge is related to the complexity of implementing electronic systems for the recordkeeping of medical information and the existing habits of health care professionals in using paper documentation. An observational study carried out at a hospital in central Florida shows that nurses could devote more time to direct patient care after the implementation of an electronic recordkeeping system. Much of the increased time for direct care can be attributed to a 12% decline in the time spent on administrative tasks (Banner and Olney, 2009). It is therefore of utmost importance for health care professionals to master electronic health records and move away from traditional written medical record systems. A study based on questionnaires by Aldosari et al. (2018) shows that health practitioners' willingness to learn how to use electronic medical record systems increases when appropriate and supportive training is provided in the respective health care organisation.

Technological barriers to digital health tools must be addressed in the region

Governments also need to overcome technological barriers to the development of digital health services, especially in rural or remote areas and among older age groups. Many developing countries do not possess sufficient infrastructure to support the functioning of digital health, with inadequate access to the Internet, mobile phones, computers and even electricity. It has been estimated that only 14% of the population in Southeast Asian countries have access to affordable high-speed Internet (OECD/WHO, 2020).

At the most fundamental level, the unreliable supply of electricity is the primary barrier to realising the promise of telehealth. In Cambodia, for example, which has relied on power imported from Thailand, Viet Nam and Lao PDR, the government should install an uninterruptible power supply (such as backup generators) to reduce exposure to the risk of power failures or shortages. In Indonesia, ICT infrastructure is weak and Internet coverage is lower than in some Southeast Asian countries. While mobile data in Indonesia are very affordable, costing roughly 50% of what consumers in other ASEAN countries pay, average connection speed and Internet bandwidth is much lower than in Singapore, Thailand or Malaysia (Das et al., 2016).

Stable Internet connectivity via broadband or mobile networks allows patients to connect with health workers through video consultations. It also allows the transfer and sharing of patients' records, files and electronic prescriptions. Brunei Darussalam and Singapore have the best online connectivity among Emerging Asian countries. Viet Nam, the Philippines and Indonesia each had Internet penetration rates of 60% to 65% as of August 2019. In the least developed countries such as Lao PDR, Cambodia and Myanmar, a large proportion of the population still had no stable Internet access or no Internet access at all with Internet penetration rates of 50% or lower as of the same date (Datareportal, 2019). Internet coverage in rural and remote areas of some ASEAN countries remains a major concern. Governments in these countries could use other means in the short term, such as radio and megaphone, to educate local people about the symptoms of COVID-19 and protective measures, while health care providers should allow audio-only consultations when Internet speed is not fast enough. In the medium to longer term, policy makers should boost the digital transformation by removing barriers to investment in networks. Additionally, options for patients to drive to a designated location to complete a video visit in their car or at a clinic with reliable Internet are being explored in the United States (Hirko et al., 2020).

Commonly used commercial video conferencing services, such as Zoom, Microsoft Teams and FaceTime, are not specifically designed and calibrated for health consultations nor are they fully integrated with patients' medical records or prescriptions. Health providers should notify patients that third-party applications may carry risks, and they should keep developing tools specifically for telehealth. For instance, the government of India recommends several tools for conducting telemedicine, including mobile or landline phones (connected over LAN, WAN, the Internet, etc.); chat apps like WhatsApp, Facebook Messenger, etc.; mobile applications and Internet-based digital platforms for telemedicine; and data transmission systems like Skype, e-mail or fax (Kapoor et al., 2020).

In 2016, the Malaysian Personal Data Protection Department updated the Personal Data Protection Act introduced in 2010 to align with society's technological developments and to better protect the large amounts of data that are being shared across networks and devices (Personal Data Protection Act, 2016). In the Philippines, the Department of Information and Communication Technology initiated an independent organisation with the Data Protection Act in 2012. This was called the National Privacy Commission and aimed to monitor and guarantee compliance of the country with international standards for data protection (Data Privacy Act, 2012).

Policy makers need to ensure the benefits of telemedicine are equitably distributed

The advent of COVID-19 has shone a spotlight on digital divides. The barriers by which people are excluded can be grouped into three broad categories: lack of access, mostly on account of an inability to pay for devices and their operating costs; lack of motivation among people who do not consider that connectivity is relevant or worth the effort; and lack of digital skills and education (Milner, 2006). Education is one of the most important factors contributing to digital exclusion, as the most educated people are likely to be early adopters of newer technologies. Improvements in health technologies tend to increase disparities in health access across education groups, due to the fact that education enhances the ability to exploit technological advances. The most educated people therefore make the best initial use of this new information and adopt newer technologies first (Glied and Lleras-Muney, 2008).

Income is another factor restricting broadband adoption and use. For instance, in India, Indonesia and the Philippines, more highly educated people and those with higher incomes are more likely to be Internet users (Figure 2.8). The gap by level of educational attainment is particularly striking in these three countries. Indeed, the difference in Internet usage between people with higher versus lower education levels exceeds 40 percentage points. The wealthier and more educated groups will likely reap the full benefits of telemedicine, while the poorer and less educated fringes of the population could be deprived of these services. The elderly, who have been most severely impacted by the pandemic, are also among the least likely to be Internet users. For instance, a 2014 study of 385 elderly living in the Khon Khaen Municipality (Thailand) revealed that most elderly did not use the Internet (80.7%), while the majority of elderly who were above 70 years of age did not use the Internet at all. The study also identified some of the problems in using the Internet, namely: trouble with eye pain; lack of skills; and lack of computers at home (Loipha, 2014).

Figure 2.8. **Internet usage by level of education and income in selected Emerging Asian economies, 2019**

Note: Data refer to percentage of people who use the Internet at least occasionally or report owning a smartphone.
Source: Pew Research Centre (2020).
StatLink 🔗 https://doi.org/10.1787/888934228172
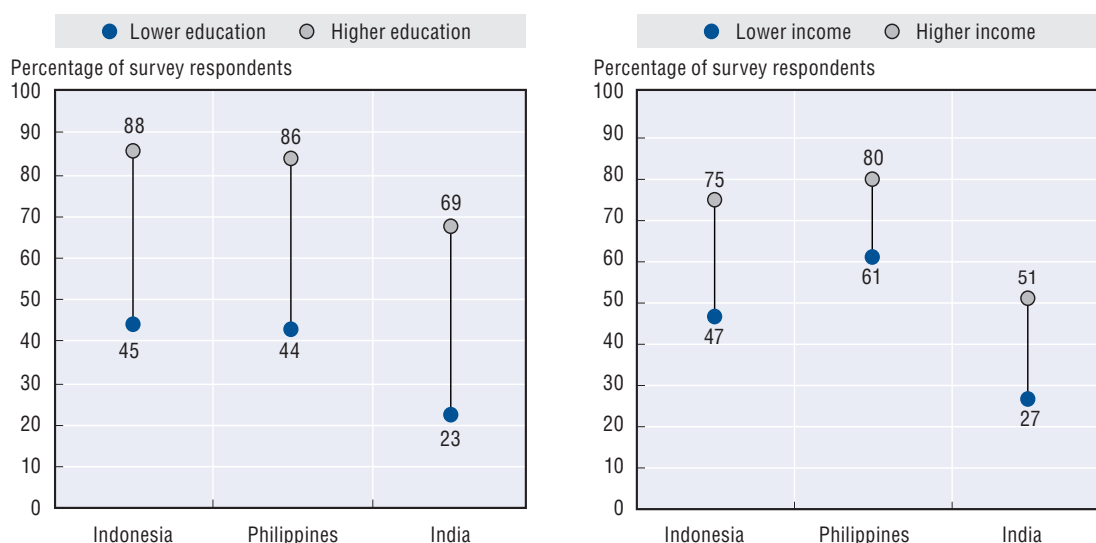
The factors discussed above greatly influence individual attitudes towards telemedicine. A cross-sectional study carried out by Lee et al. (2020), involving 4 504 residents from selected districts of the Malaysian state of Selangor, shows that education and age are important factors associated with higher levels of digital health use. More precisely, the study reveals that individuals aged 39 and below, those with higher educational attainment and those who owned two or more mobile devices were more interested in using digital health and health-related applications in their daily lives. According to the same study, the most common issues respondents needed help with were: connecting their devices to a wireless network (49.9% of respondents); searching for information on the Internet (48.6%); and checking e-mails (46.9%). Moreover, nearly half of survey participants claimed they were willing to use a mobile health device (m-health) if education were provided, while 47.5% of respondents said they would consider using an m-health device if it required fewer than five steps to set up (Lee et al., 2020).

Providing people with reliable equipment and access to it is undoubtedly the most promising avenue for bridging the digital divide in access to telemedicine. Reopening places that enable free and public access to the Internet could be prioritised, with the necessary safeguards in place (Allmann, 2020). In the meantime, digital isolation could be tackled through immediate and pragmatic solutions. For example, buses equipped with solar-powered Wi-Fi routers are being used to provide Internet access to isolated and underserved communities in the United States (Lee, 2020). In addition, the strategy to reduce digital divides should also involve the establishment of intensive and long-term support networks to help people acquire the digital know-how they lack. In the United Kingdom, for instance, the *Oxfordshire Digital Inclusion Project* is a research project that is looking at the role of public libraries in closing the digital divide. Under the project, library customers can request assistance from volunteer "digital helpers" for various actions, such as setting up an e-mail account or learning how to use Skype (Allmann, 2020). Finally, education campaigns are necessary to inform the public about the benefits of telemedicine as a trustworthy health management strategy.

A confluence of policy measures is necessary to spur digital health development

The COVID-19 pandemic fuelled growth for telemedicine that would have otherwise taken several decades to materialise. Various initiatives are necessary in order to ensure the continuity of telemedicine as a viable alternative to traditional health care even when COVID-19 no longer represents a public health concern, while also acknowledging that access to digital technologies is far from being universal.

- Policy makers need to overcome any regulatory barriers to ensure legal certainty for all stakeholders (patients, practitioners, insurance providers, etc.) and the highest service quality standards. Indeed, confidence that the quality of care is at least equal to that delivered in a traditional hospital plays a key role in the successful shift from conventional health care to telemedicine. In addition, Emerging Asian regulators could work towards ensuring a certain level of harmonisation of terminology and definitions employed in their respective legal frameworks to enable the cross-border provision of telemedicine services.

- Policy makers need to establish a clear legal framework for data protection, which governs the collection, storage, processing and sharing of patients' data. The legal framework should provide for a simple and transparent patient consent procedure. The growing risk of cyberattacks targeting the sector needs to be accounted for appropriately. In order to promptly identify and trace the source of IT incidents, such as fraudulent access or misuse of patients' personal data or to determine the origin of an IT incident compromising patients' data, telemedicine providers should implement incident management systems.

- Furthermore, simplifying reimbursement rules could accelerate telemedicine adoption and ensure the financial sustainability of telemedicine. Policy makers

should consider expanding the scope of telemedicine by adding new activities covered by social security. The conditions under which telemedicine costs are reimbursed need to be carefully considered, taking into account the dual objective of improving the quality of health care, while at the same time ensuring a lower relative cost for society. Either fee-based or value-based reimbursements could be envisaged, with the latter option typically considered to be more cost-effective.

- Upskilling health professionals in digital technologies is paramount for the wider adoption of telemedicine. In order to tackle digital-skill barriers, practical training could be integrated into the curricula of medical schools. Governments in Emerging Asia could also fund additional courses in telemedicine and digital health records for health professionals, potentially through joint work with the TVET sector. Moreover, reward schemes could be envisaged as an incentive for health care professionals to ensure high quality standards in the provision of telemedicine services.

- In addition, policy makers in Emerging Asia need to overcome several technical barriers to the development of telemedicine. Governments should redouble their efforts to enhance the IT infrastructure and strengthen its capacity to process intensive information flows. The widespread availability of reliable devices and sound cellular and broadband networks has the potential to reduce telemedicine costs by transferring these expenses from telemedicine providers to patients who already have these devices available for use at home. Rural-urban gaps in digital development need to be reduced in order to ensure an uneven spread of telemedicine services. Alternative means for accessing telemedicine solutions should be envisaged in areas with weak IT infrastructure, such as audio-only consultations or directing patients to designated locations for completing video visits.

- Finally, as with all technological advances, the greater use of telemedicine services creates groups that gain more than others from the change. The benefits of digital health care are far from being equitably distributed. Education and access to technology are some of the most important factors contributing to digital exclusion. Policy makers need to ensure equal access to reliable, affordable and easy-to-use equipment. Innovative solutions like, for instance, using buses equipped with Wi-Fi routers to provide Internet access to underserved communities, could offer an immediate response. At the same time, long-term support networks could be envisaged to help people acquire the digital skills they lack. Public libraries, for instance, could play a key role in supporting this objective. Education campaigns are necessary to inform the public about the benefits of telemedicine and thus encourage the shift from treatment to prevention.

Online education in Emerging Asia requires an upgrade in digital skills

The COVID-19 pandemic and subsequent government responses have disrupted education across the globe. Billions of students have had their education interrupted or transformed through attempts to reduce transmission of the virus by limiting physical contact. In addition, at a time when the pandemic is also disrupting industries such as travel, tourism and hospitality, and causing job losses, there is a significant demand for upskilling and reskilling of adult workers, in particular to enhance digital skills ranging from basic computer or digital device operation to innovative tasks in programming.

Emerging Asian countries seek optimal strategies as schools reopen

Some degree of primary or secondary school closure occurred during the pandemic in China, India and every ASEAN economy. Some of these closures were localised to areas with high transmission rates of the virus, while others were nationwide. Some Emerging Asian countries started to implement school closure policies as early as February 2020, while by April entire school systems were shut across the region (Figure 2.9).

Figure 2.9. **School closure policies in Emerging Asian economies,
January to November 2020**

Stringency level*

Note: * The stringency of school closure policies is defined on a scale from 0 to 3, as follows: 0 – no measures;
1 – recommend closing, or all schools open with alterations resulting in significant differences compared to usual,
non-COVID-19 operations; 2 – require closing, but only some levels or categories (e.g. just high schools, or public
schools); and 3 – require closing at all levels. Monthly values of the stringency indicator have been obtained by
averaging the daily values for the respective month. Average of ASEAN-10 countries, China and India. Data as of
26 November 2020.
Source: OECD Development Centre based on data from Oxford *COVID-19 Government Response Tracker*.
StatLink 🔗 https://doi.org/10.1787/888934228191

More than 1.4 billion students at all levels, including more than 140 million K-12 students
in ASEAN and more than 232 million K-12 students in China alone, spent some time barred
from in-person studies (UNICEF EAPRO, 2020a; UNESCO, 2020a). Figure 2.10 shows the
seven-day rolling average number of learners under total closures for kindergarten to
grade 12, college, TVET and university, excluding learners on scheduled academic breaks.

Figure 2.10. **Global 7-day rolling average of students out of school due
to COVID-19 closures**
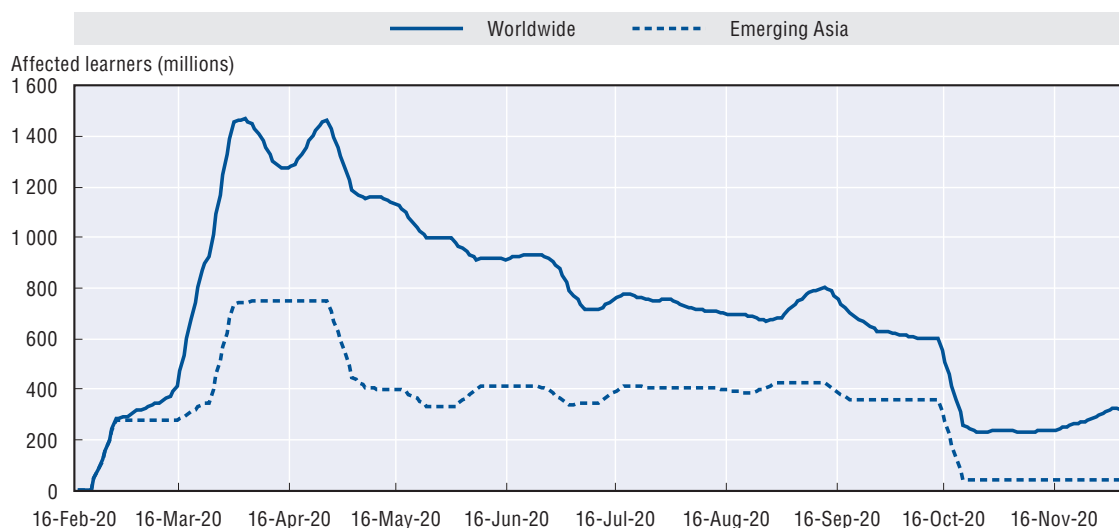
Note: The figure covers all UNESCO member countries.
Source: OECD Development Centre, based on UNESCO (2020a).
StatLink 🔗 https://doi.org/10.1787/888934229426

School reopening began in May 2020 in some areas, with the implementation of hygienic measures including regular disinfection, reporting of COVID-19 symptoms and contact tracing, temperature checks, use of masks or other protective gear by teachers and/or students, and measures to enforce physical distancing (Table 2.3). Of these strategies, symptom reporting and enforcement of physical distancing have been perhaps the most disruptive to education. Group activities may need to be limited, and ensuring some in-person class time for all students may involve rotating students between in-person and virtual learning. In the context of education, quarantine or self-isolation means possibly cancelling in-person lessons for a certain period of time and transitioning to remote learning on very short notice.

