

OCTOBER 2026

East Asia & Pacific Economic Update

Riding the AI Wave



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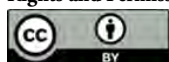
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ISBN (electronic): 978-1-4648-2362-6
DOI: 10.1596/978-1-4648-2362-6

Cover design: David Spours (Cucumber Design); Design and Creative Services, Global Corporate Solutions, World Bank Group.

The cutoff date for the data used in the report was September 23, 2026.

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Acknowledgments

This report is a product of the Office of the Chief Economist for Asia (DECPA) and the Prosperity Practice for East Asia and Pacific (EEADR). The report was managed by Franziska Ohnsorge (Chief Economist, Asia), under the general guidance of Indermit S. Gill (former Vice President and Chief Economist, Development Economics), Carlos Felipe Jaramillo (Regional Vice President, East Asia and Pacific), and Sarvesh Suri (Regional Vice President, Asia Pacific).

Chapter 1 was written by Patrick Kirby and incorporates comments from Charles Collyns (former IMF), Phil Kenworthy, Gitanjali Kumar (both DECPG), and Ou Nie (EEAF2). Box 1.1 was prepared by Ekaterine T. Vashakmadze (EEAM2) and Zoe Leiyu Xie, and reviewed by Charles Collyns (former IMF). Invaluable research assistance was provided by Laalithya Bhiminani, Giorgi Bokhua, Kaihao Cai, Eedo (Yiduo) Mei, Yan Wang, Julius Benedikt Alexander Wolff, and Xiao'ou Zhu.

The following colleagues from EAP Prosperity team prepared country-specific macroeconomic outlooks: Amina Coulibaly, Csilla Lakatos, Deisigan Shammugam, Dwi Endah Abriningrum, Ekaterine Vashakmadze, Fayavar Hayati, Fionne Lim Jing Wen, Hilda Shijaku, Indira Hapsari, Jaffar Al-Rikabi, Jose Luis Diaz Sanchez, Jun Ge, Keomanivone Phimmahasay, Kevin Chua, Kevin Cruz, Kiatipong Ariyaprachya, Natsuko Kiso Nozaki, Patrizia Benedicto, Ratih Dwi Rahmadanti, Remrick Patagan, Reshika Singh, Sacha Dray, Samik Adhikari, Sodeth Ly, Somneuk Davading, Sutirtha Sinha Roy, Tehmina S. Khan, Thi Da Myint, Thu-Ha Thi Nguyen, Undral Batmunkh, Vishesh Agarwal, Warunthorn Puthong, Yew Keat Chong, Yus Medina Pakpahan, and Yusha Li.

Chapter 2 was prepared by Omar Arias, Alessandro Barattieri, Margaret Triyana and Yu Cao with input from Duong Trung Le, Jonathan David Timmis, and Antonio Ughi (Paris School of Economics).

Box 2.1 was prepared by Jonah Rexer, Jonathan David Timmis, and Margaret Triyana. Invaluable research assistance was provided by Laalithya Bhiminani, Issac Yurui Hu, Haiqin Liu, Klara Katharina Stelzel, and Xinyi Wang. The Chapter uses inputs from a paper authored by Jingyun Huang, Yan Liu, He Wang, and Shu Yu. The chapter and the Box were reviewed by Gaurav Chiplunkar (University of Virginia), Charles Collyns and Graham Hacche (both former IMF).

Helpful comments were provided by members of the WBG Regional Management Team, members of the World Development Report 2026 team, and members of sectors and country teams in the EAP region, including Cristian Aedo, Oleksii Balabushko, Sudeshna Ghosh Banerjee, Luis Benveniste, Diomedes Berroa, Benu Bidani, Daria Goldstein, Marco Hernandez, Serene Ho, Camilla Holmemo, Ruchira Kumar, Priyank Lathwal, Daniel Levine, Eric Rodrik Masanet, Elitza Mileva, Lalita Moorty, Elvira Morella, Gaurav Nayyar (director of the World Development Report 2026), Siew Sanz Ng, James L. Neumann, Habib Rab, Francesco Strobbe, Mahesh Uttamchandani, and Shu Yu. The team also thanks everyone else who has helped prepare this report and apologizes to any who may have been overlooked inadvertently in these acknowledgements.

Syed Muhammad Shams Sadiq was responsible for the layout and typesetting. David Spours (Cucumber Design) and Design and Creative Services, Global Corporate Solutions,

World Bank Group designed the graphics and layout. Graeme Littler copyedited the chapters. Maria Laura Gonzalez Canosa coordinated the publication and supported outreach. Geetanjali Chopra, Linda Smioldo Herda, Ngan Hong Nguyen, and Nansia Constantinou supported the dissemination. Cecile Wodon and Narya Ou provided administrative support.

East Asia and Pacific as used in this report includes Cambodia, China, Fiji, Indonesia, Kiribati, Lao PDR, Malaysia, the Republic of the Marshall Islands, Federated States of Micronesia (FSM), Mongolia, Myanmar, Naoero,

Palau, Papua New Guinea, the Philippines, Samoa, Solomon Islands, Thailand, Timor-Leste, Tonga, Tuvalu, Vanuatu, and Viet Nam. ASEAN as used in this report includes Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor-Leste and Viet Nam. Pacific Island Countries (PIC) include Federated States of Micronesia (FSM), Fiji, Kiribati, Marshall Islands, Naoero, Palau, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

The data cutoff date for this report was September 23rd, 2026.

Executive Summary

In East Asia and Pacific, a global surge in AI-related activity is lifting growth in countries that participate in AI supply chains, while high energy costs are weighing on growth elsewhere, particularly in Pacific Island economies. Growth in the region is slowing, but considerably less than anticipated previously and is forecast to remain robust. The influence of AI is unmistakable in the region's industrial sector, but it is less apparent in the rest of the economy. Like in many other EMDEs, AI use in East Asia and Pacific is less prevalent than in advanced economies. Firms cite costs, a lack of relevant knowledge, and concerns about security and privacy as barriers to AI adoption. Nevertheless, AI adoption is beginning to reshape skills demand as firms' requirements for AI-related skills are often paired with complementary analytical and soft skills. The region's dependence on AI-related industrial activity has been a source of strength, but it could become a weakness if global AI activity slows or reverses. Growth could also be weaker if energy shortages or damage from an unusually strong El Niño increase inflation and borrowing costs. To sustain growth and foster more productive jobs, AI can be leveraged through investments in infrastructure and skills, which encourage AI use while also supporting growth. Scaling up energy generation capacity, especially from renewables, can help meet strong electricity demand and lessen the risks of imported fossil fuel dependence.

Chapter 1. AI Tailwinds, Energy Headwinds.

A global surge in the production of AI-related goods is lifting growth in those countries in the East Asia and Pacific region that are involved in their manufacture, while high energy costs are weighing on growth elsewhere, particularly in Pacific Island economies. Growth in the region is expected to average 4.4 percent per year in 2026–28. Activity could be slowed by energy prices remaining elevated for an extended period, spillovers from a slowdown in AI investment and related financial strains, or damage caused by a severe El Niño. Scaling up energy generation capacity to meet the needs of growing economies and AI use can also limit the risks of depending on imported fossil fuels. Broadening adoption of AI tools can help increase productivity and create good jobs across sectors. Tourism and agribusiness offer potential for job creation at scale. These sectors tend to have low entry barriers, low minimum scales of operation, and labor-intensive production processes.

Box 1.1. Small States, Big Challenges: Growth in East Asia and Pacific Small States.

Over 2022–25, small state EMDEs grew faster than other EMDEs—except in East Asia and Pacific (EAP), where most small states grew more slowly than the median small state EMDE. While EAP's small states resemble their non-EAP peers in demographics, education levels, and governance, they are among the most remote, sparsely populated, geographically dispersed, and least connected countries in the world. EAP's small states are also more vulnerable to natural disasters and energy shocks than other small states. Outmigration accounts for about twice as large a share of the population in EAP's small states as in the average small state EMDE. As a result, EAP's small states generate less income from exports and tourism, and rely more on official development assistance (ODA) and remittances. Historically, sustained high-growth episodes among small states have been preceded by faster growth in

foreign direct investment, fixed investment, and air passenger arrivals—precisely the channels that are obstructed by remoteness. Lifting growth in EAP’s small states therefore depends on reducing the effective distance to markets, easing key firm-level constraints—finance, electricity, transport, and labor regulations—where these economies lag, building disaster resilience, and reducing their reliance on imported fossil fuels.

Chapter 2. AI Adoption, Adaptation, and Advancement in East Asia and Pacific.

Artificial intelligence (AI) adoption is increasing across East Asia and Pacific among both individuals and firms, though it remains below levels in advanced economies. Firms’ growing demand for AI-related skills is often bundled with analytical skills, such as mathematics and critical thinking, and social skills, such as communication and collaboration. AI innovation in East Asia, reflecting both adaptation and advancement, is pivoting from Japan to China and the Republic of Korea. For most countries in the region, adoption and adaptation of existing AI technology—especially of small AI tools—offer the main pathway to reap AI benefits in the short term. Governments play a key role as enablers, users,

and regulators of AI. Efforts to improve the fundamental enablers of a conducive business environment, in particular the availability and reliability of infrastructure and a skilled workforce, could yield double dividends in harnessing AI for development and supporting broader growth momentum in East Asia and Pacific. Policymakers can maximize AI benefits by ensuring digital foundations, by using AI to improve the provision of public services, by strengthening institutional and regulatory readiness, and by deepening intra-regional cooperation.

Box 2.1. Data Centers in East Asia and Pacific.

The adoption, adaptation, or advancement of artificial intelligence (AI) requires access to “compute”, the ability to process large amounts of data. Local data centers offer one form of access to compute. High-capacity and reliable energy grids in some EMDEs in East Asia and Pacific make them attractive data center locations. Data center investment is also attracted by other good fundamentals, such as sound governance and regulatory quality, and a skilled workforce. Efforts to improve these fundamentals are therefore likely to constitute “no-regrets” policies that benefit data center investment as well as broader investment.

Abbreviations

ABS	Asset-Backed Securities
AE	Advanced Economy
AGI	Artificial General Intelligence
AI	Artificial Intelligence
AISHE	All India Survey on Higher Education
APAC	Asia-Pacific
ASEAN	Association of Southeast Asian Nations
ASR	Automatic Speech Recognition
ATP	Assembly, Testing and Packaging
AUS	Australia
AV	Autonomous Vehicles
BPO	Business Process Outsourcing
BRN	Brunei Darussalam
CAD	Computer-Aided Design
CAN	Canada
CAPEX	Capital expenditure
CEPII	Centre d'Etudes Prospectives et d'Informations Internationales
CHE	Switzerland
CHN	China
CMBS	Commercial Mortgage-Backed Securities
Comm.	Communication
CPC	Cooperative Patent Classification
CSET	Center for Security and Emerging Technology
DEFA	Digital Economy Framework Agreement
DEU	Germany
EAP	East Asia and Pacific
ECA	Europe and Central Asia
EMDE	Emerging Market and Developing Economy
EPIC India	Energy Policy Institute at the University of Chicago, India
ERP	Enterprise Resource Planning
ESCO	European Skills, Competences, Qualifications and Occupations
EU	European Union
EU27	27 member countries of the European Union
excl.	Excluding
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
FJI	Fiji
FRA	France
FSM	Federated States of Micronesia
FY	Fiscal Year
GBR	United Kingdom
GDP	Gross Domestic Product
GenAI	Generative Artificial Intelligence

Abbreviations (continued)

GPT	General-Purpose Technology
GPT	Generative Pre-trained Transformer
GNI	Gross National Income
GVC	Global Value Chain
GW	Gigawatt
ICT	Information and Communication Technology
IDN	Indonesia
IEA	International Energy Agency
ILOSTAT	International Labour Organization Statistics
IMF	International Monetary Fund
IND	India
IPC	International Patent Classification
ISCED-F	International Standard Classification of Education Fields
ISCO-08	International Standard Classification of Occupations 2008
ISR	Israel
JPN	Japan
KHM	Cambodia
KOR	Republic of Korea
KWh	Kilowatt-hour
LAC	Latin America and the Caribbean
LAO	Lao People's Democratic Republic
LHS	Left-Hand Side
LLM	Large Language Model
m ³	Cubic Meter
Mbps	Megabits per Second
Mfg	Manufacturing
MMR	Myanmar
MNA	Middle East and North Africa
MNC	Multinational Corporation
MNE	Multinational Enterprise
MNG	Mongolia
MSMEs	Micro, Small, and Medium-sized Enterprises
MW	Megawatt
MWh	Megawatt-hour
MYS	Malaysia
NAICS	North American Industry Classification System
NLD	Netherlands
NO _x	Nitrogen Oxides
NRU	Naoero
NZL	New Zealand
OECD	Organisation for Economic Co-operation and Development
ODA	Official development assistance
OJP	Online Job Posting

Abbreviations (continued)

OpEx	Operating Expenditures
PATSTAT	European Patent Office's Worldwide Patent Statistical Database
PCT	Patent Cooperation Treaty
PHL	The Philippines
PM10	Particulate Matter $\leq$ 10 micrometers
PM2.5	Particulate Matter $\leq$ 2.5 micrometers
RMI	Republic of the Marshall Islands
PNG	Papua New Guinea
ppl.	People
PUE	Power Usage Effectiveness
res.	Results
RHS	Right-Hand Side
RTI	Routine Task Intensity
SAR	South Asia Region
SGP	Singapore
SO _x	Sulfur Oxides
SSA	Sub-Saharan Africa
STEM	Science, Technology, Engineering, and Mathematics
tech	Technology
THA	Thailand
TLS	Timor-Leste
TWh	Terawatt-hour
U.S.	United States
UIS	UNESCO Institute for Statistics
UN	United Nations
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
USA	United States of America
USD	United States Dollar
VNM	Viet Nam
WBES	World Bank Enterprise Survey
WBG	World Bank Group
WDR	World Development Report
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WTO	World Trade Organization



CHAPTER 1

AI Tailwinds, Energy Headwinds

Chapter 1. AI Tailwinds, Energy Headwinds

A global surge in the production of AI-related goods is lifting growth in those countries in the East Asia and Pacific region that are involved in their manufacture, while high energy costs are weighing on growth elsewhere, particularly in Pacific Island economies. Growth in the region is expected to average 4.4 percent per year in 2026–28. Activity could be slowed by energy prices remaining elevated for an extended period, spillovers from a slowdown in AI investment and related financial strains, or damage caused by a severe El Niño. Scaling up energy generation capacity to meet the needs of growing economies and AI use can also limit the risks of depending on imported fossil fuels. Broadening adoption of AI tools can help increase productivity and create good jobs across sectors. Tourism and agribusiness offer potential for job creation at scale. These sectors tend to have low entry barriers, low minimum scales of operation, and labor-intensive production processes.

Summary

The East Asia and Pacific (EAP) region is successfully weathering a challenging global environment. The region's participation in fast-growing global value chains for AI-related goods has supported activity even as other drivers of growth have faded. The drag from elevated energy prices has not been as severe as anticipated, mitigated by a combination of market forces, increasing use of renewables, the drawdown of inventories, and subsidies for consumers. Inflationary pressures have grown around the world, however, particularly in EAP (figure 1.1).

The region is expected to grow by 4.5 percent in 2026. The 0.3 percentage point upgrade relative to the April forecast is largely due to the strength of high-tech investments and exports in countries that participate in the global AI value chain.

While AI has provided significant support for economic activity, it also brings risks. Domestic activity has been weak in many countries. The same is true for trade: headline trade growth has been strong, but growth excluding AI-related goods has been weak or negative.

The rapid growth in global AI investment has been supported by low interest rates and abundant liquidity around the world, and may be slowed by the latest tightening of financial conditions. This would spill over through both financial markets and by reducing demand for exports and investment. Such a reversal would remove a key pillar holding up growth in trade, investment, and financial market valuations in many countries.

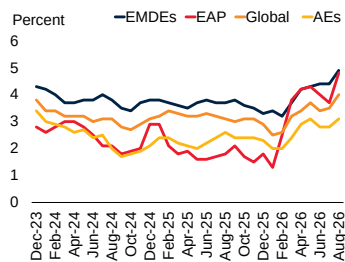
Similarly, efforts to shield the economy from high energy prices risk becoming unsustainable the longer high energy prices persist, particularly in countries with stretched fiscal positions. East Asia has responded more intensively than the rest of the world, averaging about 50 percent more measures per economy, with a greater focus on energy subsidies. A renewed rise in energy prices may be more damaging to economic activity than initially observed, particularly as the drag from higher inflation and tighter financial conditions grows. Finally, the probability of a very strong El Niño is very high this year. In the past, strong El Niño conditions have led to severe heatwaves, droughts, floods, and crop failures. Damage from a pronounced El Niño could disproportionately harm poor and vulnerable populations, including by increasing the risk of food insecurity.

This chapter was prepared by Patrick Kirby (DECPA).

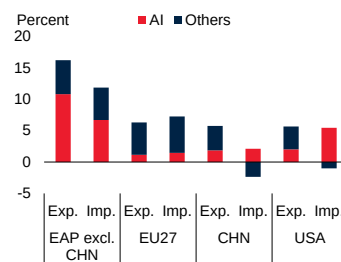
FIGURE 1.1 Summary

The impact of high energy prices is increasingly apparent in rising inflation. AI-related trade and investment are supporting global activity, particularly in East Asia and the Pacific (EAP), and have contributed to recent resilience and forecast upgrades in the region. EAP faces risks from persistently high energy prices, a reversal in AI-related trade, and damage from a strong El Niño. Countries can help scale up energy generation capacity by redirecting fossil fuel subsidies, and help create better jobs by enabling workers to leave agriculture for other sectors.

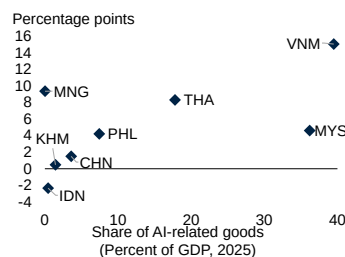
A. Median headline inflation



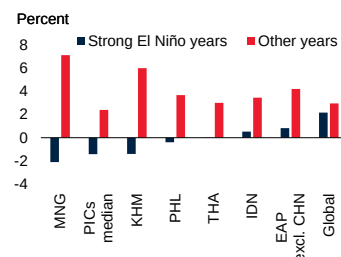
B. AI and non-AI trade growth, 2025



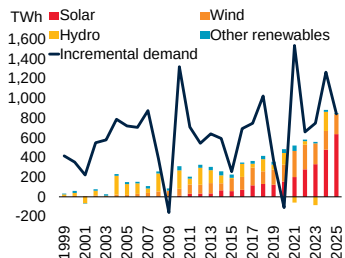
C. AI-related goods exposure and real exports growth revisions, 2026



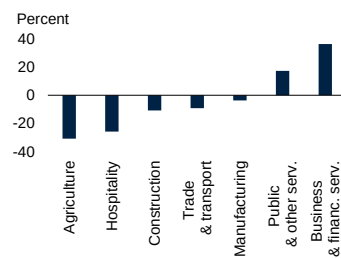
D. Crop production growth during strong El Niño episodes



E. Incremental electricity demand and additional renewable energy production globally



F. Wage differentials from national average



Sources: Haver Analytics; ILOSTAT; MPO; NOAA; Our World in Data (database); WDI; WTO (2025); World Bank Policy Tracker; World Bank Trade Watch database; World Bank Group.

A. EAP includes Cambodia, China, Indonesia, Lao PDR, Malaysia, the Philippines, Thailand, and Viet Nam. "Global" includes 138 economies, "AE" includes 35, and "EMDEs" includes 103.

B. AI-related exports follow the WTO (2025) classification of AI-enabling products. "EU27" shows extra-EU trade only.

C. AI-related goods follow WTO (2025). "Real export growth revision" is the difference in real exports growth forecasts for 2026 between the current forecast and the April 2026 forecast.

D. Bars show annualized crop production growth during strong El Niño years and other years. Strong El Niño years (1965, 1972, 1982, 1987, 1992, 1997, 2009, and 2015) are those in which the Relative Oceanic Niño Index (RONI) reaches or exceeds 1.5, with 5 consecutive months above 0.5; each year refers to the peak of the episode. Aggregates are weighted by 2010–19 real GDP, except for the PICs median. "Global" includes 186 economies; "EAP excl. CHN" includes 21 economies.

E. Bars show additional global electricity generation capacity from each renewable source. Line shows increase in global electricity consumption compared with the previous year.

F. Chart shows percentage difference between average wage in each sector and national average wage. EAP averages weighted by total employment using data since 2020 in Cambodia, Fiji, Indonesia, Kiribati, Lao PDR, Mongolia, Myanmar, the Philippines, Thailand, Timor-Leste, Tonga, and Viet Nam.

Generating sufficient energy for fast-growing, AI-enabled economies requires scaling up energy generation. This can also limit risks of depending on imported fossil fuels. Increasing generation capacity can be supported by increasingly cost-effective renewable technologies such as solar panels and wind turbines. Speeding this process involves removing price distortions that discourage investment in renewables, mobilizing private investment, and investing in grid infrastructure.

The transition of a large number of workers away from low-productivity employment in agriculture and informal activities into better jobs requires the creation of jobs that can accommodate limited formal education or skills. Tourism and agribusiness have particular potential to create such jobs, as they tend to have low entry barriers, low minimum scales of operation, modular and routine task structures, and labor-intensive production processes.

East Asia is producing large volumes of AI-related goods, but the general use of AI tools is lagging advanced economies. These tools can be leveraged to create better jobs across sectors. Policy efforts to improve the fundamentals of a conducive business environment, in particular the availability and reliability of infrastructure and a skilled workforce, could yield double dividends in harnessing AI for development and supporting broader growth momentum.

Global developments and outlook

Energy market developments

Since the conflict in the Middle East, shipping through the Strait of Hormuz has been disrupted. This Strait is the world's energy chokepoint, carrying roughly 20 percent of global petroleum consumption and

20 percent of global LNG trade. Oil prices surged as a result, with the Brent oil price peaking at about \$110/bbl, comparable to the increase during the Russian Federation's initial invasion of Ukraine. The prices of many refined energy products, such as diesel and jet fuel, have increased by even more (figure 1.2).

Countries have taken a variety of steps to compensate for lost oil supplies. Inventories have been drawn down, with most stocks falling well below normal historical levels. Imports of solar panels, cells, and wafers have surged. Some countries, notably China, have reduced oil imports by switching to alternative sources of energy supply or drawing down inventories.

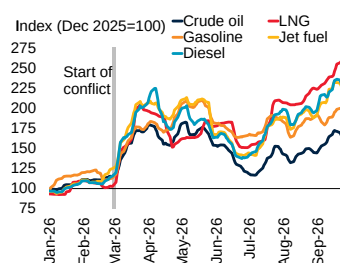
In general, governments have relied on four broad types of measures to cope with the energy-price shock: 1) consumer subsidies and price support, such as capping or freezing fuel and electricity prices and cutting fuel taxes, 2) demand-side measures that curb consumption directly, such as fuel rationing, driving restrictions, and work-from-home or shortened-week mandates, 3) social protection for vulnerable households, mainly cash transfers and in-kind distribution of fuel or essentials, 4) supply-security measures, such as releasing strategic reserves and trade controls.

Subsidies have been by far the most common policy response among emerging and developing economies. Of 58 EMDEs tracked, 39 provided at least one new subsidy in response to the disruption of energy supplies. Many countries have also ramped up subsidies that were already in place. It is not clear how effective these policies have been, however. Countries with substantial subsidies in place generally have had smaller increases in retail gasoline prices than non-subsidizers, but this relationship weakened considerably for headline inflation (*South Asia Economic Update*, annex 1.1).

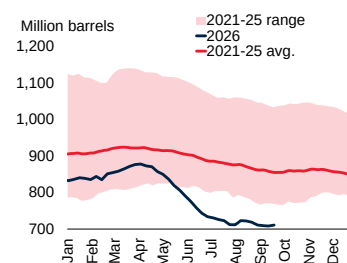
FIGURE 1.2 Energy market developments and inflation

Since the disruption of shipping in the Strait of Hormuz, prices of oil, LNG, and refined energy have risen sharply. Commercial and public oil inventories have been substantially drawn down. Countries have implemented a variety of policy measures to mitigate the impact of more expensive energy, including subsidies, which can be successful at reducing retail gasoline prices but not broader inflation. Around the world, inflation has risen sharply since the beginning of the year, especially in EAP.

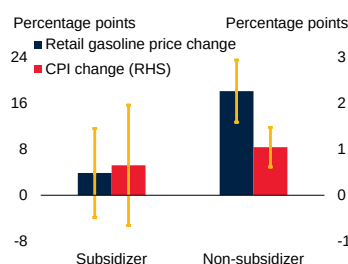
A. Crude oil, LNG, and refined-product prices



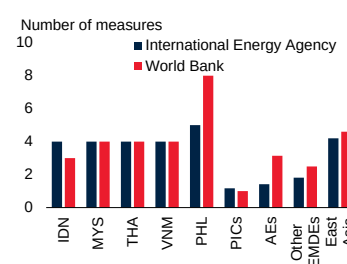
B. U.S. total crude oil inventories



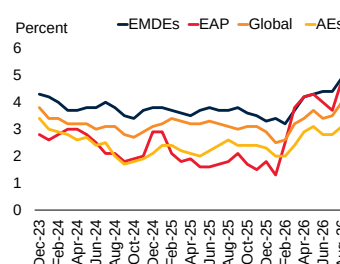
C. Retail gasoline and CPI change, by subsidy status



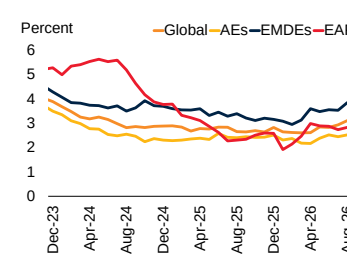
D. Policy response following the Middle East conflict



E. Median headline inflation



F. Median core inflation



Sources: Barchart; Ember; Federal Reserve Bank of St. Louis; Global Petrol Prices; Haver Analytics; IEA 2026 Energy Crisis Policy Response Tracker; Investing.com; Marketwatch.com; U.S. Energy Information Administration; World Bank Policy Tracker; World Bank Group.

A. Lines show 7-day moving averages of prices, indexed to an average of 100 in December 2025. Crude oil refers to Brent crude oil; LNG to Platts Japan/Korea Marker (JKM) futures; gasoline to New York Harbor gasoline; diesel to the ICE Low Sulphur Gasoil continuous futures contract; and jet fuel to U.S. Gulf Coast kerosene-type jet fuel spot prices.

B. Weekly data interpolated to daily frequency and aligned by date. Shaded area shows minimum-to-maximum range across 2021–25 for each date; red line shows 2021–25 average; and blue line shows inventories in 2026. Data include the sum of the Strategic Petroleum Reserve and private crude oil stocks.

C. Subsidizers had an explicit gasoline/diesel subsidy above 0.21 percent of GDP in 2024 (IMF global median); others are non-subsidizers. Gasoline price changes are latest relative to February levels. Bars show group averages; whiskers show 95 percent confidence intervals. Sample includes 38 EMDEs and 22 advanced economies.

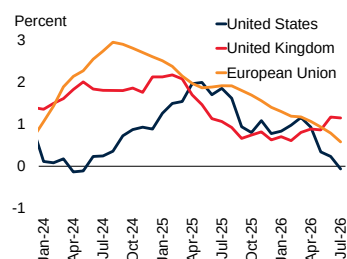
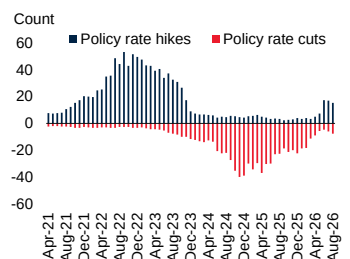
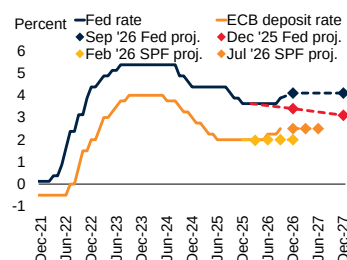
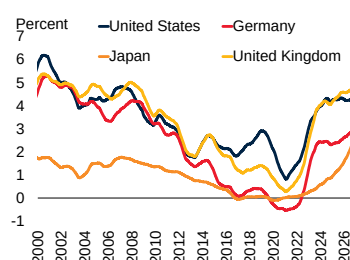
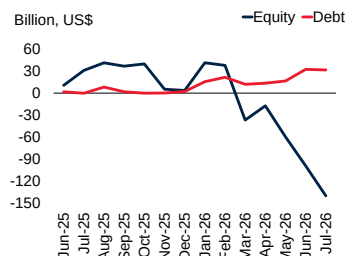
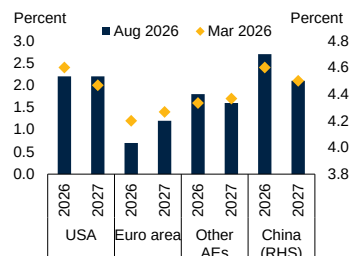
D. Average number of measures as of 16 June 2026, drawn from the IEA 2026 Energy Crisis Policy Response Tracker, which captures energy conservation measures, and the WBG's "Tracking Global Social Policy Responses to High Energy Prices," which tracks fiscal and social protection measures in response to the energy crisis.

E. "EAP" includes Brunei, Cambodia, China, Indonesia, Lao PDR, Malaysia, Mongolia, Myanmar, the Philippines, Thailand, and Viet Nam. "Global" includes 138 economies, "AE" includes 35, and "EMDEs" includes 103.

F. "EAP" includes China, Indonesia, Lao PDR, Malaysia, the Philippines, Thailand and Viet Nam. "Global" includes 78 economies, "AE" includes 31, and "EMDEs" includes 47.

FIGURE 1.3 Global inflation and growth

Higher inflation has pushed down real wage growth. It also triggered monetary tightening, which has pushed up borrowing costs and contributed to financial outflows from EMDEs. The impact on economic activity has been limited thus far.

A. Real wage growth**B. Global monetary policy changes****C. Monetary policy expectations****D. 10-year government bond yields****E. Cumulative net portfolio inflows into EMDEs****F. Consensus forecasts for major economies**

Sources: Board of Governors of the Federal Reserve System; CEIC; Consensus Economics; ECB Survey of Professional Forecasters (SPF); Haver Analytics; IIF Portfolio Flow Tracker; World Bank Group.

A. Chart shows year-over-year growth rates of 6-month moving averages of real wages. Last observation is September 23, 2026.

B. Three-month moving average count of monetary policy rate hikes (above X axis) and cuts (below X axis) for 107 economies.

C. Lines show the federal funds target rate and the European Central Bank's deposit rate. Projections are year-end Federal Open Market Committee forecasts and quarterly ECB SPF modal forecasts, respectively.

D. Lines show 12-month moving average of 10-year government bond yields for major economies. Last observation is September 23, 2026.

E. Cumulative net inflows of debt and equity into up to 20 EMDEs. Among EAP economies, "Debt" includes Indonesia and Thailand; "Equity" includes Indonesia, the Philippines, Thailand, and Viet Nam.

F. "Other AEs" includes 15 advanced economies.

Other tools have been far less universally used—demand-side measures (fuel rationing, driving restrictions, work-from-home or shortened-week mandates) were adopted by

only about a fifth of EMDEs, and social protection by roughly one in seven. Most developing economies thus converged on subsidies and price support, with only a minority layering on demand-side or social-protection measures.

East Asia has responded more intensively than the rest of the world, averaging about 50 percent more measures per economy. The composition of East Asia's policies has mirrored the global pattern, with subsidies and price support making up about half the region's policy actions.

Global activity. The global economic impact of lower oil supply is most apparent in prices. Despite the mitigating efforts of fuel subsidies and price caps in some countries, headline inflation has sharply increased in many countries, even as core inflation has remained more subdued. Rising inflation has depressed real wage growth to around zero in major advanced economies (figure 1.3).

Rising prices have also put an end to a global monetary easing cycle, with major central banks raising rates for the first time since 2023. This has contributed to a steady increase in borrowing costs and substantial capital outflows from EMDEs.

Compared with their impact on prices, the impact of energy market disruptions on economic activity has been modest thus far. Consensus forecasts for growth in major economies in 2026 were downgraded after the outbreak of conflict in February and have remained stable since, without broad-based increases or decreases.

In the **United States**, private domestic demand expanded in the first half of 2026, supported by robust AI-related investment, resilient consumer spending, and additional

tax breaks. However, rising inflation has weakened consumer sentiment. Going forward, tighter financing conditions and policy uncertainty are likely to slow growth. Consensus forecasts for 2026 growth have been revised from 2.4 percent in March to 2.1 percent in June. The legal framework for U.S. import tariffs has changed significantly over time, but the tariffs themselves are broadly unchanged relative to April. Most categories of AI-related goods, such as electronics, remain exempt. Separate investigations into structural excess capacity, forced labor and intellectual property may result in further tariff increases in some countries.

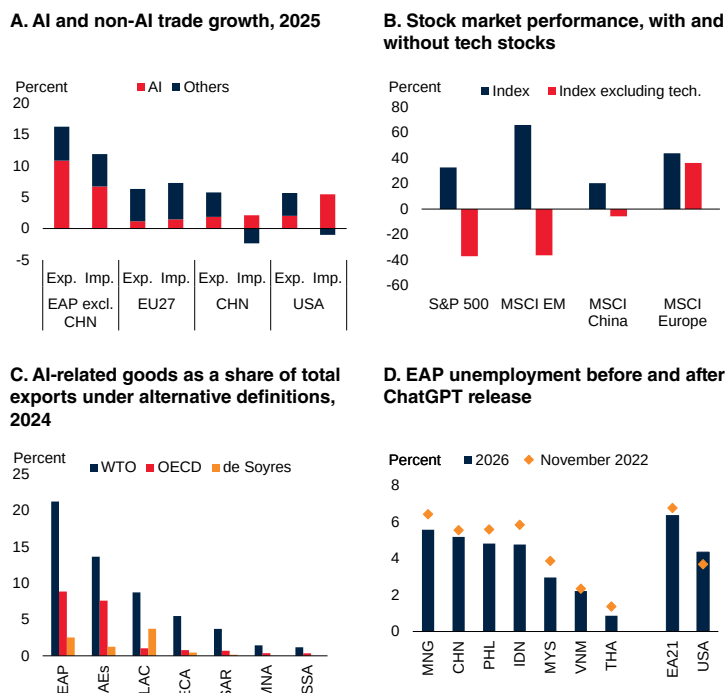
In the **euro area**, growth prospects have been dampened by elevated energy prices and the tightening of monetary policy. The consensus forecast for 2026 growth has been lowered from 1.2 percent in March to 0.7 percent in August.

Global trade and financial markets are being supported by a surge in AI-related investment. AI-related trade accounts for a growing share of global trade and, were it excluded, headline trade growth in major economies would be substantially weaker (figure 1.4). The same is true for technology firms and stock market indexes—if tech stocks were excluded, most major stock index valuations would have declined thus far in 2026.

There are several methods for delineating the share of “AI-related goods” in total trade, with the WTO, the OECD, and the Federal Reserve all providing alternative definitions. All of these include foundational AI products like chips, semiconductors, and servers, but the OECD also includes upstream inputs such as manufacturing equipment and raw materials, and the WTO includes adjacent goods like telecommunications equipment. Under any of these definitions,

FIGURE 1.4 AI-related activity

International trade growth and stock market appreciation would have been weak without AI-related activity. AI-related exports are prominent in EAP countries, regardless of the definition used. Unemployment across the region is lower now than it was when ChatGPT was released.



Sources: Bloomberg; CEPII BACI; de Soyres et al. (2026); Haver Analytics; OECD (2025); WTO (2025); World Bank Trade Watch database; World Bank Group.