Table 2.3. **Primary and secondary educational responses to COVID-19 in Emerging Asia**

Country	Date closed	Date opened	School environment measures
Indonesia	16 March (partial), 25 March (full)	13 September (partial)	Safe operating guidelines provided by Ministry of Education and Culture
Malaysia	18 March (full), 9 November (full)	24 June (partial), 3 August (full)	Digital learning platforms (Internet) for students and training for teachers; hygiene measures include provided meals and prohibition of most extra-curricular activities, including sports
Philippines	9 March (partial), 16 March (full)	N/A	Remote teaching resumed on 5 October; no return to class until vaccine is available and distributed
Thailand	18 March (full)	14 August (full)	Daily temperature screening for students with health status indicated by a stamp on the wrist; assemblies and gatherings cancelled (UNICEF Thailand, 2020)
Viet Nam	28 February (partial), 31 March (full), 1 September (partial)	4 May (partial), 18 May (full), 5 September (full)	Schools must meet government safety standards to reopen; preschools closed indefinitely 26 July in some provinces
Brunei Darussalam	11 March (break), 1 April (full)	2 June (partial), 27 July (full)	
Singapore	8 April (full)	2 June (partial), 29 June (full)	Temperature and symptom screening at the start of each day; distancing aided by fixed exam-style desks; masks for students beyond kindergarten
Cambodia	8 March (partial), 16 March (full)	7 September (partial), 23 November (full)	Students alternate between in-school and distance learning; government guidelines on school operating procedures; radio lessons in three widely spoken languages for Grades 1-3
Lao PDR	19 March (full), 1 September (partial)	18 May (partial), 2 June (full), 1 November (full)	Select grades in class only for the purpose of sitting key exams
Myanmar	16 March (full), 27 August (full)	21 July (partial)	Closed 27 August in response to COVID-19 pandemic; free masks for students and teachers (UNSDG, 2020)
China	16 February (partial), 21 February (full)	27 April (partial), 10 October (full)	Staggered attendance at almost all schools (distance learning otherwise) and in compliance with government-issued hygiene measures
India	4 March (partial), 25 March (full)	15 October (partial)	Gradual reopening of schools, which must comply with government regulations; distance learning to continue until further notice; in-school attendance will require parental consent

Note: Dates refer to the first day of closure or opening, not the dates of policy announcements.
Source: Opening and closing dates from UNESCO (2020a). School environment measures from UNICEF EAPRO East Asia and Pacific Regional Office (EAPRO) (2020a), "UNICEF Education COVID-19 Response Update – September", unless otherwise indicated.

While spikes in viral transmission have been the common justification for reclosing schools, the rationale behind reopening has been less clear. However, given that the five countries with the most academic days under some level of closure (Table 2.4) are five of the six countries with both broadband speed and coverage below the Emerging Asian average (Figure 2.13), it is unlikely that inadequate ICT infrastructure spurred reopening. The extended closure of schools in areas with poor ICT infrastructure and access risks

widening educational and economic inequities, something that should concern policy makers as they decide on educational plans for 2021 while their countries await the availability and distribution of COVID-19 vaccines.

Table 2.4. **Public health measures have kept students out of school**

Country	Academic days	Fully closed (%)	Partially closed (%)	Fully or partially closed (%)
Brunei Darussalam	273	22.7	20.1	42.9
Cambodia	227	47.1	37.4	84.6
Indonesia	291	48.8	41.2	90.0
Lao PDR	276	21.7	27.5	49.3
Malaysia	306	44.8	13.1	57.8
Myanmar	307	78.5	12.1	90.6
Philippines	207	86.0	2.9	88.9
Singapore	266	10.2	10.2	20.3
Thailand	262	33.6	0.0	33.6
Viet Nam	245	13.9	20.4	34.3
China	276	23.9	39.5	63.4
India	338	60.4	34.6	95.0

Note: "Academic days" refers to calendar days excluding scheduled academic breaks. Data cover 16 February 2020 to 18 January 2021 inclusive. Data includes rounding errors.
Source: UNESCO (2020a).

The decision on whether or not to reopen schools, or to what extent, should protect the rights of children and be based on helping them achieve the best holistic outcome (UNESCO et al., 2020). This approach should consider the benefits and drawbacks of attending physical classes versus staying at home, from various viewpoints: physical health and COVID-19; learning opportunities; mental and emotional health; and risks or costs to family members and communities.

The scope of school closures is another aspect to consider; whether they should be adopted at the national or subnational level. Several studies have modelled the relative benefits of different school closure strategies during pandemics, but the evidence is rather mixed. One study concluded that a policy of "area closure" – whereby all schools within a radius of 10 kilometres of a confirmed case closed for a fixed period – delivered similar results to a policy in which each school closed following a case in the respective school (Ferguson et al., 2006). In a similar vein, another academic paper found no consistent differences between the effects of closing individual schools and closing schools at the national level (Lee et al., 2010). Conversely, other studies suggest that closing individual schools would be more effective than closing an entire school system (Halder et al., 2010; Chao et al., 2011).

Another strand of analysis explores the merits of implementing blended school opening strategies and their optimal structure, distinguishing between alternating weeks of in-person learning rather than alternating days. For instance, Gandolfi (2021) shows that careful planning of temporary school openings could drastically reduce the number of extra cases of COVID-19 that would be induced by fully opening the school. As illustrated in this study, blended models, which involve an alternation of weeks of remote and in-class activities are optimal or near-optimal solutions. Alternation on a weekly

basis appears to be more efficient given the COVID-19 incubation period. For instance, with about half of the weeks in class, the increase in the number of cases can be reduced by a factor of three, while schedules with a choice between in-class and remote teaching on a daily basis would not improve the reduction much. The study also concludes that a random selection of the weeks of in-class teaching activities would not reduce the number of new infections as effectively as an optimal choice, but would nevertheless achieve a substantial reduction compared to full opening.

The use of distance learning is increasing rapidly

As students were abruptly forced out of schools, distance learning strategies were rapidly developed and implemented worldwide in an effort to provide continuity of learning and stave off the economic costs associated with a delayed education. Psacharopoulos et al. (2020) estimate the net present value of the losses caused by a four-month educational delay to be as high as 61% of current year GDP, with low-income countries and the least educated most affected proportionally. Crucially, these estimates are made under the assumption that the closures are of fixed length and that distance learning is a perfect substitute for in-person learning in terms of learning quality. Both of these assumptions are particularly strong. Not only did some ASEAN countries have initial school closures lasting longer than four months (Cambodia), but several countries have had to reclose schools in whole or in part in response to deteriorating epidemiological situations (Malaysia, Myanmar, China) (UNICEF EAPRO, 2020a).

Figure 2.11 shows the quarterly downloads of educational mobile apps since the start of 2017, with Q1 2020 (the start of the declared pandemic) having the most downloads. In some Emerging Asian countries, the practice of distance learning is not new. For instance, nearly 6.5 million students in China were enrolled in open and distance learning in 2016. This is the equivalent of 17.8% of the country's total student population (Qayyum and Zawacki-Richter, 2019).

Figure 2.11. **Global mobile education app downloads, Q1 2017 to Q1 2020**
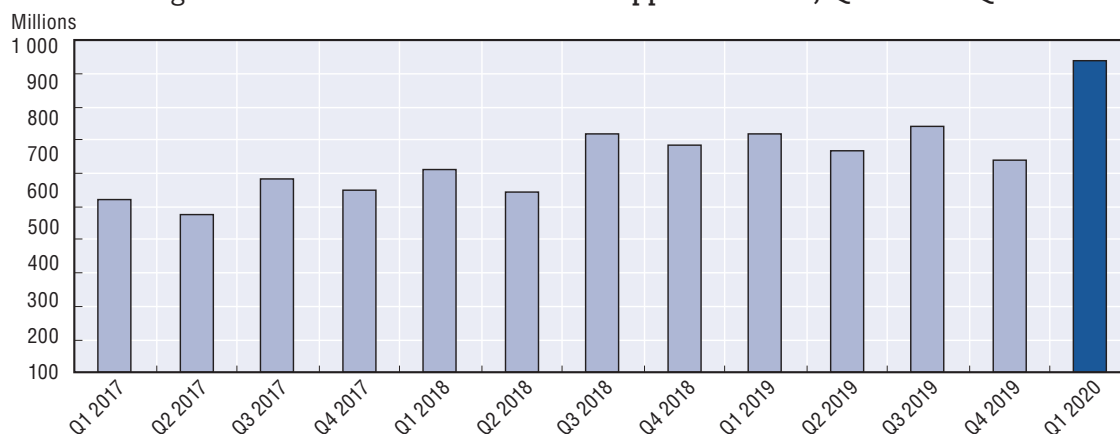
Source: Statista (2020), "Worldwide mobile education app downloads from 1st quarter 2017 to 1st quarter 2020, by platform".

StatLink 🔗 https://doi.org/10.1787/888934228210

Keyword searches related to Internet-based learning significantly increased starting from the first quarter of 2020, the period when physical distancing restrictions began to be implemented in many ASEAN countries. Figure 2.12 shows keyword search trends on selected national learning platforms for each corresponding country. These trends suggest growing awareness of digital learning. Evidence from Singapore also indicates acceleration of the National Digital Literacy Programme due to the COVID-19 pandemic (Singapore Ministry of Education, 2020a). The programme, which previously intended to equip every

secondary school student with a personal digital learning device by 2028, has progressed faster than planned. Within a few weeks, there was universal adoption of digital learning, and teachers in some schools shifted to delivering online lessons overnight.

Figure 2.12. **Keyword search trends related to selected national learning platforms, 2020**
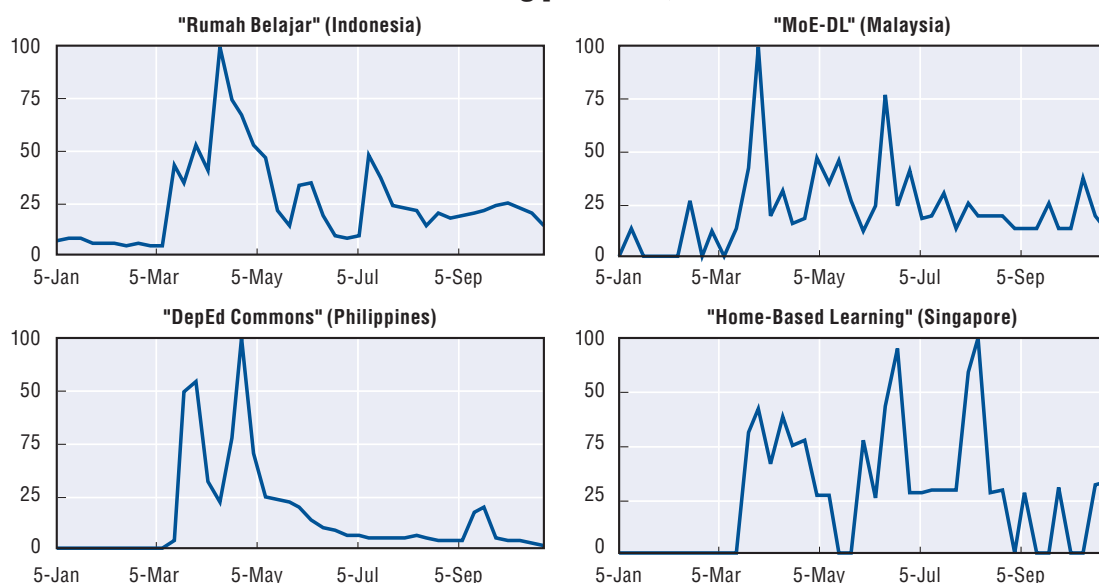
Note: Numbers represent search interest relative to the highest point on the figure for the given country and time (January-October). A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means there was not enough data for this term.
Source: Google Trends, accessed 26 November 2020.
StatLink 🔗 https://doi.org/10.1787/888934228229

Among the ASEAN-10, each country developed national strategies to implement distance learning, with some freedom for subnational authorities to make modifications relevant to their localities. While every country utilised Internet-based learning, several turned to television, radio or mobile phone as alternatives. In some cases, instructors or authorities delivered physical learning materials to students in a safe manner.

- **Brunei Darussalam** provides online learning advice for both teachers and parents, including an overview of the technologies being used to deliver content, advice on creating a proper home learning environment and a reminder that physical activity is still key for children. The Ministry of Education is delivering content through a variety of Google applications, as well as other tools for group work and teacher screen sharing, while WhatsApp is being used to facilitate communication between teachers and parents. Lessons are also delivered by television for some grade levels (Ministry of Education of Brunei Darussalam, 2020).

- In **Cambodia**, the Ministry of Education, Youth, and Sport is delivering educational content through Facebook videos posted to official agency pages. After being streamed live on Facebook and multiple television channels, the videos also become available on an official YouTube channel and a mobile application developed by the government to facilitate distance learning by mobile phone. Owing to agreements between service providers and the government, accessing lessons by mobile phone does not incur data usage and charges. Lessons are available for all grade levels, as well as for the Basic Education Equivalency Programme, a joint initiative with UNESCO allowing out-of-school learners to achieve Grade 9 equivalency (UNESCO, 2020b).

- **Indonesia** is providing lessons on TVEdukasi, a television station run by the Ministry of Education and Culture since 2004. There are two channels, one for students and another for teachers. "Rumah Belajar" (Learning House) is an online hub for lessons, textbooks, assignments and evaluations developed by the ministry. Similar to the situation in Cambodia, the ministry has partnered with service providers to render access to the hub free of charge (World Bank, 2020a).

- Lessons in **Lao PDR** are mostly being delivered by Internet, television and radio, as only students in Grades 5, 9 and 12 have returned to the classroom to prepare for state exams at the end of primary, lower secondary and upper secondary education (UNICEF, 2020). This arrangement achieves the dual objectives of safety (through physical distancing in schools) and maintaining quality education and progress (by prioritising students with upcoming exams, while not compromising the others).

- In **Malaysia**, a Ministry of Education online resource hub called EduwebTV and an online learning platform called MoE-DL are available, with lessons and digital textbooks for all levels. But the country is focusing much of its new distance-learning effort on radio and television, as a significant share of the population lacks Internet access. Public broadcaster Radio Televisyen Malaysia (RTM) launched TV Okey on 6 April with these students in mind. Initial broadcasts lasted two hours per day, with plans to expand this, and the streams are archived on the RTM website (World Bank, 2020a).

- The **Myanmar** Digital Education Programme is the source for digital education materials accessible by computer or mobile app. WhatsApp and Viber are used for student-teacher communication. People requiring a low-tech arrangement receive a drive with all the materials loaded on it. The no-tech households, which have no digital devices and are reliant on solely physical tools, are being sent textbooks and workbooks with instructions for self-paced learning in a collaboration between the Ministry of Education and the postal service. The programme includes reference to the need to provide appropriate aid to students with special needs (Myanmar Ministry of Education, 2020).

- The **Philippines** Department of Information and Communication Technologies, in collaboration with the Department of Education, launched the Digital Teachers and Learners Project in July 2020, as a pilot project in San Juan. DepEd Commons, an online platform, was also developed to support the continuous delivery of basic education during the pandemic.

- **Singapore** launched Home Based Learning in response to the COVID-19 pandemic, blending online and offline elements. The intention is for students to use their family's devices, but a family unable to provide a device for each child can borrow the necessary equipment from the school. The schools can also help facilitate Internet access (or improved Internet access) if necessary. The device loan programme is unique within ASEAN (Singapore Ministry of Education, 2020b).

- **Thailand**'s Ministry of Education will rely on Distance Learning Television as its main instructional mode for all grades. This project has been used locally for several years and is being expanded nationwide in response to the COVID crisis (UNESCO Bangkok, 2020). Some material is available and more lessons are being recorded. The government also collaborated with the Asia Foundation to develop an online learning platform for primary and secondary students (Chang, 2020).

- **Viet Nam** has seen the growth of multiple e-learning platforms from the telecommunications providers VNPT, FPT and Viettel, all of which are allowing free access. The same basic technology has also been repurposed for other uses, such as

doctor-patient conferencing and professional communication. The Viettel platform hosts more than 29 000 lessons and had been distributed to more than 26 000 schools as of March, with 41 million visitors in the prior month (Dharmaraj, 2020).

Colleges and universities should maintain quality in a remote setting

The COVID-19 pandemic has led colleges and universities to transition to online learning. In areas with weaker Internet penetration, however, online learning may not be possible, leading to students deferring their studies. In response to the financial pressures associated with the pandemic and an admitted decline in instruction quality, universities in the Philippines and Thailand are considering whether to refund tuition fees in whole or in part, while Viet Nam is providing scholarships for students whose families have been most adversely affected by the pandemic (Yarrow, 2020).

Policies should focus on student retention, both during and after the period of restriction. Governments may need to subsidise tuition or offer soft student loans, with payment or interest holidays for some time after graduation. Many countries have implemented interest-free deferments on outstanding student loan payments, while Canada has doubled available grants, eliminated required fixed contributions and increased the weekly loan limit from CAD 210 to CAD 350. For assisting in employment, the Chinese government is instructing state-owned enterprises to expand hiring and reserve a portion of the created positions for new graduates.

In the event that academic terms must be repeated due to the interruptions, financial relief should be made available. It is important for educational institutions to consider whether enough of the term material was covered and whether students were properly assessed prior to any consideration of blanket advancement (i.e. automatic passing grades for every student). While there is an understandable desire for both students and institutions to have educational progress proceed unimpeded, it is important that the quality of education received by the students be equivalent at a minimum.

Another concern for universities is the administration of examinations. Typical exams are not permissible under public health measures where educational institutions are closed, and this has led to deferral of exams or graduation until either the sanitary situation changes or an alternative method can be found. Challenges include adapting exams for computer-based completion and the preservation of academic integrity. Bilen and Matros (2021) found evidence of cheating in online examinations through learning system data at an American public university where some exams were conducted with traditional methods (face-to-face and proctoring) versus asynchronously online due to closure. The paper highlights three main policy options to curb cheating: requiring students use a camera and show identification to it to prevent someone else from taking the test on their behalf; allowing professors to assess suspected cheating on their own for those who refuse to use a camera; and avoiding fitting grades to a pre-determined distribution.

A study by Prigoff et al. (2020) attempts to shed light on how grading has been disrupted by the transition to online learning and provides evidence on the impact of the transition on different tools for assessing medical students. Open-book exams and virtually proctored shelf exams, with grade adjustments, appear to be a reasonable option for medical students. This notwithstanding, the authors of the study recommend virtual proctoring through a video-conferencing application, if available, in order to avoid adjustments and student dissatisfaction.

Subjects with necessary practical components, such as sciences, engineering and medicine, require students to spend some time on campus to master the use of techniques, tools or software. It is important that students have the opportunity to complete these physical aspects of their programmes in order to be fully qualified to enter the workforce in their chosen discipline. Universities will have to work with students and authorities to develop methods of allowing students to complete this part of their education safely and with as little delay as possible. Financial investment in the development of online laboratories, typically called WebLabs or iLabs, could be envisaged as a medium to long-term solution. WebLabs would allow students to practice remotely, with direct feedback on the results of their actions. Originating in microelectronics, these online laboratories are experimental set-ups that can be controlled through the Internet from a simple web browser (Debacq et al., 2021). Some applications in chemical engineering have been documented (Klein and Wozny, 2006; Alliet-Gaubert et al., 2012).

A survey of 3 670 medical students in the Philippines provides insights into the barriers to learning they have faced during the COVID-19 pandemic (Baticulon et al., 2020).[1] The Doctor of Medicine is a four-year programme consisting of didactic (classroom) learning, clinical rotations and licensure examinations. All phases were suspended indefinitely. The survey found that 41% of students considered themselves prepared for online learning. More than 70% of students agreed that they had enough time and resources to prepare for the next-year level, but a similar proportion believed they should automatically be given a passing grade. Fewer than half of the students believed their school had the resources to facilitate online teaching effectively, but more took issue with the administration and infrastructure than with the instructors. In terms of learning barriers, nearly 70% of students reported never having to work for extra money or facing issues meeting basic needs or with their devices. Lack of technical skills was an occasional problem (8% always, 24% never), though 89% of students reported some level of unreliability in their Internet service. The most pervasive issues related to adjusting to academics in an unfamiliar space. Nearly one-third of students reported that "difficulty adjusting learning styles" and "need to fulfil obligations at home" were constant barriers, while 80% indicated issues with a lack of space conducive to studying.

This suggests that the issues may not lie with online learning generally, but rather with the abrupt transition necessitated by public health measures surrounding the COVID-19 pandemic. It thereby reinforces the urgency for educational institutions to develop distance learning solutions, and to not abandon this pursuit when the public health crisis has passed.

Improvement of ICT infrastructure and access undergirds distance learning

Differences in Internet coverage and speed have exposed students in Emerging Asian countries to varying levels of disruption following the implementation of COVID-19-related restrictions. Levels of disruption may have been lower in countries with fast and widely available Internet, such as Singapore and China. Inversely, students living in Cambodia, India, Indonesia, Lao PDR, Myanmar and the Philippines have likely faced greater difficulties in studying remotely, as Internet availability and quality are low in these countries. In Malaysia and Thailand, broadband speed is above the world average, but low subscription rates limit the benefits. By contrast, although inequality of Internet access is lower in Viet Nam, the quality of the service is below-average (Figure 2.13).

Figure 2.13. **Fixed broadband subscriptions and speed in selected Emerging Asian economies**
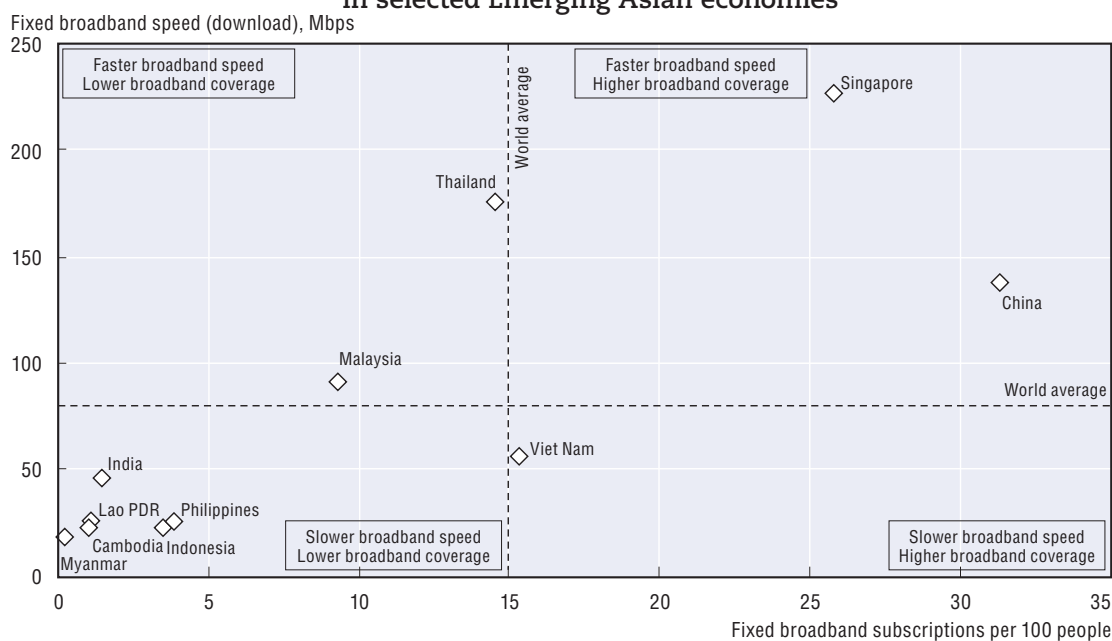
Fixed broadband speed (download), Mbps

Note: Data on fixed broadband subscriptions are as of 2019, except for Myanmar (2018) and World average (2018). Data on fixed broadband speed (download) are as of September 2020.
Source: OECD Development Centre based on data from World Bank and Speedtest Global Index.
StatLink https://doi.org/10.1787/888934228248

Access to information and communication technology (ICT) is the linchpin of the entire distance learning effort. In the short term, several countries have developed alternatives to online learning, as described above, but these have disadvantages. Radio, television and physical home learning (where physical learning materials are safely delivered to homes by officials or post) deny students opportunities to interact with teachers and receive rapid support in the event of questions or learning struggles. This may become more apparent with age, as the complexity of study may eclipse the ability of older family members to provide assistance. Radio or television learning (RTL) also commits children and their carers (often parents) to a schedule. A child who misses the scheduled broadcast misses the daily lessons, perhaps with limited if any opportunity to review. Likewise, RTL removes any opportunity for self-pacing. Students cannot advance if they have already mastered the concepts being taught and, more troublingly, students are denied the opportunity to repeat difficult lessons until mastery. With the cumulative nature of studies in compulsory school, students who struggle in an area can quickly be left behind, with little hope of closing learning gaps.

Uneven ICT infrastructure development among various provinces or regions within a country could exacerbate regional disparities. For instance, Indonesian ICT development varies significantly by province (Figure 2.14). The capital, Jakarta, and a handful of other provinces score above the national average, but the bulk of provinces display much lower scores. People who live in areas with weak ICT infrastructure will likely face greater challenges to study and work remotely compared to their compatriots from the capital and other regions with more developed ICT infrastructure.

Figure 2.14. **Disparity among Indonesian provinces
in the ICT Development Index, 2016**
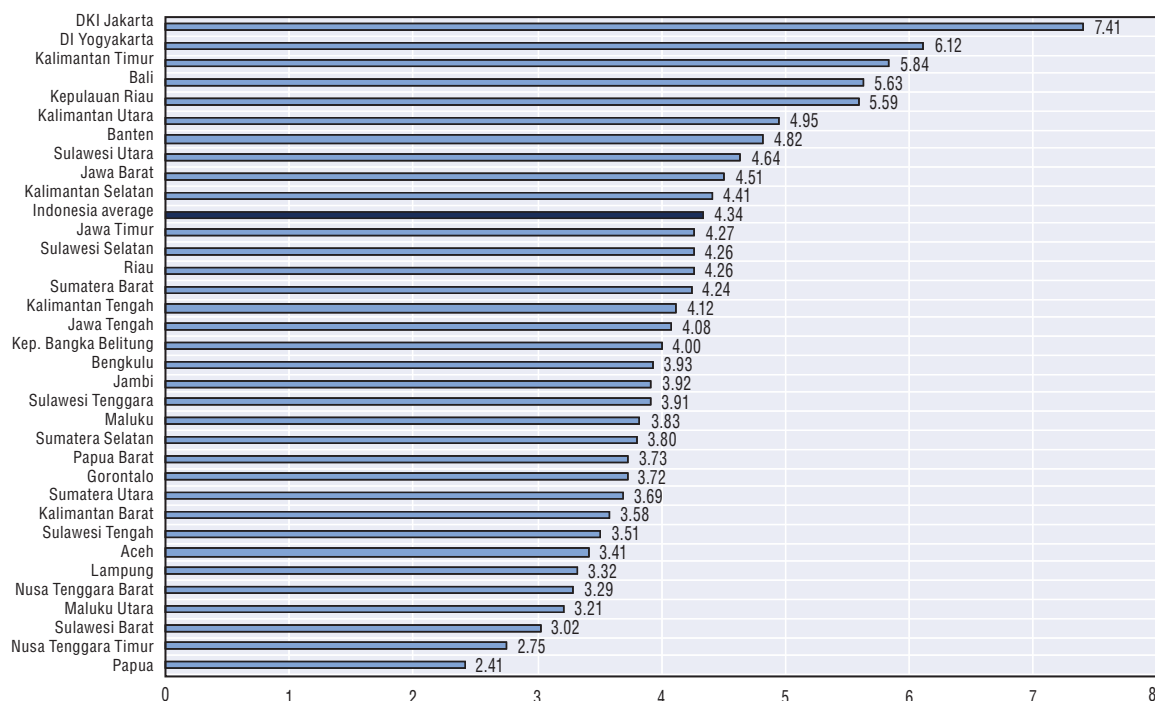
Note: The ICT Development Index is defined on a scale ranging from 0 (minimum) to 10 (maximum).
Source: Statistics Indonesia (2017).
StatLink 🔗📈 https://doi.org/10.1787/888934229445

Online learning could provide the best method of distance teaching when accounting for flexible needs of students. However, lack of availability and the cost of devices and service often deny students the necessary access. The coverage gaps are often seen in the poorest rural areas. This poses a significant problem for distance learning, as it is often students in those environments who stand to benefit the most from educational advancement. Beyond the scope of education, government investment in Internet access is worthwhile from the perspective of human capital enhancement. Some countries have already made arrangements with telecommunications providers to allow free access to online learning resources (i.e. accessing those resources does not use up purchased data). Alternatively, mobile data access could be subsidised at the student level. In any case, care should be taken in educational platform design to maximise functionality while minimising the demand for mobile data.

Some countries in the region need to bridge digital divides

Multiple digital divides exist in Emerging Asia and pose significant barriers to effective distance learning. Examples include divides among socio-economic or age groups, between genders and among and within countries. From a gender perspective, the proportion of females using the Internet is less than the proportion of males doing so. Among Emerging Asian countries for which data are available, only in Brunei Darussalam (2016) and Cambodia (2018) is the gender balance even, based on International Telecommunication Union (ITU) data (International Telecommunication Union, 2020).

The COVID-19 crisis has also highlighted the importance of digital financial literacy, yet the ability to make use of financial technology also differs among socio-economic groups. In Viet Nam, for instance, awareness of Fintech services contrasts sharply among households. Overall, households with lower incomes are far less aware of available Fintech services than the wealthier ones (Figure 2.15). The difference is particularly pronounced with respect to digital money, with only 22.4% of the lower-income households aware of this service, versus 62% in the high-income category.

Figure 2.15. **Awareness of Fintech services by household income group in Viet Nam, 2019**
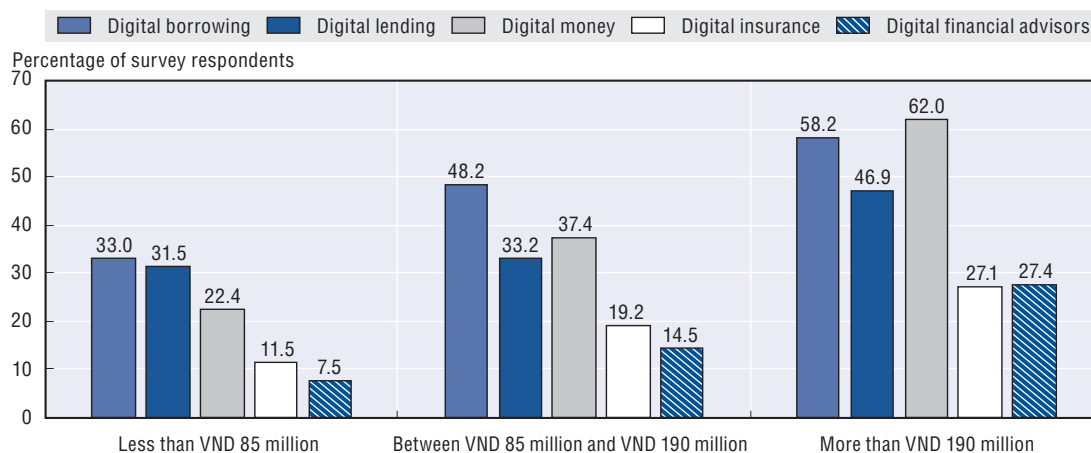
Note: VND stands for Vietnamese dong.
Source: Morgan and Trinh (2020).
StatLink ᐅ https://doi.org/10.1787/888934229464

The costs of digital devices and service vary widely among Emerging Asian countries, and this leads to disparities concerning Internet access in the home (Figure 2.16). Singapore leads in this area, with 98.4% of its homes connected to the Internet, rivalling or exceeding many OECD countries. The Philippines trails far behind, at 17.7%, and this situation has been a major barrier to launching online distance learning in the country. Traditional Internet penetration measures simply calculate the proportion of the population using the Internet, without regard for the means of access. These metrics do not reflect that low- or no-cost access methods, such as public or business Wi-Fi, Internet cafés and computing facilities at educational institutions, may be unavailable as a result of public health measures.

Figure 2.16. **Households with home Internet access in selected Emerging Asian economies**
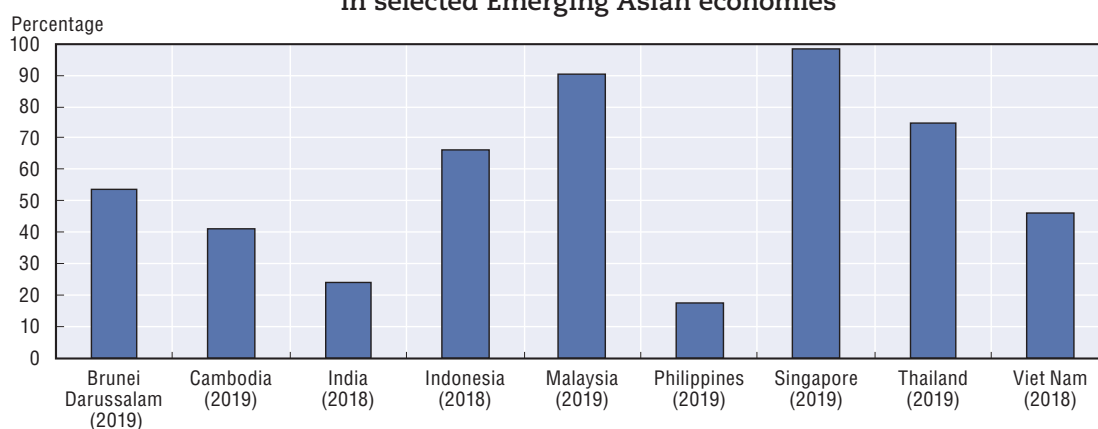
Source: International Telecommunication Union (2020).
StatLink ᐅ https://doi.org/10.1787/888934229483

Two immediate solutions for bridging the digital divide in the short term, as necessitated by public health measures, are to provide data access and devices. Governments and telecommunication companies should collaborate to increase the coverage and capabilities of Internet networks in order to support more connections by more people, especially in disadvantaged areas. Alternative transitory solutions can be offered using mobile Internet relay, for instance via broadcasting trucks (Beaunoyer et al., 2020). Singapore is providing devices to students who do not have any, while Cambodia, Myanmar, Malaysia, Singapore and Viet Nam are providing free data to students either generally or for specific purposes (i.e. accessing educational material does not consume a purchased data allotment). Public authorities should consider keeping places that provide public access to the Internet open, with the necessary safety measures in place (Beaunoyer et al., 2020). In addition, several different video streaming platforms that offer different streaming formats and resolutions could be explored for the conduct of online classes so that students could opt for a lower resolution for viewing in order to save their data allocations (Azlan et al., 2020).