A. AI-related exports follow the WTO (2025) classification of AI-enabling products. “EU27” shows extra-EU trade only.

B. Chart shows total return relative to January 2025 for the Index and Index excluding the information technology sector (GICS definition). Last observation is September 23, 2026.

C. AI export shares are computed as the sum of AI exports across countries in each region divided by the sum of their total exports. Three definitions of AI exports are applied: WTO (2025) AI-enabling products, de Soyres et al. (2026) AI-related products, and OECD (2025) semiconductor value chain products.

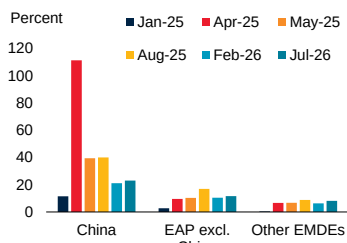
D. All series are truncated in July 2026 to ensure a broadly common comparison period. Where July data are unavailable, the window ends at the latest published observation: 2026Q2 for Mongolia and Viet Nam and February 2026 for Indonesia. Bars show the average unemployment rate over the preceding 12 calendar months. Gold diamonds show the corresponding 12-month average ending in November 2022, when ChatGPT was first released. The EA 21 refers to the euro area composition of 2026. China refers to urban unemployment.

East Asia and Pacific plays an outsized role, reflecting decades of deep integration into electronics global value chains. These definitions do not capture AI-related services—such as software development or business process outsourcing—which are harder to measure. This understates the importance of AI, particularly in countries like the Philippines which have significant service export sectors that increasingly support and utilize AI applications.

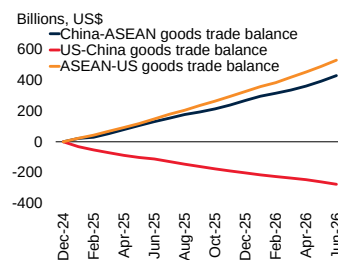
FIGURE 1.5 Regional economic activity

U.S. tariffs on the region's exports appear to have stabilized after a period of rapid change, and trade patterns have adjusted to minimize their impact. The region is highly dependent on imported energy and has seen significant increases in inflation despite subsidies for gasoline. Manufacturing activity remains robust despite higher input costs, and export growth has been supported by AI-related goods.

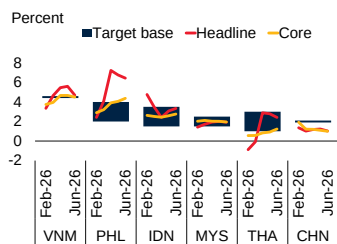
A. United States tariff rates



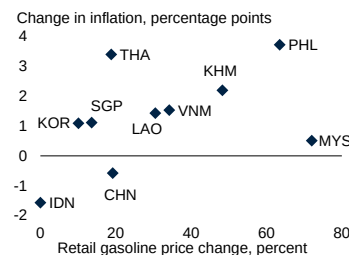
B. Cumulative goods trade balance since January 2025



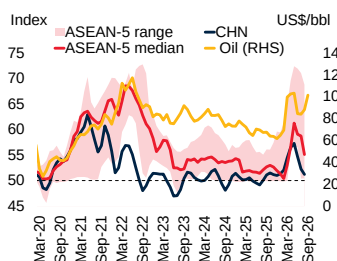
C. Inflation relative to targets



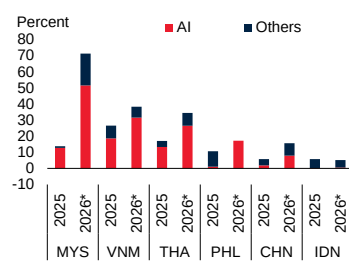
D. Increases in inflation and gasoline prices since start of the conflict in the Middle East



E. Manufacturing input prices PMI and oil prices



F. Export growth in EAP



Sources: Bangko Sentral ng Pilipinas; Bank Indonesia; Bank Negara Malaysia; Bank of Thailand; Global Petrol Prices; Haver Analytics; National Assembly of Viet Nam; State Council of China; United States International Trade Commission; WDI; World Bank Trade Watch database; WTO (2025); WTO-IMF Tariff Tracker; World Bank Group.

A. Tariff rates are calculated from Harmonized Tariff Schedules for individual products, weighted by bilateral import values fixed at their 2024 levels. Country-level aggregate tariffs are trade-weighted averages. Months provide snapshots of tariff rates after significant changes in policy, with January 1, 2025 serving as the baseline.

B. Lines show the cumulative monthly trade balance between countries since January 2025. C. Headline and core consumer price inflation, year on year, monthly from February to June 2026, for six economies. Navy bars show official inflation targets or target ranges for 2026, which differ by country. For the Philippines, Indonesia, and Thailand, they represent headline inflation targets of 2.0–4.0 percent, 1.5–3.5 percent, and 1.0–3.0 percent, respectively. For Thailand, the 1.0–3.0 percent band represents the medium-term headline inflation target range. For Malaysia, the 1.5–2.5 percent band is Bank Negara Malaysia's forecast for average headline inflation and is not an inflation target. For China, the marker denotes the government's CPI objective of around 2 percent; for Viet Nam, it denotes the National Assembly's target for average CPI growth of around 4.5 percent.

D. Changes in retail gasoline price and CPI growth are relative to February 2026 data. E. Red shading shows the range across ASEAN-5 countries for 3-month moving average of manufacturing input price PMI. Oil refers to the average monthly Brent crude oil price.

F. Bars show each component's contribution to total export growth by country. AI exports follow the WTO (2025) classification of AI-enabling products. For 2026, growth is calculated using exports through May for China and through April for other economies, compared with the same period in the previous year.

Developments in East Asia

Growth in EAP remains stronger than the EMDE average, underpinned by a diverse set of drivers. Several countries in the region—including China, Malaysia, the Philippines, Thailand, and Viet Nam—are benefiting significantly from their role in value chains for goods related to AI. Many countries in the region have built particularly strong positions in semiconductor assembly, testing, and packaging (World Bank Group 2026a). Strength in investment and exports related to this has supported economies even as other sectors have waned. AI-related activity appears to have been a net source of job creation, at least so far, as unemployment across the region is lower now than at the time of ChatGPT's launch in late 2022.

As the region remains heavily dependent on energy imports, higher oil prices following the conflict in the Middle East have increased pressure on regional economies. Although oil import volumes have declined across the region, import bills have risen sharply since the start of the conflict, with Viet Nam experiencing the largest increase, as the nominal value of oil imports rose by 36 percent. Currencies in the region have generally depreciated, sometimes sharply: The Indonesian rupiah, Philippine peso, and Thai baht—three of the deeper and more internationally traded currency markets in the region—have each depreciated by at least 5 percent since February 2026, compared with a 2 percent average depreciation for the other 18 floating-rate EMDEs listed in the MSCI emerging market stock index. U.S. tariffs on the region's exports appear to have stabilized after a period of rapid changes, and trade patterns have adjusted to limit their impact (figure 1.5).

The increase in global energy prices has also increased headline inflation, although inflation is generally still close to target in the region.

Some countries, including Indonesia, have increased subsidies to limit the increase in retail gasoline prices. Countries have also made efforts to curtail public sector fuel consumption or boost public transport. China has limited the pass-through of higher global oil prices to consumers and firms by drawing down stocks, increasing the use of alternative energy sources (notably renewables), and temporary fuel price caps. Indonesia combined efforts to reduce public-sector fuel use with steps to expand biodiesel blending and tighten access to subsidized fuels. Thailand encouraged remote work and carpooling, asked public officials to avoid unnecessary travel, and increased the availability of gasoline with higher biofuel content. The Philippines reduced government travel and shortened public-sector work arrangements. Viet Nam focused on encouraging public transport, while Malaysia's response included remote work for civil servants and temporary reductions in public transport fares.

As energy is a major input for East Asia's large manufacturing sector, higher energy prices have pushed up manufacturing input costs, echoing the earlier energy price spike at the start of the war in Ukraine in 2022. At the same time, rising transport costs have weighed on demand, with the PMIs for new manufacturing export orders declining across the region, pointing to a potential slowdown in exports in the later part of the year. By April 2026, however, export growth remains robust in the region, except in Indonesia, as increased demand for AI-related products has supported exports in the region, accounting for more than half of total export growth in most countries and more than 70 percent in Malaysia, the Philippines, Thailand, and Viet Nam.

Sectoral developments

Growth in major EMDEs in EAP is more dependent on the manufacturing sector than in the average EMDE (figure 1.6). The services sector in the region is nonetheless large and dynamic.

EAP has experienced the largest increase in per capita income of any EMDE region over the past decade, alongside the fastest structural transformation. The share of employment in agriculture declined from around 38 percent in 2010 to 24 percent in 2025, with most of this labor absorbed by the services sector. Employment in modern services expanded more rapidly than in any other EMDE region, with the share nearly doubling from 4.5 percent to 8 percent.

In most major EAP economies, **manufacturing** value added accounts for about twice the share of GDP as the EMDE median. As a result, although EAP accounts for around one-fifth of global GDP, it produces almost one-third of global manufacturing value added.

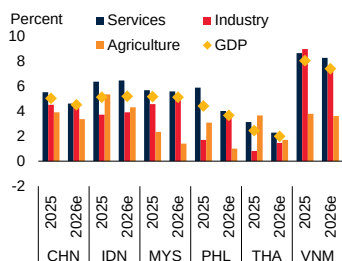
China, Malaysia, and Thailand have above-average shares of more complex manufacturing. China has the largest metals sector, alongside strong machinery and electronics production. Indonesia has the largest agribusiness-related manufacturing sector, reflecting palm oil processing. Malaysia has a strong heavy manufacturing base, as well as a large petrochemicals sector. The Philippines has a sizeable agribusiness sector and a strong electronics industry. Thailand has large automotive, chemicals, and electronics sectors. Viet Nam has the largest textiles sector (relative to its GDP), but also a strong electronics segment.

In all these countries, the shares of manufacturing value added and employment ranks in the top quartile of EMDEs, but

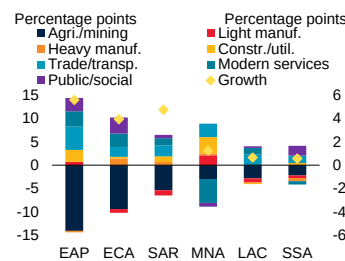
FIGURE 1.6 Sectoral activity

Growth and job creation in EAP economies are largely driven by services, but manufacturing retains more importance than in other EMDEs. Industrial production growth remains generally robust and services growth is broad-based. The region's agricultural sector is sophisticated and productive compared with other EMDEs, accounting for a large share of global production of many key foods.

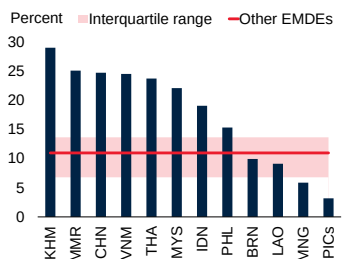
A. Growth by sector in East Asia



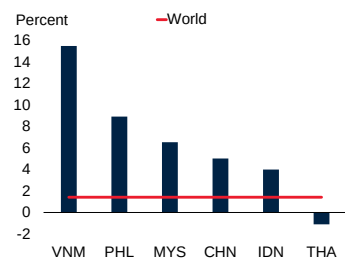
B. Change in employment share and GDP per capita growth, 2010–24



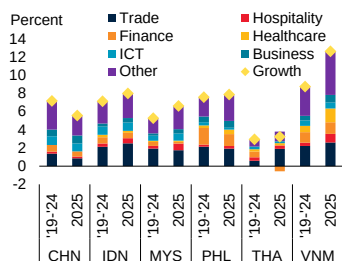
C. Share of manufacturing value added in GDP



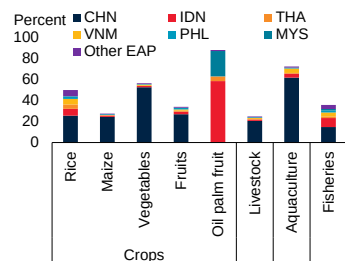
D. Industrial production growth, 3-month moving average



E. Decomposition of nominal services sector growth in EAP



F. EAP's share of global production of major crops, livestock, aquaculture, and fisheries



Sources: FAOSTAT; FAO FishStat; Haver Analytics; ILOSTAT; MPO; WDI; World Bank Group. A. Bars show real growth in services, industry, and agriculture. Diamonds show overall real GDP growth. Data for 2026 are estimates based on the World Bank's Macro Poverty Outlook database.

B. Annual averages. Bars show the change in each sector's share of total employment between 2010 and 2024, in percentage points. Employment data starting points range from 2010 to 2015, and ending points range from 2021 to 2025, depending on data availability for each economy. Regional averages are calculated weighted by employment. Diamonds show average annual real GDP per capita growth between 2010 and 2024.

C. Median and interquartile range are based on 117 EMDEs. Average of 11 PICs countries uses real GDP weights. Figure shows the 2025 value, or the 2024 or 2023 value if the 2025 value is unavailable.

D. Bars show growth in the 3-month moving average of the industrial production index. The latest value is August 2026 for Vietnam and China, June for Indonesia and World, and July for other countries.

E. Bars show each sector's contribution to year-on-year nominal services growth, in percentage points; diamonds indicate overall growth. "Other" covers services not shown separately; trade comprises wholesale and retail trade; hospitality broadly comprises accommodation and food-service activities. "Business" covers business services in China, Indonesia, Malaysia, and the Philippines; professional and technical services in Thailand; and technical and support services in Viet Nam.

F. Crop and livestock shares are based on gross production value, measured in constant 2014–16 international dollars. Fisheries figures refer to capture fisheries and are based on 2023 production quantity, measured in live-weight tons. Aquaculture figures are based on 2023 production value, measured in dollars.

these shares have been declining gradually as the service sector has grown. Recent growth in industrial employment and production has mainly reflected construction and utility sector activity, although manufacturing indicators have remained broadly steady. Industrial production indices and manufacturing PMIs continue to point to expansion despite higher costs of energy and transportation.

Services have remained a steady and robust contributor to regional growth in EAP. Growth within services has been broad-based. Trade remains the largest services subsector and an important driver of growth, but finance, ICT, and business services have also contributed strongly. Current indicators point to continued expansion.

So far, higher transportation costs amid the energy price shock do not appear to have discouraged tourist arrivals in the region. Tourist arrivals continue to increase in most countries. The main exceptions are Cambodia and Thailand, where tourist arrivals were already weak before the conflict in the Middle East, largely because of tensions along their border.

Agriculture remains an important sector in EAP. Agricultural jobs tend to be modern and more productive in EAP than in other EMDEs. The region produces the majority of the world's vegetables, almost half of global rice output, more than two-thirds of global aquaculture production, and about a third of fishery production. The rise in global fertilizer prices has pushed up fertilizer inflation in several EAP countries. Between January and June, it increased from 1.1 to 5.2 percent in the Philippines, from 1.5 to 4.7 percent in Indonesia, from 1.9 to 6.2 percent in Cambodia, and from 13 percent to 25 percent in Mongolia. Rising crude oil prices have made palm oil—which is a significant export for Malaysia and Indonesia—more attractive as a biodiesel feedstock, supporting palm oil prices.

Country developments

In **China**, growth moderated to 4.3 percent year on year in 2026Q2, the weakest quarterly pace since 2022Q4 and down from 5.0 percent in 2026Q1. Consumption has remained weak, with retail sales contracting by an average of 4.0 percent y/y in April–July, in part due to the fading effect of the government’s consumer goods subsidies. Weak consumption has meant that firms could not fully pass the higher costs through to consumers; consumer price inflation remained low at 1.0 percent y/y in April–July while firm profit margins narrowed.

Investment growth also slowed as higher energy costs weighed on energy-intensive sectors, even as the impact of the energy shock was partly offset by the drawdown of large oil reserves, a high share of renewable energy, and temporary limits on the increase in gasoline prices (World Bank Group 2026a, 2026b). Real estate investment fell by 18 percent year on year in January–June, housing sales were around two-fifths of their peak level, and real house prices remained about 23 percent below their 2021 peak (figure 1.7).

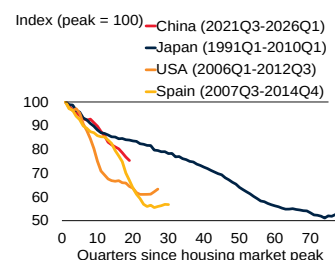
The prolonged property correction continues to weaken local-government finances. The consolidated deficit narrowed to 3.2 percent of GDP in the first seven months, from 4.0 percent a year earlier, as local governments reduced capital spending in response to declining land lease revenues and tighter investment.

Resilient exports cushioned the slowdown in domestic demand. Exports rose 21.1 percent y/y in April–July as high-tech exports surged, including those related to AI, electric vehicles, and green products. Weak domestic demand limited import growth outside of technology-related inputs. This helped maintain a current account surplus of 3.7 percent of GDP in the second quarter of 2026.

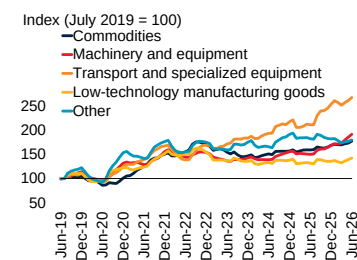
FIGURE 1.7 Country developments

China’s growth has been supported by exports, especially of products related to artificial intelligence. Domestic demand continues to be dampened by falling housing wealth. Indonesia’s currency and stock market have both declined substantially in 2026, and domestic sentiment is also declining. Household debt levels in Thailand have risen rapidly.

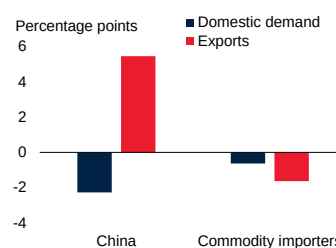
A. Real residential property prices



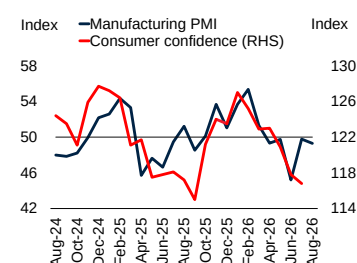
B. China: Exports



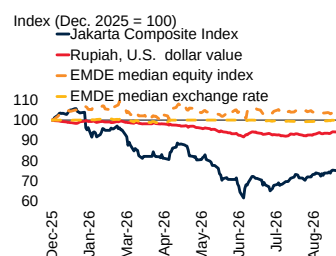
C. Deviation from pre-pandemic (2015–19) growth rates, 2023–25



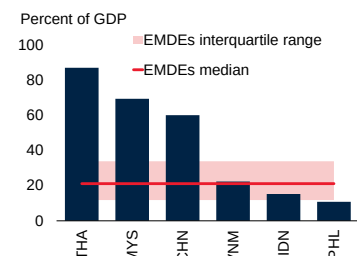
D. Indonesia: Manufacturing PMI and consumer confidence



E. Indonesia: Change in equity market and exchange rate since beginning of year



F. Household debt in 2026Q1



Sources: Bank for International Settlements; General Administration of Customs of China; Haver Analytics; WDI; World Bank Group.

A. Real residential property prices are indexed to 100 at the peak of each selected housing cycle: China, 2021Q3; Japan, 1991Q1; Spain, 2007Q3; and the United States, 2006Q1. The horizontal axis shows quarters elapsed since the respective peak. For the United States, Japan and Spain, the series end four quarters after their respective troughs. China is shown through 2026Q1.

B. Product categories follow the UNCTAD classification. “Commodities” includes mineral products, precious metals, and base metals. “Machinery and equipment” includes machinery and mechanical appliances, electrical equipment, and their parts. “Transport and specialized equipment” includes vehicles, aircraft, vessels, related transport equipment, and optical and precision instruments. “Low-technology manufacturing goods” includes chemicals, plastics, rubber, leather, wood, paper, textiles, footwear, ceramics, and glass. “Other” includes food, beverages, and miscellaneous goods, and is measured as the residual relative to reported total exports.

C. Domestic demand is the sum of total consumption and capital formation. Bars show the change in average export and domestic demand growth in 2023–25 relative to 2015–19. For non-China commodity importers, growth is calculated using the aggregate exports and domestic demand of 62 countries, measured in constant 2015 U.S. dollars.

D. Fifty is the expansion threshold for the manufacturing purchasing managers index and 100 is the neutral level for the consumer confidence index.

E. All series rebased such that the last trading day of 2025 equals 100 and interpolated on days when markets were closed. EMDE medians include 19 economies for the equity index and 46 for the exchange rate.

F. Sample of EMDEs includes 25 economies. “Interquartile range” is the 25th–75th percentile range.

In **Indonesia**, the economy started the year on a strong footing, accelerating from 5.1 percent growth in 2025 to 5.4 percent in the first half of 2026, its strongest two-quarter growth average since 2022. The pickup reflected strengthening private consumption and a surge in public spending around the turn of the year, as an earlier Ramadan and Eid, front-loaded public-sector holiday bonuses, and the accelerated rollout of the free nutritious meals program shifted government spending earlier in the fiscal cycle (World Bank Group 2026c). Domestic economic activity appears to have since weakened, with the manufacturing purchasing managers index falling to 49.3 in August and consumer confidence declining to 116.8 in July.

Rising deficits contributed to concerns over fiscal trends and sovereign ratings (World Bank Group 2026c). Market sentiment around Indonesia worsened in January, later exacerbated by higher global oil prices and shipping disruptions. Portfolio outflows reached 0.2 percent of GDP in 2026Q1. Concerns that Indonesia would be downgraded to frontier status by the global stock index provider MSCI—triggering automatic sales from passive index funds—led to a sharp decline in the value of the rupiah and the Jakarta stock index. The government responded by drawing down foreign exchange reserves, implementing financial sector reforms, and raising the central bank policy rate by a cumulative 100 basis points between May and June. This has helped contain the passthrough of depreciation into inflation. Fuel subsidies that suppressed price increases also contained inflation pressures and inflation fell from 4.8 percent in February to 3.4 percent in July.

In **Malaysia**, output rose 5.2 percent in 2025 and accelerated to 5.7 percent in the first half of 2026. Manufacturing led the acceleration, expanding 7.5 percent in the second quarter. Exports of electrical and electronic products, which account for nearly half of exports, were

boosted by strong AI investment (Bank Negara Malaysia 2026).

Malaysia's position as a net energy exporter has buffered some of the negative impacts of higher global energy prices. Energy subsidies have contributed to the country having one of the smallest increases in inflation in recent months: headline inflation increased from 1.4 percent year on year in February to 1.9 percent in August, within the central bank's forecast range of 1.5–2.5 percent. Producer price index, however, rose sharply from 1.1 percent in March to 9.7 percent in July, indicating upstream cost pressures. The exchange rate of the ringgit has also been stable compared with other currencies in the region. Fiscal consolidation continued, as higher fuel subsidy costs have been compensated by petroleum-related revenue. The federal deficit was 3.4 percent of GDP in the four quarters to March 2026, inside the 3.5 percent target for the year and down from 3.7 percent in 2025, while federal debt held at 65.3 percent of GDP (IMF 2026a).

In **the Philippines**, the economy grew 4.4 percent in 2025 but slowed to 2.3 percent year on year in 2026Q2, the weakest pace since the pandemic. As a net oil importer, the Philippines was among the economies most exposed to the energy supply shock caused by the closure of the Strait of Hormuz and the conflict in the Middle East. Unlike many other countries, the Philippines did not respond with energy subsidies. This, combined with currency depreciation and limited local buffer stocks, passed the shock through to consumers. Headline inflation breached the central bank's 2–4 percent target range, rising from 2 percent at the beginning of the year to 6.1 percent in August. The central bank, which had been easing policy as recently as February, has since increased its policy rate by 75 basis points.

Investment has slowed, with real private construction slowing to 3.8 percent

year-on-year in 2026Q2 and public construction contracting 32 percent amid strengthened spending review processes. Net inflows of FDI fell to their lowest point since 2016.

Tradable sectors lost momentum through late 2025 but have rebounded in 2026. Merchandise exports rose 13 percent in the first half of 2026, led by electronics growth of 21 percent as the country benefited from the global surge in AI-related investment (BSP 2026; World Bank Group 2025a). The current account deficit nonetheless widened to 4.8 percent of GDP in 2026Q1 as a result of rising import prices. National government debt reached 65.2 percent of GDP in the first quarter of 2026, its highest level since 2005.

In **Thailand**, growth averaged 2.4 percent in 2025 and rose to 2.8 percent year on year in 2026Q1, but decreased to 1.9 in 2026Q2. Growth has been supported by government measures, strong private investment, and goods exports. Private consumption picked up in June, supported by the “Thais Help Thais Plus” co-payment fiscal transfers. Merchandise exports increased by nearly 22 percent year on year in July. Exports of computers and parts have doubled their share in the export basket since 2023, rising to 8 percent. The strength in exports has not translated into a broad-based manufacturing recovery, however. Overall manufacturing production fell for three consecutive months, contracting 3.1 percent in June, even as production of electrical equipment grew 8 percent. Higher costs are weighing on economic activity—headline inflation was -0.7 percent at the beginning of 2026 and rose to 2.5 percent in August as higher oil prices passed through to domestic prices.

Tourism also weakened. Arrivals totaled 15.9 million in the first half of the year, 4.9 percent below the same period of 2025 and 19.8 percent below the corresponding period

of 2019. Monthly arrivals declined to their lowest level since November 2022 in June, 20.7 percent below a year earlier.

Debt levels continue to rise: household debt remains elevated at 86.9 percent of GDP in 2026Q1, well above the regional average. Public debt reached 66.7 percent of GDP in March 2026, just below the statutory ceiling of 70 percent. The central government’s deficit widened in the first nine months of FY2026, as both current and capital spending accelerated.

In **Viet Nam**, the economy grew 8 percent in 2025 and accelerated further to 8.3 percent in the first half of 2026, making it the strongest performer in the region. Manufacturing, exports, and public investment drove the expansion. Goods exports rose 22 percent year on year in August, with strong growth in electronics and machinery. Investment in these sectors remains robust, and foreign direct investment reached a five-year high in the first half of the year.

Growth is also being bolstered by fiscal policy. The 2025 deficit widened to an estimated 3.7 percent of GDP on a 45 percent increase in public investment, and the 2026–2030 public investment plan envisages further increases—mainly for energy, transport, and logistics—aimed to increase total investment toward 40 percent of GDP (World Bank Group 2026d). Inflation rose from 2.5 percent at the beginning of the year to 4.9 percent in August.

Imports have increased even more rapidly than exports in 2026 due to the accumulation of electronics inventories and rising prices for chips and fuel. As a result, foreign exchange reserves have declined and are expected to be equivalent to less than 2 months of imports in 2026 (World Bank Group 2026d).

In **Cambodia**, domestic demand weakened in 2026 as international arrivals and remittances fell, while higher oil prices squeezed household

incomes and a real estate correction and tighter credit conditions weighed on investment. Growth was supported by rising goods exports. In **Lao PDR**, growth held up in the first half of 2026, supported by trade and hospitality, construction, electricity generation, and foreign investment.

In **Mongolia**, the economy grew 7.8 percent in the first half of 2026. Higher mining output has boosted exports, investment, and growth, but generated limited linkages to the wider economy. Non-mining growth of 4.3 percent mainly reflected recovery after a winter where extreme cold and heavy snow prevented livestock from grazing—known as a “dzud”—leading to significant losses. In **Myanmar**, real GDP contracted by an estimated 1.3 percent in the fiscal year ending March due to conflict, energy shortages, and depressed household incomes. Inflation exceeded 20 percent, while diesel and petrol prices rose more than 50 and 70 percent, respectively, between end-February and end-September.

In **Papua New Guinea**, growth accelerated to 5.6 percent in 2025, supported by the ramp-up of the Porgera mine and stronger non-resource activity as foreign exchange constraints eased. In **Timor-Leste**, growth reached 4.5 percent in 2025 but slowed in early 2026. Activity has been supported by government spending and a more than doubling of non-oil goods exports, led by coffee. These have been outweighed, however, by moderating tourism growth, slower credit expansion, and the end of petroleum production.

Many **Pacific Island Countries** are facing significant near-term headwinds. Higher prices for jet fuel have slowed tourist arrivals in many countries. Governments have made efforts to shield the domestic economy from higher energy prices, but these are weighing heavily on

already-stretched fiscal positions. Remittances have generally remained strong, however.

In **Fiji**, the economy has slowed alongside tourism growth, despite offsetting support from construction activity, strong remittances and a cut to the VAT. **Solomon Islands** was hit by Cyclone Maila in early April, causing a sharp decline in fishing and farm production. Unlike many other countries, **Palau** has experienced strong growth in tourist arrivals. After a strong post-pandemic rebound when the economy grew at an average of 8 percent for three years, economic activity in **Samoa** has slowed sharply due to high energy prices and weak agricultural production. Growth in **Tonga** has been supported by reconstruction from damage inflicted in 2022 by an underwater volcanic eruption and tsunami, but this has slowed due to energy price pressures. **Vanuatu** is rebounding after its national airline went bankrupt in early 2024, its capital was damaged by a major earthquake in late 2024, and a series of cyclones, most recently in early 2026.

Growth in **sovereign rent-led economies** (**FSM**, **RMI**, **Kiribati**, **Naoero**, **Tuvalu**) has been supported by donor support, trust fund income, and fishing license revenues. In **Kiribati**, growth has been supported by high donor financed investment in transport and coastal protection. **Tuvalu**’s growth has been underpinned by coastal adaptation and public works. **Naoero**’s growth reflects progress converting its Aiwo Port into a climate-resilient deepwater seaport and solar energy projects.

Outlook

Regional outlook

EAP is expected to grow 4.5 percent in 2026 (figure 1.8). The 0.3 percentage point upgrade relative to the April forecast is largely due to the strength of high-tech investments and exports

in countries that are part of the AI value chain. Countries that are more integrated in global value chains for AI-related goods have seen substantial upgrades in forecast export growth.

The region's integration in fast-growing global value chains for AI-related goods has supported activity even as other drivers of growth have faded. The drag from elevated energy prices has not been as severe as anticipated, mitigated by a combination of market forces, increasing use of renewables, the drawdown of inventories, and subsidies for consumers.

There are many exceptions to the broad regional narrative: Indonesia has not benefited from AI-related value chain integration, but its domestic demand growth is healthy; the Philippines has suffered more than other EMDEs from high energy prices. Idiosyncratic factors are driving the outlook for many smaller countries. By sector, the forecast includes strong contributions across sectors, with generally robust forecast for services, industry, and agriculture.

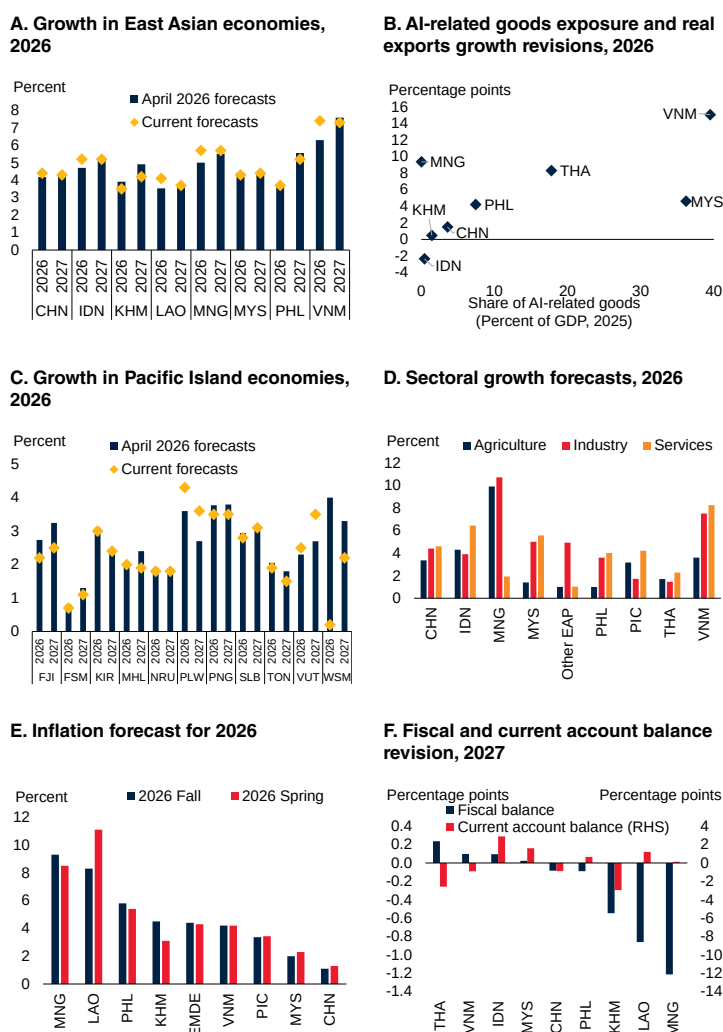
While regional growth has not been affected as much as anticipated by high energy prices, the same cannot be said for inflation. Inflation rose rapidly across the region in 2026 and is expected to remain elevated into 2027. Despite the region's dependence on imported energy and use of policy support to buffer against higher energy prices, current account balances and fiscal balances are expected to remain generally contained.

Country outlooks

Growth in **China** is projected to moderate to 4.5 percent in 2026 and 4.3 percent in 2027 amid continued weakness in domestic demand. Consumption and investment are expected to be constrained by a soft labor market, property sector adjustment, and low corporate profitability in some sectors. Strength

FIGURE 1.8 Outlook

Growth in East Asia and the Pacific is expected to remain strong across most of the region, with countries more integrated in AI production seeing larger upgrades to forecasts for exports. Pacific Island countries face particular headwinds from high energy prices. Industrial activity makes up a significant share of growth. Inflation is expected to remain elevated. Fiscal and current account balances are expected to remain generally contained.



Sources: MPO; WDI; World Bank Trade Watch database; WTO (2025); World Bank Group.

A. 2026 refers to FY25/26 for economies that use fiscal year.

B. AI-related goods follow WTO (2025). "Real export growth revision" is the difference in real exports growth forecasts for 2026 between the current forecast and the April 2026 forecast.

D. "Other EAPs" aggregated using real GDP.

E. "EMDEs" refers to the median of 95 non-oil exporting and non-energy exporting EMDEs outside of EAP.

F. Bars reflect the revision to 2027 fiscal balance and current account balance forecasts, measured as the difference in percentage points of GDP between the current MPO vintage and the April 2026 MPO vintage.

in high-tech sectors and exports, as well as fiscal support, will partly offset these headwinds. Over the medium term, structural factors such as an aging population, high debt levels, and diminishing returns to capital are expected to weigh on China's growth trajectory.

TABLE 1.1 Growth in East Asia and Pacific

	October 2026 forecast				Forecast Revision	
	2025	2026 (f)	2027 (f)	2028 (f)	2026	2027
East Asia and Pacific	5.0	4.5	4.4	4.3	0.3	0.0
East Asia and Pacific (excluding China)	4.9	4.7	4.9	5.0	0.5	-0.1
Pacific Island Countries	2.6	2.1	2.5	2.8	-0.6	-0.5
China	5.0	4.5	4.3	4.2	0.3	0.0
Indonesia	5.1	5.2	5.2	5.3	0.5	0.0
Malaysia	5.2	5.1	4.7	4.5	0.7	0.3
Philippines	4.4	3.7	5.2	5.5	0.0	-0.4
Thailand	2.4	2.0	2.3	2.4	0.7	0.0
Viet Nam	8.0	7.4	7.3	7.3	1.1	-0.3
Cambodia	5.3	3.5	4.0	5.0	-0.4	-0.9
Lao PDR	4.8	4.1	3.7	3.7	0.6	0.0
Mongolia	6.9	5.7	5.6	5.4	0.7	0.1
Myanmar	-1.3	2.0	2.5	...	0.0	-1.5
Papua New Guinea	5.6	3.5	3.5	3.2	-0.3	-0.3
Timor-Leste	4.5	4.1	3.8	3.8	0.0	-0.2
Palau	6.0	4.3	3.6	3.2	1.3	0.9
Fiji	2.5	2.1	2.3	3.0	-0.6	-0.9
Solomon Islands	3.6	2.8	3.1	3.1	-0.1	-0.1
Tuvalu	2.2	1.4	2.3	2.6	-1.1	-0.4
Marshall Islands (RMI)	1.8	2.0	1.9	1.8	0.0	-0.5
Vanuatu	1.7	2.5	3.5	2.8	0.2	0.8
Kiribati	4.3	3.0	2.4	2.2	-0.1	0.0
Tonga	4.4	1.9	1.5	1.3	-0.1	-0.3
Samoa	4.2	0.2	2.2	2.5	-3.8	-1.1
Micronesia, Fed. Sts.(FSM)	1.1	0.7	1.1	1.4	-0.1	-0.2
Naoero	2.1	1.8	1.8	1.8	-0.1	-0.1

Note: GDP is measured in average 2010–19 prices and market exchange rates. For the following countries, values correspond to the fiscal year: Federated States of Micronesia, Marshall Islands, and Palau (October 1–September 30); Myanmar (April 1–March 31); Naoero, Samoa, and Tonga (July 1–June 30).