Lifelong improvement in digital skills is vital for education and economic mobility

One of the most persistent barriers to digital education is instructors' poor digital skills (OECD, 2020a). The education component of the Fourth Industrial Revolution, called "Education 4.0" and taught by "Teacher 4.0", requires teaching, research and service, and includes the use of learning technologies such as blended learning (a mixture of physical classroom and online learning) and Massive Open Online Courses (MOOCs) – large courses delivered by the Internet, often with minimal standards for enrolment (Xing and Marwala, 2017). In a MOOC environment, instructors and assistants deliver recorded content, but they must be prepared to answer questions from a student body displaying a broad range of competency levels and respond to technical issues.

In some countries, digital learning technologies sit unused simply because instructors do not know how to operate them (OECD, 2020a). This has been laid bare by the need to pivot swiftly to digital education in response to COVID-19. Evidence from the Philippines suggests that many instructors are uncomfortable with online learning tasks. A survey by Alda et al. (2020) also revealed that instructors frequently overestimate their digital skills.[2] This illustrates the need for digital skills development as a component of lifelong learning.

Each career or discipline will likely also have specialised digital skills that must be learned by a person desiring to enter the field, such as software applications common in an office setting (spreadsheets, presentation builders) or specialised software (e.g. CAD for engineering, point-of-sale software for businesses) or skills (programming or troubleshooting and technical support). The ability to master new digital skills rapidly will be critical for stabilising employment and income mobility. *Computers and Future Skill Demand* (Elliott, 2017) suggests that low and middle-skilled workers will be most affected by the shift to computers as jobs become automated, while survey data collected from 2011 to 2015 by the OECD's Programme for the International Assessment of Adult Competencies (PIAAC) showed the employment rate to be 72.7% for respondents with basic computer skills compared to 52.5% for those without. In a separate study, 78.2% of respondents with advanced computer skills reported employment, suggesting that there is significant benefit to a basic level of aptitude, though continuing to develop skills may also be beneficial.

Several strategies can be implemented on a short-term basis to increase people's capacity to interact efficiently with new technologies. The first could be to reinforce household and family support (typically intergenerational) and community peer support to promote the uptake of digital skills. In the short term, this could be achieved with the help of volunteers interacting with digitally disadvantaged people by phone. In a longer-term perspective, the establishment of digital alphabetisation units at community level

could be envisaged. For people who already possess some digital skills, even if limited, the acquisition of new skills or the upgrading of existing ones could be promoted through online videos, tutorials or courses. Governments could collaborate with corporations and higher education institutions to develop such material and potentially render its access free of charge (Beaunoyer et al., 2020).

In the longer term, policy makers should aim to increase the presence of digital skills acquisition in school curricula. For both students and teachers, curricula should be updated to include a focus on developing digital skills, both generally and within the context of school subjects and employment preparation. Education officials must be aware of current and expected technological trends, with a goal of sending students into post-secondary education or the workplace digitally prepared. It has been estimated that Indonesia will suffer a shortage of around nine million skilled and semi-skilled ICT workers until 2030 (Song et al, 2016). Similar projections can be found for many ASEAN countries. One study pointed to an underlying factor explaining this: a tendency among the younger generation to avoid industries requiring ICT due to their reputation for long working hours (Wahab and Ramachandran, 2011). Among those who do choose an education within ICT, higher salaries abroad often cause graduates to migrate, making it difficult for many ASEAN countries to retain the workforce and their competencies in the country.

Learning and knowledge acquisition are no longer finite processes

In an economy that is increasingly globalised and knowledge-based, skills development can no longer be thought of as a finite process upon reaching the end of compulsory schooling or some other arbitrary point in adulthood. As more of the economy moves to digital platforms with no indication that the trend will ever be reversed, people without some basic aptitude will be left behind in their careers. While a "basic level" is not strictly defined by any governing body, this could include, for instance: safely starting and shutting down a computer, smartphone or tablet; successfully and efficiently browsing the web to retrieve desired information; establishing and using an e-mail account; safely installing software; detecting cybersecurity threats (e.g. spam, malicious links); downloading or transferring files; and being able to use a word processor to create and save a typical document (e.g. a memo or letter).

Countries in the region should ensure that lifelong learning for employment is tangibly beneficial and should encourage employers to do the same. Lifelong learning efforts should be widely recognised and lead to benefits such as increases in wage, job security or employability. Educational authorities should be in regular communication with industry experts about labour market conditions to direct people to the areas of need and to continuously update curricula to fit current industry standards. Micro-credentialing should be used to allow workers to communicate their skills accurately. Micro-credentials "focus on modules of learning much smaller than those covered in conventional academic awards, which often allow learners to complete the requisite work over a shorter period" (Chakroun and Keevy, 2018). Combining these credentials with macro-credentials (the type issued in full college, university or TVET programmes) into a portable digital format that is secure and verifiable will allow both employers and workers to have confidence that the credentials the worker presents are legitimate and valuable. According to Chakroun and Keevy (2018), blockchain technology may be of use in this regard, as "the implications for digital credentials include the ability to provide 'a single secure record of educational attainment, accessible and distributed across many institutions'". The development of world reference levels in training will allow for globalisation of the labour market and reduce frictions from labour mismatch. However, it

is imperative that quality of the qualifications be transparent and maintained; otherwise trust in the system of credentials may be undermined.

TVET will play a vital role in the recovery but it must adapt

Technical and vocational education and training (TVET) equips learners with knowledge and skills for employment. These skills are often less theoretical and more practical in nature than those acquired through education in a college or university, and the training can end with an apprenticeship. The COVID-19 pandemic has wrought havoc on the TVET sector due to closure of workplaces as part of public health measures, depriving students of the practical learning they need. The TVET sector has had to scramble to adapt digitally, perhaps even more so than colleges and universities.

Millions of workers in Emerging Asia, especially in the travel and tourism sectors, will need to reskill in order to earn a living during and after the COVID-19 pandemic. The pandemic and ensuing public health measures shut down international travel almost entirely, and put significant restrictions on domestic travel that lasted in some countries past the period of home confinement. As demand for tourism has collapsed, employees have been laid off and many businesses have failed. According to estimates by the International Labour Organization (ILO), more than half a million workers in the tourism sector in Thailand lost their jobs due to the pandemic, with the hardest hit areas found in the southern and central parts of the country (ILO, 2020c). Many will not be able to return to their former jobs. In addition, ILO estimates show that only 7% of workers in Southeast Asia and the Pacific are engaged in occupations that would allow them to carry out their work from home (Figure 2.17). It is thus vitally important for affected workers to be able to acquire new skills that will enable them to seek employment in other sectors. Some learning platforms are offering solutions to idle workers, including those who are not able to continue their regular activities and are unable to work remotely, as well as furloughed workers, workers in informal sectors and self-employed workers. For example, Mexico's Capacitate Para El Empleo online portal is currently offering free access to its hundreds of courses, as well as several diploma degrees for technical occupations, and has developed partnerships to expand this access to several countries in Central America (World Bank, 2020b).

Figure 2.17. **Estimates of home-based work probabilities by sub-region, 2020**
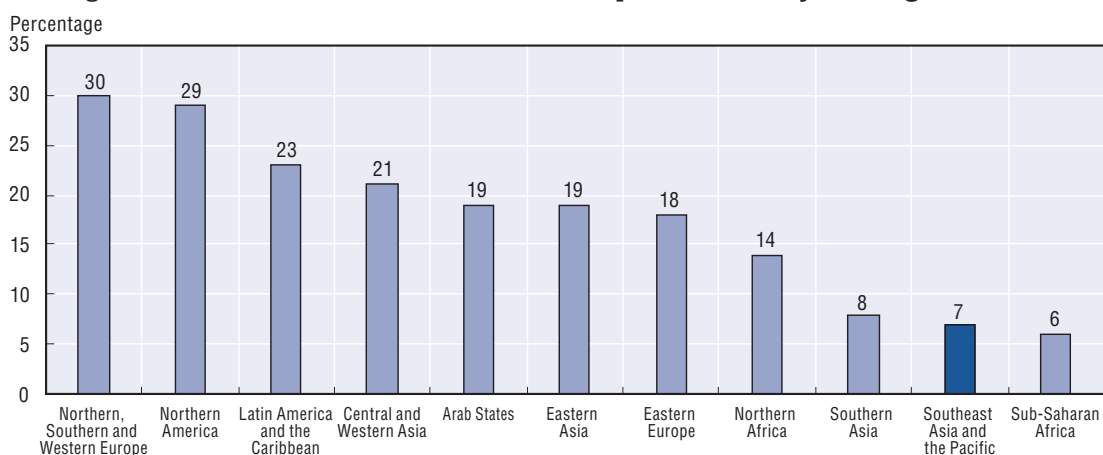
Note: The "Southeast Asia and the Pacific" aggregate is comprised of the following jurisdictions: Australia, Brunei Darussalam, Cambodia, Cook Islands, Fiji, French Polynesia, Guam, Indonesia, Kiribati, Lao PDR, Malaysia, Marshall Islands, Micronesia, Myanmar, Nauru, New Caledonia, New Zealand, Niue, Norfolk Island, Palau, Papua New Guinea, the Philippines, Samoa, Solomon Islands, Singapore, Thailand, Timor-Leste, Tokelau, Tonga, Tuvalu, Vanuatu and Viet Nam.
Source: ILO (2020a).
StatLink 🔗 https://doi.org/10.1787/888934229502

Some individuals might find returning to full-time study infeasible (World Bank, 2020b). TVET offers a unique solution because many TVET disciplines have an apprenticeship component. As an apprentice, one can learn and perform paid work simultaneously. The role of the state in facilitating reskilling will be to support individuals in training prior to the apprenticeship phase. This may take a number of forms, separately or in combination: tuition waivers or financing; preferential placement programmes that give priority to people who are unemployed and have a high likelihood of not being able to return to their former job or field; work-study opportunities for adults that give TVET students an opportunity to work at something else to earn an income until they reach the apprenticeship portion of their studies; and assistance with domestic duties (World Bank, 2020b).

TVET institutions can co-ordinate with authorities to participate in the health response to COVID-19 while simultaneously encouraging reskilling of newly unemployed workers in sectors expected to have slow or incomplete recoveries. This is already occurring in the region: TVET institutions in Thailand have been asked to contribute to the production of hand sanitiser; some Malaysian TVET institutions are assisting with the production of ventilators; Indonesian TVET institutions are beginning or expanding training for medical equipment technicians; institutions in the Philippines are producing hand sanitiser and masks. Culinary arts students in the Philippines are also contributing to the provision of food for frontline workers (Majumdar and Araiztegui, 2020). For as long as COVID-19 poses a public health threat, medical supplies will remain in high demand. Educational authorities may consider adopting a production school model, where trainees work under supervision as they learn, with only the most necessary theory to perform their required tasks. If these programmes were offered to individuals in need of reskilling, they could provide a short-term solution to unemployment caused by COVID-19 and restrictive measures, while giving them skills to build on for a more permanent career.

It is important to note that qualifications should be achieved as quickly as possible without sacrificing competency. Furthermore, policy makers should fortify credit-transfer systems across disciplines and levels of education. TVET graduates who wish to expand their skillset should have their prior credentials acknowledged as much as possible. This would allow people seeking upskilling to study only the new skills in depth, reducing the time to qualification and the associated cost. Transfers across levels of education should be streamlined and, in disciplines where this would be appropriate, work experience should be accepted as an alternative to college or university credit. For instance, a trained electrician who desired to move into electrical engineering should benefit from his or her prior experience. Likewise, any theoretical knowledge from secondary or post-secondary studies that is relevant to the TVET qualification of interest should count in favour of the student. Quality assurance is essential, and it would not be unreasonable to ask students seeking credit transfer to provide proof of learning or take a competency examination.

Two programmes of interest are the Kartu Prakerja programme in Indonesia and the Skills Passport programme in Sri Lanka. Kartu Prakerja is a government initiative where participants are enrolled in a TVET training course of their choosing, at no cost to them, and receive monthly stipends to help defray living costs. Participants also receive a further cash bonus if they successfully complete the course. The programme is open to anyone age 18 or over who is currently unemployed, with the exception of government officials and their family members (Government of Indonesia, 2020). The Skills Passport is a secure card containing the holder's identity and skills information. This allows the card holder to be matched to jobs in a centralised database. The project is a joint venture of the Tertiary and Vocational Educational Commission of Sri Lanka, the Employers' Federation of Ceylon and the ILO (Government of Sri Lanka). It is primarily targeted at Sri Lankan migrant workers who need recognition of their skills and experience gained abroad, but Sri Lankan authorities are also seeking bilateral skill-recognition agreements

with multiple countries. Failure to recognise skills earned in foreign countries creates unnecessary labour market frictions, at a cost to both the potential employer and potential employee.

Several approaches could be envisaged for ensuring the digitalisation of TVET (Table 2.5). Additionally, with the rapid shift of TVET to digital modes, maintenance of quality instruction is essential. In the European Union, for instance, the European Network on Quality Assurance (ENQA) and the European Quality Assessment Register (EQAR) have guided national quality assurance agencies on their responses. Where physical visits were not permitted due to public health measures, agencies were encouraged to visit by video or postpone the visits to a later date. Regional programmes such as the ENQA and EQAR provided national or subnational education authorities with advice on content development and practical matters for the transition to online study for both learners and instructors. This assistance also included assessment planning and procedures to maintain academic standards. All of these are vital aspects of the transition to fully digital or blended learning so that neither graduates from these learning modes nor industries are disadvantaged. The ENQA is already working with several other organisations alongside ASEAN to train quality assessors for the region (ASEAN-QA Quality Assurance Training Course). Forming bodies similar to the ENQA and EQAR at the regional level within ASEAN could help with information sharing on methods to improve TVET education and could also provide more support to reciprocal recognition of TVET training from accredited institutions in ASEAN countries.

Table 2.5. **Examples of approaches towards digitalising TVET in selected Emerging Asian economies**

Approach	Description of approach	Examples of countries where the approach has been deployed
Massive Open Online Courses (MOOCs)	Large courses delivered by the Internet, often with minimal standards for enrolment (Xing and Marwala, 2017). In a MOOC environment, instructors and assistants may not need to deliver lectures live, but be prepared to answer questions from a student body displaying a broad range of competency levels, as well as being able to respond to technical issues.	**Malaysia:** Zulkifli et al. (2020) find that TVET students in Malaysia are open to learning in MOOCs and are prepared to do so. **Philippines:** The Technical Education and Skills Development Authority of the Philippines has developed some TVET-themed MOOCs. A MOOC can be used for "remote and flexible TVET programmes for agriculture" and to "promote TVET in the Philippines through the development of quality-assured and competency-based training courses and modules" (Ehlers, 2020). **China:** Under an initiative by the Ministry of Education, more than 18 000 MOOCs have been built, with cumulative enrolment of 310 million.
Open Educational Resources (OER)	An OER is defined as "learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright, that have been released under an open licence, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others" (Ehlers, 2018). OER have the potential to contribute substantially in the task of skilling people. Increased availability and use of OER will lead to better access, thereby contributing to more equity, and to higher quality and improved efficiency of TVET (Ehlers, Schuwer and Janssen, 2018).	In a recent study conducted by OERasia, the usage of OER was found to be widespread in Asian countries, with **China** using them the most. Many ASEAN countries have followed suit and are reaping the advantages, with **Viet Nam** and the **Philippines** utilising OER for both individual and institutional purposes (Abeywardena and Dhanarajan, 2012).
Digital simulators	TVET institutions are developing digital simulators for trainees to develop their practical skills despite the COVID-19 public health restrictions. Simulations range from the ability to explore a tool or device to being able to perform simulated procedures that an apprentice would typically perform in the workplace. Even if development via simulators is not perfect, they can shorten the time to qualification once TVET facilities are again allowed to operate. Qualifications can be issued in a provisional manner that requires real practice when conditions permit.	Simulators are data intensive and as such may have limited utility in some countries in Southeast Asia.

Source: OECD Development Centre based on various sources.

The road forward in digital education

The rapid adaptation of education to the COVID-19 situation should be considered a great achievement. The sudden need to adapt to a digital environment posed challenges for schools, teachers and parents, and much progress has been made. However, a considerable amount of work remains to be done.

- ICT infrastructure expansion and access to the Internet and digital devices are crucial.

- Educational authorities were largely unprepared for this type of scenario, so curricula and protocols for digital instruction were new to most countries. Educational authorities faced twin pressures of minimising the learning losses from an extended time out of school, while also delivering a quality educational experience. Curricula and protocols need to adapt and should undergo continuous review with a goal of necessary modifications being made if needed.

- Students kept out of school likely suffered learning losses, with those unable to participate fully in remote learning seeing the harshest effects. Education officials must plan to help these students catch up and fill gaps in their education. As delays in educational progress carry their own costs, individualised approaches are likely to be necessary.

- Distance learning may require new assessment approaches and techniques. Emphasis should be placed on formative rather than summative assessments, though passage through educational milestones must be maintained as much as possible (UNICEF EAPRO, 2020b; UNESCO, 2020c). However, it is important to ensure that students are prepared to advance from any grade. Learning gaps compound over time and can have permanent negative effects on educational attainment, employment and well-being. According to a United Nations (2020), simulations in developing countries participating in PISA suggest that a learning loss of one-third in Grade 3 might result in 72% of students dropping out or being unable to learn new material by Grade 10.

- Schools that reopen must adhere to safety protocols, including a plan on how to cope with students or staff contracting COVID-19. The return to in-person classes should be largely voluntary, allowing families to take account of their own situations. Students will need to be able to participate in online learning without falling behind their in-class peers.

- Colleges and universities must maintain quality in a remote setting. Some institutions were already holding online instruction prior to COVID-19, while others had to transition quickly. Colleges and universities may need to work with government officials to provide tuition relief for students whose economic situations have changed. As with primary and secondary school, there must be thoughtful consideration of graduation, especially if the situation has left courses incomplete.

- People returning to education for the purposes of reskilling may be adults with responsibilities that are incompatible with full-time study. Courses should be designed so that people being reskilled can also work to provide for themselves or families. Government support in caretaking duties may prove helpful to those with children or elderly parents at home.

- Many instructors and teachers in the region have deficient ICT skills, which presents another barrier to online learning. There is also the new challenge of managing an online classroom in a way that keeps all learners engaged with teachers and with each other. Training efforts must address these issues in the short term as part of a learning continuity response to COVID-19, but they also need to be addressed

in the long term through instructor education. ICT skills and distance lesson delivery must be incorporated into the required training of candidate teachers, professors and instructors, regardless of the level or discipline in which they desire to work. Regular ICT upskilling must also occur. Training should be continually reviewed to capture the newest digital education technologies and should be taken as professional development on an annual basis. Instructors must also learn to manage a digital classroom, fielding content questions and facilitating discussion when students are not physically present in the same location. Use of discussion boards found on many learning management systems may be helpful, along with incentives for participation.

- Teachers will need to collaborate with parents to ensure that learning objectives are being met and that issues are addressed in a timely fashion. For students learning offline, there may be no interaction with teachers. Radio and television lessons likewise provide no opportunity for interaction, leaving parents to work with the students. For parents who are essential workers, this may pose a significant challenge. Areas where radio and television are the main modes of distance learning should work to facilitate regular communication between teachers and parents or students. This would allow parents and students to approach the teacher with concerns or questions about the material and to progress through it.

- TVET disciplines will likely require continued in-person instruction. Simulators may help somewhat, but they will be of little use in low-tech environments. Continuing apprenticeships should be a priority, and provisional qualifications with deferred in-person evaluation may be an avenue to consider. The recognition, development and use of OER can help TVET authorities adapt quickly to distance learning, minimising disruption. TVET can be a vital tool in reskilling efforts. Subsidised short TVET courses can help get people back into the workforce quickly and with stability. Secure digital micro-credentials can allow workers to specify their skills while maintaining trust. Education and training records based on block chain technology may play a role.

Accelerating Industry 4.0 in the post-COVID-19 era

Today's technological advancement has brought the world to a new phase of industrial revolution. Generally referred to as Industry 4.0, the fourth industrial revolution focuses heavily on automation, interconnectivity and real-time data across the manufacturing supply chain, resulting in a smart factory. Additive Manufacturing (3D printing), advanced robotics, artificial intelligence (AI), augmented and virtual reality (AR/VR) and the Internet of Things (IoT), among others, are examples of technology associated with Industry 4.0.

Despite the widespread use of Industry 4.0 technologies in advanced economies, low penetration can still be observed in emerging economies. In a globalised world, where economies participate in global value chains, non-adoption of Industry 4.0 technologies may have significant economic consequences. This is particularly true for emerging countries where labour-intensive manufacturing makes an important economic contribution. With automation, a developed country may no longer see the advantage of offshoring. For instance, the unit labour cost of producing a cotton shirt in the United States and Europe would fall from USD 7.00 to USD 0.40 if sewing robots were employed, and countries such as India and Cambodia, where the approximate cost of producing the same shirt is USD 0.50 and USD 0.33 respectively, would eventually lose their competitiveness (ADB, 2018).

The importance of adopting Industry 4.0 technologies has been highlighted by the COVID-19 crisis. Restrictions on movement have slowed economic activities. Lockdown measures also disrupted the functioning of global value chains, which was particularly problematic for countries with high dependency on foreign suppliers. Adopting Industry 4.0 technologies can keep employees safe from exposure to disease while maintaining operational activities.

Some countries in Emerging Asia are moving ahead with Industry 4.0

Several countries in Emerging Asia have translated their awareness of the potential of advanced digital technologies for economic progress into a national policy agenda (Table 2.6). China, India and Singapore are among the region's early adopters of the Industry 4.0 concept. ASEAN-5 countries have also started transforming their industrial sectors by embracing Industry 4.0 technologies, but the CLM countries (Cambodia, Lao PDR, Myanmar) lack a national strategic plan to adopt advanced technologies for the industrial sector.

Table 2.6. **Examples of Industry 4.0 initiatives in Emerging Asia**

Country	Industry 4.0 initiatives	Launch year
ASEAN-5		
Indonesia	Making Indonesia 4.0	2018
Malaysia	Industry4wrd	2018
Philippines	Inclusive Innovation Industrial Strategy (i3s)	2016
Thailand	Thailand 4.0	2016
Viet Nam	National Digital Transformation Programme by 2025 with orientations towards 2030	2020
Brunei Darussalam and Singapore		
Brunei Darussalam	Digital Economy Masterplan 2025	2020
Singapore	Smart Nation	2014
	Smart Industry Readiness Index	2017
	SMEs Go Digital	
China and India		
China	Made in China 2025	2015
	Internet Plus	
India	Make in India	2014
	SAMARTH Udyog Bharat 4.0	

Source: OECD Development Centre compilation based on national sources.

As countries seek to reform their industries, the region has seen wide adoption of industrial robots. Asia remains the strongest market for industrial robots, with the share of newly installed robots accounting for two-thirds of global supply (IFR, 2020). China's annual installation of industrial robots is the highest globally, with around 140 500 new robots installed in 2019 (Figure 2.18). This may be explained by the fact that the country is shifting away from labour-intensive manufacturing. In terms of robot density, however, China stands at 187 units per 10 000 workers, far below Korea and Singapore, where industrial robot density is the highest globally. India and Thailand were among the 15 largest markets for industrial robots in 2019, with 4 300 newly installed in India and 2 900 in Thailand.

Figure 2.18. **Annual installations of industrial robots and robot density, 2019**
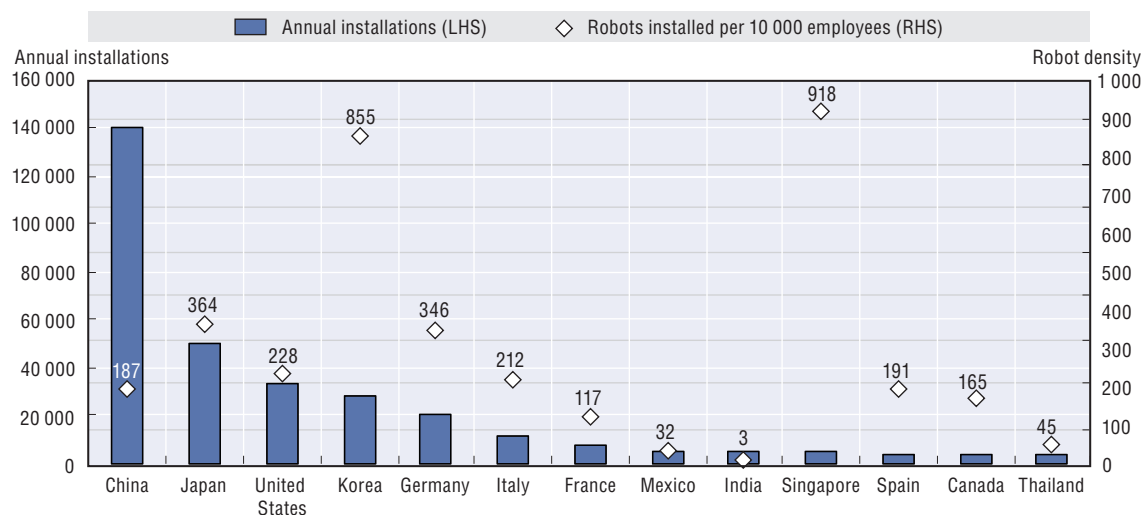
Note: Data for annual installations in Singapore are as of 2018. Data for robots installed per 10 000 employees in Mexico, India and Thailand are as of 2016. LHS means left hand scale. RHS means right hand scale.
Source: OECD Development Centre based on data from IFR (2020) and Consultancy Asia (2018).
StatLink 📊 https://doi.org/10.1787/888934228267

COVID-19 has sparked progress towards Industry 4.0

As the pandemic disrupted global economies, including in Emerging Asia, manufacturing activities were negatively affected. According to the United Nations Industrial Development Organization (UNIDO), a decline of 6% in global manufacturing output growth was recorded in the first quarter of 2020. In the Asia-Pacific region, developing countries registered a manufacturing growth rate of -2.5% year-on-year during the same period (UNIDO, 2020a).

Nonetheless, the pandemic appears to be working as a trigger for accelerating the process of the fourth industrial revolution. Indeed, innovation, agility and flexibility in production systems are proving essential for firms to survive during the coronavirus pandemic, and Industry 4.0 technologies are allowing firms to stay responsive to market needs. In Denmark, Italy and the United States, firms temporarily converted their activities in an effort to generate revenue during the COVID-19 crisis. In Denmark, plastic production companies began producing personal protective equipment (PPE) such as visors, which are in high demand. In the United States, a manufacturer of high-end lighting used manufacturing apps to allow their workers to assemble protective gear for health professionals from home (WEF, 2020). In Italy, the regional 3D printing community, consisting of companies, labs and universities, was actively involved in making available 3D-printed valves and parts within a short time (WEF, 2020). Such initiatives are also taking place in Emerging Asia.

In **China**, manufacturing output dropped by 14.1% in the first quarter of 2020 (UNIDO, 2020a), but activities resumed by the end of the second quarter and recovery is forecast to take place faster than in other countries (OECD, 2020c). The adoption of digital technology may partially explain China's higher business resilience and rapid recovery. The Chinese State Council attributed the rebound in economic activity to a surge of new engines, new business and new models. High-tech industries are playing a key role. During the first seven months of 2020, investment in high-tech manufacturing industries and high-tech services increased by 8.8% and 7.2%, respectively (NBS, 2020). In addition, more than 30% of Chinese companies participating in a survey responded that they were accelerating automation initiatives. This number is significantly higher than in the rest of Asia (16% of respondents) and the rest of the world (18%) (Agrawal et al., 2020).

Despite a slowdown in factory activities in **India**, the pandemic seems to be accelerating innovation and the adoption of Industry 4.0 technologies. The government co-operated with big manufacturers, start-ups and academia to respond to increasing demand for medical equipment and PPE. Manufacturing of ventilators is a case in point. Europe and China have been the primary sources of imported ventilators for India, but given the disruption of trade during the lockdown, several Indian non-medical industries shifted their activities and collaborated with engineering and technological institutes across the country to boost domestic ventilator production. Workers and engineers collaborated remotely due to restrictions on movement. 3D printing is being used in the production process, as this technology allows lower costs for making prototypes and testing new products. As a result, India was able to produce 60 000 ventilators within three months, a significant advance from previously producing almost no ventilators domestically (Aggarwal et al., 2020).

In **Singapore**, firms are moving forward with digital transformation, and manufacturers have made shifts in production activity to help fight COVID-19. For instance, automotive and electronics manufacturers responded to requests for the production of ventilators, while breweries and distilleries converted their activities to produce hand sanitiser (Keat, 2020). The pandemic's impact is accelerating innovation in other Singaporean industries. For example, a medical device producer developed an Alpha ventilator that can be controlled over the Internet. Unlike conventional ventilators, which need to be read and adjusted manually, the remote-controlled Alpha ventilator reduces the need for health care workers to gear up with PPE merely to take readings or make adjustments (EDB, 2020).

In **Thailand**, the Board of Investment has offered measures to accelerate investments in the medical industry. Complementing a pre-existing tax holiday of three to eight years for qualified companies in the medical device, equipment and supply industry, the new measures include a 50% reduction in corporate income tax for a further three years (OBG, 2020). Moreover, an exemption from import duties on machinery will be given to manufacturers who adjust their existing production lines to manufacture medical devices or parts. With such incentives, manufacturers are being pushed to innovate and increase their production capacity to respond quickly to the increasing demand for medical equipment during the pandemic.

In parallel, the need to manage cash flow pressures that have arisen during the pandemic has pushed many firms to improve business efficiency through the use of technology. Many businesses in Emerging Asia, including SMEs, are tapping into the opportunities offered by the digital economy as a way to cope with the COVID-19 crisis. New initiatives have also been introduced or previous initiatives adjusted by governments to spur digitalisation of businesses to allow them to thrive amid the pandemic (Table 2.7).

Table 2.7. **Initiatives to support digitalisation during COVID-19**

Country	Initiative	Details
ASEAN-5		
Indonesia	IoT Smart Machine	Providing IoT Smart Machines to retail markets, pharmacies and supermarket chains to minimise personal interactions when people purchase daily necessities and groceries
Malaysia	National Economic Recovery Plan (PENJANA)	Offering a set of incentives for MSMEs and mid-tier companies to encourage adoption of e-commerce and to digitalise operations and trade channels
Philippines	Small Enterprise Technology Upgrading Programme (SET-UP)	Providing assistance to MSMEs for procuring necessary equipment and training, and offering an innovation-enabling, interest-free loan of up to PHP 5 million (Philippine pesos)
Thailand	Saphan Digital	Offering local businesses, individuals and NGOs a wide range of digital support and access to experts to help them acquire digital skills
Viet Nam	Digital transformation campaign	A campaign to step up digital transformation using cloud computing technology; some domestic cloud-computing enterprises have committed to offer a 20% discount to new users to stimulate demand

Table 2.7. **Initiatives to support digitalisation during COVID-19** *(cont.)*

Country	Initiative	Details
Brunei Darussalam and Singapore		
Brunei Darussalam	eKadaiBrunei	An online e-commerce directory to facilitate a safe and convenient way to do business amid the pandemic; the directory lists online grocery stores, department stores, delivery systems and payment platforms, among others
Singapore	Stay Healthy, Go Digital	Providing support for SMEs to adopt pre-approved digital solutions through grants, free trials and limited-time offers
China and India		
China	Action Plan to Digitalise MSMEs	Collecting and pooling digital service providers, and recommending a range of digital platforms, solutions, products and services for MSMEs; the plan focuses on promoting digital management and operation, exploring new business models such as service-oriented manufacturing, using digital platforms to guarantee supply chains and strengthening data sharing and development
India	Digitalising MSMEs	Providing support to develop platforms, apps and software products such as enterprise resource planning (ERP), accounting and customer service software

Source: OECD Development Centre compilation based on national sources and OECD (2020d).

Industry 4.0 faces country-specific challenges in Emerging Asia

While there are some common challenges in the region with regard to Industry 4.0, some country-specific challenges prevail, as each country is at a different level of readiness and has a different economic structure. These challenges include lack of digital awareness, insufficient budget, a shortage of skilled labour and inadequate infrastructure. Table 2.8 presents a brief summary of the current state of play. The countries will be considered individually thereafter.

Table 2.8. **Country-specific challenges for Industry 4.0 in Emerging Asia**

Country	Industry 4.0 challenges
ASEAN-5	
Indonesia	Raising awareness of new digital technologies
Malaysia	Addressing financing issues to boost digitalisation of SMEs
Philippines	Meeting the need for future skills
Thailand	Overcoming skills shortages
Viet Nam	Creating incentives for digital transformation
Brunei Darussalam and Singapore	
Brunei Darussalam	Fostering digital awareness and SME development
Singapore	Boosting technology adoption among SMEs
CLM countries	
Cambodia	Enabling conducive industrial infrastructure
Lao PDR	Expanding digital connectivity
Myanmar	Improving basic infrastructure
China and India	
China	Setting technological standards
India	Fostering SME participation and addressing cybersecurity

Source: OECD Development Centre based on various national sources.