Growth in **Indonesia** is projected to remain stable at 5.2 percent in 2026 and 2027. This represents a 0.5 percentage point upgrade in the forecast for 2026, as the drag from higher energy prices has been less severe than anticipated. Activity has also been supported by a ramp up of government priority programs, state-linked investment, and energy subsidies. The policy mix has supported near-term growth while contributing to larger fiscal and external imbalances, which are expected to persist in coming years as current account

deficit is expected to widen to 1.5 percent of GDP in 2026. As fiscal stimulus moderates, medium-term growth is projected to rely more on private investment. Inflation is expected to remain around the upper bound of the central bank's target range.

In **Malaysia**, growth was stronger than expected in the first half of 2026. GDP is projected to expand by 5.1 percent in 2026 and 4.7 percent in 2027. Domestic demand is expected to remain the main driver of growth,

while the strong contribution from external demand moderates as frontloaded trade flows and re-exports normalize. The further easing in 2027 mainly reflects slower investment growth, while household consumption remains resilient. Inflation is projected to remain broadly stable as targeted fuel subsidies limit the pass-through of higher energy prices to households.

Growth in **the Philippines** is projected to slow to 3.7 percent in 2026 as weakness in domestic demand widens the negative output gap. Pressure from high energy prices is forecast to push inflation to 5.8 percent in 2026, weakening household purchasing power and raising production costs, while weak public investment and confidence will soften investment growth. Growth is forecast to increase to an average of 5.4 percent in 2027–28 contingent on the rebound of public investment and the expected normalization of inflation by 2027.

Growth in **Thailand** is projected to slow to 2.0 percent in 2026 as higher energy prices weigh on tourism and logistics. This slowdown is less severe than previously anticipated, as strong exports, AI-related investment, and energy relief measures are partially offsetting these pressures in the second half of 2026. Growth is projected to strengthen to 2.3 percent in 2027 and 2.4 percent in 2028 as oil-price pressures ease and fiscal stimulus offsets a moderation in private investment. Headline inflation is expected to rise from -0.1 percent in 2025 to 2.2 percent in 2026 as higher energy prices pass through to domestic prices. Public debt is projected to continue its sharp increase, rising above 69 percent of GDP by 2028, with the recent rise driven by cost-of-living relief and support for the energy transition.

Growth in **Viet Nam** is expected to remain robust at 7.4 percent in 2026. The manufacture and export of high-tech and AI-related goods

has underpinned recent stronger-than-expected growth. This is projected to continue. Activity is also expected to benefit from increased domestic stimulus from structural reforms and expanded public investment. After years of consolidation, the fiscal balance is expected to remain in deficit over the projection. Inflation is projected to average 4.2 percent in 2026 due to rising costs for fuel, housing, and utilities.

Growth in **Cambodia** is projected to moderate to 3.5 percent in 2026, primarily driven by a contraction in private consumption. This reflects diminishing remittance inflows, elevated inflation, and subdued credit growth, which have severely constrained household purchasing power. Over the medium term, growth is forecast to rebound to 4.0 percent in 2027 and 5.0 percent in 2028, supported by the stabilization of energy prices, a recovery in tourism, and the successful economic reintegration of returning migrant workers. El Niño is expected to temper 2027's agricultural recovery.

Growth in **Lao PDR** is projected to moderate to 4.1 percent in 2026, as headwinds from higher fuel prices are partly offset by domestic policy easing. In addition, strong power generation and investment inflows will also cushion some impacts. Inflation is expected to remain elevated this year reflecting high oil prices and broader price pressures.

Growth in **Mongolia** is projected at 5.7 percent in 2026 and around 5.5 percent over the medium term, supported by mining, fiscal expansion, and large infrastructure investments. Fuel supply constraints will keep price pressures elevated in the near term, before monetary tightening moderates inflation in the medium term.

Growth in **Myanmar** is projected to recover modestly to 2.0 percent in FY2026/27, supported by reconstruction and

gradual business adaptation. However, persistent conflict, electricity shortages, labor constraints, foreign-exchange restrictions, and weak domestic demand are expected to keep activity well below pre-crisis levels. Inflation is projected at around 20 percent, driven by high fuel costs, exchange-rate pressures, supply disruptions, and domestic deficit financing.

Growth in **Papua New Guinea** is expected to moderate to 3.5 percent in 2026 and 2027 as the temporary boost from the Porgera gold mine's reopening fades and resource sector output stabilizes. The effects of El Niño, weaker external demand, and higher energy prices are also expected to weigh on growth.

Growth in **Timor-Leste** is projected to moderate to 4.1 percent in 2026 and 3.8 percent in 2027–28 as temporary public spending measures unwind. More fundamentally, the closure of the country's last producing petroleum field in 2025 marked the end of the petroleum revenues that financed the state and supported growth for much of the past two decades. The medium-term outlook assumes that the country successfully transitions from a growth model led by public spending toward a more diversified and private-sector-driven economy, with the Petroleum Fund providing a financial buffer to ease adjustment. Inflation is projected to rise to 2.1 percent in 2026 as the effects of higher fuel and transport costs feed through, before stabilizing.

Growth in **Pacific Island countries** is generally expected to slow in 2026, reflecting higher energy prices and slower tourism inflows. Inflation in PICs will remain high given their dependence on imported energy (box 1.1). **Palau** is forecast to slow to 4.3 percent in FY26 as previous strong growth in tourism and construction normalizes. In **Fiji**, growth is projected to slow to 2.1 percent in 2026, while widening fiscal and current account deficits

push public debt higher. In **Solomon Islands**, growth is projected to slow to 2.8 percent in 2026 as fuel-prices and damage from Cyclone Maila weigh on activity. In **Tuvalu**, growth is forecast to slow to 1.4 percent in 2026 before recovering to 2.6 percent by 2028. In the **RMI**, an accommodative fiscal stance is expected to offset the drag from high energy prices, and growth is expected to remain stable around 2 percent until 2028. **Vanuatu's** economy is expected to accelerate as tourism and agriculture normalize. Growth in **Kiribati** is expected to moderate to 3.0 percent in 2026, while energy support widens the fiscal deficit to 17 percent of GDP. In **Tonga**, growth is projected to slow to 1.5 percent in FY2027 and inflation to reach 8 percent amid higher energy costs and El Niño-related agricultural losses. Growth in **Samoa** is expected to recover to 2.2 percent in FY2027, supported by public spending, although inflation is projected to rise to around 4 percent. In **FSM**, growth is estimated to moderate to 0.7 percent in FY26 as the oil price shock erodes purchasing power. **Naoro** is projected to grow by 1.8 percent in FY2027 as hosting revenues offset weaker fishing revenues.

Risks and vulnerabilities

Persistently elevated energy prices

Thus far, the shortfall of oil supplies caused by conflict in the Middle East has been mitigated by a variety of factors. Governments have drawn down stocks of oil and natural gas, which were unusually full prior to the conflict in the Middle East but have now been substantially depleted (figure 1.9). Trade networks for crude oil and refined goods have been reconfigured. Some ships are transiting despite blockades of the Strait of Hormuz, China's oil imports have declined substantially, and U.S. exports have increased. Energy subsidies have protected many consumers from larger price increases.

Previous spikes in oil prices were not foreseen by markets, and new ones could be triggered in a variety of ways. Other oil-supplying regions could rein in recent output expansion, including due to conflict. The drawdown of oil inventories may need to be curtailed as reserves dwindle. Fiscal support may prove unsustainable given stretched fiscal positions in many countries. A renewed rise in energy prices may therefore be more damaging to the global economy than observed during the initial increase.

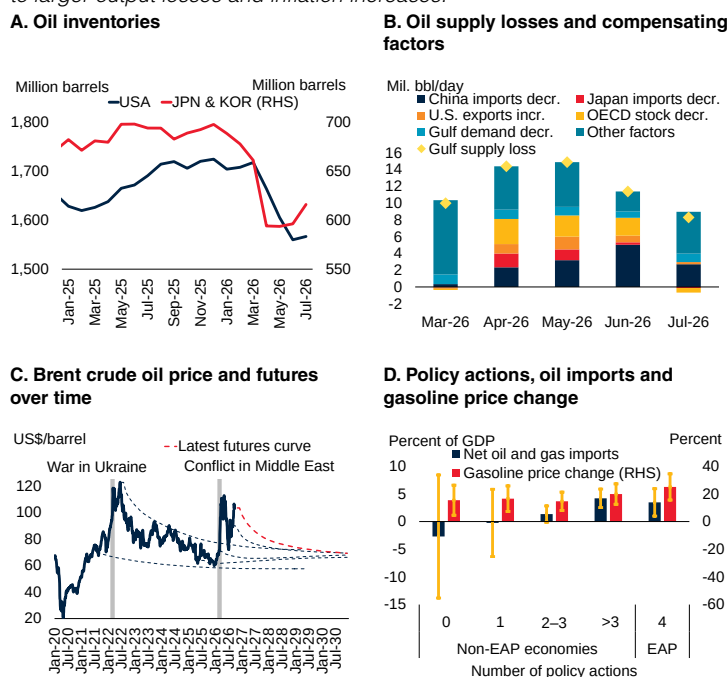
Export restrictions could compound the impact of a renewed rise in fossil fuel prices. In the most recent episode, countries that produce or refine energy products have mostly let markets match supply and demand, with the notable exception of Russia. In previous episodes of global supply disruption, however, countries have frequently resorted to export restrictions to avoid domestic shortages. These weaken market incentives and amplify scarcity during a crisis, and would amplify any increase in energy prices (Laborde, Lakatos and Martin 2019).

In the most likely, baseline scenario, oil exports from the Gulf region mostly return to pre-conflict levels by mid-2027. Should shipments remain blocked for longer, dwindling inventories will require prices to rise high enough to reduce demand by an amount equivalent to the supply shock. As inventories approach critical operational levels, physical scarcity could cause prices to spike.

Shortages of oil, fertilizers, and aluminum would weigh on the global economy: oil shortages could raise transport and logistics costs; fertilizer shortages would threaten agricultural production and food prices; and aluminum shortages would disrupt construction, transport equipment, manufacturing, and renewable energy supply chains. Given that many refined energy products, such as jet fuel and diesel, have already increased by far more than crude oil,

FIGURE 1.9 Risk of persistently elevated energy prices

Oil inventories have been substantially depleted and prices remain well above pre-conflict levels, as traffic through the Strait of Hormuz remains limited. Prices for refined energy products have increased even more. Countries in EAP have put in place many policies to limit their exposure to more expensive energy imports, but it is not clear that they have been effective. A more persistent energy shortage, which could result from conflict spreading in the Middle East or in another oil-producing region, would lead to larger output losses and inflation increases.



Sources: Bloomberg; CEPII BACI; Global Petrol Prices; Haver Analytics; IEA Oil market Report; IMF Port Watch; International Energy Agency; Japan Ministry of Finance, Trade Statistics of Japan; JODI-Oil World Database; World Bank Policy Tracker; World Bank Group.

A. Lines show total stocks of oil and oil products. B. Gulf supply losses are from IEA Oil Market Report estimates. Changes in U.S. exports and Chinese and Japanese imports are calculated relative to the same month a year earlier. The decline in Gulf demand is proxied by the year over year change in refinery intake in Kuwait and Saudi Arabia, based on the JODI Oil World Database. The July value is estimated using the March-June average. OECD stock decrease shows average daily decrease in total OECD crude oil stocks based on IEA.

C. Blue line shows one-week moving average of Brent crude oil prices. Dotted lines show oil futures curves 1 month and 1 working day before the curve's starting month, which is the smallest possible gap between available futures and the spot price. For example, the curve starting in July 2026 shows the oil futures curve as of May 29, 2026. Future curves are smoothed using 31 day moving average.

D. Bars show means; whiskers show ± 1 standard deviation. Gasoline price change measured from 23 February 2026 to the latest available data (retrieved July 31, 2026). Groups are arranged by the number of implemented policy actions (excluding announced-but-not-implemented measures) from World Bank Policy Tracker.

further increases could weigh heavily on countries reliant on airborne travel or those with limited domestic refining capacity, such as Pacific Island Countries.

Further increases in energy prices could lead to disruptions in supply chains, higher inflation, and tighter financial conditions as major central banks raise policy rates. This could also trigger a deterioration of risk appetite in financial markets, leading to a substantial fall in global

equity valuations, a rise in volatility, higher corporate bond spreads, and a decline in consumer and business confidence. The impact of such a scenario of persistently higher energy prices on individual countries depends on two factors: their exposure to global energy markets and their use of policies to dampen shocks.

Fuel subsidies (Malaysia, Niue, Palau) and fuel tax cuts (Cambodia, Lao PDR, Viet Nam) have slowed the pass through into consumer prices. Storage drawdowns have increased supplies and redirected fuels from industrial toward vulnerable users. Cash transfers (the Philippines, Fiji) have eased the burden on vulnerable groups. Working-from-home mandates, support for efficient transportation (buses, carpooling, or electric vehicles) and fuel rationing have reduced demand (Lao PDR, Myanmar, Viet Nam, Fiji).

It is not clear how effective these measures have been, however, as EAP countries have taken more policy actions than other EMDEs, on average, but have nonetheless seen larger increases in gasoline prices. These measures may postpone the adjustments to behavior required if the shock is persistent rather than temporary, while also imposing fiscal costs and lowering foreign currency reserves. For example, Indonesia, Thailand, and Viet Nam—all countries that have taken measures to contain retail gasoline prices—have reduced their foreign exchange reserves by between 15 to 40 percent in 2026.

Reversal in global AI activity

Global investment in AI-related assets has risen sharply on the expectation of significant profits and productivity gains. This spending has become an important driver of global activity. Capital expenditure by the five largest U.S. hyperscalers is set to exceed US\$1 trillion over 2025 and 2026, rising from 18 percent in 2024 to 32 percent of their revenue in 2025 alone, against 7 percent for firms generally (BIS 2026).

U.S. GDP growth in recent quarters would have been substantially weaker without investment in information-processing equipment and software (figure 1.10).

AI has become similarly important for global trade. In early 2026, U.S. imports of AI-enabling goods rose nearly 60 percent year-over-year while imports of non-AI-related goods declined by nearly a quarter. Exports of AI-related goods grew three times as fast as other exports in the European Union and in China, while AI-related exports from many countries, such as Viet Nam and Malaysia, have at least doubled relative to their 2020–22 averages.

The importance of AI is even more apparent in financial markets. In April, the “Magnificent 7” technology stocks accounted for 32 percent of the S&P 500 and 21 percent of the MSCI All Country World Index capitalization. In East Asia, concentration is also high. At the end of April 2026, the two Korean semiconductor majors accounted for 43 percent of the KOSPI market valuation, and the Terrific 10 Chinese technology firms have increased their share of global equity market capitalization to nearly 2 percent (Avalos, Doerr, and Pinter 2025).

In the past, some rapid increases in sectoral investment have been followed by significant corrections. Gross AI-related capital expenditure has reached 6 percent of U.S. GDP (Armstrong 2025)—similar to the share information-technology investment reached at its peak in 2000, and to the peak share that residential investment reached in 2005. After several years of accelerating investment, both episodes ended in corrections that contributed to a global downturn in 2001 and a global recession in 2008–09 (BIS 2026; Kose, Sugawara, and Terrones 2020). The current episode has risen faster than either previous cycle and is still gaining speed. As in previous episodes, a correction in AI investment would not necessarily indicate that the underlying

technology had failed. Instead, it could indicate that investment had run ahead of realized demand (World Bank Group 2026e).

Such a reversal could be triggered in a few ways. The rapid growth in AI investment was supported by abundant liquidity and may be slowed by the latest tightening of financial conditions. Valuations have been held up by optimism about future profits and could be lower if cash flows do not meet expectations, or in response to a perception that the market for AI is more competitive, and therefore less profitable, particularly for companies that are unable to ring-fence dominant market positions. New investment could be stalled by public dissatisfaction—protests against new data centers in the United States are becoming increasingly common, for example, particularly in areas with larger increases in electricity prices and lower per capita incomes. A sharp reversal in AI investment would affect EAP through two channels.

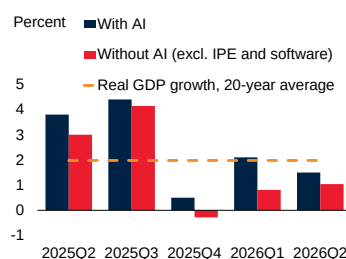
The first would be a *financial channel*, as a repricing of AI-related assets could prompt global risk aversion, capital outflows from emerging markets, and tighter financial conditions. How large that spillover would be depends on the type of stress transmitted and the availability of policy room to buffer shocks.

Local projection-based estimations show that emerging market equities, exchange rates and local government bond yields respond to U.S. financial stress (as proxied by an increase in the VIX or decline in the S&P500 for equity markets, or an increase in the term premium or the MOVE index for bond markets). EMDE equities fall during both U.S. bond-market and (more substantially) U.S. equity-market stress. Local government bond yields rise during bond-market stress. The response in EAP is broadly in line with that of other EMDEs (annex 1.1). EMDE exchange rates also depreciate relative to the

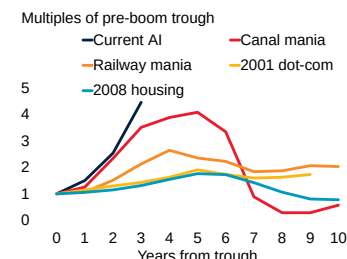
FIGURE 1.10 Reversal in AI activity

Rapid growth in AI investment is an increasingly important part of U.S. GDP and stock market valuations. This rapid growth shares some commonalities with previous increases in investment that eventually reversed. Protests against new data centers in the United States are becoming increasingly common, particularly in areas with larger increases in electricity prices. Financial stress in the United States would propagate to EMDEs.

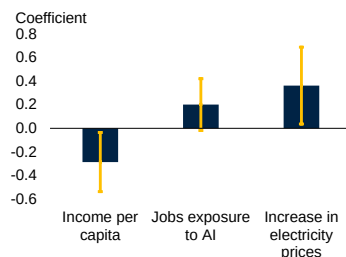
A. U.S. real GDP growth with and without IPE and software investment



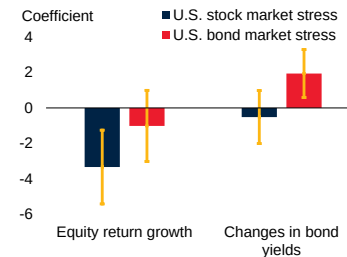
B. Change in investment around major turning points



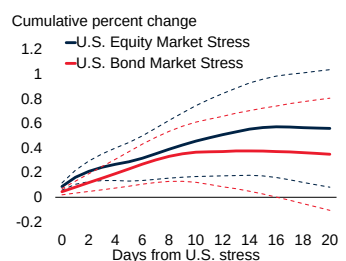
C. U.S. state-level correlates with actions against data centers



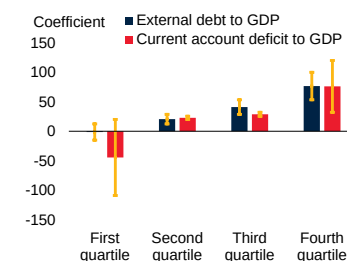
D. Spillovers to EMDE assets from U.S. financial market stress



E. Daily EMDE exchange rate response to U.S. financial market stress



F. Estimated change in domestic bond yields in response to U.S. financial stress, by vulnerability



Sources: Bureau of Economic Analysis; Data Center Tracker; Federal Reserve Economic Data (FRED); Felten, Raj, and Seamans (2021); Haver Analytics; Rungcharoenkitkul (2026); U.S. Census Bureau; U.S. Energy Information Administration; WDI; World Bank IDS (database); World Bank Group.

A. Growth excluding AI is calculated as real GDP growth less the contributions from information processing equipment (IPE) and software, which is used as a proxy for AI-related activity. Dashed line shows average quarterly GDP growth over 2006Q2–2026Q2.

B. Investment is indexed to each episode's pre-boom trough. "Canal mania", "Railway mania", "2001 dot-com", and "Current AI" are from Rungcharoenkitkul (2026) which show U.S. canal spending (1835), British real investment (1843), U.S. information-processing equipment and software investment (1995), and capital expenditure by five U.S. AI hyperscalers (2023), respectively. AI spending for 2026 is based on guidance provided during earnings calls, not realized spending. "2008 housing" shows U.S. private residential fixed investment.

C. Regressions use state-level variables relating data center actions to changes in electricity prices, AI exposure (Felten, Raj, and Seamans 2021), and per capita income (May 2025). Whiskers show 95 percent confidence intervals.

D. E. F. Refer to annex 1 for details.

E. Cumulative change in EMDE exchange rates against the U.S. dollar after U.S. financial stress, estimated using daily local projections. Equity stress uses the VIX and S&P 500; bond stress, the MOVE index and U.S. term premium. Dotted lines show 95 percent confidence intervals.

F. Bars show midpoint of estimated first month bond yield response in basis points within each quartile of the distribution of EMDEs according to each metric of vulnerability shown. Whiskers show lowest and highest estimated responses within each quartile.

U.S. dollar following U.S. financial stress, with most of the depreciation occurring within the first two weeks.

Country vulnerabilities shape the size of these responses. Countries in the top quartile among EMDEs according to the size of their current-account deficit or external debt burdens faced larger estimated increases in local government bond yields under U.S. financial-market stress, while those with the most limited vulnerabilities—in the lowest quartile for either indicator—centered at or below zero.

These estimates are based on historical experience in public markets. A growing share of exposure to AI is happening in markets that are less visible, and that have not been tested by a severe downturn: of the US\$2.9 trillion of AI capital expenditure planned for 2025–28, US\$800 billion is expected to be financed by private credit (figure 1.11). Private credit assets under management have quadrupled in a decade to an estimated US\$2.1 trillion at end-2024, US\$1.5 trillion of it in North America. AI-related lending has risen to 34 percent of private credit activity in 2025, from an average of 18 percent over the previous five years (FSB 2026).

Ownership of private credit can be obscure but tends to be with large investors with significant linkages both domestically and internationally. In a European Central Bank simulation of a severe private credit shock, euro area pension funds lose 5–6 percent of assets and insurers 4 percent, against bank losses of at most 1.3 percent of equity (Cera et al. 2026). Pension funds and insurers are the largest identified investors, accounting for 35 percent of committed capital; a further 30 percent is disclosed only as “other” and 35 percent is not identified at all (IMF 2024).

Direct exposure to private credit by investors in emerging market and developing economies

is small—under 5 percent of the global market, half of which is in India (IMF 2026b). Stress in private credit could nonetheless have broader effects through correlated asset markets, spilling over to leveraged loans and high-yield bonds and, through deteriorating risk sentiment and investor outflows, triggering broader repricing of high-yield bonds and equities (Cera et al. 2026).

Banking systems in East Asia and Pacific entered 2026 sound. In China, the financing of AI investment largely runs outside private credit markets (IMF 2026b). Risks in the non-bank financial institutions sector as a whole have declined markedly in recent years, though vulnerabilities remain, notably in the fast-growing asset management industry, amplified by rising interconnectedness with the banking sector through ownership, common asset holdings, and funding linkages (IMF 2026c). Nonperforming loans are high in a few smaller economies—at 9.6 percent of total loans in Cambodia, 10.2 percent in Solomon Islands, and 14.3 percent in Tonga—but otherwise modest.

Bank funding is the broadest exposure. Foreign-currency-denominated liabilities of banks provide a channel for global dollar funding to transmit into domestic credit markets, and they are significant in some countries: 29.2 percent of GDP in Malaysia and 20.7 percent in the Philippines. Thailand has the highest level of household debt among EMDEs in the region, at 86.9 percent of GDP, but only 1 percent of this is denominated in foreign currencies and funding costs are low, so stress would arrive mainly through interest rates and asset prices. Reserve cover has fallen since 2020—from 12.3 to 7.3 months of imports in the Philippines and from 8.4 to 5.5 in Indonesia—and monthly data show it falling further after the conflict escalated in February.

The second channel is through the *real economy*, in particular trade. A 1-percentage-point

slowdown in U.S. growth lowers growth in other emerging market and developing economies by an estimated 0.6 percentage point after one year, with an investment effect roughly twice as large (Kose et al. 2017; World Bank Group 2025b). A slowdown concentrated in AI would be material for East Asia because of the region's prominence in the AI supply chain. China, Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam exported US\$1.4 trillion of AI-related goods to the world in the twelve months to April. Much of this went to the United States, which imported US\$739 billion of AI-related goods in the 12 months to April 2026, one third of it from East Asia and Pacific.

There is also substantial AI-related trade within EAP. China, the largest supplier at US\$785 billion, mostly exports intermediate inputs, which account for nearly three-quarters of the country's AI-related exports, to other ASEAN countries. Assembled equipment such as computers, servers, and routers accounts for 69 percent of Thailand's AI-related exports and 60 percent of Viet Nam's, with a larger share directed to final demand in the United States.

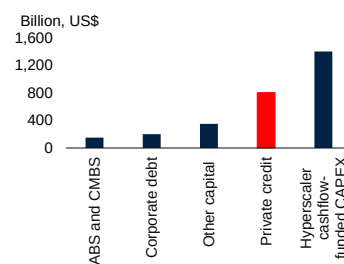
These exports also stimulate domestic demand. For example, announced greenfield data-infrastructure investment in Malaysia reached 3.7 percent of GDP and 46 percent of all announced greenfield FDI in 2023–24.

AI-enabling good exports, and the associated domestic investment, make up a substantial share of GDP in many countries in EAP. A slowdown in global AI demand could therefore affect upstream suppliers such as China indirectly, through weaker demand from the producers they supply, while affecting downstream assemblers such as Thailand and Viet Nam more directly through weaker final demand.

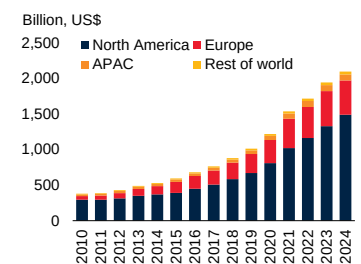
FIGURE 1.11 Reversal in AI investment, financial and real linkages

AI investment is increasing happening in private credit markets whose linkages with other markets can be obscure. A reversal in AI activity could impact EAP through financial-sector vulnerabilities or through linkages with trade and investment. Many countries have benefited from the growth of the AI supply chain and would also be exposed to a decline.

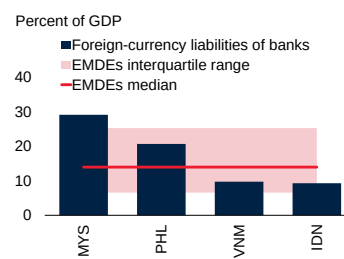
A. Funding of AI-related capital expenditure, 2025–28



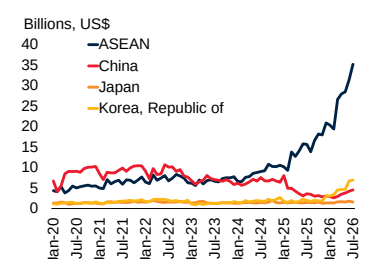
B. Private credit assets under management by region



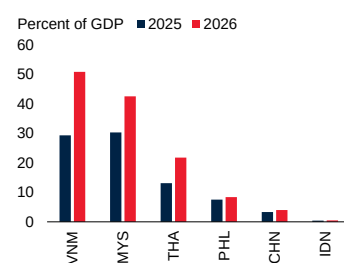
C. Foreign currency-denominated liabilities of banks in 2025



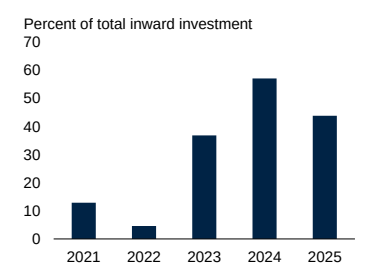
D. United States: AI-related imports by source



E. Exports of AI-related goods to the world



F. Malaysia: Announced inward FDI in data centers



Sources: Bank of England; Bank for International Settlements; Financial Stability Board (2026); Financial Times fDi Markets; Haver Analytics; Morgan Stanley; U.S. International Trade Commission; World Bank Trade Watch; WTO (2025); World Bank Group.

A. "Other capital" includes private equity, venture capital, and sovereign wealth funds.

B. Assets under management for North America include business development companies, while other regions do not include semi-liquid funds; figures for Asia and Pacific exclude funds denominated in renminbi.

C. Line shows median of 58 non-EAP EMDEs; shaded area shows the range of the 25th–75th percentiles. Bars show foreign currency liabilities of deposit takers: all liabilities denominated in, or with payments linked to, a currency other than the domestic one. These include resident foreign currency deposits, borrowing from abroad, interbank funding, and debt securities issued in foreign currency.

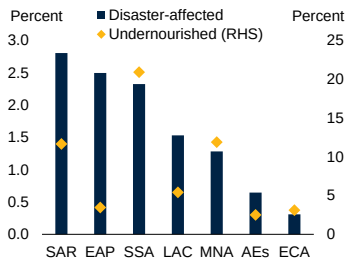
D.E. AI-related goods are defined according to the World Trade Organization's (2025) classification of AI-enabling products. "ASEAN" includes all 11 member states. "2025" and "2026" show East Asian economies' exports of these goods to the world in the 12 months to April 2025 and the 12 months to April 2026, respectively.

F. Data center investment includes projects that fDi Markets tags "Data Center" or classifies under the business activity "ICT and Internet Infrastructure."

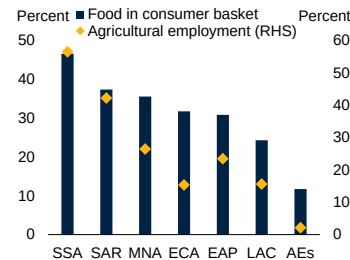
FIGURE 1.12 Food insecurity and natural disasters

EAP is highly exposed to natural disasters. The region also has a high share of food in the consumption basket and a large share of the population employed in agriculture. This makes it vulnerable to increases in the price of agricultural inputs such as fertilizer and energy. These dynamics could be worsened by a disruptive El Niño. The warming current is expected to be one of the strongest on record this year, bringing heatwaves, droughts, and floods. Previous strong El Niños have caused a sharp decline in regional crop yields.

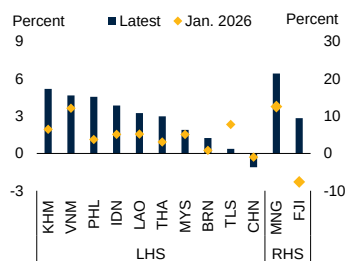
A. Share of population affected by natural disasters and undernourishment, since 2011



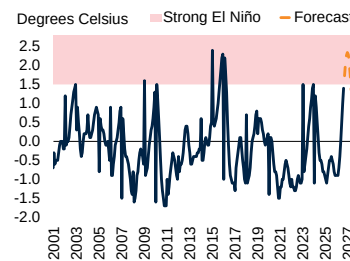
B. Share of food in the consumer basket and agricultural employment



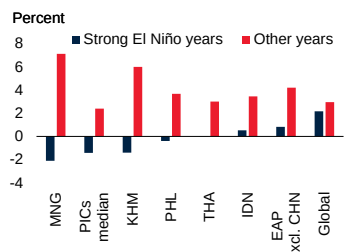
C. Food price inflation in EAP



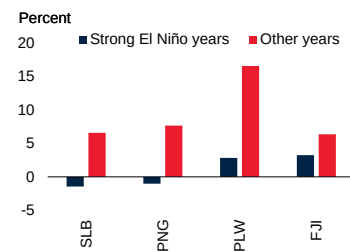
D. Relative Oceanic Niño Index



E. Crop production growth during strong El Niño episodes



F. Captured fish production growth during strong El Niño episodes



Sources: Haver Analytics; IMF, Consumer Price Index (database); United Nations; Our World in Data (database); NOAA; WDI; World Bank Group.

A. Bars show the annual average share of the population affected by natural disasters since 2011, by region. Diamonds show the share of the population that was undernourished in 2023. B. Bars show the share of food and non-alcoholic beverages in the consumer price index basket. Regional averages are population-weighted averages. Diamonds show employment-weighted share of agricultural employment.

C. Bars show food price inflation by country. The latest values are from July for Brunei and Timor-Leste, and August for other countries.

D. Chart shows the Relative Oceanic Niño Index (RONI), measured as the 3-month average sea-surface temperature anomaly in the Niño 3.4 region relative to the tropical mean. Values above 1.5°C indicate strong El Niño conditions. Orange dashed line shows the forecast period, based on NOAA probabilities as of June 2026 for different Niño index ranges. For visualization purposes, open-ended values of "2.0°C+" are shown as 2.5°C.

E.F. Bars show annualized production growth during strong El Niño years and other years. Strong El Niño years (1965, 1972, 1982, 1987, 1992, 1997, 2009, and 2015) identified using RONI ≥ 1.5 with 5 consecutive months above 0.5. Aggregates are 2010–19 real GDP-weighted, except PICs median. "Global" covers 186 economies; "EAP excl. CHN" covers 21.

Food insecurity and natural disasters

Rising global temperatures are amplifying El Niño-related extremes, making associated heatwaves more intense, droughts more persistent, and heavy rainfall and floods more severe (WMO 2026). Many people in EMDEs have limited ability to adjust and fiscally constrained governments often have limited capacity to protect vulnerable populations.

EAP is highly exposed to natural disasters (figure 1.12). Food accounts for more than 30 percent of the consumption basket and nearly a quarter of workers are in agriculture. The region is the world's dominant producer and consumer of rice, which is a thinly traded commodity: most rice is consumed in the same country it is produced, and only about 10 percent of production is traded on global markets, substantially less than for other major staples. Furthermore, exports come from a few large producers. Relatively small and concentrated trade volumes mean that modest supply disruptions can trigger significant price spikes that propagate across countries, with the poorest and most food insecure bearing the largest burden. In 2008, for example, rice prices spiked from US\$375 to nearly US\$900/ton between January and April because of weather-related shortages compounded by trade restrictions.

The effect of extreme weather events on agricultural production could be compounded by rising fertilizer prices. The interruption of traffic through the Strait of Hormuz briefly sent prices soaring for fertilizer alongside energy. The World Bank Group's fertilizer price index rose by more than 50 percent above its 2025 average in April as the price of urea doubled, before declining alongside a rise in exports from China.

Higher input costs have contributed to increasing food prices in most East Asian countries. Food price inflation rose from 1

percent in January to 4.6 percent in August in the Philippines, from 1.5 percent to 3.9 percent in Indonesia, and from -7.6 to 9.5 percent in Fiji over the same period. Estimates suggest that an extended conflict keeping oil prices above US\$100/bbl this year could push up to 45 million more people into acute food insecurity globally, with the largest relative increase in food insecurity (24 percent) in Asia (WFP 2026).