Affordable and reliable Internet connectivity is fundamental for firms to go digital, and it becomes more crucial during a pandemic to support remote working activities. Yet Internet speed in many countries of the region is still below the global average (Figure 2.13). Fixed broadband, which offers a more reliable network and higher data transfer speeds, also remains costly in some countries, and countries where the cost of fixed broadband is higher have fewer subscribers.

Indonesia: Raising awareness of new digital technologies

Technology adoption by Indonesian firms remains low. According to a study by the Asian Development Bank (ADB), only 6% of surveyed firms can be considered technologically advanced (ADB, 2020a). In contrast, 64% of firms still have low technology adoption, mainly performing their activities manually and on paper, or with basic tools such as spreadsheets and e-mail. They often have no in-house research and development (R&D) or innovation capability. The other 30% can be classified as intermediate technology adopters, as they already employ some advanced technologies, such as SAP, Oracle, ERPs, customer relationship management, computer-aided manufacturing and a collaborative supply chain. This group of intermediate adopters may be motivated to innovate but is often hindered by a lack of resources.

Lack of access to information on digital technologies is another issue. Although the government launched Making Indonesia 4.0 in 2018 to assist companies and help address barriers to technology adoption, 93% of the firms in the survey said they were unaware of this initiative (ADB, 2020a). Further efforts to alert firms to the availability of such programmes may be needed. The government could complement its Indonesia Industry 4.0 Readiness Index initiative by providing facilities to increase collaboration between firms and other innovation stakeholders and to showcase the real value of new technological applications. Barriers to the adoption of new technologies that were highlighted in the survey are shown in Table 2.9.

Table 2.9. **Barriers to technology adoption across manufacturing firms in Indonesia**

	Ecosystem enablers	Inadequate digital infrastructure	Lack of access to expertise	Lack of access to information	Lack of incentives	Lack of skills	Technology cost
Advanced							
Automotive						✓	
Electronics	✓				✓		
Food and beverages				✓		✓	✓
Textiles, clothing and footwear	✓						
Intermediate							
Automotive				✓			✓
Electronics			✓			✓	
Food and beverages	✓					✓	
Textiles, clothing and footwear	✓		✓				
Basic							
Automotive			✓	✓			
Electronics		✓				✓	✓
Food and beverages				✓			✓
Textiles, clothing and footwear	✓			✓			

Source: Adapted from ADB (2020a).

Malaysia: Addressing financing issues to boost digitalisation of SMEs

The positive attitude shown by Malaysian SMEs towards digital technology adoption was evident from the start of the COVID-19 pandemic. A large number of manufacturing companies took advantage of downtime to study their operations and processes, and seek technologies able to support their needs (FMM, 2020). However, despite positive attitudes toward ICT, the use of software or digital automation to improve business processes is not common among Malaysian SMEs (MPC, 2020). Approximately half of SMEs responding to a survey by SME Corp and Huawei Technologies identified financing as a barrier to making

desired improvements. Sixty per cent were unaware of financing options, and some still mistakenly believed advanced ICT tools like cloud computing to be expensive (SME Corp and Huawei, 2018). In a separate survey by the Federation of Malaysian Manufacturers (FMM), affordable automation and digitalisation packages were found to be among the most desired for manufacturing SMEs.

The government has introduced initiatives, mainly financial aid, to help SMEs adopt digital tools. However, these initiatives come with restrictions, including a limit on the number of SMEs that can apply. For instance, the SME Digitalisation Grant is limited to the first 100 000 applicants (MDEC, 2020), while the Readiness Assessment of Industry 4.0, a programme launched under the Malaysia's Industry4wrd policy, has seen a very limited take-up rate. Among respondents to the FMM survey, only 23% had applied for the programme, and just 36% of these applicants were selected. Firms that did not apply mentioned limited budgets and lack of awareness of the programme as among the main reasons (FMM, 2020). The government might therefore need to reduce restrictions on participation and expand outreach to help boost digitalisation of SMEs.

Philippines: Meeting the need for future skills

Use of digital technologies in the Philippines has increased during the COVID-19 crisis, helping individuals, businesses and the government to cope with physical distancing measures. Around 17% of Philippine companies with digital transformation projects reported that the crisis pushed them to start implementing the projects (Grant Thornton, 2020). However, technology adoption in the manufacturing sector is relatively slower than in the services sector. In the services sector, Information Technology and Business Process Outsourcing (IT-BPO) is one of the largest contributors to the country's economy (Kim et al., 2019). With talented workers, a beneficial cost structure and a stable socio-political and economic environment, the Philippines has become the second outsourcing destination globally, behind India (Chang et al., 2016; Tholons, 2016). BPO is dominated by call centre activities that absorb 87.6% of workers in the sector (Figure 2.19). 46.2% of BPO establishments engage in the sector's second largest field, computer-related activities. Other activities in the sector include medical transcription and animated films and cartoon productions.

Figure 2.19. **BPO sector in the Philippines, 2016**
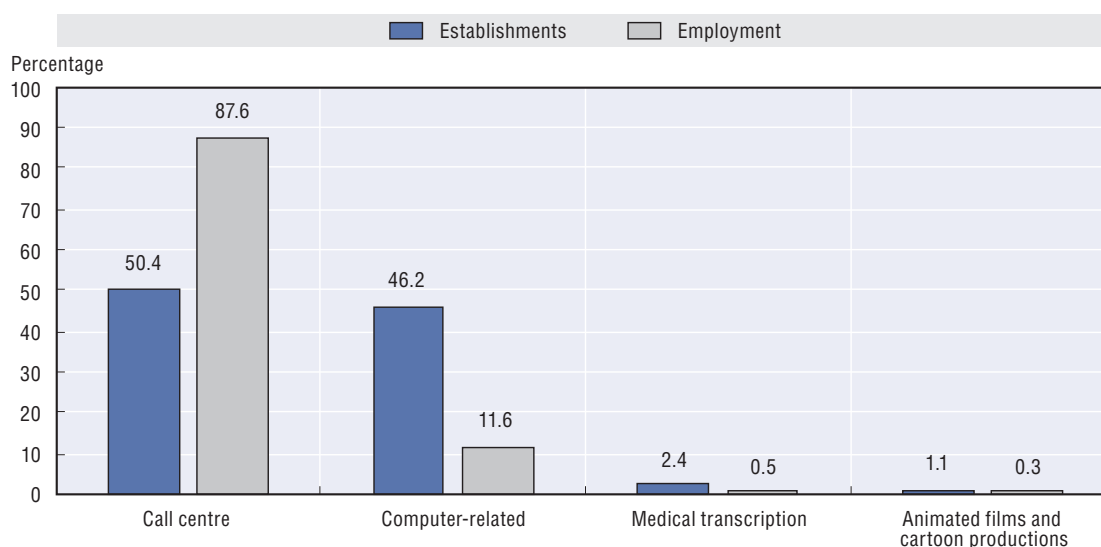
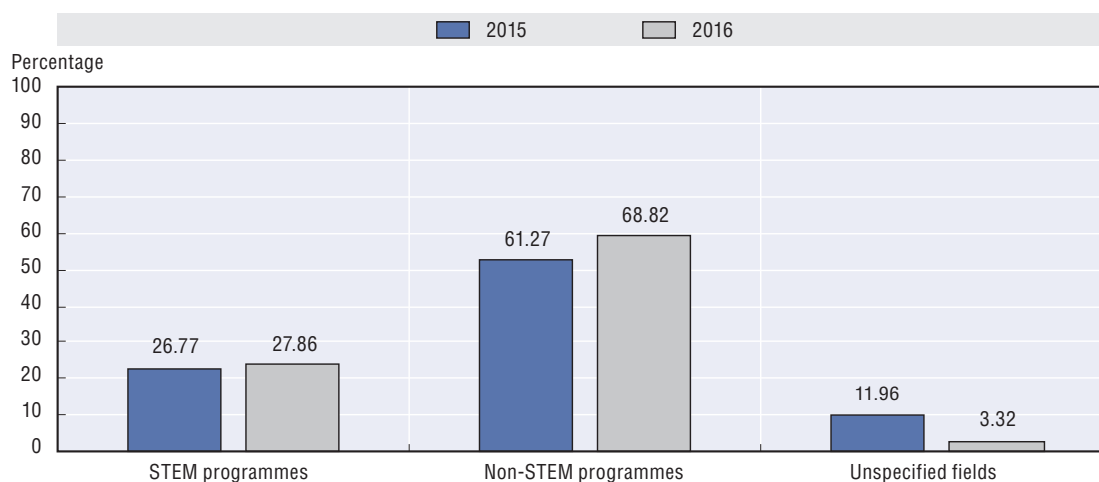*Source:* PSA (2018).

StatLink 🔗 https://doi.org/10.1787/888934229521

BPO firms in the Philippines are shifting toward more specialised BPOs, such as cover-fraud analytics, data integration, project management, R&D, merger and acquisitions valuation and product profitability analysis (World Bank, 2020c). This makes it essential to upskill and reskill the labour force. Mismatches between technical skills taught in classrooms with skills needed in the workplace are cited by many ICT firms (World Bank, 2020c). This has led to firms hiring IT professionals from abroad or invest in training for new hires, including those with ICT-related credentials.

Thailand: Overcoming skills shortages

Under the Thailand 4.0 policy, the country has invested massively in connectivity and digital infrastructure. A study covering 320 firms found that a majority (approximately 59%) would use technology to compensate for the shortage of workers during the COVID-19 crisis (UNIDO, 2020b). The demand for tech-savvy workers is likely to increase, yet the country faces a shortage of industry-ready skilled workers, most importantly with IT and STEM-related skills. For instance, vocational colleges and universities in the vicinity of the Eastern Economic Corridor can fill only 30% of the demand for skilled workers, while more investors in the area are adopting modern technologies (Asia Foundation, 2020). Low enrolment in STEM fields also constitutes a challenge. As of 2016, the share of graduates from STEM programmes in tertiary education remained low, at 27.86%, significantly lower than 68.82% of students graduating in the same year from programmes other than STEM (Figure 2.20).

Figure 2.20. **Distribution of tertiary graduates by field of study, Thailand**

Source: UNESCO (2020d), UIS Statistics (database).
StatLink https://doi.org/10.1787/888934229540

Thailand will need to invest in human capital to provide more Industry 4.0-ready professionals. Adjustments within the education system, for instance by enhancing the role of TVET in producing graduates with specialised skills needed for Industry 4.0, could help. Raising awareness of IT and STEM-related careers in manufacturing might be needed as well, since public perceptions of this sector in Thailand are often negative (Jones and Stowell, 2019). A public awareness campaign could inspire more people to pursue careers in manufacturing 4.0. Examples include "Dream It. Do It." in the United States and Young Engineers Australia.

Viet Nam: Creating incentives for digital transformation

Viet Nam's government began focusing on Industry 4.0 as early as 2017 with a directive on strengthening access to the Fourth Industrial Revolution (Directive No. 16/CT-TTg). Through massive investment and development in public IT infrastructure, Viet Nam was

among the world's first countries to test 5G, which will have its commercial launch in 2021. The country also boasts the region's lowest-cost fixed broadband. Moreover, the ICT industry has been growing rapidly: exports of ICT goods amounted to 33.45% of Viet Nam's total goods exports in 2017, compared to 4.95% in 2007 (Figure 2.21).

Figure 2.21. **ICT goods exports, Viet Nam 2007-17**
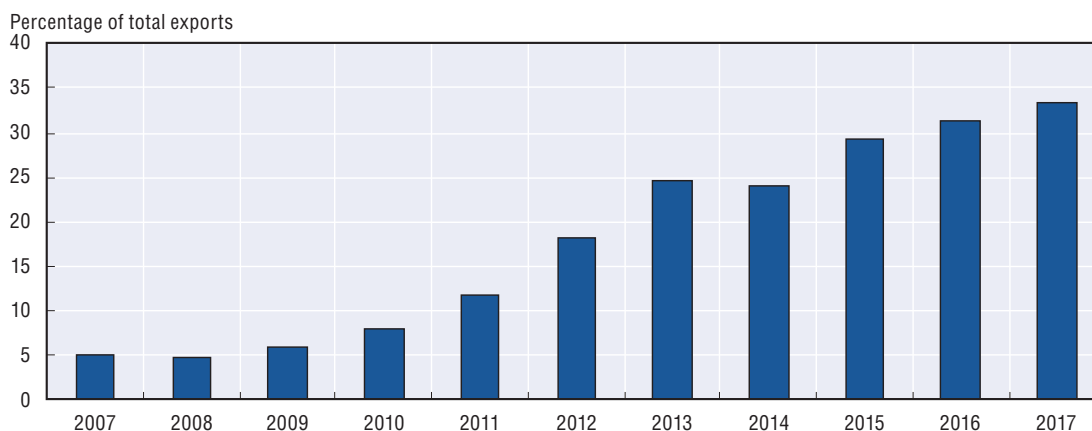
Percentage of total exports

Source: World Bank (2020d), *World Development Indicators* (database), https://data.worldbank.org/.
StatLink https://doi.org/10.1787/888934229559

Favourable IT infrastructure, strong performance in the ICT sector and large smartphone penetration are among key enablers of the surging digital economy in Viet Nam. The COVID-19 pandemic accelerated digital transformation in the retail sector, with many businesses rushing to adapt. E-commerce, online shopping and online delivery services contributed positively to the Vietnamese retail market in the first quarter of 2020 (IDEA, 2020).

Having a clear national vision can help Viet Nam maximise its potential to use Industry 4.0 as a means of becoming competitive with its ASEAN neighbours. Lack of financing and insufficient information, particularly regarding the economic benefits of technology adoption, have been identified as barriers to digital transformation in Viet am (Cameron et al., 2019). The government could develop action plans and policy mechanisms to maximise potential, such as offering financial incentives, readiness assessment or other assistance for firms willing to embark on digital transformation.

Brunei Darussalam: Fostering digital awareness and SME development

The economy of Brunei Darussalam has been heavily reliant on the oil and gas sector, which accounted for more than 90% of its exports in 2019 (DEPS, 2020). For long-term economic sustainability, the government shifted its focus in past years to economic diversification. Industrial sites have been established and basic and digital infrastructure improved, with a sharp increase in fixed broadband penetration for households and businesses, from 20.1% to 51.6% in 2019 (MoFE, 2020). Concerning human capital, Brunei Darussalam was ranked third among ASEAN countries in reading, mathematics and science performance in the 2018 PISA rankings. With highly skilled workers, high quality infrastructure and strong political will to diversify the economy, especially through the digital economy, Brunei Darussalam has great potential to benefit from Industry 4.0.

In 2020, the government launched the Digital Economy Masterplan 2025 with a vision to become a smart nation through digital transformation. Digitalisation of industry is among the plan's key strategies, but barriers remain. First, businesses lack understanding of digitalisation due to unfamiliarity with the implementation of Industry 4.0 technologies (MTIC, 2020). The government plans to assess the capabilities and readiness of business to

adopt Industry 4.0 solutions. Industry awareness activities and pilot projects to showcase advanced technologies may also help to address this issue. Second, SMEs, which account for roughly 98% of the country's enterprises, are still in the early stages of growth (OECD, 2018). Many of these establishments are struggling with competitiveness issues, which limit their capacity to innovate. To overcome these barriers, the government may need a strategy to strengthen the development of local SMEs. As of 2018, specific policies targeting SMEs were still lacking, with regulations often covering all types of business (OECD, 2018). These non-specific regulations can potentially hold back the development of SMEs.

Singapore: Boosting technology adoption among SMEs

Infrastructure and enabling environment are being continuously set in place to support Industry 4.0 in Singapore, and digital adoption within the industry sector has improved in recent years. The level of technology adoption varies, however. While basic digital tools, such as computers and websites, are widely adopted, the use of advanced digital technologies, such as AI, data analytics and IoT, remains low. This low rate of advanced technology adoption among firms is found to be driven by SMEs (Tan and Chian, 2019). As of 2019, SMEs made up 99% of all enterprises in Singapore and contributed to 72% of employment (Singstat, 2020). Supporting SMEs in their digitalisation efforts is therefore critical. A set of government initiatives has been introduced to help SMEs harness digital technologies. These include the Technology Adoption Programme, the Productivity Solutions Grant and the SMEs Go Digital programme.

According to an ASME-Microsoft study, 83% of SMEs in Singapore had digital transformation strategies in place as of October 2020 (Microsoft, 2020). However, more than half of the SMEs surveyed reported delays in their digitalisation plans due to COVID-19. SMEs that had already started implementing their digital transformation initiatives also reported only moderate levels of success: only two in five perceived they were successful in transforming digitally. The study highlights that high implementation costs remain the biggest challenge faced by SMEs in their digitalisation journey, but it also found that most were unaware of government initiatives targeted to SMEs. In fact, government schemes tend to benefit larger firms, the study found. Plans to adopt advanced technologies including AI, business process apps and big data analytics in the coming year are particularly prevalent among larger companies. Outreach activities to increase awareness of existing government initiatives could enhance advanced technology adoption by Singapore's SMEs and improve their digital transformation success rate.

Cambodia: Enabling conducive industrial infrastructure

Cambodia's government emphasises the digital economy and Industry 4.0 as key drivers of economic diversification under its Rectangular Strategy Phase IV, which intends to achieve the vision of becoming a high-income country by 2050 (RGC, 2018). With wide use of smartphones by its population, increasing foreign direct investment (FDI), the development of Special Economic Zones and other supporting factors, Cambodia has the potential to leapfrog into Industry 4.0. However, the country faces key barriers.

First, Cambodia needs to improve its basic infrastructure, notably electricity. The high cost and insufficient supply of electricity are challenges for many companies, with around half of manufacturing firms experiencing electrical outages (UNDP, 2020b). The high cost of electricity can also create a competitive disadvantage, especially for the emerging manufacturing sector with a high dependency on electricity. Second, reliable digital infrastructure is also important. Cambodia has the highest 4G coverage and Internet penetration among CLM countries (Economist Intelligence Unit, 2020), yet there has been little progress in broadband connectivity. Fixed broadband costs are relatively

high and subscriptions remain low, with only one of every 100 inhabitants subscribed. Therefore, to adopt Industry 4.0, the country needs to work on industrial infrastructure, most importantly by closing the gaps in electricity supply and broadband coverage.

Lao PDR: Expanding digital connectivity

The electricity sector makes a high contribution to industry in Lao PDR, accounting for 10.6% of the country's GDP in 2017 (LSB, 2018). Three-quarters of total production in 2018 was exported (AMRO, 2020). In comparison, the manufacturing sector accounted for only 7.49% of GDP in 2017 (LSB, 2018). Lao PDR can benefit from Industry 4.0 adoption within its industrial sector. By using the IoT in the electricity sector, it will be easier to monitor dam and hydropower systems. In the manufacturing sector, automation can boost productivity and further increase competitiveness. However, Lao PDR lags behind its peers in terms of Industry 4.0 adoption. Digitalising the economy is still absent from the country's development agenda, and the overall business environment needs to be improved so that entrepreneurs can do business more efficiently and compete internationally. More importantly, inadequate digital infrastructure needs to be addressed as it remains a major barrier for the country to embrace Industry 4.0.

Lao PDR has seen rapid expansion of mobile broadband Internet services. However, the coverage is limited, with many rural and remote areas still unserved. Among the CLM countries, Lao PDR has the lowest coverage of 3G and 4G networks. Latest data from the Economist Intelligence Unit revealed that 3G and 4G networks cover only 78% and 43% of the population (Figure 2.22). In comparison, the 4G network serves 80% and 75% of the population of Cambodia and Myanmar, respectively. With such limited access, Lao PDR may find it difficult to respond to the boom in online economic activities. In addition, fixed broadband services remain limited. Many consumers and private companies are reluctant to use fixed broadband Internet due to its unreliability and high cost (UNCTAD, 2018). Therefore, there is an urgent need to improve the availability, affordability and quality of both mobile and fixed broadband services. Regulatory reforms may be needed to stimulate digital infrastructure investments and to boost competitiveness among service providers. To expand network coverage, especially in rural and remote areas, the government can boost private investment, for example through private-public partnerships.

Figure 2.22. **Network coverage in CLM countries, 2020**
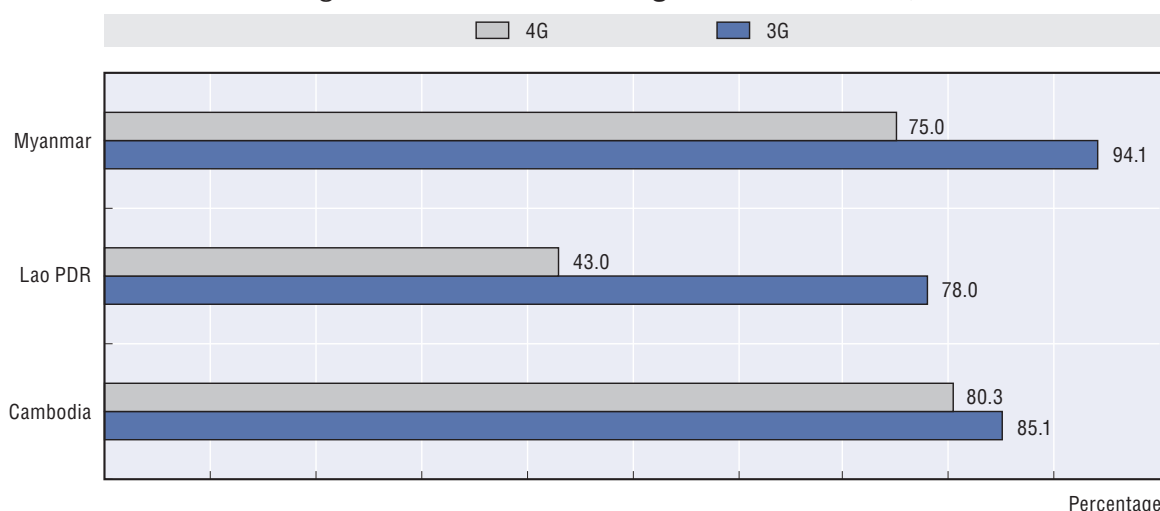
Source: Economist Intelligence Unit (2020), *The Inclusive Internet Index 2020* (database), https://theinclusiveInternet.eiu.com/.
StatLink https://doi.org/10.1787/888934229578

Myanmar: Improving basic infrastructure

Myanmar's manufacturing sector has experienced significant expansion in recent years. According to the country's Central Statistical Organisation, the sector's contribution to GDP rose to 23.8% in early 2018 from 12.8% in 2006. There has also been rapid growth within the garment sector, with exports rising to more than USD 2.5 billion in early 2018 from less than USD 1 billion in 2015 (CSO, 2019). However, further expansion of manufacturing can be hindered by issues related to basic infrastructure, such as unstable electricity supply. Due to frequent power outages, manufacturers are relying on large-scale generators to maintain production activities (AHK, MSR and Roland Berger, 2019). The electrification rate in Myanmar is the lowest in the region, and only 66% of the population has access to electricity (Figure 2.23).

Figure 2.23. **Population with access to electricity in Emerging Asian economies, 2018**
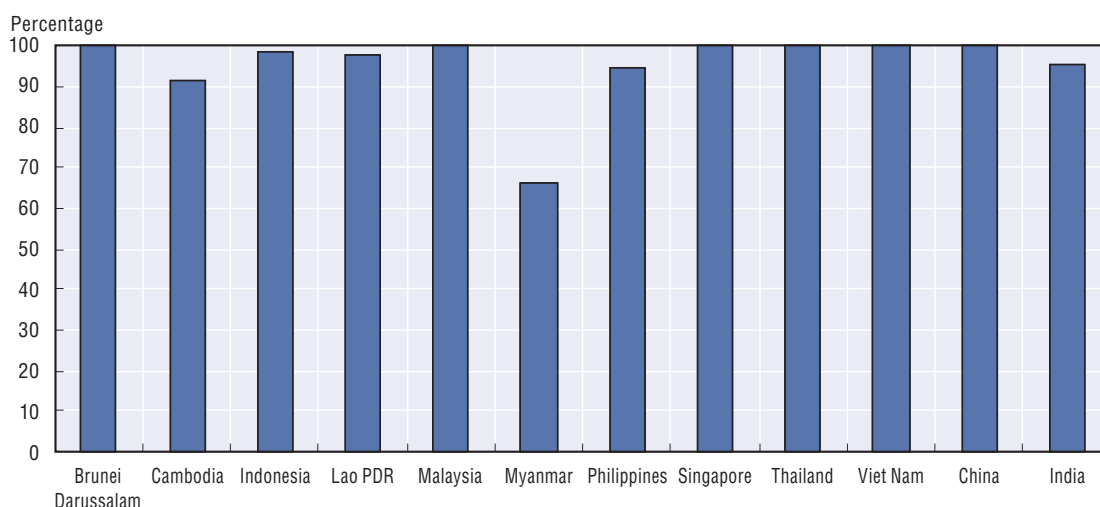
Source: World Bank (2020d), *World Development Indicators* (database), https://data.worldbank.org/.
StatLink 🔗 https://doi.org/10.1787/888934229597

With respect to telecommunications and technology, Myanmar's effort to liberalise the sector has led to a significant drop in SIM card prices and has increased access to affordable mobile broadband (AHK, MSR and Roland Berger, 2019). While there are few concerns related to service provision of mobile broadband, challenges remain on fixed and wireless infrastructure. Such infrastructure mainly covers urban areas, such as Yangon, Mandalay and Nay Pyi Taw (MoTC, 2020). In addition, the cost of fixed broadband services is relatively high in terms of gross national income per capita. Addressing the issue of fixed broadband affordability may help Myanmar to expand Industry 4.0 adoption.

China: Setting technological standards

The Made in China 2025 initiative marks the first step of the Chinese government's plan to make the country the world's leading manufacturing power by 2049. In modernising the manufacturing industry, the government foresees a key role for industrial Internet platforms. There is room for further improvement in the Chinese manufacturing industry. In particular the digital connectivity of manufacturing equipment remains uneven (Arcesati et al., 2020). A set of strategies has however been introduced which, in addition to the industrial Internet platforms operated by many companies, may facilitate this improvement. Moreover, big data usage is not yet optimised for high-value creation or predictive maintenance, as the majority of Chinese industrial digital platforms are

still limited to helping firms connect devices into a cloud (Arcesati et al., 2020). Among firms that already use sensors to collect data, relatively few use the data to discover new insights or develop forecasting and optimisation models (Deloitte, 2017).

Interoperability standards and regulations on data security would improve digital performance of SMEs in China. The interconnection of machines and devices is possible when data are standardised. However, as reported by some Chinese cloud and Industrial IoT platform providers, many SMEs have incomplete information systems or tend to stick with old systems (Arcesati et al., 2020). In a survey of companies, issues with interoperability standards were reported by more than half of respondents as the main challenge in applying Industrial IoT (Deloitte, 2017). In addition, the industrial intelligent software deployed by the Chinese manufacturing industry may vary, making production equipment and facilities incompatible (Feng et al., 2018). The development of interoperability standards would allow Chinese manufacturing to realise the full potential of the IoT.

India: Fostering SME participation and addressing cybersecurity

India is focusing on Industry 4.0 in light of the government's target of increasing manufacturing output to 25% of GDP by 2025, from 16% in 2016 (Grant Thornton, 2017). As initiatives are put in place, such as the Centre of Excellence on IT for Industry 4.0, firms in the manufacturing sector are starting to adopt digital solutions. However, Industry 4.0 is still in its infancy in India. Clarifying the economic benefits of adopting digital solutions and resolving cybersecurity issues would likely speed its progress, particularly among large manufacturing organisations (EY, 2020). At the same time, India's SMEs have very little access to automation technologies (Jadhav and Mahadeokar, 2019). A study conducted by the Asian Productivity Organisation found that lack of digital capabilities, insufficient knowledge, especially with regard to cybersecurity, and difficulty in defining the starting point are among main barriers faced by SMEs in adopting advanced technologies (NPC, 2018; NPC 2019).

As lack of knowledge is often cited as a major barrier for SMEs, a good first step might be to increase awareness of digital technologies and the benefits of their adoption. SMEs need to be given easy access to automation technologies and assistance in starting their digital transformation. Improving collaborative efforts among government, academia and industries, including technology providers, could help address the issue. The Centre of Excellence on IT for Industry 4.0 is indeed a good start. This initiative could be developed to better serve SMEs in undertaking digital innovation. Public authorities might also need to address challenges related to cybersecurity. This is in line with findings from India's Cybercrime Survey, that 79% of enterprises included cybersecurity among the top five business risks (KPMG, 2017).

Greater regional co-operation is needed for a smooth transition to Industry 4.0

Several Emerging Asian countries have taken initiatives to remain competitive by adopting the Industry 4.0 concept as the main driver of economic growth. However, implementation is still in its infancy. More can be done for the region to thrive in the era of advanced technology. Lack of awareness, inadequate infrastructure, shortages of skilled workers, limited financing capacity and weak cybersecurity are among the main factors that contribute to low adoption of Industry 4.0 technologies. Existing government initiatives mainly benefit large companies and have not reached many SMEs, the backbone of Emerging Asian economies. In CLM countries, both basic and digital infrastructure have deficiencies that must be rapidly addressed.

Industry 4.0 can be considered as a data-driven revolution, since data are a key ingredient for industrial production. The COVID-19 crisis led some businesses to transform their operations digitally, and many are joining the digital economy. The seamless flow of data and information is a fundamental component of this transformation. The ability to access, process and store data across borders can bring many benefits, for example increasing the range of cloud service providers available to firms. Access to larger resources can also create opportunities for new forms of collaboration to improve performance and increase efficiency. Moreover, open data sharing platforms can catalyse collective innovation among countries. Despite these benefits, the free flow of data can also bring challenges, especially issues related to confidential and sensitive information placed on commercial servers, such as health records and financial transactions. Therefore, countries must co-ordinate in setting rules and regulations that govern cross-border data flows.

The region also needs to involve the private sector in the process of deepening the regional co-operation in the field of cybersecurity. The cybersecurity threats do not concern only the national institutions (Shahar et al., 2019), but have cross-border implications as well. From 2014 to 2019 Cambodia and Lao PDR did not conduct any cybersecurity research, while Singapore, Malaysia and Myanmar conducted 70% of the research in the ASEAN region over the same interval (Shahar et al., 2019). The countries are also at different stages of development regarding data privacy, data protection and cybersecurity legislation. These facts make it harder to facilitate a common cybersecurity co-operation network.

Nonetheless, ASEAN might need to invest more to respond to increasingly sophisticated cyber threats and to strengthen cyber resilience in the region. A regional co-ordination platform could: facilitate information sharing related to threat detection; improve awareness; and enable cross-border co-operation. Regional co-operation is also needed to harmonise cybersecurity standards and regulations. Differing country-level regulations may burden firms that seek to expand their business internationally. By harmonising cybersecurity standards and regulations, compliance costs for firms can be reduced.

The ASEAN member countries have launched ASEAN Digital Integration Framework (DIF) in order to overcome the barriers to digital integration. The DIF's main targets are to facilitate seamless trade, protect data while supporting digital trade and innovation, enable seamless digital payments, broaden digital talent base, foster entrepreneurship and co-ordinate actions. The project was finalised in 2018 and adopted in 2019 (ASEAN, 2019). ASEAN countries have had earlier frameworks such as the Framework on Digital Data Governance in 2012 and ASEAN Framework on Personal Data Protection in 2016.

One of the initiatives launched as an action to the ASEAN Digital Integration Framework is the Go Digital ASEAN initiative which aims to equip MSME enterprises, which account for 99% of businesses in key sectors in most ASEAN economies, and youth, especially in the periphery, with crucial digital skills and tools. The digital integration, a key part of the project, can lead to the crucial digital inclusion, which is crucial for the success of the region. The project is implemented by The Asia Foundation and approved by ASEAN Coordinating Committee on Micro, Small and Medium Enterprises (ACCMSME) (The Asia Foundation, 2020).

Cyberspace regional initiatives in ASEAN in response to COVID-19

With more devices connected to the Internet and more activities performed on line, vulnerability to cyberattacks will increase. Responses to the COVID-19 pandemic caused more businesses and individuals to go on line due to physical distancing measures. This has generated an online environment ripe for cybercrime. According to Interpol (2020), main regional cybercrime threats were fraud; phishing; and sale of illegal or counterfeit medical supplies, drugs and PPE. Fake news and spread of misinformation were also reported among the survey participants. The participating countries consider that the

lack of cybersecurity knowledge hinders prevention of the most common cybercrimes. In the Philippines, for instance, the National Bureau of Investigation recorded a 200% increase of phishing scams since the country went into lockdown (Lin, 2020). In Malaysia, cybersecurity incidents during the Movement Control Order increased by 82.5% compared to the same period last year (Devanesan, 2020).

Box 2.5. **Rise in ransomware incidents in Singapore**

Singapore's Cyber Security Agency (CSA) reported a steady increase in the number of ransomware incidents relative to last year, and has also reported several trends associated with this increase. Since 2019, cybercriminals have shifted their sights from low hanging opportunist targets to larger businesses and institutions that have higher value data, in the hopes of setting more lucrative ransom amounts (CSA, 2020a). Particularly concerning is the exposure of hospitals to this type of cyber threat, as they can lead to fatalities and other complications for hospitals that are already overburdened by the COVID-19 pandemic. In September 2020, there was a reported ransomware incident in Germany that led to the death of one citizen (HSCCC, 2020).

Although there have not been any reported fatalities related to ransomware incidents affecting hospitals in Singapore, this overall rise in ransomware cases reveals a potential threat to the health care sector. CSA received 61 reports of ransomware from January to October, an increase of almost 75% over the entirety of 2019.