Over-stretched farmers now face El Niño conditions strengthening rapidly over the 2026 monsoon season. As of mid-2026, El Niño conditions have been established in the equatorial Pacific. By the end of the year, the probability of a very strong El Niño—with the relative Oceanic Niño Index exceeding 2°C—is above 90 percent. If realized, this would be one of the strongest El Niño episodes in this century. The previous very strong El Niño episode in 2015–16 hurt the livelihoods of more than 60 million people worldwide (UN.ESCAP 2017). Pacific Island Countries are particularly vulnerable, as the share of the population affected by natural disaster is almost double the share in the average small state (box 1.1).

Global crop production is not systematically affected by strong El Niños, but the same was not true for many countries in EAP: crop production during previous strong El Niño years was substantially weaker than normal. The 2015–16 El Niño brought unusually dry conditions across much of Southeast Asia, weakening harvests, reducing water availability, and disrupting rural livelihoods. Indonesia was also heavily affected by drought-driven forest and peatland fires, while Viet Nam reported severe damage or losses to up to 60 percent of crops in parts of Central Viet Nam and the Mekong Delta. Cambodia saw drought affect an estimated 2.5 million people, and typhoons affected around 6 million people in the Philippines.

In addition to affecting food markets, extreme weather events such as flooding could also disrupt manufacturing centers and transport infrastructure. For example, almost half of Thailand's output is produced in Bangkok and would be at risk from severe flooding (World Bank Group 2026f).

Policy challenges

Scaling up energy generation

The need to scale up energy generation in EAP has been magnified by two recent developments. First, the rapid expansion of AI infrastructure requires substantial energy inputs—global electricity demand from data centers alone is forecast to double from its current level by 2030 and triple by 2035, accounting for as much as 4 percent of total production (figure 1.13; IEA 2026a). These new demands are in addition to the pre-existing challenge of generating sufficient energy in a rapidly growing region.

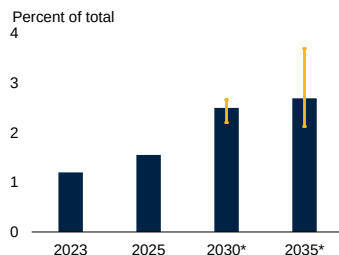
Second, recent increases in energy prices have highlighted the costs and risks of depending on imported fossil fuels. EAP's vulnerability has been illustrated by the many disruptions caused by the interruption of energy flows through the Strait of Hormuz, including shortages of key goods, slower growth, higher inflation, and currency volatility. Many countries have imposed short-term policies to mitigate these harms, but reducing this vulnerability in the longer term requires countries to invest significantly in new generation capacity.

Renewable energy sources such as solar panels and wind turbines are increasingly the most cost-effective option for expanding electricity generation, while also causing fewer negative externalities, such as air pollution, than other energy sources. This combination has made them an increasingly compelling choice: Last year marked the first year in

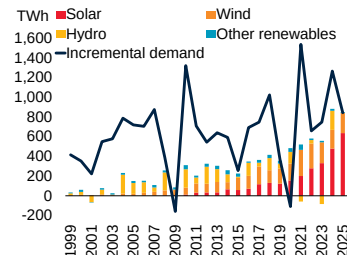
FIGURE 1.13 Scaling up energy generation

Last year was the first in which incremental global electricity demand was fully met by new renewable generation. Many countries in the region have a high or growing share of renewables, but others lag behind. The energy intensity of economic activity has fallen over time, but further improvements are being slowed by subsidies for fossil fuels and import restrictions on renewable energy.

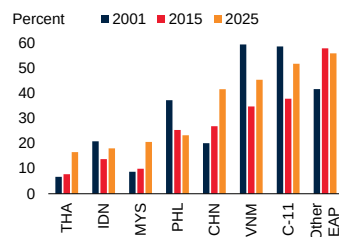
A. Global data center electricity consumption as a share of global electricity consumption



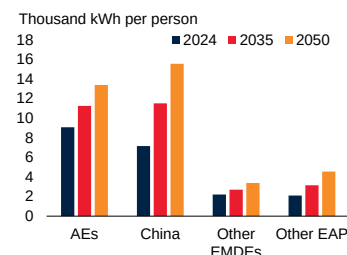
B. Incremental electricity demand and additional renewable energy production globally



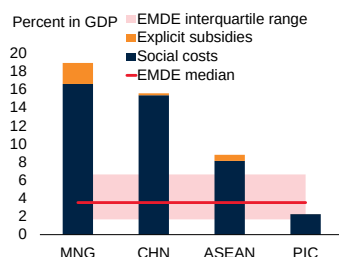
C. Share of renewable energy sources in electricity production



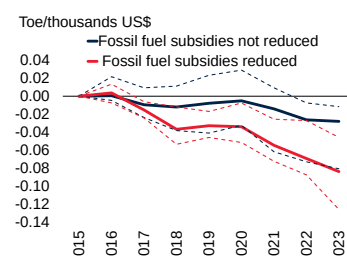
D. Electricity production projections per person



E. Social costs of energy support: Implicit and explicit, 2025



F. Change in energy intensity: by reduction in energy subsidies



Sources: IMF Fossil Fuel Subsidies Database; International Energy Agency (IEA); OECD Green Growth Database; Our World in Data (database); United Nations, World Population Prospects 2024; WDI; World Bank Enterprise Surveys; World Bank Group.

A. Bars show projected data center electricity consumption as a share of global electricity production, based on IEA projections. Whiskers indicate the high and low cases.

B. Bars show additional global electricity generation capacity from each renewable source. Line shows increase in global electricity consumption compared with the previous year. C. Bars show the share of renewable energy in total electricity production.

D. Bars show electricity consumption per capita. Electricity projections are from the IEA and population projections are from the United Nations. AEs comprise the United States, the European Union, and Japan. "Other EAP" includes Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor-Leste, and Viet Nam. E. "Explicit subsidies" reflect retail prices below fuel supply cost because of direct financial transfers, tax breaks, or price controls. "Social costs" measure the difference between the price paid by the fuel user and the fuel's full social cost, including supply costs and negative externalities such as local air pollution and broader externalities related to driving. EMDE interquartile range is based on the distribution of total fossil fuel explicit subsidies and social costs as a share of GDP in 2025 among 99 non-energy exporting and non-oil exporting EMDEs. PICs include Tonga, Samoa, Fiji, Solomon Islands, Papua New Guinea and Vanuatu. Country groups are weighted by real GDP.

F. Chart compares the change in energy intensity between economies that reduced fossil fuel subsidies between 2015 and 2023 and those that did not. Dotted lines show the interquartile range.

which incremental global electricity demand—including in EAP—was fully met by new renewable generation. In EAP, China has made rapid progress at increasing the share of renewables in electricity production (particularly from solar power), Thailand has done the same at a more modest pace, whereas in Indonesia and the Philippines rapid increases in coal and LNG generation have driven down the share of renewables. Fiji and Samoa have set ambitious goals to rely largely or entirely on renewable energy for their electricity generation within a few years.

Fossil fuels still account for more than 75 percent of global energy consumption, however, and remain essential to the energy mix (World Bank Group 2024a). Sufficient baseload capacity from fossil fuels or nuclear power is important to compensate for the inherent intermittency of solar and wind power. Nuclear energy—including, potentially, from small nuclear reactors—could provide reliable, low-carbon power where strong institutions and viable financing support its safe and cost-effective deployment. Nuclear energy is an important source of energy in China, where it accounts for 5 percent of total electricity generation and half of the global capacity under construction (IEA 2026b). It plays little role in the rest of the region, but major expansions are being planned in Viet Nam, the Philippines, and Indonesia.

Increasing energy efficiency can also help countries meet growing demand while containing costs. This is particularly important for China, given that its generation capacity is already substantial and is expected to become more so. In many countries, widespread underpricing of fossil fuels is an obstacle to improving energy efficiency and expanding renewable generation. In Indonesia, for example, increasing government subsidies meant that retail gasoline prices scarcely increased even as crude oil prices nearly doubled earlier this year.

Retail fossil fuel prices also typically fail to reflect the negative externalities of fossil fuel use, including pollution, congestion, and health costs, resulting in an implicit subsidy on top of more explicit price support (Black et al. 2025; Damania et al. 2023). Total fossil fuel subsidies as a share of GDP rank among the top quartile of non-energy exporting EMDEs for ASEAN as a whole, as well as in China and Mongolia (IMF 2026d).

Studies covering EMDEs between 2010 and 2021 find that fossil fuel subsidies discourage investment in renewables (Diallo, Ouoba and Gatete 2024; Parashar and Jaiswal 2026), while phasing out fossil fuel subsidies and introducing environmental taxes accelerates renewable adoption (Chavda and Mehta 2025). Consistent with this literature, between 2015 and 2023, fossil fuel subsidies have been significantly associated with higher energy intensity, and EMDEs that reduced fossil fuel subsidies between 2015 and 2023 saw faster reductions in energy intensity than those that did not.

Muted price signals also discourage the adoption of renewable energy. Many distortive trade measures increase the price of imports of renewable energy generation products. Because the global production network for renewable energy spans multiple stages across national borders, trade friction at any one stage can cascade through the supply chain (World Bank Group et al. 2017). Ferrantino (2012), for example, finds that an average ad valorem trade cost of 10 percent compounds to an effective tariff equivalent of 34 percent by the end of a five-stage supply chain. Such distortive trade measures erode the competitiveness of renewable energy relative to fossil fuels (UNCTAD 2014).

Reforming energy pricing and removing trade barriers are critical steps to accelerate investment in new generation capacity. Subsidy

reform is most politically durable when it is sequenced carefully: reforms that recycle savings toward targeted cash transfers or energy vouchers for vulnerable households have been more successful in building and maintaining public support than those framed purely as fiscal consolidation (Damania et al. 2023).

Governments also play a role in ensuring that the underlying infrastructure can absorb and transmit the electricity that new capacity produces. Grid modernization is among the most capital-intensive and time-sensitive investment priorities facing EAP countries. By 2050, developing economies worldwide will need to add or upgrade more than 73 million kilometers of power lines—a total exceeding all power lines built globally in the past century (IEA 2023; IFC 2024). In EAP, where roughly 70 percent of electricity still comes from fossil fuels and CO₂ emissions from power generation tripled between 2000 and 2020, aging and congested grids represent a binding constraint on the deployment of solar and wind at scale (World Bank Group 2024b). For many EAP countries, reforms to state-owned utilities—including unbundling generation, transmission, and distribution functions—can introduce competitive pressures to reward efficiency and innovation.

Scaling up investment in energy generation and grid infrastructure requires mobilizing private capital alongside public finance. Annual investment in electricity generation in developing countries needs to more than double by 2035—from around US\$280 billion to US\$630 billion—with more than half of that increment needing to come from the private sector (Banga 2025). Yet EMDEs currently attract only about one-fifth of global electricity investment, reflecting higher perceived political and regulatory risks. Closing this gap requires a suite of complementary measures that reduce the cost of capital for private investors (IEA 2026c; IFC 2025; World Bank Group 2024c).

BOX 1.1 Small States, Big Challenges: Growth in East Asia and Pacific Small States

Over 2022–25, small state EMDEs grew faster than other EMDEs—except in East Asia and Pacific (EAP), where most small states grew more slowly than the median small state EMDE. While EAP’s small states resemble their non-EAP peers in demographics, education levels, and governance, they are among the most remote, sparsely populated, geographically dispersed, and least connected countries in the world. EAP’s small states are also more vulnerable to natural disasters and energy shocks than other small states. Outmigration accounts for about twice as large a share of the population in EAP’s small states as in the average small state EMDE. As a result, EAP’s small states generate less income from exports and tourism, and rely more on official development assistance (ODA) and remittances. Historically, sustained high-growth episodes among small states have been preceded by faster growth in foreign direct investment, fixed investment, and air passenger arrivals—precisely the channels that are obstructed by remoteness. Lifting growth in EAP’s small states therefore depends on reducing the effective distance to markets, easing key firm-level constraints—finance, electricity, transport, and labor regulations—where these economies lag, building disaster resilience, and reducing their reliance on imported fossil fuels.

Introduction

Growth in small states. Small states—economies with a population below 1.5 million—face distinctive development challenges, including limited economies of scale, narrow production bases, and high exposure to external shocks and natural disasters (World Bank Group 2016, 2024d).^a East Asia and Pacific (EAP) is home to 13 small states—more than one-third of the world’s small state EMDEs—12 of which are Island economies, the largest number of island small states along with the Caribbeans. During 2022–25, only three small states in the region grew faster than the median small state EMDE.

Focus of this box. This box answers the following questions:

- How do small state EMDEs grow?

This box was prepared by Ekaterine Vashakmadze (EEAM2) and Zoe Leiyu Xie (DECPA).

^a The small state EMDE group covers 35 economies (annex table B1.1), of which 13 are in East Asia and Pacific (EAP), 12 in Latin America and the Caribbean (LAC), 6 in Sub-Saharan Africa (SSA), 2 in South Asia (SAR), and 1 each in the Middle East and North Africa (MNA) and Europe and Central Asia (ECA). Thirty of the 35 small state EMDEs are Small Island Developing States (SIDS) as classified by the United Nations. Within EAP, 11 of the 13 small states are Pacific Island economies—all except Brunei Darussalam and Timor-Leste; and 12 (the 11 Pacific Island economies and Timor-Leste) are SIDS. This box compares small state EMDEs with 116 other EMDEs.

- How do small states in East Asia and Pacific compare with other small states?
- What characteristics distinguish small states that grow fast from those that grow slowly?
- What policy options might be most effective at promoting sustained growth?

Main findings. This box reports the following findings.

First, small state EMDEs around the world grew faster than other EMDEs during 2022–25, even though small state EMDEs are more vulnerable to natural disasters and global energy market dislocations because of their reliance on energy imports.

Second, only three of EAP’s 13 small states (Fiji, Palau, and Samoa) grew faster than the median small state EMDE during 2022–25, compared with six during 2015–19. Most small states in East Asia and Pacific are among the world’s most remote, least connected by shippinglines, and most sparsely populated countries, with some of the most geographically dispersed land areas. The share of outmigration in the population is more than twice as high in small states in East Asia and Pacific as in the average small state. As a result, despite similar demographics, education, and quality of governance, small states

BOX 1.1 Small states, big challenges: Growth in East Asia and Pacific small states

in East Asia and Pacific on average have lower export earnings, tourism receipts, and foreign direct investment (FDI) inflows—all factors associated with higher growth—and larger official development assistance and remittance inflows. Because of unusually low elevations, larger-than-average agricultural sectors, and heavy reliance on imported fuels, small states in East Asia and Pacific are more vulnerable to natural disasters and global energy price shocks, amplified by their remoteness and weak fiscal positions.

Third, faster growth in FDI, investment, and exports or air passenger arrivals has been associated with short-term growth accelerations or sustained high-growth episodes among small states. EAP's remoteness and distance from major markets are obstacles to these growth drivers.

Fourth, lifting growth through investment and tourism in small states in East Asia and Pacific depends on reducing the effective distance to markets by improving connectivity and reducing barriers to trade, freight, and travel. Small states in East Asia and Pacific also face greater firm-level constraints than other small states, including in access to finance and infrastructure (electricity and transport). The development of renewable energy capacity, which is higher than average in some small states in the region, could help reduce their exposure and vulnerability to global energy price shocks. Meanwhile, building fiscal and external buffers could provide more room to absorb future disasters and energy shocks.

Income and growth of small states

Richer and growing at a similar pace. Small states are on average richer than other EMDEs: 70 percent of small state EMDEs have higher GDP per capita than the median EMDEs. Small states have on average grown at a similar or faster pace than other EMDEs. The median

growth rate among small states has picked up from below 3 percent before 2015 to 4.6 percent during 2022–25, while the median growth rate among other EMDEs has fallen from pre-2015 levels. Compared with other EMDEs, services are a larger component of income in small state EMDEs, but contribute a similar share of growth. On average, agriculture accounted for 11 percent of GDP but only 6 percent of growth in small states over 2022–25. Industry is a smaller part of small state economies than of other EMDEs (21 versus 31 percent of GDP) but accounted for a similar share of growth in both (figure B1.1.1).

More volatile growth. Output growth is more volatile in small states than in other EMDEs. During 2022–25, the median standard deviation of real GDP growth among small states was almost double that among other EMDEs and was higher than in 2015–19 (figure B1.1.2). A lack of fiscal buffers among most small states further reduces their resilience to natural disasters and energy shocks (World Bank Group 2024d).

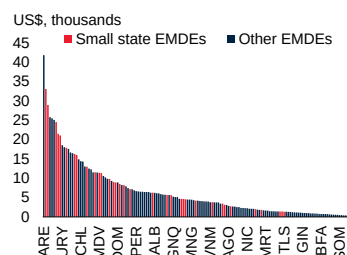
- **Natural disasters.** Small states tend to be more exposed to natural disasters because of their remoteness and proximity to the sea—on average, 18 percent of their population lives less than 5 meters above sea level. As a result, the average share of the population affected by natural disasters in small states was more than twice that among other EMDEs during 2022–25 (figure B1.1.2).
- **Energy shocks.** Another source of volatility is dependence on fuel imports. Fuel imports averaged 10 percent of GDP in small states during 2022–25, compared with 6 percent of GDP among other EMDEs (figure B1.1.2). Small states generated, on average, half as large a share of their electricity from renewables as other EMDEs.

BOX 1.1 Small states, big challenges: Growth in East Asia and Pacific small states

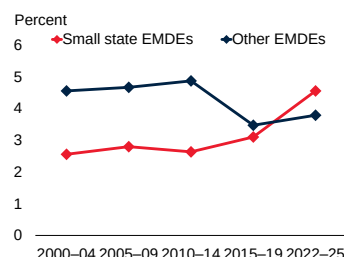
FIGURE B1.1.1 Growth and income of small states

Small state EMDEs on average have higher per capita incomes than other EMDEs, and grew faster than other EMDEs during 2022–25—except in East Asia and Pacific (EAP), where most small states grew more slowly than the median small state EMDE. Services were the main source of growth in EAP's small states, as in the average small state, whereas industry contracted in EAP's small states but expanded in the average small state.

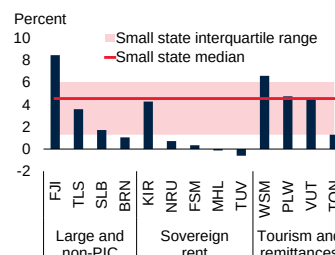
A. GDP per capita of small states and other EMDEs, 2022–25 averages



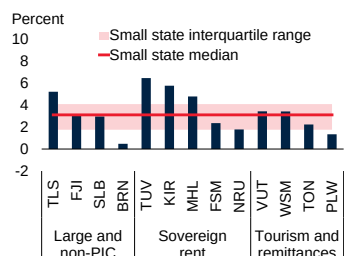
B. Growth of small states and other EMDEs



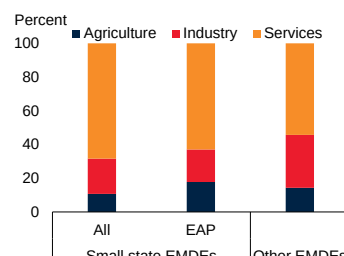
C. Annual growth of EAP small states, 2022–25



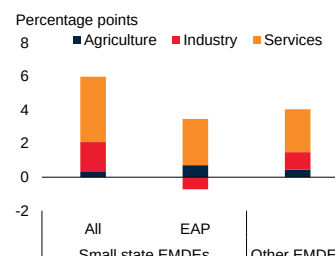
D. Annual growth of EAP small states, 2015–19



E. Sector composition of income, 2022–25



F. Sector composition of growth, 2022–25



Sources: IMF Article IV; World Development Indicators (database); World Bank Group.

Note: PIC = Pacific Island Country. Sample includes 35 small state EMDEs and 116 other EMDEs. For country code abbreviations, refer to the International Organization for Standardization, <https://www.iso.org/obp/ui/#search>. A. Bars show average GDP per capita in 2022–25, in thousands of US dollars. Blue bars indicate small state EMDEs, with EAP small state EMDEs shown in light blue. Countries are ordered by GDP per capita. Sample includes 116 other EMDEs and 35 small states (13 EAP).

B. Lines show average annual real GDP growth during each period. Country group values are medians.

C, D. Bars show average annual growth of real GDP in 2015 US dollars over 2022–25 (C) and 2015–19 (D). Shaded region is the interquartile range of small state EMDEs during the same period, and the horizontal line is the median. Timor-Leste's real GDP growth during 2022–25 (C) is the average non-oil real GDP growth rate, reported in IMF Article IV.

E, F. Sample includes 33 small state EMDEs (including 11 from EAP) and 114 other EMDEs. Two small states (NRU, TUV) in EAP are missing sector output data. Sector composition of income is computed as the sectoral share of total gross value added (E), averaged over 2022–25. Sector contribution to growth is computed as sectoral growth scaled by sectoral share of income (F).

Characteristics associated with faster growth in small states.

Sorting all small states into quartiles by their characteristics highlights the association between geography and growth. The most remote, most dispersed, or least connected small states grew, on average, 2–4 percentage points more slowly over 2022–25

than the least remote, least dispersed, or most connected small states (figure B1.1.3). Small states with the smallest shares of income from exports, tourism, or FDI grew 1.5–3.5 percentage points more slowly than those with the largest shares, while those receiving the most remittances grew 1.5 percentage points more slowly.

BOX 1.1 Small states, big challenges: Growth in East Asia and Pacific small states**Characteristics of small states in East Asia and Pacific**

Slower and more volatile growth. Only three of EAP's 13 small states grew faster than the median small state during 2022–25, compared with six during 2015–19 (figure B1.1.1). Five of EAP's small states (Federated States of Micronesia, Kiribati, Marshall Islands, Naoero, and Tuvalu) rely heavily on natural resource revenue (such as fishing) and other nontax revenues, and are described as “sovereign-rent economies” (World Bank Group 2024e, box 1). Growth in six EAP small states—most of them sovereign-rent economies—was slower than growth in three-quarters of all small states.

- **Tourism and remittance-dependent economies.** Compared with 2015–19, growth in tourism and remittance-dependent small states—including Fiji—accelerated as these economies recovered from deep pandemic-era contractions.
- **Sovereign-rent and other economies.** In contrast, growth in sovereign-rent economies slowed as rent income declined (World Bank Group 2026g). Similarly, as oil production declined, Timor-Leste's headline GDP contracted at an average annual rate of 10 percent—the steepest decline among small states in the world—even though its non-oil output grew at 3.6 percent per year.

Growth volatility was higher on average among EAP's small states than among other small states during 2022–25 and 2015–19 (figure B1.1.2).

Similar demographics and governance. EAP's small states are on average even smaller than

other small states—nine of the 13 countries have smaller populations than the average for small states elsewhere, and four (Marshall Islands, Naoero, Palau, and Tuvalu) have populations of less than 100,000 people. Despite their smaller populations, EAP's small states are otherwise similar to other small states in demographics, employment, and education (figure B1.1.3).^b EAP's small states are also similar to other small states in the quality of governance—the share of firms that report facing major constraints from crime, corruption, political instability, and courts—as well as in government effectiveness and the size of government relative to total employment.

More remote and dispersed. Where EAP's small states differ from others is geography (figure B1.1.3). Almost all of EAP's small states are more remote—at a greater geographic distance from the world's 30 largest economies—than the average small state (figure A.B1.1). The average distance is 23 percent greater for EAP's small states. Their land is far more dispersed, with land separated by vast stretches of ocean. Almost all of EAP's small states rank in the top quartile of small states for the ratio of their exclusive economic zone (EEZ) to their land area (a measure of land spread) and in the bottom quartile for population relative to the area of their EEZ.^c Brunei and Timor-Leste are the only exceptions, as they share land borders with Malaysia and Indonesia, respectively.

^b The share of public employment in total employment tends to be larger in smaller countries, reflecting economies of scale in the provision of public goods (Alesina and Spolaore 1997; Alesina and Wacziarg 1998; Carroll et al. 2025). The share of public employment in the average small state is twice that in other EMDEs in the sample, but the share among EAP's small states is similar to that in the average small state.

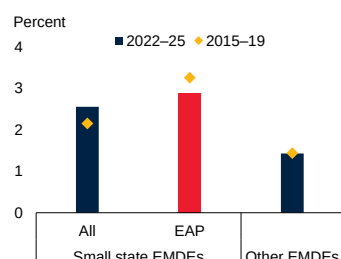
^c An EEZ extends 200 nautical miles (or about 370 km) outward from every piece of a country's coastline. The ratio of EEZ to land area thus measures how dispersed a country's land is.

BOX 1.1 Small states, big challenges: Growth in East Asia and Pacific small states

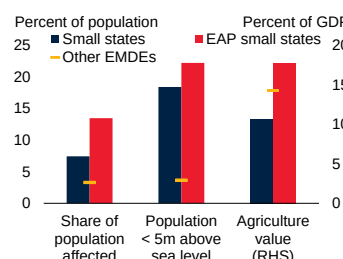
FIGURE B1.1.2 Volatility and vulnerability of small states

Growth in small state EMDEs tends to be more volatile than that in other EMDEs, and even more so in EAP's small states. Small states, especially those in EAP, are more vulnerable to natural disasters and energy shocks, even though renewable energy capacity is larger in many of EAP's small states than in the average small state. Fiscal buffers eroded during the pandemic in some of EAP's small states, exacerbating countries' vulnerability to shocks.

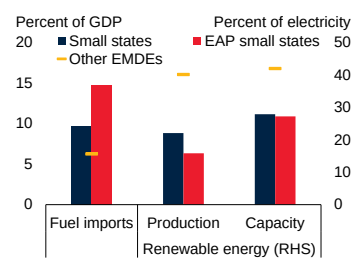
A. Growth volatility



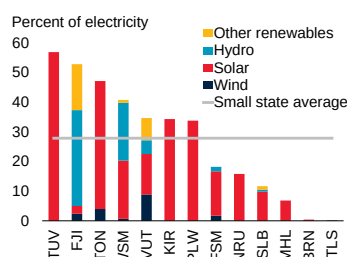
B. Vulnerability to natural disasters



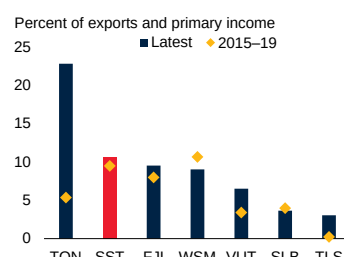
C. Vulnerability to energy shocks



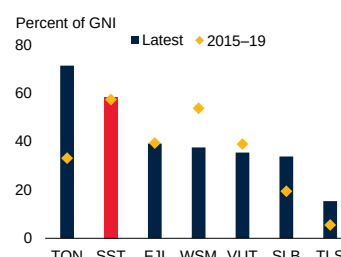
D. Renewable energy capacity by source



E. Total debt service



F. External debt



Sources: EM-DAT (database); IRENA (database); World Development Indicators (database); World Bank Group.

Note: SST = small state EMDEs. Annex table B1.2 lists sample size of each characteristic. For country code abbreviations, refer to the International Organization for Standardization, <https://www.iso.org/obp/ui/#search>.

A. Bars and markers show medians for each country group. Growth volatility is the standard deviation of annual real GDP growth during the period. Sample includes 116 other EMDEs and 35 small state EMDEs (13 EAP).

B. C. Bars and markers show averages for each country group.

B. Share of population affected by natural disasters is computed as the sum of the population affected by natural disaster in a year as a share of the country's total population. Value is averaged over 2022–25. Share of population living less than 5 meters above sea level is for 2015, the latest year for which data are available. Agriculture value added as percent of GDP is averaged over 2022–25.

C. Fuel imports as a percent of GDP are averaged over 2022–25. Share of renewables in electricity generation is averaged over 2022–23, as data are available only through 2023. Share of renewables in electricity capacity is averaged over 2022–25.

D. Share of renewables in electricity capacity is averaged over 2022–25. Horizontal line shows the small state average.

E. F. Latest year is 2024 for both total debt service and external debt, except 2023 for Tonga's external debt. Simple average is used for small state EMDEs.

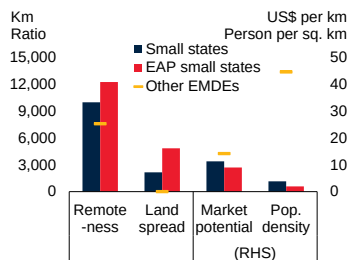
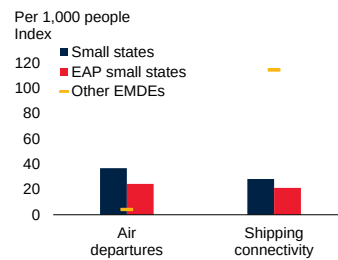
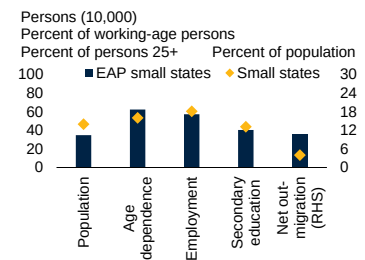
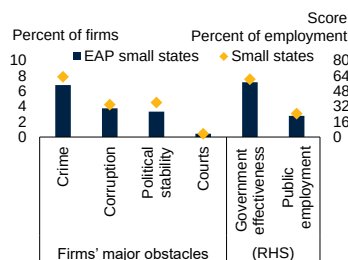
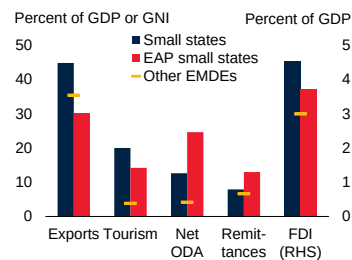
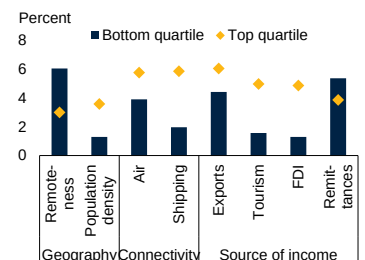
Less connected. Air connectivity is important for tourism in remote small states, while liner shipping connectivity boosts exports. Among EAP's small states with available data, all but Naoero have fewer air departures per capita than the average small state. All of EAP's small states except Fiji, Samoa, and Solomon Islands score lower on UNCTAD's liner shipping connectivity index than the average small state, and four

score lower than three-quarters of all small states worldwide. The Pacific Island states do not lie on the major shipping lanes that connect major producers with markets (figures B1.1.2 and A.B1.1; Becker 2012).^d

^d Compared with other EMDEs, the average small state has, by construction, more air departures per capita due to its small population base, smaller carrier sizes with more frequent departures and, in many cases, a lack of alternative land transport.

BOX 1.1 Small states, big challenges: Growth in East Asia and Pacific small states**FIGURE B1.1.3 Characteristics of small states**

Compared with the average small state, EAP's small states are more remote, less densely populated, and more geographically dispersed. Remoteness and lack of connectivity are among the factors associated with lower growth in small states. As a result, despite similar demographics, education, and quality of governance, EAP's small states on average derive smaller shares of income from exports and tourism and larger shares from ODA and remittances, and face about twice the out-migration as the average small state.

A. Geography**B. Connectivity****C. Demographics, education, employment, and migration****D. Governance****E. Sources of income****F. Growth of small states by quartile of characteristics, 2022–25**

Sources: CEPII GeoDist; International Labor Organization; UNCTAD; World Bank Enterprise Surveys; World Development Indicators (database); World Governance Indicators (database); World Bank Group.

Note: FDI = foreign direct investment; ODA = official development assistance; Pop. = population. Characteristics are averages for 2022–25 except for tourism (average 2017–19). Annex table B1.2 lists sample size of each characteristic.

A. Remoteness is the average distance from a country's capital to the capital of a top-30 economy, in kilometers. Market potential is the average real GDP of the top-30 economies weighted by the inverse of the distance between a country's capital and the capital of a top-30 economy. A top-30 economy is ranked by real GDP during 2022–25. Land spread is the ratio of the exclusive economic zone (EEZ) to land area. An EEZ extends 200 nautical miles (or about 370 km) outward from every piece of a country's coastline. Population density is the ratio of the population to the EEZ in square kilometers.

B. Air departures are the number of plane departures per 1,000 population. Shipping connectivity is an index by UNCTAD that captures the liner shipping connectivity.

C. Total population is in units of 10,000 people. Age dependency is the ratio of population younger than 15 or older than 64 to the working-age population (15–64). Employment is expressed as a percentage of the working-age population. Secondary educational attainment is expressed as a percentage of the population aged 25 and over. Net out-migration is expressed per 1,000 people.

D. "Firms' major obstacles" refers to the average share of firms that report facing each obstacle as the largest constraint to doing business. Sample includes a country's latest wave of the Enterprise Surveys during 2022–25. Government effectiveness is the WGI score (0–100) in 2024. Public employment is expressed as a percentage of total employment.

E. Tourism is measured as tourist expenditure as a percentage of GDP. Net ODA inflows are expressed as a percentage of GNI. Remittances are personal remittances received, as a percentage of GDP. FDI refers to net inflows as a percentage of GDP.

F. Bars show the average real GDP growth in 2015 US dollars over 2022–25 for small states in the bottom quartile by each characteristic. Markers show the same metric for small states in the top quartile by each characteristic.

Greater vulnerability to natural disasters. EAP's small states are on average more vulnerable to natural disasters than other small states. The share of the population affected by natural disasters in EAP's small states is almost double that in all small states, and these economies also have a

larger share of their population living less than 5 meters above sea level—an indicator of future vulnerability (figure B1.1.2). Compared with other small states, EAP's small states are more dependent on agriculture—and therefore more vulnerable to weather-related shocks.

BOX 1.1 Small states, big challenges: Growth in East Asia and Pacific small states

Greater vulnerability to energy shocks. Despite having similar renewable energy capacity to the average small state, EAP's small states import more fuel as a share of GDP and generate a smaller share of electricity (figure B1.1.2). Remoteness and poor connectivity to major shipping routes further expose EAP's small states to disruptions to the few shipping lines that reach them, amplifying the transmission of global fuel prices to domestic economies. Tonga and Solomon Islands are particularly exposed to imported fuel costs, and higher fuel prices increased operating costs in Fiji's tourism and transport sectors during the global energy crisis of 2022.

Less income from exports and tourism, more from ODA and remittances. EAP's small states lack the features that are associated with faster growth in small states. Compared with the average small state, EAP's small states export less (by 15 percentage points of GDP), receive less in tourism receipts (by 5 percentage points of GDP) and net FDI inflows (by around 1 percentage point of GDP) (figure B1.1.3). Lower exports, tourism, and FDI reflect these countries' small export base, as well as their remoteness and thin transport links that raise the cost of moving goods and people (figure A.B1.2; Feyrer 2019; Redding and Venables 2004).^c These countries also receive 12 percentage points of GNI more in net official development assistance (ODA) and 5 percentage points more in remittances. A higher remittance share coincides with substantial labor outflows—both permanent emigration and participation in temporary labor mobility schemes—against a backdrop of limited domestic employment opportunities (World Bank Group 2023a, 2026g).

^c This is consistent with evidence that remoteness constrains small economies' ability to overcome scale limits through specialization and trade (Winters and Martins 2004; World Bank Group 2017). Controlling for location, Easterly and Kraay (2000) find no evidence that small states are disadvantaged in income or growth, suggesting that remoteness rather than small size drives these outcomes.

Higher ODA is consistent with greater vulnerability to climate disasters and lower incomes among these small states.