Figure 2.24. **Number of ransomware cases reported to CSA, 2016 - October 2020**
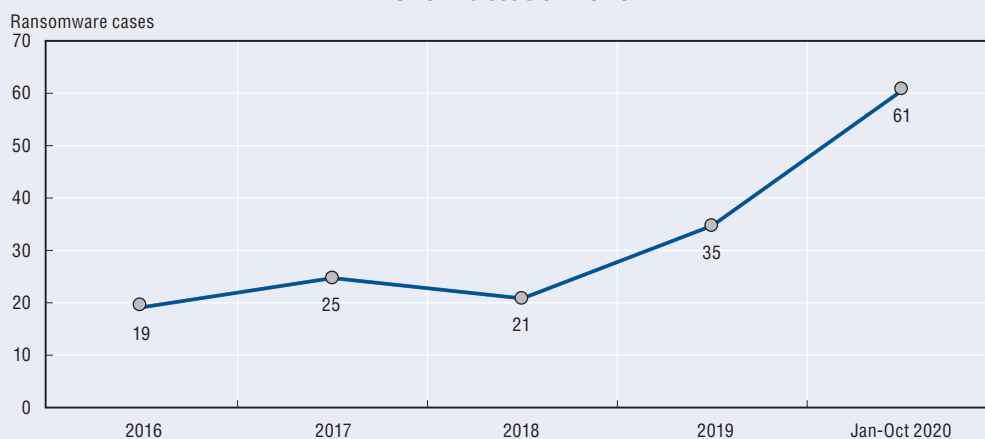
Source: CSA (2020a).
StatLink ᐅᗌᐊ https://doi.org/10.1787/888934229616

Outside ransomware threats, there have been instances of criminals taking advantage of the COVID-19 pandemic by using themes related to the virus to establish phishing scams masquerading as official sources. There have also been instances of criminals impersonating government officials using fake e-mail addresses; one particular incident in March involved an e-mail supposedly from Prime Minister Lee Hsien Loong. The World Health Organization's e-mail handle has also been reportedly acquired and used for criminal purposes (CSA, 2020b).

ASEAN member states' cybersecurity capabilities vary considerably. Whether cybersecurity mechanisms are purely instated at the technological or socio-economic level, those differences pose a challenge in providing a unified and cohesive response to the increase in both the amount of threats and the new types of threats that have emerged following the onset of the COVID-19 pandemic.

To combat the spread of fake news and misinformation, the governments in the region have taken strong action against online hoaxes. For example, the governments of Singapore (2020) and Malaysia (2020) have launched websites and information campaigns against fake news and misinformation. A major policy issue with cybersecurity in general, but also misinformation, is inadequate legislation. For instance, Indian legislation does not contain terminology for fake news or misinformation (LoC, 2020). Cybersecurity threats are a major problem in Viet Nam. The country ranks among the most DDoS (Distributed Denial of Service) attacked countries in the world. Significant number of these attacks are targeted at critical national infrastructure. Many Vietnamese organisations are willing to invest in technology, but not nearly as many on cybersecurity (MIC, 2019a, 2019b).

Brunei Darussalam has tackled cybersecurity threats by launching a national cybersecurity agency to co-ordinate national efforts against cyber threats and cybercrime. The agency operates under the Ministry of Transport and Infocommunications. The agency is mandated to offer cybersecurity services and awareness to both the public and private sectors and to improve national cyber-resilience (CSB, 2020). Indonesia (BSSN), Malaysia (NCSA), Thailand (NCA), Cambodia (CamCERT) have also founded their own specific cybersecurity agencies (Yaksha, 2018). Given that cybersecurity threats are not constrained by borders, this issue requires a regional approach. However, ASEAN investment in developing cybersecurity measures and policies remains limited. Some initiatives to enhance the security of regional cyberspace are underway, including the ASEAN Cyber Capacity Programme, funded by Singapore, and the ASEAN-Japan Cybersecurity Capacity Building Centre, which is intended to develop a cybersecurity workforce.

The rapid increase in digitalisation will gradually usher in greater concern for cybersecurity, resulting in more initiatives being undertaken in this sphere by ASEAN countries. More developed countries, such as Singapore have displayed this pattern and continue to make strides in the enhancement of cybersecurity capabilities. In April 2015, Singapore established a Cyber Security Agency (CSA), giving it the responsibility to protect Singapore's cyberspace. The CSA is given the tasks to monitor, mitigate and respond to cyber threats and protect critical information infrastructure (CII) within the country. Furthermore, the agency seeks to create strong links with other countries in the region, in an effort to create a more cyber resilient environment. The agency is currently working to establish an operational technology Cybersecurity Expert Panel (OTCEP) to provide advice to other ASEAN governments on improving their cybersecurity capabilities. The first meeting of the panel is scheduled to occur during first half of 2021. CSA also launched an innovative Cybersecurity Labelling scheme in an effort to better educate consumers in the domain of cybersecurity and allow them to make informed decisions when purchasing digital equipment.

ASEAN countries have no common regulation of cross-border data flows and have different levels of domestic regulation. Singapore, Malaysia, Indonesia and the Philippines have legislation, Thailand is acknowledging the issue, while Brunei Darussalam, Cambodia, Lao PDR and Myanmar have personal data protection legislation (ERIA, 2020).

Malaysia was one of the first ASEAN countries to set privacy legislation. The Personal Data Protection Act was passed in 2010. Legislation on the subject from as early as 1997 was used to initiate these laws. The Consumer Protection Act was also amended in 2010 in

order to protect consumers against e-commerce related scams and other safety concerns. Indonesia has been establishing e-commerce governance in the 2010's. The Ministry of Trade has issued a law on trade, which requires e-commerce service providers to provide relevant data and information. The data to be provided include product descriptions, merchant qualifications, payment details and delivery procedures. Indonesia has also issued a Presidential Regulation on the e-commerce roadmap for 2017-19. The roadmap guides government agencies and central, local and regional governments to develop sector policies, programs and supporting and accelerating the development of e-commerce. The roadmap consists of eight e-commerce related sectors, including customer protection and cybersecurity, for instance. The roadmap has been divided to 26 programmes that have been carried out between 2017 and 2019 (ERIA, 2020).

The work-from-home arrangements in response to COVID-19 have highlighted the reality that cybersecurity capabilities are indeed crucial going forward. A secure cyberspace fosters both growth in business activity and governmental stability. Co-operation between the public and private sector is more vital than ever. This co-operation was evidently displayed during the fifth edition of the Singapore International Cyber Week (SICW) held from 5 to 9 October 2020 and organised by the CSA, where 6000 participants from 60 countries were in attendance. The participants and speakers came from various government and industry backgrounds. According to Singapore's Safer Cyberspace Masterplan 2020, the CSA has funded research initiatives to develop AI technologies to help combat cyber threats and is currently collaborating with local industry firms to design an architecture for an integrated and automated Security-as-a-Service (SaaS) solution (CSA, 2020c).

Furthermore, a cyberspace that is governed at the regional level instead of at the national level creates a more unified system that is more resilient to cyber threats. During the 5th ASEAN Ministerial Conference on Cybersecurity (AMCC) held in October 2020, discussions were focused on the development of a rules-based cyberspace and strengthening Critical Information Infrastructure (CII) protection (CSA, 2020d). Capacity building is also a key development area in cybersecurity. The ASEAN-Japan Cybersecurity Capacity Building Centre, located in Bangkok and established in 2018; and the ASEAN-Singapore Cybersecurity Centre of Excellence located in Singapore and established in 2019 are both entities focused on achieving this goal.

Key challenges must be addressed to bolster cybersecurity

Cybersecurity development in ASEAN varies by country. A country's secure critical infrastructure acts as an artery for a complex network of information and communication technology (ENISA, 2016). However, a current infrastructure technology gap exists within ASEAN, and cybersecurity capabilities follow this trend. Closing that technology gap logically precedes the development of technologies that safeguard that very infrastructure. ASEAN countries must strengthen the development of critical infrastructure technology and subsequently establish robust cybersecurity safeguards. In September, Viet Nam not only held meetings with neighbouring countries to discuss cybersecurity issues, but also participated in a meeting with the European Union (Viet Nam Ministry of Public Security, 2020).

There are several challenges in combatting cybercrime, particularly in crafting the right balance between privacy and security. Cyberspace currently provides a certain level of anonymity to criminals who have hostile transnational intentions, and the smarter the individual criminal or organisation, the more sophisticated the layers of anonymity become. In order to peel back the layers, there must be an increase in law enforcement presence on line, particularly on the dark web, where criminals benefit from encryption

to conceal their identities and activities. According to a joint partnership study between United States National Institute of Justice and the RAND Corporation, 57% of the websites on the dark web are used for criminal purposes (Goodison et al., 2019). Law enforcement faces both technical and labour barriers to efficient monitoring of such a vast and increasingly complex cyberspace.

Developing ASEAN countries, such as Cambodia and Lao PDR, are lacking cybersecurity legislation or the policies are outdated, whereas advanced countries, such as Malaysia and Singapore, have more effective and up-to-date legislation.

In addition to many infrastructural and legislative challenges to cybersecurity, ASEAN countries also face shortages of skilled workers in the field. These can be ameliorated through educational incentives and tight government collaboration with universities and industry. Due to the public health responses to COVID-19, more people are working from home. These decentralised arrangements have exposed companies to more cyber threats, and companies are expected to allocate more resources to combat this issue. Thus, not only will the demand for cybersecurity professionals to provide enterprise-level solutions increase, but McKinsey & Company anticipates that companies will be particularly motivated to instate or fortify cybersecurity training for employees (Anant, Caso and Schwarz, 2020).

Conclusion

The rapid changes brought by digitalisation present both opportunities and challenges for Emerging Asia. The unprecedented environment created by the COVID-19 pandemic demonstrated the importance of digitalisation. Use of e-commerce and e-payment, online learning and health applications increased significantly due to the health crisis. The flexibility of digital tools and their effective use provided the ability to adapt quickly in various sectors, including health, education and business.

- Digital health showed its huge potential for solving pressing health issues during the COVID-19 crisis by reducing hospital attendance, enabling rapid delivery of diagnosis and treatment, and providing equality in access to health care. With more users incorporating digital health into their health care options, a radical shift from the traditional clinical approach is needed.

- In the education sector, further efforts are needed to ensure the continuity of education without sacrificing the quality of knowledge acquired or the well-being of students. Lifelong learning programmes and TVET have large potential to contribute to strengthening digital skills. However, these programmes need to adapt to the changing environment.

- The COVID-19 pandemic also triggered an acceleration of digital transformation to support Industry 4.0. The agility and flexibility offered by Industry 4.0 solutions allowed firms to increase business resilience amid restrictions on movement. In adopting Industry 4.0 technology, the region needs to increase digital security and co-operation, while country-specific challenges must also be addressed.

Notes

1. The survey used a four-point Likert scale ("strongly disagree", "disagree somewhat", "agree somewhat", "strongly agree") to ask five questions about the response to COVID-19 in their medical education. Students were asked: 1) whether they considered themselves physically and mentally capable of studying on line for the rest of the semester; 2) whether medical schools should give a passing grade to all their students (i.e., mass promotion); 3) whether they had enough time and resources for online learning; and 4, 5) whether the resources of their schools and the skills of their educators were adequate. The survey also identified ten barriers to online learning and asked students to answer how often they encountered these barriers by "never", "sometimes", "often" and "always". The barriers identified were "difficulty adjusting learning styles", "lack of basic needs", "no device or limited access", "need to work for extra income", "lack of technical skills", "mental health difficulties", "unreliable or no Internet access", "limited space conducive for studying", "poor communication with educators" and "need to fulfil responsibilities at home".

2. A sample of 450 teachers and school administrators from teacher training institutions in the Philippines responded with an average of 2.86 ("Agree") on a 1-5 Likert scale ("Strongly Disagree", "Disagree", "Neither Agree nor Disagree", "Agree", "Strongly Agree") to the statement "As a faculty, I am ready for Education 4.0 because I…" with eight different conclusions to that statement. Despite the moderately positive overall score, the respondents provided an average value of 2.4 ("Disagree") to the statement "As a faculty, I am ready for Education 4.0 because I am skilful in the use of learning management system, google classroom, and online class modality". If the teacher education instructors are unprepared, then they would be unable to pass the requisite digital skills onto their pupils for use in their classrooms. It is worth noting that respondents averaged 3.51 ("Strongly Agree") to the statement "As a faculty, I am ready for Education 4.0 because I attend seminars and conferences to enhance my technological and pedagogical skills", which suggests they are trying to make improvements.

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Annex A. Statistical annex

Table A.1. **Real GDP growth in ASEAN, China and India, 2019-21**

Annual percentage change

	2019	2020	2021
ASEAN-5			
Indonesia	5.0	-2.4	4.0
Malaysia	4.3	-5.2	7.0
Philippines	6.0	-9.0	5.9
Thailand	2.4	-6.4	4.5
Viet Nam	7.0	2.6	7.0
Brunei Darussalam and Singapore			
Brunei Darussalam	3.9	1.8	3.1
Singapore	0.7	-5.5	5.0
CLM countries			
Cambodia	7.1	-2.9	5.4
Lao PDR	5.5	0.6	5.0
Myanmar	6.8	1.7	5.0
China and India			
China	6.1	1.8	8.0
India	4.2	-9.9	7.9
Average of ASEAN-10	4.7	-3.4	5.1
Average of Emerging Asia	5.4	-1.7	7.4

Note: Data are as of 5 January 2021. Data for India and Myanmar relate to fiscal years. The 2019 figures are based on national sources. The 2020 and 2021 projections for China, India and Indonesia are based on the *OECD Economic Outlook*, December 2020.
Source: OECD Development Centre.

Table A.2. **Current account balances of ASEAN, China and India, 2019-21**

Percentage of GDP

	2019	2020	2021
ASEAN-5			
Indonesia	-2.7	-1.0	-0.4
Malaysia	3.3	2.9	3.2
Philippines	-0.1	0.1	-1.2
Thailand	7.0	4.5	5.1
Viet Nam	3.4	2.6	3.3
Brunei Darussalam and Singapore			
Brunei Darussalam	6.6	7.0	8.9
Singapore	17.0	16.2	17.0
CLM countries			
Cambodia	-15.8	-19.0	-16.8
Lao PDR	-6.4	-9.7	-8.0
Myanmar	-2.5	-4.4	-4.0
China and India			
China	0.9	2.5	3.5
India	-0.8	0.9	0.5
Average of ASEAN-10	1.7	1.6	2.0
Average of Emerging Asia	0.7	2.0	2.6

Note: Data are as of 5 January 2021. Weighted averages are used for ASEAN average and Emerging Asia average. Data for India and Myanmar relate to fiscal years. The 2019 figures are based on the IMF *World Economic Outlook* database, October 2020. The 2020 and 2021 projections for China, India and Indonesia are based on the *OECD Economic Outlook*, December 2020.
Source: OECD Development Centre.

Table A.3. **General government fiscal balances of ASEAN, China and India, 2019-21**
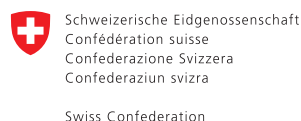
Percentage of GDP

	2019	2020	2021
ASEAN-5			
Indonesia	-0.4	-6.5	-5.8
Malaysia	-1.6	-6.7	-6.0
Philippines	-0.1	-8.2	-7.8
Thailand	-0.2	-5.3	-5.0
Viet Nam	-1.8	-6.2	-5.3
China and India			
China	-5.4	-6.9	-6.2
India	-3.3	-8.3	-6.7
Average of ASEAN-5	-0.7	-6.5	-5.9
Average of Emerging Asia	-4.0	-7.1	-6.2

Note: Data are as of 5 January 2021. Weighted averages are used for ASEAN average and Emerging Asia average. Data for India and Myanmar relate to fiscal years. The 2019 figures are based on the IMF *World Economic Outlook* database, October 2020. The 2020 and 2021 projections for China, India and Indonesia are based on the *OECD Economic Outlook*, December 2020. General government balances data are not necessarily comparable to the budget balances published by the national governments. Emerging Asia is comprised of ASEAN-5, China and India.
Source: OECD Development Centre.

Economic Outlook for Southeast Asia, China and India 2021

REALLOCATING RESOURCES FOR DIGITALISATION

The *Economic Outlook for Southeast Asia, China and India* is a regular publication on regional economic growth, development and regional integration in Emerging Asia. It focuses on the economic conditions of Association of Southeast Asian Nations (ASEAN) member countries: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam. It also addresses relevant economic issues in China and India to fully reflect economic developments in the region. The Outlook comprises two main parts, each highlighting a particular dimension of recent economic developments in the region. The first part presents the regional economic monitor, depicting the economic outlook and macroeconomic challenges in the region. The second part consists of a special thematic chapter addressing a major issue facing the region. The 2021 edition of the Outlook addresses reallocation of resources to digitalisation in response to COVID-19, with special focuses on health, education and Industry 4.0. During the COVID-19 crisis, digitalisation has proved critical to ensuring the continuity of essential services. The use of e-commerce, digital health tools and online education all accelerated sharply during the pandemic in Emerging Asia. However, there is still a lot of work to be done, for the region to be able to get the full benefits of digitalisation.

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