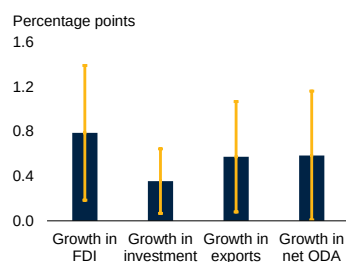
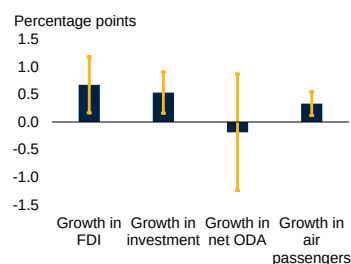
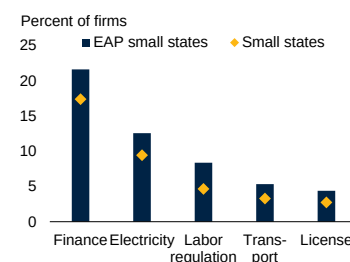
Few buffers. EAP's small states have faced a succession of shocks over the past decade—natural disasters, the pandemic, food and fuel price spikes, supply-chain disruptions, and geopolitical tensions—and have emerged from the pandemic with higher debt and diminished fiscal and external buffers (World Bank Group 2026g). Total debt service as a share of exports and primary income—a common measure of a country's debt burden—stayed below the small-state average in most of EAP's small states during 2022–25, but it rose in almost all of them compared with the pre-pandemic period (figure B1.1.2). Thinner fiscal and external buffers weaken countries' ability to shield economies from disasters and global energy shocks. In Timor-Leste, Tonga, and Vanuatu debt service increased by two-fold or more. In Samoa, by contrast, higher-than-average debt service during 2022–25 reflected the government's efforts to pay down external debt amid stronger-than-average economic growth.

Options for raising growth among EAP small states

Increase investment, exports, and tourism. Probit estimates of EMDE small states over 2000–19 indicate that faster growth in FDI inflows, fixed capital formation, and real exports often preceded a growth acceleration year, where real GDP growth is positive and increased sharply from the previous three years (figure B1.1.4). Compared with growth accelerations, sustained expansions, where high growth lasts for at least three years, are much rarer: Only about 11 percent of country-years qualify, including five episodes among EAP's small states. Faster growth in FDI, fixed investment, and air passenger arrivals are associated with sustained growth.

BOX 1.1 Small states, big challenges: Growth in East Asia and Pacific small states**FIGURE B1.1.4 Factors of growth among small states**

Both one-year growth accelerations and three-year episodes of rapid growth were associated with faster growth in FDI inflows and investment, as well as growth in exports or air passenger arrivals. Firms in EAP's small states struggle more than those in other small states with access to finance, electricity, and transport, as well as with labor and licensing regulations.

A. Factors associated with one-year growth acceleration**B. Factors associated with three-year high-growth episodes****C. Firms facing major constraints due to regulation and access to inputs**

Sources: World Bank Enterprise Surveys; World Development Indicators (database); World Bank Group.

Note: FDI = foreign direct investment; ODA = official development assistance.

A.B. Bars show the marginal effects derived from probit regressions of a growth indicator on the annual change of a factor, with country fixed effects and year fixed effects, and standard errors clustered at the country level. Sample includes small state EMDEs during 2000–19. Whiskers indicate 90 percent confidence intervals. Refer to annex B1.1 for more details on the setup.

C. Bars show the country-average share of firms that report facing each obstacle as the largest constraint to doing business among EAP small states. Markers show the same metric for all small state EMDEs. Sample includes a country's latest wave of Enterprise Surveys during 2022–25.

Improve connectivity and business-enabling regulations. Better air connectivity is associated with higher tourism and FDI as a share of GDP among small states, while better shipping connectivity is associated with higher exports (figure A.B1.2; Fugazza and Hoffmann 2017; Mazzola et al. 2022). Firms in EAP's small states are more likely than those in other small states to cite access to finance, electricity, labor and licensing regulations, and transport as their largest obstacles to doing business (figure B1.1.4). The relative lack of infrastructure in EAP's small states in part reflects their smaller size compared with other small states. Expanding access to finance and improving the reliability of energy and internet infrastructure can promote investment among Pacific Island small states (World Bank Group 2024f, 2026g). Reducing regulatory burdens for firms—such as improving the speed and consistency of processes for starting a business, obtaining licenses or permits, and hiring foreign workers—will improve the efficiency and predictability of the business environment.

Accelerate the energy transition to strengthen resilience. Repeated shocks depress investment, slow productivity, and erode gains in per capita incomes, making resilience central to long-term growth; frequent supply shocks also complicate policymaking. Accelerating the energy transition is one of the most practical levers available for reducing exposure to imported fuel price volatility. EAP's small states have significant potential for renewable energy development, especially from solar (Kiribati, Palau, Tonga, and Tuvalu), wind (Vanuatu), and hydropower (Fiji and Samoa) (figure B1.1.2; World Bank Group 2024f). Investment in renewables, storage, energy efficiency, and resilient infrastructure can reduce exposure to imported fuel price volatility, strengthen energy security, ease pressure on external balances, and mitigate one of the recurring economic costs of remoteness. Resilience also depends on rebuilding fiscal buffers and on strengthening disaster preparedness, early warning, and post-disaster response capacity.

The World Bank's Accelerating Sustainable Energy Transition Multi-Phase Programmatic Approach, approved in September 2024, exemplifies this approach in EAP: a US\$2.5 billion financing envelope is being deployed across Cambodia, Mongolia, Indonesia, Papua New Guinea, and Pacific island states to facilitate 2.5 gigawatts of new renewable capacity and reduce emissions by an estimated 60 million metric tons of CO₂ equivalent, consistent with most countries' national goals for climate decarbonization (World Bank Group 2024b).

Strengthening cross-border interconnections offers a further multiplier: expanded regional grids allow countries to exchange surplus renewable power—particularly from solar- or hydro-rich but demand-limited economies—reducing the need for back-up capacity and lowering system-wide costs.

Overcapacity in the production of solar panels, wind turbines, and batteries provides a historical opportunity for countries in EAP. Unit costs have declined dramatically and created a historically favorable window for developing economies to acquire clean energy hardware at low cost. Annual clean energy investment in Southeast Asia alone has already reached over US\$100 billion, a 30 percent increase since 2024 (IEA 2026d). Countries and regions that move decisively now to lock in long-term contracts, build regulatory frameworks, and develop the grid infrastructure to absorb new capacity will be better positioned to capture the full economic benefit of this deflation in technology costs before global supply tightens again. Conversely, countries that delay—whether through prolonged trade restrictions on renewable components or inadequate grid investment—risk paying higher technology costs in the future. They also risk falling behind in building the generation capacity needed for their growing economies and forgoing the near-term macroeconomic benefits of reduced energy import dependence.

Creating jobs with low entry barriers at scale

Many countries in EAP have large numbers of people in low-productivity employment. Agriculture employs nearly one in four workers in EAP, including about two out of three workers in Lao PDR, and nearly half in Myanmar and Timor-Leste. Farmers often operate informally on a small scale, generally being self-employed or working with family members (figure 1.14). These jobs are typically less than half as productive as the economy's average (Ohnsorge and Yu 2022). Many of these jobs are subsistence level and would not be chosen if it were possible to earn a higher wage through a formal job in another sector. In Pacific Island Countries, lack of employment has resulted in persistent out-migration.

While jobs in agriculture have the lowest wage premium, the jobs with the highest wage premium are in business and financial services. These jobs also have significant barriers to entry, requiring high levels of education and skills. These barriers prevent these sectors from creating jobs that are numerous enough and suited to the many people currently working low-quality jobs.

In the past, manufacturing played a critical role in moving people up the job quality ladder. The movement of surplus labor from agriculture to manufacturing was a critical part of the manufacturing-led development model (Lewis 1954). Providing large numbers of relatively unskilled workers with capital allowed them to rapidly increase productivity toward the global frontier. Over time, the path of manufacturing-led development has narrowed. Labor productivity in manufacturing has risen faster than in the broader economy, meaning higher manufacturing output is now compatible with fewer manufacturing jobs. Automation and robotics are reducing the labor intensity of production even at lower ends of

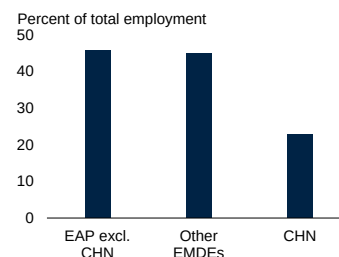
the value chain. The scale and technological depth of Chinese manufacturing make it difficult for later entrants to compete for low-end manufacturing exports (Chatterjee and Subramanian 2026; Rodrik 2016). For most countries, the share of manufacturing in total employment peaks at a lower level and at a lower share of GDP than was previously the case, meaning that countries once reached high-income status before their industrial employment peaked, but no longer. For example, the countries that reached their peak industrial employment share between 1995–99 did so at an interquartile range of income per capita between \$4000 and \$28,000 (constant 2015 U.S. dollars). Those countries that reached a peak industrial employment share between 2015–19 did so at an interquartile range of per capita income between \$900 and \$5,900, well below high-income levels.

To create a large number of better jobs for people working in low-value informal activities and agriculture in the same way as manufacturing once did, these jobs must be accessible. The priority is to identify sectors where entry barriers are low enough to absorb workers at scale in the near term, while providing pathways to progressively better-paid, more productive work over time. Two sectors have particular potential to kickstart this process by creating large numbers of jobs with low entry barriers: tourism and agribusiness. These sectors tend to have low entry barriers, low minimum scales of operation, geographic proximity to agricultural workers, modular and routine task structures, and labor-intensive production processes (Baum et al. 2016; Christiaensen, Rutledge, and Taylor 2020; Muñoz, Robinson, and Marston 2025; OECD 2024). These properties reduce the friction costs associated with sectoral transitions, enabling agricultural workers to climb the jobs ladder without requiring substantial retraining, capital accumulation, or geographic relocation.

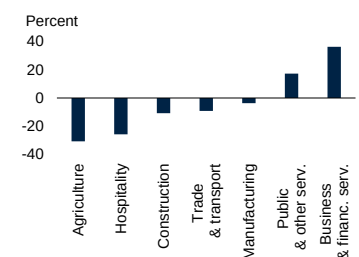
FIGURE 1.14 Creating jobs at scale in tourism

Self-employed farmers make up a large share of employment and receive below-average wages for their work. Manufacturing was once an important rung in the ladder to better jobs, but its ability to create jobs at scale has diminished over time. Tourism already employs many workers with limited formal education and has shown the ability to move large numbers to higher-wage work in the formal sector.

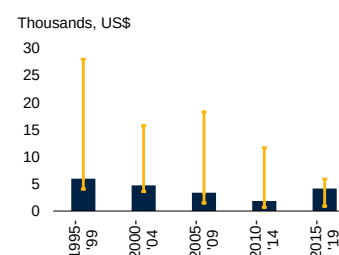
A. Share of self-employed in total employment



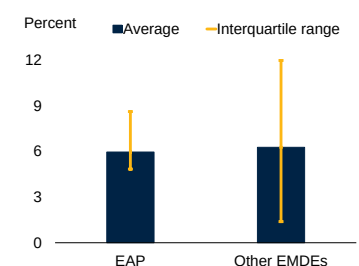
B. Wage differential from the national average



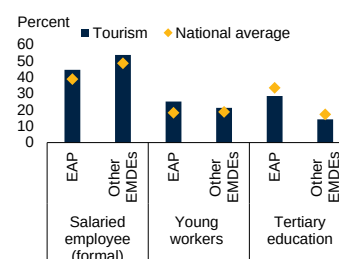
C. Median GDP at peak industrial employment, by peak-year



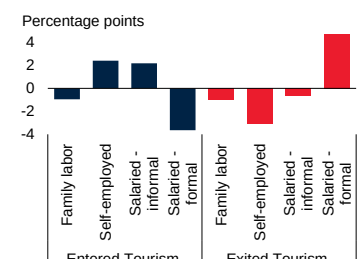
D. Tourism in total employment, latest available data



E. Share of types of work in tourism



F. Viet Nam: Origin and destination of workers entering and exiting tourism jobs, by contract arrangement



Sources: Global labor database; ILOSTAT; Informal Economy Database; Malaysia LFS; Vietnam LFS; World Bank Group.

A. Self-employment data are from 2010–20. “EAP excluding China” includes 14 countries. “EMDEs” includes 65 economies. Shares are simple averages.

B. Chart shows sectoral wages relative to the national average. EAP average weighted by total employment using data since 2020 for Cambodia, Fiji, Indonesia, Kiribati, Lao PDR, Mongolia, Myanmar, the Philippines, Thailand, Timor-Leste, Tonga, and Viet Nam.

C. Bars show median GDP per capita at peak industrial employment; whiskers show the interquartile range. The sample covers 58 economies reaching their peak in 1995–2019, grouped into five-year periods. GDP per capita is in thousands of constant 2015 U.S. dollars.

D. Bars show tourism as a share of total employment. Yellow whiskers show interquartile range. “Other EMDEs” includes 23 economies; the latest data available are for 2017–2024. E. Bars show the share of tourism workers who are paid employees as a proxy for formality. “Young workers” defined as those under 25 years of age.

F. Bars show percentage-point changes in the share of workers entering and exiting tourism, categorized by employment type. “Salaried – informal” refers to salaried workers with temporary contract (less than one-year) or without contract. “Salaried – formal” refers to salaried workers with long-term contract. The analysis sample includes workers surveyed twice within a year in each Viet Nam LFS intra-year during 2013–22 who reported switching industries into or out of tourism.

Tourism includes those employed in hospitality services such as accommodation, food and beverage, and travel agencies. This sector has already absorbed large numbers of workers at a range of skill levels, from entry-level service roles to mid-skill positions in management, logistics, and specialized services. On average, the tourism sector employs 6 percent of workers in EAP—broadly in line with the EMDE average—and substantially more in the Philippines, Thailand, Indonesia, and the Pacific Island Countries. International tourism receipts (which undercount the sector's total contribution) accounted for 5 percent of GDP in EAP. In Pacific Island states, tourism accounts for up to 36 percent of employment and 58 percent of GDP.

The barriers to entry into tourism are low. Workers in the sector are less likely to need a tertiary education, and more likely to be under 25 years old. In Viet Nam, research has mapped out the sector's ability to draw workers out of agriculture and toward higher-skill services. Workers entering the sector are more likely to be from the informal sector, and those exiting the sector are far more likely to exit into the salaried formal sector. Policymakers can maximize tourism's potential for driving upward mobility by enabling programs that provide training, credential recognition, and clear career pathways (Stacey 2015; Stangl et al. 2024).

Agribusiness provides another pathway that allows workers to move up the value chain from low-wage farming jobs without leaving the sector altogether. Expanding the share of agricultural activity that takes place away from farms is associated with higher productivity for the sector and better-paid jobs for individuals (Christiaensen, Rutledge, and Taylor 2020; World Bank Group and IFC 2021, Yi et al. 2025). These activities include midstream activities such as processing, wholesale, storage, and transportation and

downstream activities such as retail and food and beverage services.

Countries in EAP have built a dense midstream economy that captures a relatively high share of food value added thanks to crop science, favorable government policies, and the delivery of extension services to smallholders (Rajalahti 2021). Regional integration, particularly through ASEAN, lowered trade barriers and allowed countries to specialize within food value chains rather than each replicating the full chain domestically, enabling Thailand to become a global hub for processed seafood and canned goods, Indonesia for palm oil refining, and Viet Nam for processed cashews and coffee. As a result, mid-stream sectors account for about a fifth of agriculture-related employment and downstream sectors account for another third, broadly in line with the average in other EMDEs (figure 1.15). Nevertheless, in Indonesia, the Philippines and Thailand, the employment share in mid-stream activities is near or in the bottom quartile of EMDEs.

Midstream jobs in the agribusiness value chain are both better-paid and have the potential to generate large numbers of jobs. In EAP, the midstream sector pays a wage premium of as much as one third over agriculture, even controlling for worker characteristics. Across EMDEs, most agribusinesses experience faster employment growth than the average non-agriculture firms. Many positions in the sector do not require advanced degrees and can make use of farmers' foundational knowledge.

There are many factors constraining agribusiness growth. In World Bank Enterprise Surveys, tax, regulation, and access to finance are the most commonly cited constraints in both midstream and downstream sectors. Finance, in particular, is cited as the biggest obstacle by midstream firms in half of EAP countries, while regulation—especially unregulated

competition from the informal sector—is cited by downstream firms in half of the countries. Policymakers can help agribusiness grow by enabling better access to finance and streamlining regulations (including on land, labor, and capital flows).

AI adoption, adaptation, and innovation

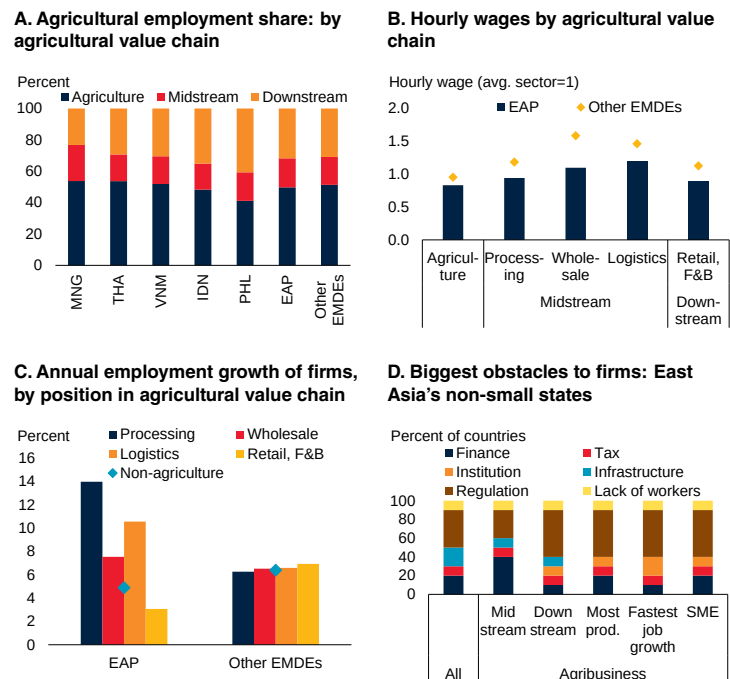
Artificial Intelligence (AI) has emerged as a transformative technology promising to reignite productivity and reshape production, jobs, and demand for skills. The potential impact of the AI revolution has been compared to the Industrial Revolution, but is unfolding at ten times the speed (Rose 2025). It took about 80 years for the steam engine to reach lower-income countries, 40 years for electricity, and 20 years for the internet. By contrast, middle-income countries accounted for half of ChatGPT’s global traffic within six months of its launch (World Bank Group 2026e).

AI use has increased in EAP between 2025 and 2026 but remains well below the 20 percent global average (figure 1.16). Individual GenAI use is comparable to the global average only in Viet Nam, Malaysia, the Philippines, and China. Individuals in EAP most frequently use GenAI for coursework, which accounts for about 25 percent of AI uses—10–15 percentage points higher than in other EMDEs and advanced economies. Higher country per capita incomes, a better-educated population, and wider internet use are associated with greater overall GenAI utilization.

Firm level data of AI use is available for a smaller subset of countries. In Thailand, only 12 percent report using at least one AI technology and 4 percent pay a subscription for AI software or systems, compared with 43 percent and 23 percent in the United States, respectively. Low adoption by Thai firms may reflect limited economic viability: the expected

FIGURE 1.15 Creating low-skill jobs at scale in agribusiness

Moving from simple farming to downstream agribusiness activities is associated with higher wages. Agribusiness job growth is generally faster than the rest of the economy, but this growth is often stunted by an unsupportive policy environment.



Sources: GLD (database), Viet Nam Laborforce survey (database); Indonesia Laborforce survey (database); Malaysia Laborforce Survey (database); Philippines Laborforce Survey (database); World Bank Enterprise Surveys; World Bank Group.

A. Country groups are simple averages, including 6 countries in EAP (Indonesia, Malaysia, Mongolia, the Philippines, Thailand, and Viet Nam), and 18 other EMDEs. B. Country group is the simple average of country-level average hourly wage for the production stage (normalized by the economy's average hourly wage). Sample includes Indonesia, Mongolia, the Philippines, Thailand, and Viet Nam. C. Country group aggregates are weighted using economy-level aggregate employment from Penn World Tables. Bars show average annual firm-level employment growth for each mid- and downstream stage of the agricultural value chain. Sample includes 11 EAP EMDEs, and 91 non-EAP EMDEs. D. Bars show the share of economies where each obstacle is ranked as the most important by the most firms, for all non-agricultural firms, and for agribusiness in the midstream (processing, wholesale, and logistics), downstream (retail and food and beverage services), the most productive (top 10 percent by labor productivity) agribusiness, the fastest growing (top 10 percent by employment growth) agribusiness, and SME agribusiness. Sample excludes small states and includes 10 non-small state EAP EMDEs, 9 Asia small states (Bhutan, Brunei Darussalam, Fiji, Kiribati, Maldives, Samoa, Solomon Islands, Tonga, and Vanuatu), and 79 non-Asia EMDEs. "Regulation" includes constraints due to land, labor, licensing, and customs regulations, and competition from the informal sector. "Institution" includes constraints due to corruption, court, crime, and political instability. "Infrastructure" includes constraints due to electricity outages and transport. "Tax" includes constraints due to tax administration and tax rates.

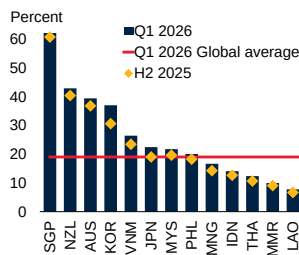
benefits of AI do not yet outweigh the costs of its adoption.

Realizing the potential of AI requires equipping workers with digital skills as AI tools are increasingly embedded in jobs. Demand for AI-related skills is spreading across East Asia and Pacific economies, but on average

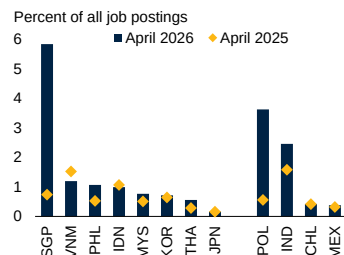
FIGURE 1.16 Getting the fundamentals right for AI

The use of GenAI in EMDE EAP is highest in Malaysia and Viet Nam and lowest in Cambodia and Papua New Guinea. AI-skill demand has barely grown in EAP EMDEs and remains below that of other EMDEs. Reliable electricity and sound governance are associated with data center investment.

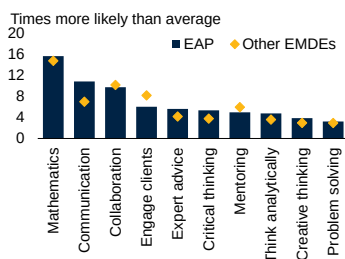
A. GenAI use in EAP



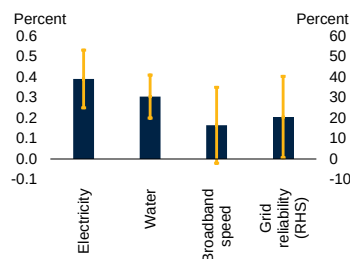
B. Job postings requiring AI-related skills



C. Prevalence ratio of AI postings in EMDEs



D. Correlates of data center location: Infrastructure



Sources: Aedo et al. (forthcoming); Ember; FAO Aquastat; Microsoft; Speedtest; World Bank B-Ready; World Bank Group.

A. Bars show GenAI adoption across EAP economies, comparing the second half (July–December) of 2025, and the first quarter (January–March) of 2026.

B. Refer to Chapter 2 Annex 2.2 for definition of AI-related skills. The value shown for Chile for April 2026 corresponds to December 2025, the latest data available.

C. Bars show the average prevalence ratio for the top ten non-technical skills required in job postings for the same skills. EAP EMDEs include Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam. Other EMDEs include Chile, India, Mexico and Poland. For other EMDEs, "Critical thinking" is proxied by "Create solutions to problems" in job postings.

D. Bars show estimates and 95 percent confidence intervals from a cross-country exponential regression of the number of data centers on energy production per capita, water resources per capita, download speeds, and an electricity reliability index (higher means fewer outages), as well as region fixed effects. All time-varying variables are measured as country averages over 2005–25. Regression models are estimated using Poisson pseudo-maximum likelihood. The sample comprises 108 economies for which all data are available. Grid reliability index corresponds to the percent change in data centers for a one-standard-deviation increase in the variable of interest. The rest of the estimates correspond to elasticities: the percent change in the number of data centers for a 1 percent increase in the variable of interest.

more slowly in than in other EMDEs and remains well below demand in some advanced economies. In general, the pace of growth in AI-related skill demand is consistent with economies' digital sophistication. Singapore, for example, leads in AI-related skills demand, reflecting the rapid integration of AI capabilities into semiconductor and electronics design ecosystems and a deliberate national strategy to attract AI talent (World Bank Group 2026e).

Employers in advanced economies in East Asia and Pacific focus on skills related to predictive AI, AI systems design and development, and AI-enabled processing of visual data. Employers in EAP show a stronger demand for skills related to predictive AI, AI deployment, and data mining, similar to other EMDEs. In the most advanced economies in East Asia and Pacific, AI skills appear in postings for management, finance, and professional services roles, while in EMDEs in the region, just like in other EMDEs, AI skill demand remains concentrated in information and communication technologies and engineering (Aedo et al. forthcoming). Employers also seek bundles rather than stand-alone technical credentials. Analytical skills such as mathematics and critical thinking, and social skills such as communication and collaboration, are 6 to 16 times more likely to appear in postings requiring AI skills than in postings generally.

The region's employment structure shapes both the potential risks and gains from AI. Only about 13 percent of AI-exposed jobs in East Asia and Pacific involve non-routine cognitive tasks, compared with 39 percent in advanced economies (World Bank Group 2025c). These economies therefore face a lower near-term risk of job displacement, but also smaller potential gains. So far, online job postings show no discernible decline in AI-automatable jobs in EAP, whereas in advanced economies postings in occupations with above-median AI automatability have fallen by an average of 5.8 percent relative to those below the median since ChatGPT's release (chapter 2). This may partly reflect lower adoption. The economic incentive to automate also depends on technology costs and labor costs, and where labor is cheap, firms will not adopt. As occupational structures shift toward cognitive-intensive jobs in services and wages rise, EAP economies will not be immune (World Bank Group 2025c).

When it comes to innovating for AI itself, China, Japan, and the Republic of Korea rank among the world's most prolific sources of AI patents. AI innovation remains at an earlier stage in many of the region's EMDEs, where it is dominated by foreign multinationals and relies disproportionately on public institutions.

Policy efforts to improve the fundamentals of a conducive business environment, in particular the availability and reliability of infrastructure and a skilled workforce, could yield double dividends in harnessing AI for development and supporting broader growth momentum.

Digital access remains uneven across and within countries. In 2024, internet penetration ranged from 98 percent in Malaysia to 19 percent in Papua New Guinea, while average download speeds in EAP were only 40 percent of the high income economy average (chapter 2; World Bank Group 2025c). Services reform can help by increasing competition and investment. In Viet Nam, liberalization of telecommunications, finance, and other services around WTO accession was associated with productivity gains in those sectors and in downstream manufacturers using them as inputs (World Bank Group 2025c, 2026b).

AI adoption requires access to “compute,” the ability to process large amounts of data. Local datacenters offer one form of access to compute. Some countries also seek local data centers for purposes of data sovereignty, cybersecurity, regulatory compliance, and digital resilience. Factor endowments and business environments appear to drive the location of datacenters: energy and water resources, grid reliability, the quality of broadband connectivity, skilled labor, and the quality of governance are all associated with greater data center investments. A one-standard-deviation increase in grid reliability is associated with 20 percent more datacenters, and a one-standard-deviation

increase in governance with 100 percent more, while energy prices are broadly uncorrelated with datacenter locations at the country level (chapter 2, box 2.1).

Several EAP countries have implemented policies to promote datacenter investment. In Malaysia, the data center boom required approximately RM4.6 million of investment per job created, against below RM1 million in electronics and automotives, and its main value lies in the digital services it enables rather than in building local industries (World Bank Group 2026a).

On the individual level, four types of skills are needed to harness the potential of AI: foundational skills and skills complementary to AI, including digital, transversal, and advanced technical and managerial skills. A strong foundation of basic skills, literacy and numeracy, allows for more-advanced skills to be built (Afkar et al. 2023). Like other digital technologies, AI may displace workers who cannot take advantage of the technology in their jobs. Investments in education and training, therefore, could emphasize the development of digital, cognitive, socioemotional and advanced technical skills that are required to work with AI technology.

Advancing AI also requires a deeper innovation ecosystem. Countries like Malaysia and India produce large STEM graduate pools while patenting little AI, indicating that research institutions, firms operating near the technological frontier, and access to global AI knowledge have not yet been assembled. Regional cooperation can help smaller economies through shared computing infrastructure, cross-border research, and talent mobility. The ASEAN Framework on Cross-Border Cloud Computing illustrates this approach through common data-governance rules and trusted data corridors (chapter 2).

Annex 1.1 Identifying spillovers from U.S. financial stress

Stress episodes are identified by adapting the Forbes and Warnock (2012) capital flow surge methodology to monthly U.S. financial indicators (i.e. VIX, MOVE, S&P500, and Kim-Wright term premium). Stress months are identified using the 12-month change in each indicator, compared against the mean and standard deviation in a 36-month rolling window. A month is in a stress episode if it satisfies the following two conditions:

- A. The 12-month increase exceeds one standard deviation on a rolling window.
- B. The episode reaches at least two standard deviations at some point during the episode and lasts at least two months.

Stress is defined as rising volatility (using VIX or MOVE), rising term premia (using Kim-Wright), or declining in equity prices (using S&P 500).

Data source. Financial stress indicators: VIX, MOVE, S&P500 are obtained from Haver Analytics. Kim-Wright 10-year term premium is taken from the FRED. Equity returns in local currency, exchange rate, and local government bond yield are also extracted from Haver Analytics. Annual vulnerability measures such as current account deficit-to-GDP ratio, trade openness and capital account openness are taken from WDI; external debt-to-GDP ratio are obtained from World Bank IDS database,

and net IIP assets to GDP are obtained from External Wealth of Nations (Lane and Milesi-Ferretti 2018). The de-facto exchange rate regime follows Ilzetzki, Reinhart and Rogoff (2019).

The MOVE index is available only from November 2002 and is extended back to 1990 using rescaled realized treasury volatility, following Bloom (2009). Equity return and exchange rate depreciation are measured as cumulative log return in percent. Bond yields are measured as the cumulative change in basis points. A positive exchange rate return denotes local-currency depreciation.

Empirical Estimation. The spillover effect is estimated using Jordà (2005) local projection model on a monthly panel of emerging market with country fixed effects. For each horizon $h = 0, 1, \dots, 6$, the following regression is estimated:

$$Y_{i,t+h} - Y_{i,t-1} = \alpha_i + \sum_k \beta_{k,h} \times stress_{tk} + \epsilon_{i,t+h}.$$

Here α_i is the country fixed effect, $stress_{i,tk}$ is an indicator equal to 1 when U.S. financial market k experiences a stress event in month t . The outcome variable is one of a) equity returns in local currency; b) the 10-year local currency government bond yields; or c) the exchange rate. The exchange rate sample is restricted to floating-regime economies.

Stock market stress refers to months in which both the VIX and the S&P 500 index are

in a stress episode. The reported responses are computed as the sum of the estimated coefficients $\beta_{VIX,h} + \beta_{SP500,H}$. Bond market stress is defined analogously, as months in which both Treasury market volatility and the term premium are in a stress episode.

To test whether the U.S. financial market stress affects EAP differently from other EMDEs, the benchmark specification is augmented with interactions between each $stress_{tk}$ and an EAP dummy. The EAP group comprises Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam; Cambodia and Lao PDR are additionally included in the equity sample, and Myanmar is additionally included in the exchange rate sample.

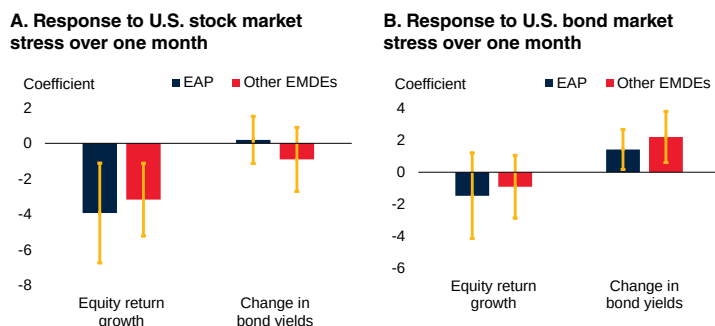
$$y_{i,t+h} - y_{i,t-1} = \alpha_i + \sum_k \beta_{k,h} \times stress_{tk} + \sum_k \beta_{k,h}^{EAP} \times dummyEAP \times stress_{tk} + \epsilon_{i,t+k}.$$

The estimated coefficient $\beta_{k,h}^{EAP}$ measures the differential response of countries in EAP region, and the sum $\beta_{k,h}^{EAP} + \beta_{k,h}$ is the average response. The differentials are statistically insignificant across stress types and outcomes. That is, EAP asset prices respond to U.S. financial stress in line with other EMDEs (figure A.1.1).

To test whether country vulnerability amplifies the response, stress indicator is then interacted with each of the five-vulnerability measures:

FIGURE A.1.1 Spillovers from U.S. financial stress

U.S. financial market stress transmits to EMDE asset prices within the corresponding market segment: equity market stress significantly lowers EMDE equity prices, and bond market stress significantly raises government bond yields, while cross-market responses are insignificant in the first month. Across both types of stress and both asset classes, the responses of EAP countries are statistically indistinguishable from those of other EMDEs.



Sources: External Wealth of Nations (Lane and Milesi-Ferretti 2018); Federal Reserve Bank of St. Louis; Haver Analytics; Ilizetzi, Reinhart and Rogoff (2019); World Bank Group. A.B. Bars show the average response of equity prices and local-currency government bond yields in the first month to an episode of U.S. stock or bond market stress for EAP and other EMDEs, estimated using local projections. Definition of stock and bond market stress can be found in Annex 1.1. Equity returns are in percent; bond yields are in tenths of a basis point. Whiskers show 95 percent confidence intervals.

$$y_{i,t+h} - y_{i,t-1} = \alpha_i + \sum_k \beta_{k,h} \times stress_{tk} + \sum_k \gamma_k \times stress_{tk} \times Z_{i,T-1}^v + Z_{i,T-1}^v + \epsilon_{i,t+k}.$$

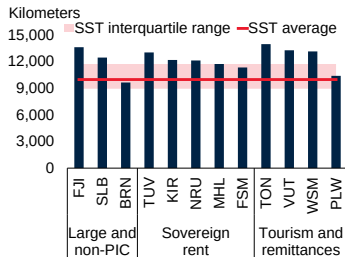
$Z_{i,T-1}^v$ is a vulnerability level, and we use five vulnerability measures: the current-account deficit, trade openness, capital-account openness, and the net international investment position, and external debt.¹ All as normalized by GDP. Driscoll-Kraay standard errors are used throughout.

¹ External debt is debt owed to nonresident, including public and publicly guaranteed long-term debt, private nonguaranteed long-term debt, IMF credit, and short-term debt.

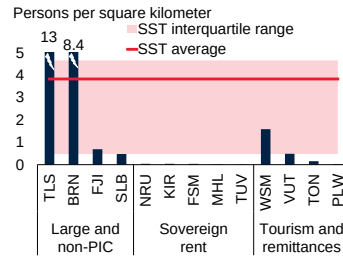
FIGURE A.B1.1 Characteristics of small states in East Asia and Pacific

Most small states in East Asia and Pacific (EAP) are among the most remote, sparsely populated, and least connected small states, with widely dispersed land areas. As a result, most of EAP's small states receive less income from exports and tourism than the average small state.

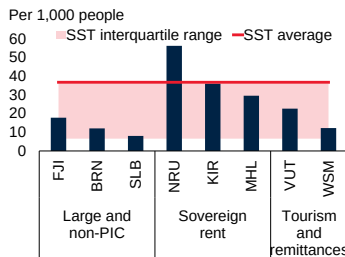
A. Remoteness of small states in East Asia and Pacific



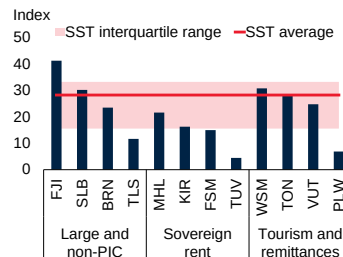
B. Population density over EEZ of small states in East Asia and Pacific



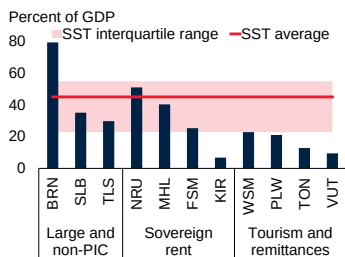
C. Air departures of small states in East Asia and Pacific



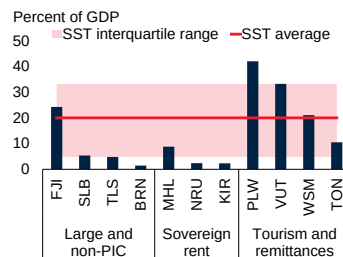
D. Shipping connectivity of small states in East Asia and Pacific



E. Exports of small states in East Asia and Pacific



F. Tourism receipts of small states in East Asia and Pacific



Sources: CEPII GeoDist; International Labor Organization; UNCTAD; World Bank Enterprise Surveys; World Development Indicators (database); World Bank Group.

Note: EEZ = exclusive economic zone; PIC = Pacific Island country; SST = small state. Characteristics are averages for 2022–25 except for tourism, which is an average for 2017–19. Annex table B1.2 lists the sample size for each characteristic. For country code abbreviations, refer to the International Organization for Standardization, <https://www.iso.org/obp/ui/#search>.

A. Remoteness is the average distance from a country's capital to the capital of a top 30 economy, in kilometers. A top-30 economy is ranked by real GDP during 2022–25.
B. Population density is the ratio of population to the EEZ area in square kilometers.
C. Air departures are the number of plane departures per 1,000 population.
D. Shipping connectivity is an index by UNCTAD that captures the liner shipping connectivity.
E.F. Exports and tourism receipts are measured as a percentages of GDP.

Annex B1.1 Methodology

Setup. The following two sets of probit regressions are used to derive the marginal effects in figure B1.1.4.

$$I_{ct} = \beta \times \Delta E_{ct} + \alpha_t + \alpha_c + \epsilon_{ct},$$

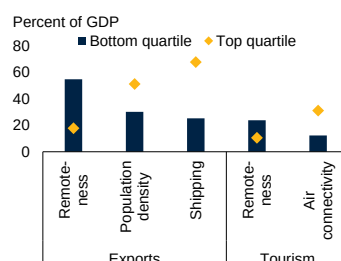
where I_{ct} is one of two indicators for country c in year t : a growth acceleration indicator or a high growth episode indicator. The growth acceleration indicator equals 1 for country-years where real GDP growth is positive and exceeds the country's average over the previous three years by a large amount—defined as the top quartile of annual growth across all small state EMDEs during 2000–19. The indicator for a high-growth episode equals 1 for country-years where the real GDP growth is in the top quartile of growth among all small state EMDEs in that year—and for at least three consecutive years. ΔE_{ct} is the annual change in variable E , which is one of the following: FDI inflow, fixed capital formation, real exports, net ODA inflows as a percentage of GNI, and air passenger arrivals. α_t and α_c represent year and country fixed effects.

Sample. The sample includes small state EMDEs during 2000–19. About 24 percent of the sample is “growth acceleration” country-years. About 11 percent of the sample meets the criteria for a “sustained high growth episode,” including Antigua and Barbuda (2004–06), Belize (2001–04), Bhutan (2001–04, 2009–12, 2014–16), Cabo Verde (2004–07), Comoros (2009–11), Djibouti (2014–19), Fiji (2013–15), Guyana (2009–11), Maldives (2002–04, 2016–19), Mauritius (2009–11), Naoero (2012–14), Seychelles (2005–07, 2015–19), Solomon Islands (2003–05), Timor-Leste (2007–12), Trinidad and Tobago (2002–06), and Samoa (2001–03).

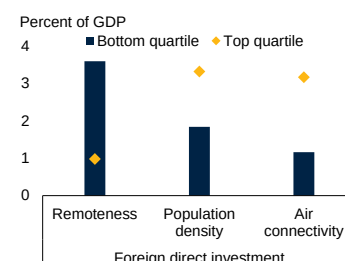
FIGURE A.B1.2 Exports, tourism, and FDI of small states by quartile of factors

Small states that are more remote and less connected tend to have lower exports, tourism, and FDI as percentages of GDP. Greater land dispersion is also associated with lower exports and FDI.

A. Exports and tourism of small states by quartile of factors, 2022–25



B. FDI of small states by quartile of factors, 2022–25



Sources: CEPII GeoDist; UNCTAD; World Development Indicators (database); World Bank Group.

A.B. Characteristics are average 2022–25. Bars show the average exports, tourism, and FDI as a percentage of GDP for small states in the bottom quartile by each characteristic. Yellow diamonds show the same thing for small states in the top quartile by each characteristic.

Annex Table B1.1 EMDE small states by region

EAP	LAC	SSA	SAR	MNA	ECA
Brunei Darussalam	Antigua and Barbuda*	Cabo Verde*	Bhutan	Djibouti	Montenegro
Federated States of Micronesia*	The Bahamas*	Comoros*	Maldives*		
Fiji*	Barbados*	Eswatini			
Kiribati*	Belize*	Mauritius*			
Marshall Islands*	Dominica*	São Tomé and Príncipe*			
Naoero*	Grenada*	Seychelles*			
Palau*	Guyana*				
Samoa*	St. Kitts and Nevis*				
Solomon Islands*	St. Lucia*				
Timor-Leste*	St. Vincent and the Grenadines*				
Tonga*	Suriname*				
Tuvalu*	Trinidad and Tobago*				
Vanuatu*					

Note: All EMDE small states in EAP except Brunei and Timor-Leste are Pacific Island economies. Papua New Guinea is a Pacific Island country but is not a small state. Bahrain and Equatorial Guinea were in the sample of small states in recent Global Economic Prospects reports (World Bank Group 2023b, 2024d) but are no longer small states after their population increased to above 1.5 million. All small states marked with * are classified by the United Nations as Small Island Developing States (SIDS), including 12 each in EAP and LAC, 5 in SSA, and 1 in SAR. Of those, Belize, Guyana, and Suriname are mainland countries facing low-lying coastal challenges.

Annex Table B1.2 Sample size for country characteristics

Characteristics	Small state EMDEs	Of which: EAP small states	Other EMDEs
Share of population affected by natural disasters	34	13	116
Population living less than 5 meters above sea level	35	13	116
Fuel imports	25	5	94
Renewable energy production and capacity in electricity generation	35	13	116
Total debt service and external debt	22	6	92
Remoteness	33	12	114
Market potential	33	12	114
Land spread	33	13	89
Population density	33	13	89
Air departures	21	8	98
Shipping connectivity	32	12	84
Population	35	13	116
Age dependency	35	13	116
Employment	14	5	62
Secondary education attainment	18	7	80
Net outmigration	35	13	116
Government effectiveness	35	13	116
Public employment	14	5	62
Exports	23	11	109
Tourism	30	11	98
Net ODA	28	12	103
Remittances	32	11	99
FDI	34	12	113
Governance, infrastructure, and regulation variables from the World Bank Enterprise Surveys	24	7	93

Note: ODA = official development assistance.

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CHAPTER 2

AI Adoption, Adaptation, and Advancement in East Asia and Pacific

Chapter 2. AI Adoption, Adaptation, and Advancement in East Asia and Pacific

Artificial intelligence (AI) adoption is increasing across East Asia and Pacific among both individuals and firms, though it remains below levels in advanced economies. Firms' growing demand for AI-related skills is often bundled with analytical skills, such as mathematics and critical thinking, and social skills, such as communication and collaboration. AI innovation in East Asia, reflecting both adaptation and advancement, is pivoting from Japan to China and the Republic of Korea. For most countries in the region, adoption and adaptation of existing AI technology—especially of small AI tools—offer the main pathway to reap AI benefits in the short term. Governments play a key role as enablers, users, and regulators of AI. Efforts to improve the fundamental enablers of a conducive business environment, in particular the availability and reliability of infrastructure and a skilled workforce, could yield double dividends in harnessing AI for development and supporting broader growth momentum in East Asia and Pacific. Policymakers can maximize AI benefits by ensuring digital foundations, by using AI to improve the provision of public services, by strengthening institutional and regulatory readiness, and by deepening intra-regional cooperation.

Introduction

Diffusion of AI. AI has emerged as a general-purpose technology (GPT) promising to reignite productivity growth and transform production, jobs, and skills demand. Ultimately, the development impact of AI in emerging market and developing economies (EMDEs) will depend on how it improves productivity and the quality of jobs in manufacturing, agriculture, and services as well as public administration and social services provision. The potential impact of AI has been compared to the Industrial Revolution, but is unfolding at ten times the speed (Rose 2025). It took about 80 years for the steam engine to reach lower-income countries, 40 years for electricity, and 20 years for the internet. By contrast, middle-income countries accounted for half of ChatGPT's global traffic within six months of its launch (World Bank Group 2026b). In East Asia and Pacific, the use of AI by individuals is currently increasing

faster than in other EMDEs (figure 2.1), but more slowly than in advanced economies.

Benefits of AI for EMDEs. The 2026 *World Development Report* proposes a framework to examine the implications of AI for development. EMDEs can benefit from AI in three steps: by adopting existing AI tools, by adapting AI to local context and needs, and by advancing the technology while building their own frontier AI models alongside the infrastructure needed to run them (World Bank Group 2026b). Since each step requires more investment, skills, and infrastructure than the previous one, countries can participate in the AI value chain in different ways. The development of small AI solutions offers the most cost-effective path to AI adaptation.

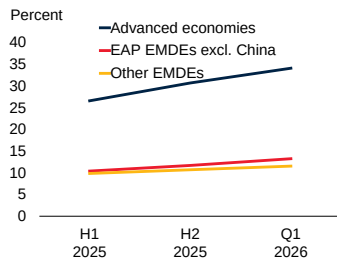
East Asia and Pacific in the AI value chain. Several East Asian and Pacific countries participate in the AI value chain, especially in the upstream stages of the production of semiconductors (chips) and access to compute (that is, data centers), but less so in the downstream stages of developing large language models (LLMs).

This chapter was prepared by Omar Arias, Alessandro Barattieri, Yu Cao, and Margaret Tryiana (all DECPA)

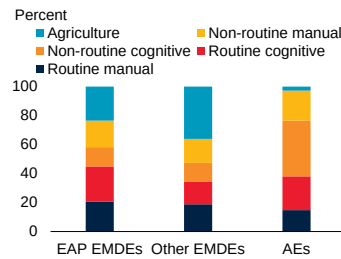
FIGURE 2.1 GenAI use by individuals and AI job exposure

GenAI use has increased in East Asia and Pacific. For now, labor markets in East Asia and Pacific are less exposed to AI than those in advanced economies because of a lower share of cognitive jobs, particularly non-routine ones that are more likely to be augmented by AI.

A. GenAI use in East Asia and Pacific, 2025–26



B. Employment distribution, 2024 or latest available



Sources: International Labour Organization Statistics; Microsoft AI Economy Institute (May 2026); World Bank Group.

A. Lines show median AI use by individuals in 10 EAP EMDEs (Cambodia, Indonesia, Lao PDR, Malaysia, Mongolia, Myanmar, Papua New Guinea, the Philippines, Thailand, and Viet Nam) and 104 other EMDEs in the first half of 2025, the second half of 2025, and the first quarter of 2026. The data covers usage of several GenAI tools including ChatGPT, Claude, Gemini, etc., as tracked by Microsoft.

B. Task content is measured using the Autor and Dorn (2013) methodology and normalized at the ISCO-08 2-digit level. Task intensity is based on the occupational share of dominant task categories. Task content in agriculture is not measured because of data limitations. AI job exposure is often proxied by the share of jobs that are intensive in routine and non-routine cognitive tasks, reflecting the extent to which occupational tasks overlap with current AI capabilities. Routine cognitive jobs are more vulnerable to AI automation, while non-routine cognitive jobs are more prone to AI-augmentation. Data for 113 economies are sourced from Labor Force Surveys, circa 2024, and the National Bureau of Statistics of China. East Asia and Pacific bars show simple averages of the employment shares by task category in Cambodia, China, Indonesia, Malaysia, Mongolia, the Philippines, Thailand, and Viet Nam. For advanced economies and other EMDEs, the bars show population-weighted averages.

Focus of this chapter. While the influence of AI is unmistakable in the region's industrial sector (as discussed in Chapter 1), the realization of AI's potential and its economic impacts will depend on how firms and individuals adopt, adapt, and advance this technology across economic sectors. As economies in East Asia and Pacific become more service-oriented and AI is increasingly embedded into production processes and management practices, it will reshape product and labor markets. This chapter examines the following questions:

1. How is AI diffusing in EMDEs in East Asia and Pacific?
2. How is AI affecting jobs and the demand for skills in the region?
3. How is AI-related innovation distributed in East Asia and Pacific?
4. What are the policies needed to fully harness the potential of AI for the region's development?

Main findings

First, AI adoption remains nascent in most of the region. AI adoption is increasing across EMDEs in East Asia and Pacific both among individuals and firms, but from a low base. Generative artificial intelligence (GenAI) use by individuals living in emerging economies in the region is well below the 33-percent in advanced economies. Although work is the largest use category, its work-related share is lower than in other EMDEs. This is consistent with the below-average 13-percent share of workers in East Asia and Pacific in jobs with predominantly non-routine, cognitive (AI-complementary) tasks. In some countries such as Thailand, only 12 percent of firms report using any AI technology and 4 percent pay a subscription for AI software or systems, compared with 43 percent and 23 percent in the United States, respectively. Low firm

- Even in the production of *chips*, the participation of East Asian EMDEs is still mostly confined to lower-value added activities such as assembly, testing, and packaging (ATP).
- There has been a significant increase in investments in *data centers* in several East Asian and Pacific countries over the past seven years (World Bank Group 2026a).
- While the development of large language models (LLMs) is concentrated only in a few countries, notably the United States and China, the development of *small AI applications* in several East Asian and Pacific countries increased exponentially (figure 2.2). However, the intensity of these activities is still below the levels recorded in advanced economies such as the Republic of Korea or the United States.

adoption may reflect limited economic viability: Thai firms report low expected productivity gains from AI, and high costs and insufficient knowledge as barriers to AI use. Based on the historical precedent of predictive AI adoption, firms' size, prior technological capabilities, and proximity to AI knowledge centers are key enablers of AI adoption.

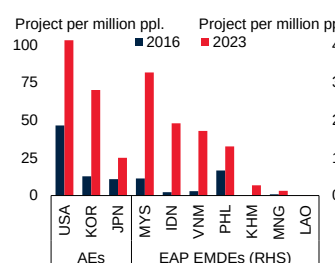
Second, there is not yet a discernible impact on AI-automatable jobs in EMDEs in East Asia and Pacific, in contrast with emerging evidence of negative impacts in advanced economies and other EMDE regions. This is consistent with the still nascent AI diffusion. AI-related skills demand has grown in several EMDEs in East Asia and Pacific, but remains below the level of some advanced economies in the region and other EMDEs. About 1 percent of online job postings in EMDEs in the region require AI-related skills, compared with 6 percent in Singapore and 2–3 percent in Poland and India. In China, demand for GenAI skills has risen fast, especially after the release of DeepSeek, but remains concentrated among listed, larger, and more technologically advanced firms. Analytical skills, such as mathematics and critical thinking, and social skills, such as communication and collaboration, are emerging as AI-adjacent skills that are typically bundled with the demand for AI-related skills.

Third, AI innovation, reflecting both adaptation and advancement, is expanding rapidly worldwide and even more rapidly in East Asia and the Pacific. China, Japan, and the Republic of Korea rank among the world's most prolific sources of AI patents, where nearly half of patents originate in the past five years, while the region's other EMDEs have barely entered the field. Although AI innovation occurs in EMDEs in East Asia and Pacific, it is increasingly owned by foreign multinationals, builds mostly on U.S. and,

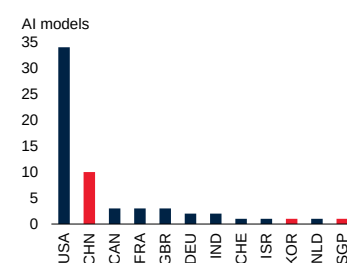
FIGURE 2.2 Development of large language models and AI applications

Development of large language models is concentrated in the United States and China. Advanced economies are also developing the bulk of AI applications.

A. AI GitHub projects in East Asia and Pacific and the United States



B. Number of AI models, world



Sources: OECD.AI Policy Observatory (2026); World Bank Group (2026a); World Bank Group. Note: ppl. = people. For country code abbreviations, refer to the International Organization for Standardization, <https://www.iso.org/obp/ui/#search>.

A. Bars show the number of public AI GitHub projects per million people in selected advanced and EAP economies in 2016 and 2023. AI projects are mapped to economies using contributor- and project-level location information; refer to World Bank Group (2026a) for details.

B. Bars show the number of AI model providers in each economy as of April 2025.

increasingly, Chinese knowledge, and relies disproportionately on public institutions.

Fourth, efforts to improve the fundamentals of a conducive business environment, in particular the availability and reliability of infrastructure and a workforce with the right set of skills, could yield double dividends in harnessing AI for development and supporting broader growth momentum. For most countries in the region, especially Pacific islands, adoption and adaptation of existing AI tools offer the main pathway to reap AI benefits, but they are hindered by weaknesses in institutional readiness, trusted data ecosystems, digital foundations, and policy implementation capacity. Beyond supporting AI adoption and adaptation, strengthening innovation ecosystems and data governance would enhance the contribution of the more developed economies in East Asia and Pacific to AI advancement. Policymakers can also maximize AI benefits by using it to improve the provision of public services, providing regulatory frameworks that foster public trust, and deepening intra-regional cooperation

around shared infrastructure, trusted data access, public sector solutions, talent mobility and research collaboration.

Contribution

First, this chapter provides new comparative evidence on AI diffusion in EMDEs in East Asia and Pacific, where uptake is advancing but remains highly uneven. Population-normalized usage data indicate strong individual use in Malaysia, the Philippines, and Viet Nam, but also show that connectivity constraints continue to hinder population-wide adoption in lower-income economies (Misra et al. 2025). More broadly, gaps in connectivity, compute, locally relevant data, and skills inhibit adoption at scale (Arias et al. 2025; World Bank Group 2025). Yet comparable firm-level evidence for EMDEs in East Asia and Pacific remains scarce. This chapter uses new firm-level data for some EMDEs in East Asia and Pacific to compare AI adoption in the region with advanced economies and other EMDEs.

Second, this chapter provides new evidence on the skill bundles that can help workers thrive in a labor market that is being disrupted by AI. In advanced economies, AI has been associated with large task-level productivity gains but mixed employment effects, with adjustment often taking the form of task and skill reallocation (Brynjolfsson, Li, and Raymond 2025; Hampole et al. 2025; Humlum and Vestergaard 2025), or adverse employment effects in more AI-automatable jobs and AI-intensive local labor markets (Bonfiglioli et al. 2025; Calvino, Reijerink, and Samek 2025; Huang et al. 2026). AI is associated with wage premiums for AI skills and complementary skills, but evidence from EMDEs in East Asia and Pacific outside of China is limited (Fan, Qi, and Leng 2026; Martins-Neto et al. 2026; Stephany and Teutloff 2024). Using online job posting data for a sample of EMDEs and advanced economies, this chapter identifies

the demand for skill bundles that include AI, domain-specific, analytical, and socioemotional skills and compares this demand across multiple countries in the region. The analysis of AI-related skill bundles helps identify the complementary capabilities workers would need to benefit from AI rather than be displaced by it (Cazzaniga et al. 2024).

Third, this chapter provides new comparative evidence on AI innovation across East Asia and Pacific, based on the AI patents filed and identified using patent data and text analysis. Comparable evidence on AI innovation in EMDEs in the region remains scarce as the literature has focused on documenting the scale, ownership, and knowledge flows of AI innovation in China, Europe, and the United States (Fang et al. 2026; OECD 2025; Santarlasci et al. 2025; World Intellectual Property Organization 2019). The chapter fills the gap by characterizing AI innovation in East Asia and Pacific along four dimensions: the geography of AI invention and how it has been shifting within the region; the divergence between where AI is invented and who owns it; the sources of the knowledge on which each economy's AI builds; and the role of human capital and public institutions in generating innovation. Research on AI innovation in EMDEs emphasizes diffusion through trade and FDI (Fu 2020; Fu and Shi 2022). The chapter complements this research by documenting diffusion through different channels, in particular, cross-border collaboration and co-invention within multinationals, and the knowledge flows recorded in patent citations.

Data and Methodology

Data. Individual AI use is measured using data from Anthropic and Microsoft (annex 2.1). Firm AI use is measured using data on adoption of machine learning (“predictive AI”) from Spiceworks Ziff Davis

Aberdeen Group for 2016–22, online recruitment platforms in China, and the World Bank Enterprise Surveys in Thailand and the United States. AI-exposure is measured using indicators of the task intensity of occupations from employment data from ILOSTAT and labor force surveys for a sample of Southeast Asian economies (Cambodia, Indonesia, Malaysia, the Philippines, Thailand, Viet Nam) and data from China's economic census. Demand for AI-related skills is measured from millions of online job postings across nine East Asia and Pacific economies, of which five are EMDEs, and four comparator economies between March 2025 and April 2026 (annex 2.2; Aedo et al. forthcoming). AI innovation is measured using more than 100,000 AI patent applications filed through the Patent Cooperation Treaty (PCT) between 2009 and 2024, drawn from the Autumn 2024 edition of PATSTAT and identified following OECD (2025). The PCT is a system managed by the World Intellectual Property Organization (WIPO) through which a single patent application can seek protection in more than 150 member countries. Data on STEM (science, technology, engineering, and mathematics) graduates come from OECD education statistics, official national sources, and the UNESCO Institute for Statistics (annex 2.3).

Estimation. The measurement of the task intensity and AI-exposure of jobs follows Arias et al. (2025) using the methodology of Autor and Dorn (2013) and Felten, Raj, and Seamans (2023). Online job-posting data are used to identify AI-related skills alongside other digital, technical and socio-emotional skills (annex 2.2). For each skill, the *prevalence ratio* is computed by dividing the share of AI-related job postings requiring that skill by the share of all job postings that also require the skill. A high ratio means the skill is distinctive in AI recruitment—disproportionately demanded relative to the average job posting.

Rarely demanded skills would score highly: mathematics, for instance, is uncommon overall but emerges as an AI-specific niche skill. The analysis reveals emerging trends and associations, not structural shifts or causal effects of AI.

AI adoption

AI adoption is increasing across EMDEs in East Asia and Pacific, both among individuals and firms, but is still well below the global average. In some countries, such as Thailand, low firm adoption may reflect limited economic viability: firms report low expected productivity gains from AI, and high costs and insufficient knowledge as barriers to AI use. Based on the historical experience from the adoption of predictive AI (machine learning tools), a firm's size, prior technological capabilities, and proximity to AI knowledge centers are key enablers of AI adoption.

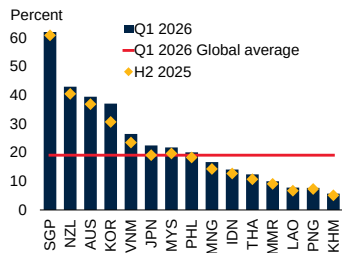
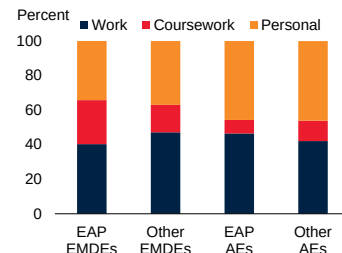
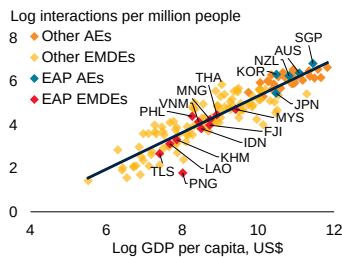
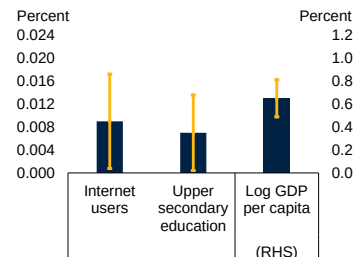
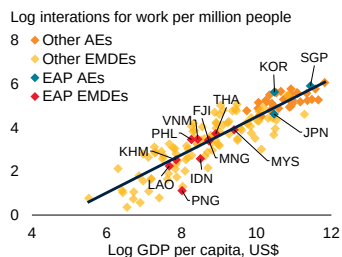
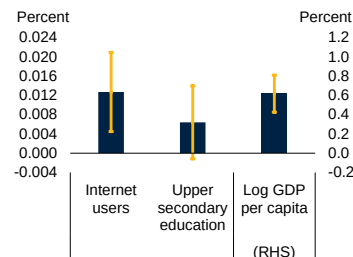
Individual use of GenAI

AI adoption. For most EMDEs in EAP, the largest gains are likely to come from the broad adoption of existing AI tools while adapting them to local needs (World Bank Group 2026a). New data from Anthropic and Microsoft's Global AI Diffusion dataset helps examine the utilization of Generative Artificial Intelligence (GenAI) by individuals, including for personal and work-related tasks. This is important to more broadly assess the potential impact of this technology. Individual use for work captures task-level utilization, which may occur without the firm-level adoption that requires investments and organizational changes to integrate GenAI into a firm's business process. Both individual and firm-level uses of AI could change worker and firm productivity.

Individual GenAI use. GenAI use has increased in EMDEs in East Asia and Pacific between 2025 and 2026 but remains

FIGURE 2.3 Individual GenAI use

The use of GenAI by individuals in EMDEs in East Asia and Pacific is highest in Malaysia and Viet Nam and lowest in Cambodia, Lao PDR, and Papua New Guinea. Individuals in EMDEs in East Asia and Pacific use GenAI for work somewhat less than those in other EMDEs. Higher per capita income, internet access, and educational attainment are associated with greater AI use by individuals, both overall and for work.

A. GenAI use in EAP**B. GenAI Claude use by region****C. Relationship between GenAI Claude use and GDP per capita****D. Correlates of individual GenAI Claude use****E. Relationship between GenAI Claude use for work and GDP per capita****F. Correlates of individual GenAI Claude use for work**

Sources: Anthropic (2026); Microsoft; World Development Indicators (database); World Bank Group.

Note: For country code abbreviations, refer to the International Organization for Standardization, <https://www.iso.org/obp/ui/#search>.

A. Bars compare GenAI use from Microsoft data across EAP economies in July–December 2025 and January–March 2026.

B. Bars show regional shares of GenAI use cases based on the Anthropic Economic Index's broad, model-assigned intent categories. Regional averages weight countries by their February 2026 Claude usage.

C.E. Scatter plots show the relationship between GenAI use (C) or GenAI use for work (E) and log nominal GDP per capita in U.S. dollars. GenAI use is measured as the log of Claude interactions per million people. GDP per capita and population of each economy are averaged from 2022 to the latest available year.

D.F. Bars show estimates from regressions of GenAI adoption intensity—log Claude interactions per million people (D)—or work-related GenAI use—log work-related Claude interactions per million people (F)—on log GDP per capita and the shares of internet users, adults ages 25 and older with at least upper secondary education, and the urban population. Estimates are elasticities with respect to GDP per capita and semi-elasticities with respect to the other three. Yellow whiskers indicate 90 percent confidence intervals. Refer to table A.2.1.1 for the regression results.

well below the 20 percent global average. Individual GenAI use is comparable to the global average only in Viet Nam, Malaysia, the Philippines, and China. According to Anthropic, individuals in EMDEs in East Asia and Pacific frequently use GenAI Claude for coursework, which accounts for about 25 percent of AI uses—10–15 percentage points higher than in other EMDEs and advanced economies (figure 2.3). Countries with higher per capita incomes, a larger share of the population with secondary education, and wider internet use tend to use GenAI more frequently. For instance, a 1 percent higher GDP per capita is associated with a 0.65 percent higher use of Claude, while a 10-percentage-point higher share of internet users is associated with a 1 percent higher usage.

Individual GenAI Claude use for work.

Like in the rest of the world, individuals in EMDEs in East Asia and Pacific use GenAI most often for work (40 percent of AI queries). GenAI use for work is positively correlated with internet use and per capita GDP, similar to overall GenAI adoption, whereas it is not significantly correlated with the share of secondary education attainment (figure 2.3).

Individual GenAI Claude use: Augmentation and automation.

According to Anthropic, GenAI use can be broadly categorized as promoting “automation” and “augmentation,” depending on AI primarily substituting or complementing humans in the performance of tasks.

- In **automation**, AI performs a task largely on behalf of the user with minimal human intervention, such as responding to prompts to format documents or generating an output from a well-defined request.
- In **augmentation**, AI works alongside the user through an iterative process, in tasks such as developing ideas, supporting learning through explanation of concepts, or reviewing work through logic checks and providing feedback and suggestions.

Lower per capita incomes are associated with more frequent use of GenAI for task automation, while conversely, in richer economies, GenAI is more often used in tasks that involve AI-augmentation. Compared with its peers with similar per capita incomes, the Philippines, Malaysia, and Indonesia stand out for their higher use for augmentation rather than automation, while the opposite is true for Thailand and Mongolia (figure 2.4). This points to the role of other factors, such as employment structure or breadth of internet access, in AI use.

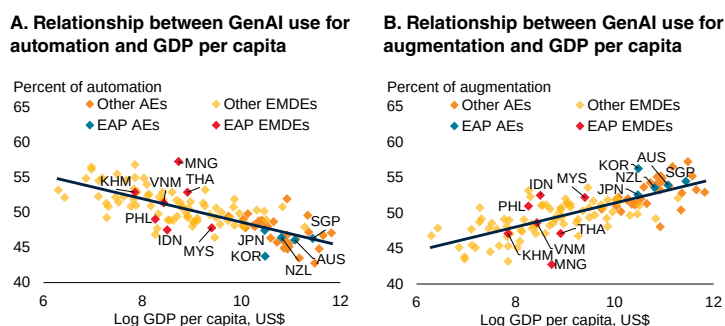
Firms' use of AI

Firms' AI adoption. The World Bank Enterprise Surveys (WBES) 2026 collected data on the adoption of a range of AI tools—including predictive, generative and agentic AI—in six EMDEs, including Thailand, and these are benchmarked against the United States. The data reveal that AI adoption and paid use is low among Thai firms: only 12 percent report using any AI technology and 4 percent pay a subscription for AI software or systems, compared with 43 percent and 23 percent in the United States, and 23 and 4 percent in India, respectively. Uptake increased following the public launch of ChatGPT on November 30, 2022 and, even more prominently, around the public launch of DeepSeek-R1 in January 2025 (figure 2.5). Low adoption by Thai firms may reflect limited economic viability: the expected benefits of AI do not yet outweigh the costs of its adoption.

Firms' expectations of AI productivity gains. Slower AI adoption in Thailand than in the United States may reflect lower expectations of productivity gains from AI adoption. The WBES survey asks firms how much they expect sales per worker to grow over the next three years under two scenarios: rapid and slow AI development relative to the current pace. The difference between the two expectations measures a firm's

FIGURE 2.4 Individual GenAI Claude use and GDP per capita: Automation and augmentation

The use of GenAI in high-income countries tends to involve tasks where AI augments users, while in lower-income countries it is more often associated with the automation of tasks.



Sources: Anthropic (2026); World Development Indicator; World Bank Group.

Note: For country code abbreviations, refer to the International Organization for Standardization, <https://www.iso.org/obp/ui/#search>.

A.B. Scatter plots show the correlation between log GDP per capita and the share of GenAI use for automation (A) or augmentation (B). Automation refers to Claude usage where AI executes tasks with minimal human oversight (for example, directive commands and task iteration). Augmentation refers to collaborative use where users work with AI as a thinking partner (for example, learning, feedback loops, and validation). The shares of automation and augmentation in each panel add up to 100, making the panels mirror images of each other. The negative correlation between the share of automation-oriented GenAI use and income per capita indicates that GenAI is used more frequently for task automation in lower-income economies and for AI augmentation in higher-income economies.

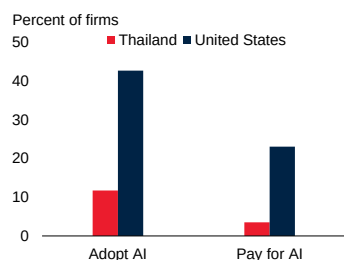
perceived labor productivity gain from faster AI development, netting out any baseline optimism or pessimism common to both scenarios. Thai firms are on average more optimistic than U.S. firms: the expected three-year gain from faster AI development averages 3.8 percent in Thailand against 1.3 percent in the United States. In both countries, expected gains are concentrated in a minority of firms. Nearly 80 percent of Thai firms anticipate near-zero gains, while 13 percent expect gains of 20 percent or more and just 1.5 percent expect AI to reduce sales per worker. Fewer U.S. firms cluster at zero, but the optimism is more muted and the downside more common: 70 percent expect no gains, 6.2 percent expect gains of 20 percent or more, and 6.6 percent expect losses (figure 2.5).

Firms' reported barriers to adopting or increasing use of AI. Thai firms report limited relevant knowledge and high costs as the main barriers to AI adoption, while non-adopting U.S. firms cite lack of knowledge and security and privacy concerns as the leading barriers.

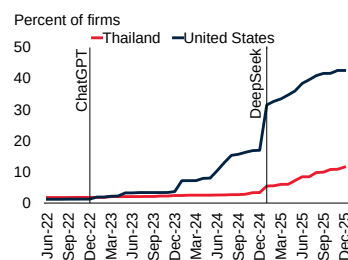
FIGURE 2.5 Firm AI adoption, productivity, and jobs

AI adoption is lower in Thailand than in the United States, and few Thai firms expect AI to raise productivity. Among firms that report facing constraints to adopting or expanding AI, lack of relevant knowledge and cost are the leading concerns in Thailand, while lack of relevant knowledge and concerns about security and privacy are the main reasons in the United States.

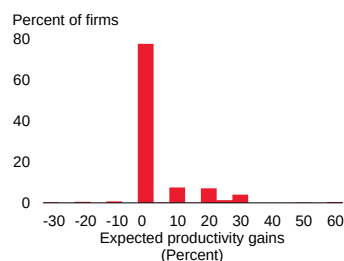
A. Thailand and the United States: Share of firms using, and paying for, AI



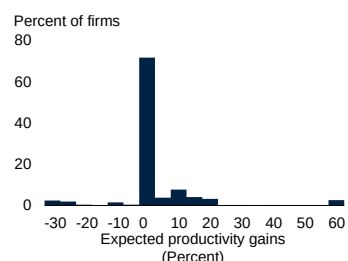
B. Thailand and United States: Share of firms using GenAI



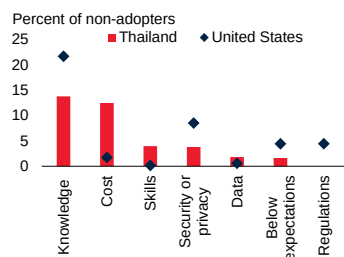
C. Distribution of expected productivity gains in Thailand



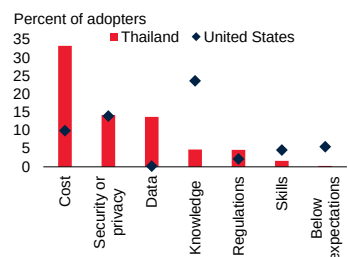
D. Distribution of expected productivity gains in the United States



E. Main reasons firms do not adopt AI



F. Main constraints to increasing AI use among adopters



Sources: World Bank Enterprise Surveys AI Module 2025–26; World Bank Group.

A. Bars show the shares of formal-sector firms adopting any AI technology and paying fees (subscriptions or purchasing costs) for AI software or systems, as of FY 2025–26.

B. Lines show the monthly cumulative share of formal-sector firms that had adopted any AI technology, from September 2022 to December 2025. The two vertical lines mark the public release of ChatGPT (November 2022) and DeepSeek R-1 (January 2025).

C.D. Charts show the distribution of expected three-year gains in sales per worker (a proxy of firm productivity) among all firms in Thailand (C) and in the United States (D). The expected AI productivity gain is derived from two WBES questions asking firms how much they expect sales to grow over the next three years under rapid and slow AI development, relative to the current pace and holding employment constant. Taking the difference isolates the perceived gain in sales per worker attributable to faster AI, netting out factors that would affect productivity expectations in both scenarios.

E.F. Bars show the percentage of firms reporting each factor as the main reason for not adopting AI (E) or not increasing their AI use (F). “Cost” indicates that firms consider AI too expensive. “Regulations” refers to laws and regulations that prevent or restrict AI use. “Knowledge” indicates that firms lack relevant knowledge. “Security/privacy” indicates that firms are concerned about the security or privacy of their data when using AI. “Skills” indicates that firms lack a skilled workforce. “Data” indicates that firms lack sufficient data. “Below expectations” indicates that firms’ previous or current use of AI did not meet their expectations. In panel E, the sample comprises 302 firms in Thailand and 178 firms in the United States. In panel F, the sample comprises 58 firms in Thailand and 214 firms in the United States.

Among firms already using AI, high costs are the main constraint to expand AI use in Thailand, while U.S. firms most often cite lack of knowledge. Security and privacy concerns are the second most cited deterrent to increasing AI use in both countries, while insufficient data is also a significant barrier for Thai firms (figure 2.5).

Historical precedent: Predictive AI adoption by firms.

GenAI’s predecessor, machine learning tools (hereafter “predictive AI”), has been used in many settings to automate routine workflows and improve predictive accuracy to inform data-driven decision making. For example, predictive AI has been used to monitor transactions to detect fraud in finance and optimize supply chain in manufacturing. For 2016–22, establishment-level data on the use of predictive AI is available for a sample of 30,000 establishments of multinational enterprises (MNEs), multi-plant firms, and standalone firms across 31 countries, including China and Thailand. Predictive AI was most widely and most rapidly adopted in MNEs: they—regardless of being headquartered in advanced economies or EMDEs—were more than twice as likely to adopt predictive AI than domestic multi-plant firms, and five to six times more likely than single-plant firms. China, the EMDE that hosts the largest number of multinational enterprise establishments in manufacturing, is no exception to this pattern (figure 2.6). A regression analysis using data on all establishments of MNEs points to several factors associated with greater adoption of predictive AI:

- **Prior technological capabilities** of the firm, measured by prior adoption of enterprise resource planning (ERP) or cloud computing;
- **Proximity to AI knowledge centers**, measured as the number of universities and research centers with AI-intensive publications during 2000–15 and that

are located less than 50 kilometers away from the establishment;

- **Larger size**, measured by the number of employees, and
- **Younger age** of the firm.

The pace of predictive AI adoption across establishments within each MNE is slow. Six years after first adopting AI in any of its establishments, an MNE headquartered in an OECD country has, on average, adopted AI in 35 percent of its establishments, while this share drops to 25 percent for MNEs headquartered in non-OECD countries (figure 2.6).

AI exposure, jobs and skills demand

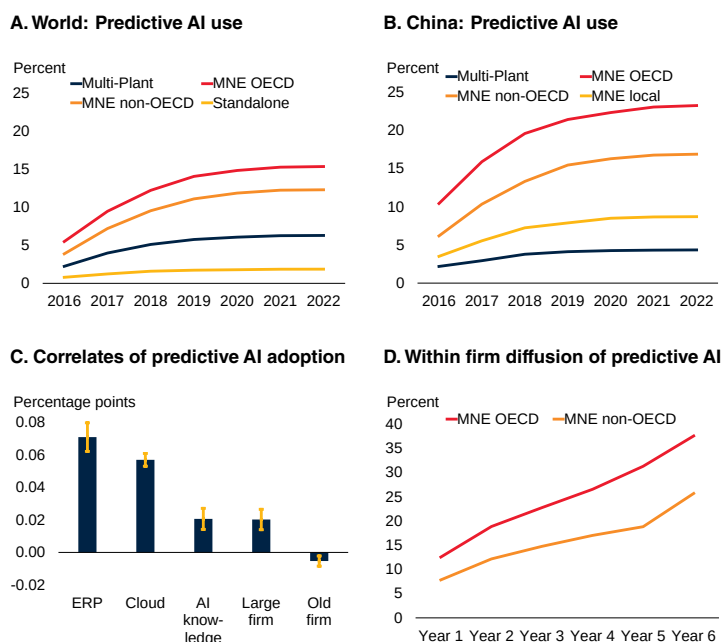
Fewer jobs involve the nonroutine cognitive tasks that AI most readily augments in EMDEs in East Asia and Pacific than in advanced economies. There are not yet discernible impacts on AI-automatable jobs in EMDEs in East Asia and Pacific, in contrast with evidence of negative impacts in advanced economies and other EMDE regions. AI-skill demand has grown less in most EMDEs in Southeast Asia and remains below the level of some advanced economies in the region and other EMDEs like India and Poland. In China, demand for GenAI skills has risen, especially after the release of DeepSeek, especially among listed, larger, and more technologically advanced firms. Analytical skills, such as mathematics and critical thinking, and social skills, such as communication and collaboration, are emerging as AI-adjacent skills that are typically bundled with demand for AI-related skills.

Impact of AI on AI-exposed jobs

Impact of AI on AI-exposed jobs. Depending on the task mix of jobs, technology can displace (“substitute” or “automate” away) or augment (“complement”) humans in existing jobs,

FIGURE 2.6 Historical precedent of firm adoption: Predictive AI

Predictive AI use increased, especially in multinationals, and is higher in larger and younger firms, more technological savvy firms, and firms closer to AI knowledge hubs. Intra-firm predictive AI diffusion is lower in multinationals located in EMDEs than in those in OECD countries.



Sources: Calvino et al. (forthcoming); World Bank Group.

Note: ERP = enterprise resource planning; MNE = multinational enterprise. A standalone firm consists of a single establishment; a multi-plant firm is a domestic firm operating multiple establishments within a single country; an MNE operates establishments in more than one country. MNE OECD (MNE non-OECD) is an MNE whose ultimate parent is domiciled in an OECD (non-OECD) economy, and MNE local is an MNE whose parent is located in the host economy. The analysis covers establishments in 31 economies over 2016–22; the MNEs operating in these economies have parents domiciled in 90 economies (38 OECD and 52 non-OECD).

A.B. Charts show the unweighted average share of establishments using predictive AI (machine learning tools) by firm type over time, across 31 economies in the sample (A) or in China (B). A firm is classified as a predictive AI adopter if at least one of its establishments reports using AI, and is treated as an adopter in all subsequent years.

C. Bars show estimates from the regression of the first predictive AI adopter within the MNE on ERP, cloud, AI knowledge (citing AI-related papers from a top 10 percent AI institution), and dummy variables for large firm (250+ employees) and older firm (10+ years). A firm is an AI adopter if at least one of its establishments reports using predictive AI. Regressions include interactions of establishment, country and 2-digit NAICS sector fixed effects. Standard errors are clustered by firm. Yellow whiskers indicate 90 percent confidence intervals.

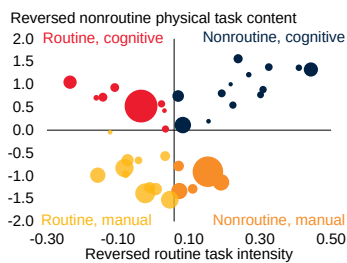
D. Lines show the cumulative average share of AI-adopting firms by year since first AI adoption and MNE origin.

create entirely new jobs, or leave existing jobs entirely unchanged. Productivity gains may arise through automation, augmentation, or the creation of task channels (Acemoglu and Autor 2011; Acemoglu and Restrepo 2019; Autor 2015). About 40 percent of jobs in Southeast Asian EMDEs are exposed to AI—in terms of having a high task content that can be either automated or augmented—compared with 34 percent in other EMDEs and 60 percent

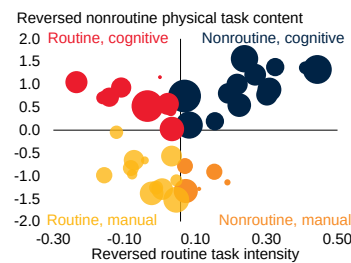
FIGURE 2.7 AI impacts on online job postings

Employment in EMDEs in East Asia and Pacific remains concentrated in manual occupations, with low AI exposure, while the share of non-routine cognitive jobs (which AI can augment) is lower than in advanced economies. Online job posting data do not reveal discernible impacts of GenAI on AI-automatable jobs in EAP EMDEs, in contrast to the negative impacts observed in advanced economies.

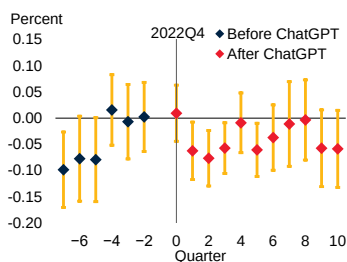
A. AI exposure and complementarity of jobs in EAP countries



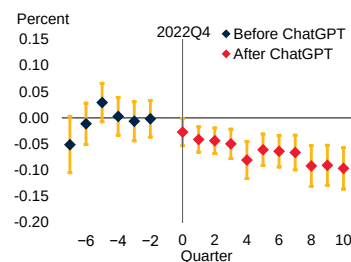
B. AI exposure and complementarity of jobs in advanced economies



C. Impact of GenAI on AI-automatable jobs in EMDEs in East Asia and Pacific



D. Impact of GenAI on AI-automatable jobs in advanced economies



Sources: Arias et al. (2025) based on Felten, Raj, and Seamans (2021); Huang et al. (2026); World Bank Group.

A.B. The x-axis reports the reversed Routine Task Intensity (RTI) index; higher values indicate greater occupational exposure to AI. The y-axis reports cognitive (upper quadrants) or manual task content (lower quadrants). Bubble size is proportional to each occupation's employment share across five Southeast Asian economies (Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam) (A) or 36 advanced economies (B). The vertical line marks the median reversed RTI value (0.058) across 39 occupations in 112 economies, while the horizontal line at zero separates relatively cognitive occupations from relatively physical ones. Colors in the four quadrants: dark blue denotes occupations which are predominantly high exposure and high complementarity; red, high exposure and low complementarity; yellow and orange, low exposure and low-to-moderate complementarity. Refer to Arias et al. (2025) for details.

C.D. Charts show event-study coefficients of the effect of AI exposure on job postings, by quarter relative to the release of ChatGPT (2022Q4, the vertical line) for Cambodia, Malaysia, Mongolia, the Philippines, and Thailand (C) and a sample of 42 high-income countries (D). Coefficients capture the change in the number of job postings relative to the quarter before ChatGPT release (2022Q3 = 0). Refer to Huang et al. (2026) for details.

in advanced economies (figures 2.1 and 2.7; Arias et al. 2025). This reflects the region's still-large agricultural employment and small services sector. Only about 13 percent of these exposed jobs in Southeast Asia involve the nonroutine cognitive tasks that AI most readily augments, compared to 39 percent in advanced economies. AI-exposure varies across East Asia and Pacific countries: China, Malaysia, and Mongolia have higher shares of workers in nonroutine cognitive jobs—

and are better equipped to benefit from AI-augmentation—while these shares are lower in the region's lower-income economies (Arias et al. 2025). The exposure of labor markets in the region to AI is likely to increase as economies become more service-oriented.

Impact of AI on AI-automatable jobs.

Among AI-exposed jobs, the estimated impact of AI has been most pronounced in occupations that involve primarily routine cognitive tasks in advanced economies, where automation tends to be more economically viable because of high labor cost. For example, the online jobs platform Lightcast has data for hundreds of millions of online job postings in advanced economies and some Southeast Asian EMDEs from the first quarter of 2018 to the second quarter of 2025. Since the public release of ChatGPT, the number of job postings in advanced economies for occupations that rank above-median in an index of automatability by AI fell by an average of 5.8 percent relative to occupations that rank below-median (figure 2.7; Huang et al. 2026). In the U.S., the decline in AI-automatable jobs is concentrated among entry-level and less-skilled jobs, and in professional services and administrative support occupations (Liu, Wang, and Yu 2025). Applying the analysis of Huang et al. (2026) in a sample of Southeast Asian EMDEs to data from the same online platforms does not show any discernible differential trend in online job postings related to AI-automatability, consistent with the lower AI adoption in these countries.

Caveat. The estimates of the impact of AI on jobs cannot be interpreted as causal because the analysis does not fully account for other confounding factors that affect the economy and the labor market. There are several measures of AI job exposure in the literature which differ in terms of approaches and data sources (for example, Demombynes, Langbein, and Weber 2025; Eloundou et al. 2024;

Gmyrek et al. 2025; Pizzinelli et al. 2023). However, the resulting measures are highly correlated with one another (World Bank Group 2026a). A key limitation of these measures is that they assume workers in the same occupations perform similar tasks in EMDEs and advanced economies. However, using actual worker-level task data from 47 EMDEs and advanced economies, Lewandowski, Madoń, and Park (2026) find that adjusting for within-occupation differences in tasks halves average AI exposure in the least-developed countries from 1 to 0.5 U.S. standard deviations (also refer to Gmyrek, Viollaz and Winkler 2026).

Impact of AI on AI-exposed jobs through trade. The diffusion of AI has also implications for a country's export-linked jobs. With the rise of global value chains (GVCs), economies increasingly specialize in tasks rather than specific goods or services. In GVCs, production is linked across multiple countries and sectors, with each stage involving distinct tasks performed by different workers and machines. Through labor substitution and augmentation, AI reduces the production costs for a given output bundle and raises productivity, with the magnitude of this productivity effect increasing with the level of AI exposure. Kruse and Yu (2026) combine recent labor force surveys and input-output tables for 26 economies to measure export-linked jobs across detailed occupations, classified as having AI-augmentation potential, facing a risk of AI substitution, or having low exposure. In most EMDEs in the region, workers in export-linked jobs have low exposure to AI and are therefore neither at risk of AI substitution nor likely to leverage AI to significantly boost their productivity. In contrast, a larger share of export-linked jobs is at risk of AI substitution in higher-income economies, reflecting export specializations in service sectors and more routine-cognitive tasks within goods-producing sectors.

Demand for AI-related skills

Significant demand for digital skills.

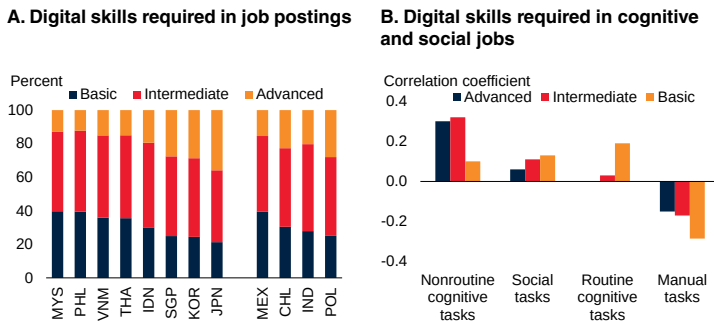
Realizing the potential of AI requires equipping workers with digital skills as AI tools are increasingly embedded in jobs. Basic digital skills include transcribing texts and using e-services, intermediate digital skills include using accounting software and designing web-based courses, and advanced digital skills include machine learning and designing cloud architecture. Online job postings data reveal that demand for advanced digital skills is concentrated in high-income economies—especially Japan (36 percent), Republic of Korea and Singapore (both 28 percent; figure 2.8). In Southeast Asian EMDEs, like other peers, intermediate digital skills account for about half of digital skill requirements, followed by demand for basic digital skills. Across all economies, advanced digital skills are more often required in jobs that involve non-routine cognitive and social interaction tasks, while basic digital skills requirements are more prevalent in routine cognitive jobs.

Skills and position in the AI value chain. The patterns of digital skill demand reflect differences in economic structure and an economy's position in digital technology-intensive global value chains (Aedo et al. forthcoming):

- **Advanced economies in East Asia and Pacific.** In the Republic of Korea, the demand for advanced digital skills is related to *hardware-intensive* activities, reflecting their semiconductor manufacturing and technology sectors, while in Japan and Singapore, demand focuses on *platform* and *services-intensive* activities such as semiconductor design, cloud computing, platform management, and financial technology.

FIGURE 2.8 Digital Skills

Demand for digital skills in EMDEs in East Asia and Pacific is more heavily tilted toward basic and intermediate skills than in advanced economies. Advanced digital skills are more often required in jobs involving cognitive and social interaction tasks.



Sources: Aedo et al. (forthcoming); World Bank Group.

Note: For country code abbreviations, refer to the International Organization for Standardization, <https://www.iso.org/obp/ui/#search>.

A. Chart shows the composition of digital skill mentions after deduplication and the ICT-offer merge using an adapted version of the digital-skill classification in Chinen and Montorsi (2025). Within each country, basic, intermediate, and advanced skills sum to 100 percent of classified digital skill mentions.

B. Bars show correlation coefficients between job task intensity (x-axis) and requirements for basic, intermediate, and advanced digital skills in online job postings, pooling data for all 12 countries shown in panel A. The correlations are similar when estimated separately for EAP EMDEs and other economies.

- **Southeast Asian EMDEs.** Demand for intermediate digital skills likely reflects the high digital footprint of service and administrative jobs that use enterprise software, communication platforms, business management and data tools. Malaysia and the Philippines emphasize digital skills related to business systems, enterprise software, and service delivery, reflecting the prominence of the *business systems* and *BPO services* sector. In Indonesia, broader demand for mobile and e-commerce platform skills tracks its domestic digital economy, while in Viet Nam, relatively strong demand for software development is aligned with growing software exports.

Demand for AI-related skills. Online job postings allow us to characterize the AI-related skills employers seek as well as other skills they demand alongside them across different jobs. AI-related skills encompass the competences required to utilize AI tools in job

tasks as well as the deeper technical digital skills and knowledge to develop AI systems. While the GenAI usage data discussed above captures how individuals actually use these tools, job postings capture the skills firms demand when they recruit (including for AI-related jobs).

- **Slow pace of demand for AI-related skills.** Demand for AI-related skills is spreading across Southeast Asian EMDEs, but more slowly than seen in other EMDEs like India and Poland and in advanced economies such as Singapore (figure 2.9). In general, the pace of growth in AI-related skill demand is consistent with economies' digital sophistication. For example, Singapore's leadership in AI-related skills demand reflects the rapid integration of AI capabilities into semiconductor and electronics design ecosystems and a deliberate national strategy to attract AI talent (World Bank Group 2026a). Demand is higher in countries like Poland and India which have important digital-intensive sectors, but lower in other EMDEs like Chile and Mexico.
- **Differential demand for AI-related skills.** Employers in advanced economies in East Asia and Pacific focus on skills related to predictive AI, AI systems design and development, and computer vision. Employers in Southeast Asian EMDEs show a stronger demand for deployment and data mining—similar to other EMDEs. In the most advanced economies in East Asia and Pacific, AI skills appear in postings for management, finance, and professional services roles, while in Southeast Asian EMDEs (like in other EMDEs) AI skill demand remains concentrated in information and communication technologies and engineering (Aedo et al. forthcoming).

Unequal demand for semiconductor-related skills.

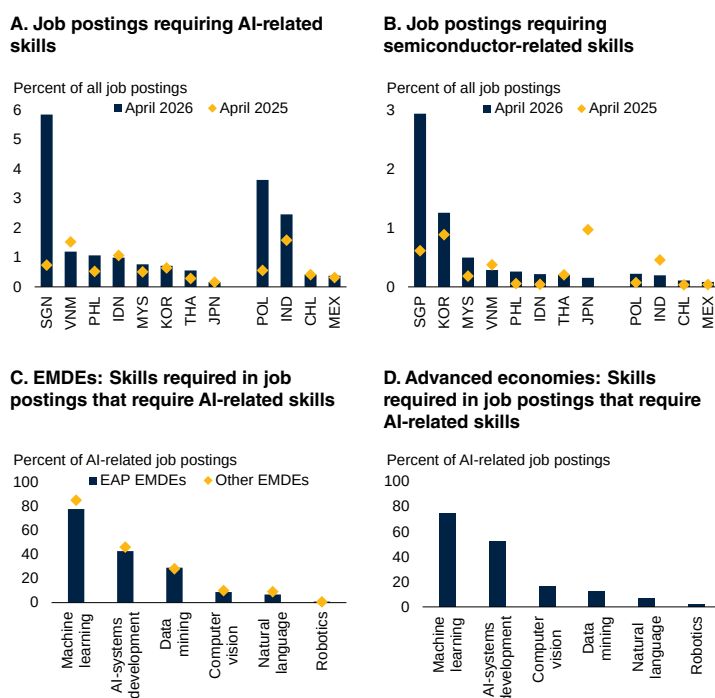
The semiconductor industry is essential to the global AI value chain and virtually all other digital industries, and a sector in which several East Asia and Pacific economies are globally significant market players. Semiconductor skill demand is more concentrated in advanced economies, reflecting the industry's capital- and knowledge-intensive nature (figure 2.9). Singapore and the Republic of Korea have the highest semiconductor-related skill demand, consistent with their large semiconductor manufacturing base. Among Southeast Asian EMDEs, like in other EMDEs, semiconductor-related skills demand remains small notwithstanding recent growth in Malaysia, the Philippines, and Indonesia linked to electronics manufacturing assembly and testing.

Increasing demand for GenAI skills in China. China, data are available for 72 million job advertisements posted on Chinese online recruitment platforms for more than 5,000 listed firms and about 2.5 million non-listed firms during 2015–25 (Li et al. 2026). Firms are classified as GenAI adopters after posting their first vacancy with GenAI-related skill requirements. Listed firms demanded GenAI skills at considerably higher rates (figure 2.10). By the end of 2025, 21 percent of listed firms had posted jobs for GenAI skills but only 0.2 percent of unlisted firms.

- **Firm characteristics.** The lower demand for GenAI AI skills among non-listed firms in part reflect firm characteristics, including being smaller, less technologically advanced or digitally ready, and having lower productivity (Li et al. 2026; Yotzov et al. 2026).
- **Sector.** Among listed firms, demand for GenAI skills was highest in the market services sector (35 percent by the end of 2025), followed by non-market services, and manufacturing (figure 2.10).

FIGURE 2.9 Demand for AI-related skills

Demand for AI-related skills has barely grown in EMDEs in East Asia and Pacific and remains below that in other EMDEs. As in other EMDEs, the AI-related skills that are most in demand are machine learning whereas demand for skills to develop AI systems is still much lower than in advanced economies. Demand for semiconductor skill is also concentrated overwhelmingly in advanced economies in East Asia and Pacific.



Sources: Aedo et al. (forthcoming); World Bank Group.

Note: Other EMDEs are benchmark economies including Chile, India, Mexico, and Poland. EAP AEs include Japan, the Republic of Korea, and Singapore; EAP EMDEs include Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam. Total job postings include only online postings with an identifiable month within the analysis window and therefore exclude postings dated only by year or outside the window. This base is narrower than the overall posting counts reported elsewhere. Skills are mapped to the European Skills, Competences, Qualifications and Occupations (ESCO) framework. For country code abbreviations, refer to the International Organization for Standardization, <https://www.iso.org/obp/ui/#search>.

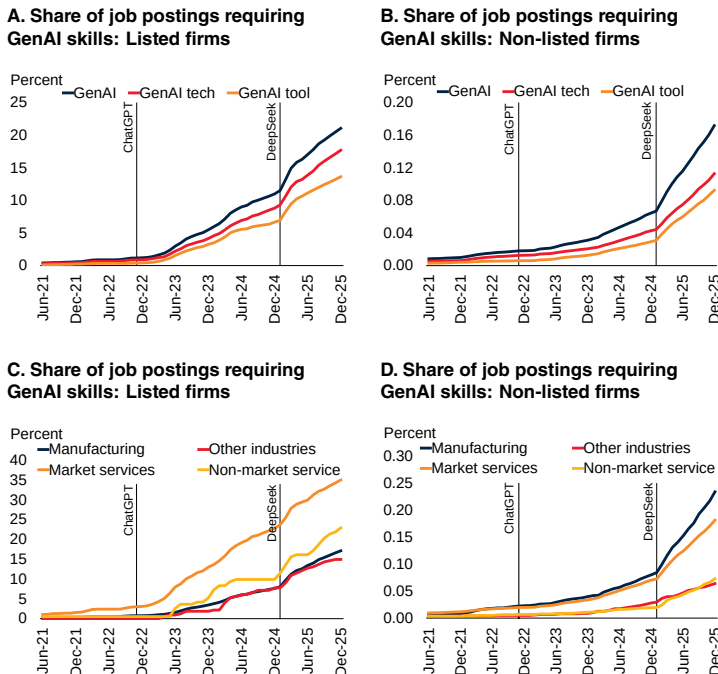
A.B. Bars and diamonds show the shares of online job postings requiring AI-related and semiconductor-related skills, respectively, by economy, grouped as defined in the note. Refer to annex 2.2 for the definitions of AI-related skills and semiconductor-related skills. The value shown for Chile for April 2026 corresponds to December 2025, the latest data available.

C.D. Bars and diamonds show the shares of online job postings requiring an AI-related skill by each AI subfield, averaged (simple, unweighted) across each group of economies. AI subfields overlap, so a subfield total can exceed 100 percent; the shares measure relative importance, not a share of job postings. "Machine learning" is short for machine learning and neural networks. "AI-systems development" refers to AI theories, architectures, and systems. "Data mining" refers to data mining and predictive analytics. "Natural language" is short for natural language and speech. "Robotics" means robotics and automation. Refer to annex 2.2 for full definition.

Among non-listed firms, demand for GenAI skills was highest among manufacturing firms, although still small at 0.3 percent. The results are largely consistent with existing studies, which suggest that jobs in the market service sector are more exposed to GenAI (Gmyrek et al. 2025).

FIGURE 2.10 GenAI adoption in China: Evidence from online job postings

In China, GenAI adoption—as proxied by job postings requiring GenAI skills—surged in 2025 but remained sharply unequal, at 21 percent among listed firms and less than 1 percent among non-listed firms.



Sources: Li et al. (forthcoming); World Bank Group.

Note: The two vertical lines mark the public release of ChatGPT (November 2022) and DeepSeek R-1 (January 2025).

A.B. Charts show the monthly cumulative share of listed (A) and non-listed firms (B) posting at least one vacancy requiring a GenAI-related capability during January 2019–December 2025. A firm is counted as an adopter from its first such posting onward. “GenAI tool” refers to knowledge of named applications, such as ChatGPT or DeepSeek; “GenAI tech” refers to specialized capabilities, such as transformers, fine-tuning, retrieval-augmented generation, and prompt engineering. “GenAI” combines these two potentially overlapping categories.

C.D. Charts show the corresponding cumulative adoption rates by broad sector, measured quarterly. Denominators are all listed firms in panel A, non-listed firms registered by that month in panel B, and firms existing in each sector-quarter in panels C and D. The indicator captures adoption revealed through hiring and may not capture firms that use GenAI without advertising for related capabilities. “Other industries” includes construction, mining, and utilities.

Importance of AI skills bundles. When employers seek workers with specific skills, they are not solely seeking technical qualifications or credentials: they want a bundle of complementary competencies. As digital technologies automate routine tasks, employers increasingly value bundles of complementary technical, digital, and transversal (both analytical and socio-emotional) skills required for non-routine cognitive and interpersonal

tasks (Cunningham et al. 2022; Deming and Kahn 2018; Grundke et al. 2018; refer also to figure 2.8).

- **Global AI-adjacent transversal skills.** AI-related job postings reveal AI skill bundles that have striking similarities across levels of development. In all countries, analytical skills like math competences, critical and creative thinking, and problem solving, and social skills like communication and collaboration are 4 to 16 times more likely to appear in AI job postings than in an average job posting, making them AI-adjacent skill demand (figure 2.11). Skills such as problem solving, critical thinking, communication and collaboration are not only distinctively required for AI work, but they are also broadly sought across the labor market, and AI diffusion could also amplify their demand (annex 2.2).

- **Differences in AI-adjacent transversal skills by income level.** Beyond these common AI-adjacent transversal skills, job postings for AI-related skills reflect differences in the economies’ position in the AI value chain and AI adoption, with research and frontier AI development concentrated in advanced economies and AI applications and deployment being dominant in EMDEs. In advanced economies, like the Republic of Korea, AI-adjacent skills emphasize abilities to conduct academic research and to provide expert advice, while in Southeast Asian EMDEs employers stress AI-adjacent skills to engage with stakeholders like clients and team members, as illustrated, for example, by the Philippines (figure 2.11).

AI innovation

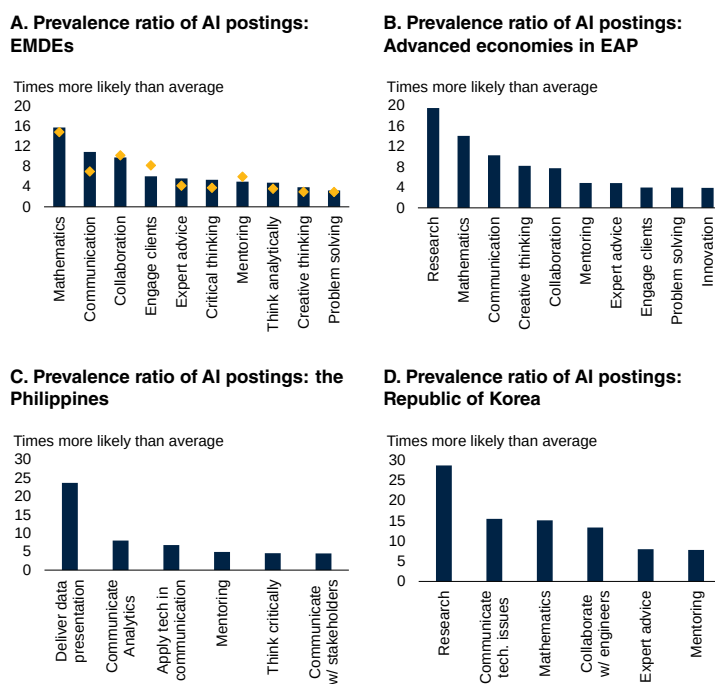
AI innovation, reflecting both adaptation and advancement, is increasing rapidly worldwide. China, Japan, and the Republic of Korea rank among the world's most prolific sources of AI patents, while the region's EMDEs remain at an earlier stage of AI patenting. Although some AI innovation occurs in EMDEs in East Asia and Pacific, it is increasingly owned by foreign multinationals, builds mostly on U.S. and, increasingly, Chinese knowledge, and relies disproportionately on public institutions.

Rise of AI patenting. Patented AI innovation has accelerated sharply over the past decade. This can reflect new AI tools resulting from local adaptation to develop AI solutions as well as advancement of AI frontier models. The number of AI patents filed under the Patent Cooperation Treaty (PCT) more than quadrupled between 2009–16 and 2017–24. AI patenting rose even faster than overall patenting: the share of AI patents in all patent applications filed under the Patent Cooperation Treaty increased from just over 1 percent in 2009–16 to almost 5 percent in 2017–24 (figure 2.12). Innovation is thus not merely expanding but orienting toward AI, consistent with its role as a general-purpose technology.

Shift toward more advanced AI tools. The composition of AI patenting has changed as its scale increases. In 2009–16, computer-vision applications and traditional machine-learning techniques accounted for about two-thirds of AI patents filed under the Patent Cooperation Treaty. By 2017–24, the mix had shifted toward more advanced techniques: deep-learning patents rose from about 8 percent to 26 percent, and machine learning to 39 percent, while computer vision fell to 15 percent (figure 2.12). Frontier techniques such as generative foundation models and general AI grew from 1 to 7 percent over this period, still a small share, but rising

FIGURE 2.11 Complementarity of skills: AI skills bundles

AI skill demand is typically bundled with other skills. Whereas in advanced economies AI skill demand is often bundled with math, innovation, and soft skills, in Southeast Asia EMDEs it is more often bundled with math and soft skills. In the Philippines, for example, which is one of the slowest adopters of GenAI, AI skill demand is most often bundled with communication skills.



Sources: Aedo et al. (forthcoming); World Bank Group.

Note: Skills are mapped to the European Commission's ESCO classification (European Skills, Competences, Qualifications and Occupations). Data are constructed from millions of online job postings from March 2025 to April 2026. Prevalence ratio refers to how many times as likely a skill is to be required in an AI-related posting as in an average job posting.

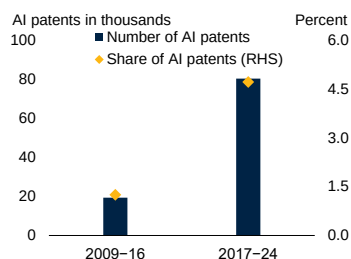
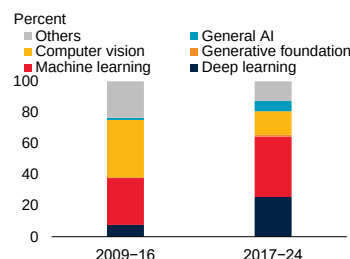
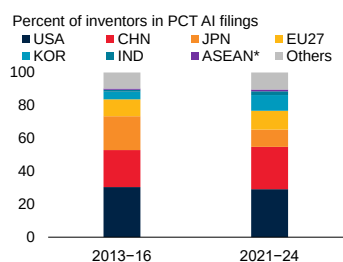
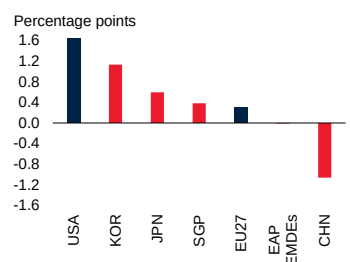
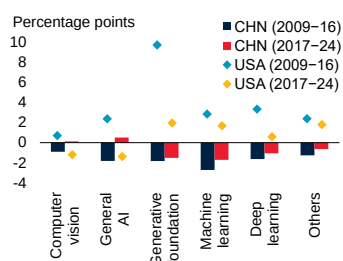
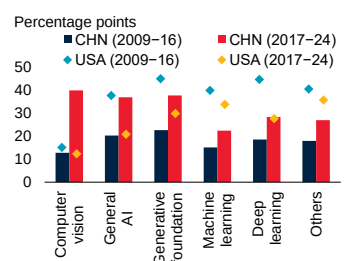
A. Bars show the average prevalence ratio for the top ten non-technical skills required in job postings in EAP EMDEs and in other EMDEs (diamonds) for the same skills. EAP EMDEs include Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam; other EMDEs include Chile, India, Mexico, and Poland. For other EMDEs, "Critical thinking" is proxied by "Create solutions to problems" in job postings.

B. Bars show the average prevalence ratio for the top ten non-technical skills required in job postings in three EAP advanced economies: Japan, the Republic of Korea, and Singapore.

rapidly. Patent data likely understate the frontier's momentum, as the scientific publications on generative AI exceeded 34,000 in 2023, while generative AI accounted for only about 6 percent of AI patent families. This gap reflects the lag between research and patent publication (World Intellectual Property Organization 2024). The share of patents in other applications, such as natural language processing, robotics control, speech and transportation, has also declined between the two periods. Illustrative examples of patents for various AI subfields are presented in annex 2.3.

FIGURE 2.12 AI innovation

AI patents have surged and grown more advanced, but they remain concentrated in a few economies, and the AI patents invented in EMDEs in East Asia and the Pacific are largely owned abroad and built on U.S. and increasingly Chinese knowledge. The ownership-invention gap has become more concentrated in frontier AI technologies in both China and the United States.

A. AI patents registered in Patent Cooperation Treaty**B. Share of AI patents registered in Patent Cooperation Treaty registered****C. Inventor nationality of AI patents in Patent Cooperation Treaty****D. Gap between share of inventors and owners of AI patents registered under Patent Cooperation Treaty****E. Gap between patent ownership and inventor shares****F. Share of patent ownership**

Sources: OECD (2025); PATSTAT 2024 Autumn; World Bank Group.

Note: ASEAN includes MYS, VNM, THA, PHL, MMR, LAO, IDN, BRN, KHM, SGP. ASEAN* include all ASEAN economies excluding SGP. For country code abbreviations, refer to the International Organization for Standardization, <https://www.iso.org/obp/ui/#search>.

A.B. Bars show the number and share of patents registered under the Patent Cooperation Treaty that are classified as AI patents (A) and the changes in field composition of AI patents in the Patent Cooperation Treaty (B) in 2009-16, and in 2017-24.

C. Bars show the changes in nationality composition of inventors who invent AI patents in PCT in 2013-16, and in 2021-24.

D. Bars show the difference between the share of patents owned by and the share of patents invented in selected economy or economy group. Values for economy groups are simple averages across the economies included.

E. Bars show the difference between the share of patents registered under the Patent Cooperation Treaty and owned by China and the share invented in China; dots show the corresponding difference for the United States. Results are shown across AI fields for 2009-16 and 2017-24.

F. Bars show the share of patents registered under the Patent Cooperation Treaty and owned by China; dots show the corresponding share owned by the United States. Results are shown across AI fields for 2009-16 and 2017-24.

A concentrated and shifting geography of innovation. AI patents remain heavily and increasingly concentrated in a few particularly innovative economies. The phenomenon of concentration of the AI value chain discussed in World Bank Group (2026b) is perhaps even more prominent when looking at the AI patenting activity. Inventors residing in the United States and China together account for more than half of AI filings in recent years. In 2021-24, U.S. inventors accounted for 29 percent of AI patents filed under the Patent Cooperation Treaty, while the share invented by Chinese inventors rose from about 22 percent in 2013-16 to about 26 percent in 2021-24 (figure 2.12). In East Asia and Pacific, the composition of AI patents is shifting towards inventors in the Republic of Korea's and China as the share of Japanese inventors is declining. Inventors in Southeast Asian economies accounted for only 1 percent of global patents, a very small share but still three times that of other emerging economies in Latin America, at 0.3 percent.

Divergent ownership of inventions. Each patent records two different pieces of geographical information: inventors and applicants. Inventors are the researchers who created the invention and applicants are the entities, commonly firms and institutions, that file the patent and hold the resulting property rights. Inventors' locations therefore show where the innovation is carried out, while applicant location shows who owns the innovation. The two coincide when a domestic entity patents the work of its own researchers, but they diverge when an entity owns inventions created by research teams abroad. The divergence can be measured as the difference between each economy's share among applicants and its share among inventors on AI patent applications under the Patent Cooperation Treaty in 2021-24 (figure 2.12). The United States appears more often as an owner than as an inventor, and so do Japan,

the Republic of Korea, and Singapore. But China shows the opposite pattern: Chinese researchers invent more AI than Chinese applicants own, consistent with evidence that multinational-sponsored patents account for a significant share of international patents by China-based inventors (Branstetter, Li, and Veloso 2015). This divergence is starkest in the region's developing economies: a substantial and growing share of AI invested in Southeast Asia is owned by foreign entities, rising from roughly one-fifth in 2009–16 to about one-third in 2017–24, predominantly held by U.S. entities (annex 2.3)

The ownership-invention gap concentrates in frontier AI technologies. The gap between patent ownership and invention was broadly uniform across AI subfield applications during 2009–16 for both the U.S. and China, except in Artificial General Intelligence (AGI) development. By 2017–24, the gap in both countries narrowed and became concentrated in the frontier applications: GenAI, machine learning, and deep learning (figure 2.12E). The United States held the largest ownership share in these frontier fields in the earlier period, but China's ownership share rose sharply and now exceeds that of the United States in AGI, Gen AI and deep learning (figure 2.12).

United States as the largest source of AI knowledge. For nearly every economy, the knowledge used in their AI patents comes primarily from technologies invented in the United States: patents invented in ASEAN and the EU27 draw the largest share of their citations from the U.S. patent stock, and even Chinese-invented AI patents drew more on U.S. than on Chinese patents in the earlier period. But China's knowledge base is turning inward. The share of citations by Chinese-invented AI patents that go to other Chinese patents rose from about one-third in 2009–16 to about half in 2017–24, indicating that Chinese AI increasingly builds

on a maturing domestic knowledge stock alongside knowledge from global frontier. Chinese-generated knowledge is also becoming a more important source for other economies, whose citations of the Chinese patent stock have risen over the same period (annex 2.3).

Importance of talent for innovation.

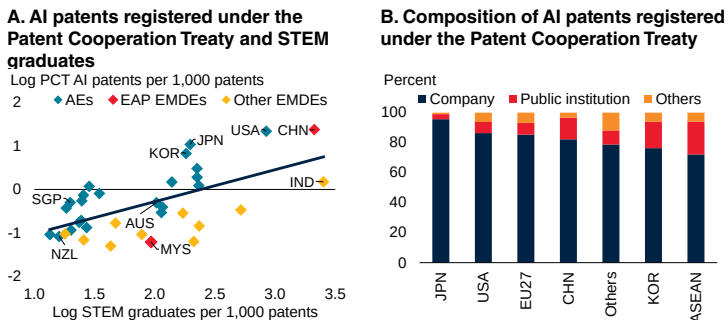
Across economies, more STEM graduates are associated with more AI patents (figure 2.13).¹ But the departure from the fitted line shows that China and the United States combine the world's largest STEM graduate pools with exceptionally large AI patent output, while Japan and Republic of Korea convert moderate graduate bases into disproportionately large AI patenting. India sits far below the fitted line, producing one of the world's largest STEM graduate pools while patenting little AI, and Malaysia shows a similar shortfall in East Asia and Pacific. These gaps may partly reflect that STEM graduates in these economies produce patents attributed elsewhere, either graduates migrated or are working within foreign multinational enterprises in their home country—both patterns are consistent with the ownership evidence documented above. This suggests that leveraging graduates into frontier invention requires complementary capabilities—such as research institutions, firms in the technological frontier, and access to global AI knowledge—that some economies with large STEM talent pools lack.

The public-private mix in innovation. More than 70 percent of AI patents arise from firms' research and development activities in every country, but the exceptions are concentrated in East Asia and Pacific (figure 2.13). Companies account for about 95 percent of AI patents filed under the Patent Cooperation Treaty and

¹ Patent invention is attributed based on the address provided on the application, which could be the inventor's home country or current country of residence. Patent offices do not collect information on nationality. A Malaysian STEM graduate, for example, would be counted as a U.S. inventor if a U.S. address is provided in the patent filing.

FIGURE 2.13 AI innovation: Human capital and institutions

AI patenting is overwhelmingly conducted by firms. The supply of STEM graduates is positively associated with AI patenting.



Sources: All India Survey on Higher Education (AISHE); Department of Statistics Singapore; Ministry of Education of China; Ministry of Higher Education of Malaysia; OECD (2025); OECD education database; PATSTAT 2024 (Autumn); UNESCO Institute for Statistics; World Bank Group.

Note: For country code abbreviations, refer to the International Organization for Standardization, <https://www.iso.org/obp/ui/#search>.

A. Chart shows the correlation between the base-10 logarithm of STEM graduates (in thousand patents) and the base-10 logarithm of AI patents (in thousand patents).

B. Bars show the composition of applicants for PCT AI patents. Public institutions include universities, research institutes, government agencies, and hospitals.

invented in Japan, and about 85 percent in the United States and the European Union. Universities, public research institutes, and government agencies play a larger role in ASEAN economies, accounting for over 20 percent of patents, compared to about 17 percent in Republic of Korea and 14 percent in China. A larger public role can reflect a solid research ecosystem, such as China's academy system and the Republic of Korea's research institutes (Fang et al. 2026; World Intellectual Property Organization 2019). However, in emerging economies, it can also signal underdeveloped capital markets and insufficient protection of intellectual property rights, which hinder the ability and incentives of domestic firms to adapt and advance AI tools.

Policy implications

Realizing AI's potential for development depends on a broad set of policy reforms to support AI adoption, adaptation, and advancement, with governments playing a key role as enablers, users, and regulators of AI (World Bank Group 2026b).

Efforts to improve fundamental enablers, in particular a conducive business environment, adequate infrastructure and financing, and a skilled workforce, could yield double dividends in supporting growth and harnessing AI for development. Other complementary policies are examined in previous regional studies (refer to Arias et al. 2025; De Nicola et al. 2025; World Bank Group 2024, 2026a). Policy priorities differ across countries in the region because the gaps and market and policy failures that inhibit these fundamentals vary across contexts and development stages. In most EMDEs in the region, the adoption and adaptation of existing AI technology—especially of small AI tools—offer the main pathway to reap AI benefits. Policymakers can maximize AI benefits by ensuring digital foundations, by using AI to improve the provision of public services, by strengthening institutional and regulatory readiness, and by deepening intra-regional cooperation.

Infrastructure

Access to basic physical and digital infrastructure. While countries in East Asia and Pacific have improved the availability of physical and digital infrastructure in the last decades, important differences remain both across and within countries. Across countries, in 2024, internet penetration rates vary from 98 percent and 91 percent for Malaysia and Thailand to 19 and 35 percent for Papua New Guinea and Timor-Leste (World Bank Group 2026a). Within countries, internet adoption rates remain significantly higher among better-educated, higher-income, and urban households and firms (World Bank Group 2024).

Access to compute. The number of data centers in the East Asia and Pacific region, including those with AI capacity, has grown substantially in the last 10 years, especially in China, Indonesia, and Malaysia (box 2.1).

BOX 2.1 Data Centers in East Asia and Pacific

The adoption, adaptation, or advancement of artificial intelligence (AI) requires access to “compute”, the ability to process large amounts of data. Local data centers offer one form of access to compute. High-capacity and reliable energy grids in some EMDEs in East Asia and Pacific make them attractive data center locations. Data center investment is also attracted by other good fundamentals, such as sound governance and regulatory quality, and a skilled workforce. Efforts to improve these fundamentals are therefore likely to constitute “no-regrets” policies that benefit data center investment as well as broader investment.

Introduction

Data centers in East Asia and Pacific. Demand for cloud computing has risen sharply as digitalization continues and the adoption of AI tools becomes increasingly widespread among firms and consumers. Cloud compute can be accessed globally or locally in local data centers. While EMDEs in East Asia and Pacific lag behind advanced economies in the intensity of data centers, the number of data centers has grown rapidly in the several East Asian countries over the past ten years (figure B2.1.1). China accounts for the largest share of new data centers and Indonesia, Malaysia, and Thailand explain the majority of the remaining growth. Malaysia and Thailand are among the top 10 recipient countries worldwide of data center investment, together with other EMDEs like Brazil and India (World Bank Group 2026a)

The case for local data centers. Local data centers are needed for frontier AI applications, but for many forms of AI adoption are not required. But countries increasingly seek local or regional compute capacity for purposes of data sovereignty, cybersecurity, regulatory compliance, digital resilience, and support for public-sector and enterprise AI deployments. The vast majority of existing data center capacity offers conventional cloud services: data storage and processing, software, and website hosting.

Indeed, in East Asia and Pacific, some AI-driven applications—such as Google searches, video calls, and cloud storage—can be run using data centers in Europe or the Americas. More sophisticated AI applications—such as robotics and autonomous driving—require low latency (the delay between a user’s request and the system’s response) and, therefore, proximity to high-capacity data centers (figure B2.1.1). If adoption of such more sophisticated applications grows in the more advanced digital economies in the region, or for data sovereignty purposes, demand will also grow for secure data centers locally or in close proximity. Other drivers of rising demand for local infrastructure are also the search for greater digital resilience, and the support for public-sector AI deployments.

Focus of this box. By enabling productivity gains, including from AI applications, data center investments can potentially support downstream economic activity and the creation of more productive, high-skilled jobs (World Bank Group 2026b; FTI forthcoming). Moreover, data centers construction involves the creation of jobs, and their maintenance require highly-skilled workers. However, complementary factors—including a skilled workforce, a reliable and affordable energy supply, and robust governance—are needed to reap these benefits by ensuring the infrastructure is used productively. Moreover, because of their intensive resource use, these investments raise environmental concerns. This box examines the enabling factors of data center investments by considering the following questions:

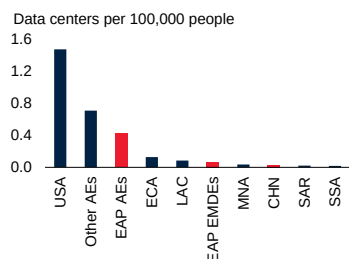
This box was prepared by Jonah Rexer, Jonathan Timmis, and Margaret Triyana (DECPA).

BOX 2.1 Data Centers in East Asia and Pacific

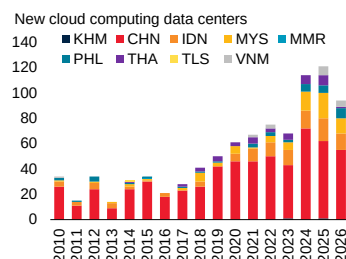
FIGURE B2.1.1 The rise of AI data centers

While data centers are concentrated in advanced economies, the number of data centers in East Asia and Pacific has risen sharply since 2015. Expanding AI development and diffusion is expected to increase demand for data centers by 2030.

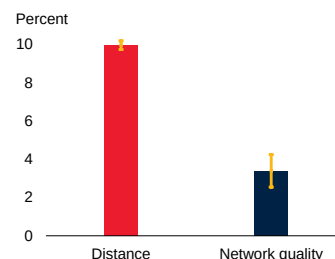
A. Stock of data centers per 100,000 people by region



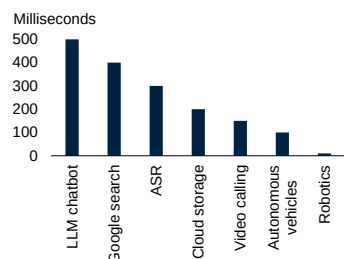
B. New cloud computing data centers in East Asia and Pacific



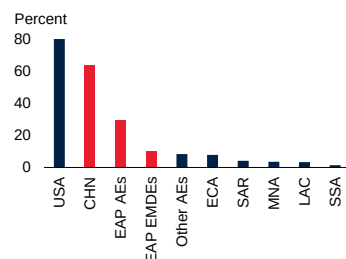
C. Reduction in latency from network quality and proximity



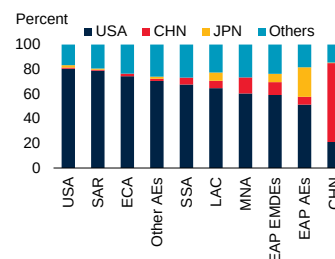
D. Maximum latency for selected transactions



E. Share of local cloud contracts



F. Composition of cloud contracts



Sources: Epoch AI; FactSet; McKinsey & Company (2026); Microsoft Azure; Ramp; World Bank (2026a); World Bank Group.

Note: ASR = automatic speech recognition; LLM = large language model. "EAP EMDEs" excludes CHN. For country code abbreviations, refer to the International Organization for Standardization, <https://www.iso.org/obp/ui/#search>.

A. Bars show the number of data centers per 100,000 people by economy group in 2025. Data center types include colocation, enterprise, government, hyperscaler, and neocloud.

B. Bars show the number of new data centers in selected East Asia and Pacific countries between 2010 and 2026.

C. Network quality measured as a Principal Components Analysis-weighted index of Mbps of download speeds and fixed broadband subscriptions per capita; blue bar indicates impact of 1-standard deviation increase in network quality on latency. Red bar indicates the impact of 1000 kilometer reduction in distance on latency. Regressions control for origin and destination latitude and longitude. Sample is 2,348 city-pairs in the Microsoft Azure cloud network. All effect sizes expressed in percentages relative to the mean latency.

D. Total data center power devoted to training—building AI models—and inference—responding to model requests. Projections for 2027–30 from McKinsey & Company (2026).

E.F. The sample comprises all firms reporting contracts with cloud computing service providers in the FactSet Supply Chain Relationships database in 2024. Simple averages are used for economy groups.

1. How do data centers fit into East Asia and Pacific's energy systems?
2. Where are data centers located?
3. What are the policy implications?

Main findings. This box documents evidence that improving fundamentals—including workforce skills, infrastructure, and governance—is key to attracting data centers.

First, if the large energy needs of new data centers are met through expanded renewable energy capacity, they may accelerate the region's shift towards larger and more sustainable energy generation capacity. This would help lower air pollution in a region whose current energy mix, on average, causes implicit social cost of energy amounting to one-third of industrial energy tariffs.

Second, in addition to energy affordability and reliability, water abundance, the quality of

BOX 2.1 Data Centers in East Asia and Pacific

domestic and international digital connectivity, the availability of a skilled workforce, and the quality of governance (including considerations of permitting and crossborder data flows) are associated with greater data center investments. EMDEs in East Asia and Pacific have some of the most reliable energy grids and fastest broadband speeds, but below-average human capital and quality of governance.

Third, improving the above fundamentals may attract data center investments in a more fiscally sustainable manner than direct incentives such as tax abatements or energy subsidies. State support can be limited to remedying clear market failures.

Contribution. This box draws on the emerging literature on data centers and AI and offers two contributions. *First*, it provides evidence on how the energy system can support data center investments in East Asia and Pacific. Evidence from the United States suggests that data centers put pressure on the grid, thereby increasing energy prices (Alvarez et al. 2026; Yue and Zeng 2026). Energy prices or grid stability could be adversely affected if infrastructure investment does not keep pace with demand (Bogmans et al. 2025; Chandramowli et al. 2024). The evidence on these spillovers for EMDEs in East Asia and Pacific outside of China is limited; this box complements it with the social cost of data center activity in the region.

Second, it provides new evidence on the drivers of data center investments, with a focus on EMDEs in East Asia and Pacific. In principle, comparative advantage in cloud computing is determined by factor endowments—energy cost, connectivity, and skilled labor—as well as regulations (Freitas et al. 2026). The analysis compares these factor endowments in East Asia and Pacific against other EMDEs and advanced

economies thus complementing the broader discussion included in Gelvanovska-Garcia, Mačiulė, and Rossotto (2024).

How do data centers fit into energy systems in East Asia and Pacific?

Energy intensity of data centers. Data centers can generate substantial power demands. While energy use accounts for a small share of the initial USD 7.6 billion capital expenditures, it accounts for 65 percent of data centers' annualized operating expenditures. For example, a 500-megawatt AI data center, an industry benchmark for AI training, would consume nearly 15 percent of baseload power for the average EMDE in East Asia and Pacific—nearly 4 times the advanced-economy average (figure B2.1.2; Secretary of Energy Advisory Board 2024). For 2025, the International Energy Agency estimates that AI-related data centers increased their electricity demand by 17 percent (IEA 2025). High baseload consumption of data centers can strain electricity grids and risk grid failure. In both energy pricing and reliability, EMDEs in East Asia and Pacific compare favorably: they have some of the lowest industrial energy tariffs among EMDEs and some of the fewest electricity outages (figure B2.1.2). There is, however, significant variation in energy prices across the region, from low residential electricity tariffs in Malaysia, Viet Nam and China to higher prices in the Philippines and Thailand. Much of this variation reflects state-controlled pricing and fuel and electricity subsidies throughout the region (IEA 2025).

Energy mix and environmental spillovers.

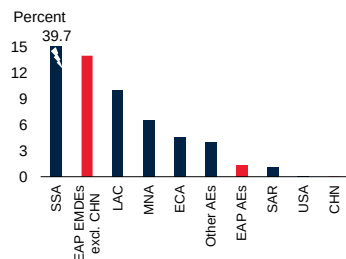
While energy tariffs and power outages tend to be lower in EMDEs in East Asia and Pacific than elsewhere, the social cost of energy use is higher because of the region's

BOX 2.1 Data Centers in East Asia and Pacific

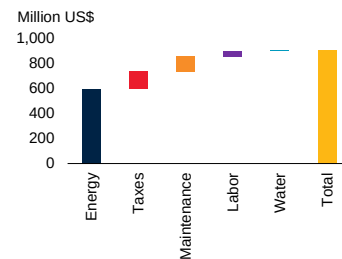
FIGURE B2.1.2 Energy and data centers

Energy costs make up 65 percent of data center operational expenditures. EMDEs, especially in East Asia and Pacific, tend to have lower energy prices, often due to subsidies, but also larger environmental externalities per unit of energy production.

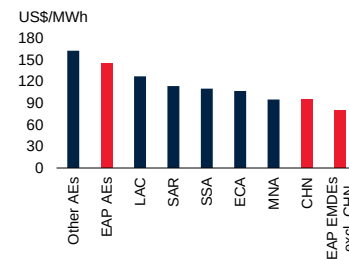
A. Energy use of a 500 MW AI data center as a share of average baseload power



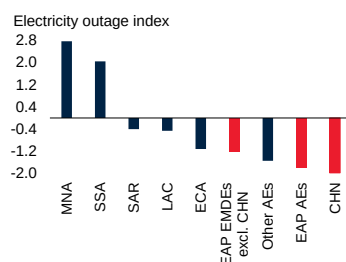
B. Annualized data center operating expenditures



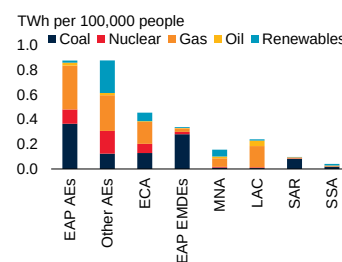
C. Industrial energy tariffs by region



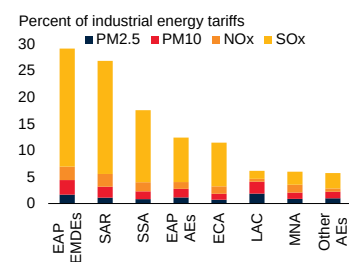
D. Electricity reliability



E. Energy mix by region



F. Air quality externality of energy production by region and pollutant



Sources: Ember; EPIC India; Epoch AI; European Environment Agency; International Energy Agency; Speedtest; Tsai et al. (2021); World Bank B-Ready; World Bank Enterprise Surveys; World Development Indicators (database); World Bank Group.

Note: KWh = kilowatt-hour; MWh = megawatt-hour; TWh = terawatt-hour.

A. Calculations assume a 500 MW data center (the industry benchmark) operates at 70 percent capacity with a power-use efficiency (PUE) factor of 1.3. Baseload power includes coal, oil, gas, nuclear, hydro, and biofuels. Regional averages of total baseload power over 2020–25 are unweighted across countries.

B. Estimates are from Epoch AI for a representative 1-GW data center in the United States.

C. Energy prices for industrial customers per megawatt-hour. Regional averages are population-weighted.

D. Higher values of the electricity outage index indicate lower reliability. The index is measured as the weighted average of the following country-level standardized variables: (i) the average number of electrical outages per month, (ii) the average duration of electrical outage, (iii) revenue losses due to electrical outages, (iv) the share of firms identifying electricity as a severe constraint, and (v) the share of firms experiencing electrical outages. Weights are loadings from the first principal component of the variables. Variables are averaged within countries from 2005–25. Regional averages are population-weighted.

E. Electricity generation measured in TWh per 100k population and disaggregated by fuel source. Production data are averaged within-country from 2020–24. F. Bars show air-quality externality costs as a share of industrial energy tariffs. Externality costs per KWh of energy production are calculated by converting total energy production into emissions of PM2.5, PM10, SOx, and NOx by energy source using conversion factors from the European Environment Agency and then converting these emissions into social costs using estimates from Tsai et al. (2021). Regional averages are weighted by total energy production.

composition of sources of energy generation. Coal accounts for about 60 percent of electricity generation in emerging East Asia and Pacific, the second highest share globally (figure B2.1.2). If the large energy needs of new data centers are met through expanded renewable energy capacity, they may accelerate the region's shift towards larger and more sustainable energy generation capacity. This would help lower air pollution in a region whose current energy mix, on average,

causes implicit social cost of energy amounting to one-third of industrial energy tariffs and where 97 percent of the population is exposed to PM2.5 levels exceeding the WHO guideline value (World Bank Group 2026a). On average during 2020–24, coal accounted for more than half of electricity generation in China, Indonesia, Mongolia, and the Philippines and 40–50 percent of electricity generation in Cambodia, Malaysia, and Viet Nam. Data centers also raise water-use concerns,

BOX 2.1 Data Centers in East Asia and Pacific

especially where they compete with residential and other demands in water-scarce areas. In Malaysia, Johor—the fastest-growing data center hub in Southeast Asia—has faced community backlash over concerns that rapid data center expansion could worsen pollution and water scarcity (World Bank Group 2026a). Consultation, environmental impact assessments, and integrated land- and water-use planning can help mitigate such concerns.

Energy price spillovers of data centers. Evidence from EMDEs is lacking but evidence from the United States suggests that data centers can sometimes put pressure on the power grid and increase local electricity prices. Yue and Zeng (2026) and Alvarez et al. (2026) both document upward pressure on local U.S. electricity prices following data center entry. However, Feher, Garcia-Appendini, and Miher (2025) find no such effect, potentially due to the prevalence of Power Purchase Agreements among large hyperscalers (such as in Viet Nam) or corporate renewable supply schemes (such as in Malaysia) that provide industrial-scale data storage and computing power. Several commentators forecast adverse impacts on energy prices or grid stability in China, Europe, and the United States if energy infrastructure investment does not keep pace with demand (Chandramowli et al. 2024; Bogmans et al. 2025).

Future evolution of the energy mix. The AI industry is exploring ways to mitigate the pressure on energy and water systems created by data centers (World Bank Group 2026a). Several data center operators are working on the development, certification, and deployment of small scale modular nuclear reactors to meet rising demand for stable, low-carbon energy, but thus far development timelines are long. Large technology players are also actively pursuing partnerships and investments with nuclear

power developers to secure long-term, reliable energy supplies, driven by aggressive clean energy commitments. Hyperscalers are pursuing long-duration energy storage technologies. The increasing integration of microgrids into data center operations and the shift to decentralized power sources—often relying on renewables such as solar and other clean technologies—can reduce data center carbon footprints and improve energy reliability.

Where are data centers built?

Global compute capacity. Since 2022, when OpenAI's public release of ChatGPT inaugurated the GenAI boom, there has been a dramatic increase in global installed AI compute capacity, from 111,000 NVIDIA H100 equivalents annually to 1.9 million in 2025, or a 17-fold increase in AI computing power. This dramatic rise represents just the earliest phase of the current data center buildup, since most existing data centers are not yet equipped for AI workloads, and most planned AI compute has yet to come online (figure B2.1.1). Despite the recent fast expansion in data centers in East Asia and Pacific and other EMDEs, most of the world's installed capacity is in the United States and China, which also remain the dominant developers of new AI models.

Patterns in data center locations. A regression analysis uncovers several pronounced patterns in the location of 12,490 data centers built in 108 economies during 2000–25. A cross-country exponential regression estimates the association between the number of data centers and indicators of resource use (energy production per capita, water resources per capita, an electricity reliability index), internet download speeds, and the business environment (a regulatory burden index, the World Bank Worldwide Governance Indicators' governance index, the share of adults

BOX 2.1 Data Centers in East Asia and Pacific

with college education), controlling for temperatures, population, and region fixed effects. Some of the resulting correlations could be consistent with causality running in either direction, but are indicated as factors that encourage data centers. Another caveat to this analysis is that regressions are run at the country level, while some of the determinants examined might vary significantly within countries. Overall during 2000–25, data centers have been built in locations with good resource availability and conducive operating environment.

- **Energy capacity and reliability.** While energy prices are broadly uncorrelated with data center locations at the country-level, better grid reliability and generation capacity are strongly related to greater investment (figure B2.1.3). For example, a country with 10 percent higher energy production per capita has on average 3 percent more data centers; one-standard-deviation increase in grid reliability—equivalent to the gap in reliability between Vanuatu and Thailand—is associated with 20 percent more data centers.
- **Water.** Notwithstanding recent technological innovations, data centers still require large amounts of water for cooling purposes. Indeed, water availability is associated with a significantly larger number of data centers: 10 percent more water resources per capita—equivalent to the gap between Timor-Leste and Thailand—are associated with 3 percent more data centers (figure B2.1.3).
- **Operating environment.** Just as important as energy capacity and reliability is the operating environment: governance and regulations as well as worker skills (figure B2.1.3). A 1 standard-deviation increase in

governance—equivalent to the gap between Malaysia and Japan—is associated with doubling of data centers. A 1 standard-deviation increase in regulatory quality—equivalent to the gap between the scores of Thailand and Malaysia—is associated with 12 percent more data centers. Finally, a 1 standard-deviation increase in the share of college graduates in the workforce—approximately equivalent to the gap between Cambodia and Thailand—is associated with 30 percent more data centers.

Policy implications

The role of fundamentals. Data center investment is attracted by good fundamentals: high quality infrastructure such as a reliable energy grid and water supply, sound governance and regulatory quality, and a skilled workforce. These are all factors that are also important for productivity-enhancing investment more broadly. Efforts to improve these fundamentals are therefore essential and likely to constitute “no-regrets” policies that benefit data center investment as well as broader investment, especially if the marginal investment is funded by data centers themselves.

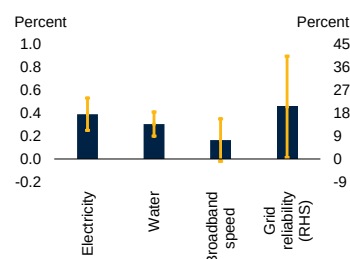
Fundamentals in East Asia and Pacific. While several economies in East Asia and Pacific are characterized by better fundamentals than many other EMDEs, infrastructure quality, human capital gaps and administrative efficiency have been in some instances binding constraints for the construction of data centers. Projects have been delayed due to insufficient investment in power and fiber infrastructure, delays in connections to energy grids, and the challenges of coordinating across multiple government agencies (World Bank Group 2026a). Malaysia’s Green Lane Pathway illustrates the benefits of addressing

BOX 2.1 Data Centers in East Asia and Pacific

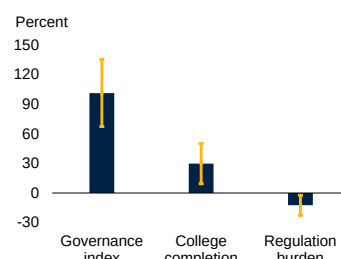
FIGURE B2.1.3 Factors correlated with comparative advantage in data centers

Data center operators prefer markets with abundant energy and water, reliable power, and high internet speeds, less red tape, better institutional quality, and a skilled workforce. The factors necessary for competitively producing computing services—skilled labor and reliable energy, water, and fiber networks—are abundant in advanced economies and scarce in EMDEs. The quality of governance is also better in advanced economies.

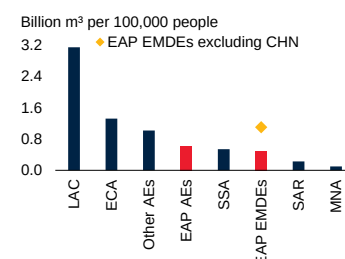
A. Correlates of data center location: Infrastructure



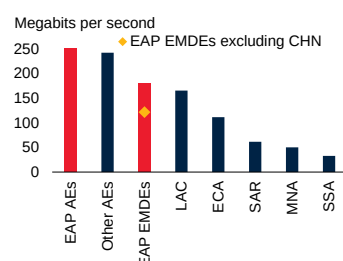
B. Correlates of data center location: Governance and human capital



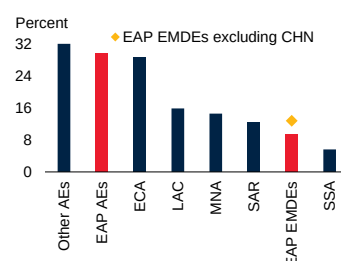
C. Water resources



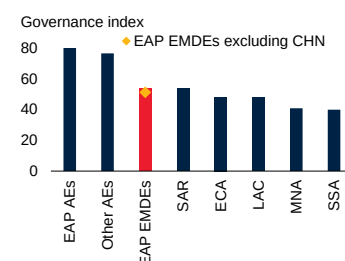
D. Broadband speed



E. Attainment of higher education



F. Governance index



Sources: Data Center Map; Ember; FAO Aquastat; Speedtest; UNESCO UIS; World Bank B-Ready; World Bank Enterprise Surveys; World Bank Worldwide Governance Indicators; World Bank Group.

A.B. Bars show estimates and 95 percent confidence intervals from a cross-country exponential regression of the number of data centers on energy production per capita, water resources per capita, download speeds, an electricity reliability index (higher means less outages), the World Bank Worldwide Governance Indicators governance index, and the share of adults with college education, a regulatory burden index, as well as a cubic polynomial in temperatures, log of population, and region fixed effects. All time-varying variables are measured as country averages over 2005–25. Regression models are estimated using Poisson pseudo-maximum likelihood. The sample comprises 108 countries for which all data are available. Grid reliability index in (A) and all estimates in (B) correspond to the percent change in data centers for a one-standard-deviation increase in the variable of interest. The rest of estimates in (A) correspond to elasticities: the percent change in data centers for a 1 percent increase in the variable of interest.

C. Water resources are measured as total annual renewable water resources in billion cubic meters per 100,000 people. Water data are averaged within countries over 2010–22.

D. Broadband speed is measured as average of country-level median download speeds in megabits per second, as measured in March 2026. Regional averages are weighted by country population.

E. The chart shows share of adults aged 25+ that have completed higher education using data from UNESCO UIS. Completion rates are averaged within countries from 2020–24. Regional averages are population-weighted.

F. Governance index is measured as the average of country-level scores for regulatory quality, rule of law, and government effectiveness from the Worldwide Governance Indicators. Scores are measured from 0 to 100 and averaged within countries over 2020–24. Regional averages are weighted by country population.

these failures: by establishing a One-Stop-Centre and fast-tracking grid connections, the country cut the grid connection timelines for data center operations from 36–48 months to just 12 months.

The role of AI-specific industrial policy. As in other areas of industrial policy, state support can

be appropriate in the case of clear market failures. Transparent criteria for support and monitoring of outcomes can help ensure that public resources generate broader economic benefits while avoiding distortions to competition. Some governments are using data sovereignty concerns or environmental externalities to provide a rationale.

BOX 2.1 Data Centers in East Asia and Pacific

- **Data localization requirements.** So far, the record of these policies has been mixed. In some instances, data localization requirements have encouraged domestic data center investment. One example is Malaysia, where demand for domestic data storage and processing has supported hyperscaler investment and the establishment of local cloud regions. Systematic evidence is more cautionary, however: localization requirements have been found to significantly increase data center entry only in large economies with faster internet or more abundant electricity, with smaller impacts elsewhere (Kassi and Lehdonvirta 2026). Localization requirements have also deterred data-intensive trade, functioning as a non-tariff barrier on digital services imports (van der Marel and Ferracane 2021). At the firm level, they have raised the variable cost of data inputs, constraining AI and cloud adoption particularly

for smaller firms in smaller countries (Demirer et al. 2024; Klügl and Nordås 2025). Even where no formal data localization requirements are in place, demand for local data center capacity can be driven by trusted cloud, sovereign AI, cybersecurity, and sensitive government data requirements.

- **Energy supply.** The expected increase in energy demand from data centers creates an opportunity for East Asian economies. In a rapidly growing region, this may be an opportunity to increase energy supply, especially if the marginal expansion of supply is funded by data center investors, to ensure that data center-related energy demand does not result in significant increases in electricity prices for other industries and final consumers. The right policy mix, including green procurement requirements, could also steer this demand toward clean energy and accelerate the clean energy transition.

Given the importance of access to data centers as an enabler of AI innovation, policies can support access to regional data centers—including to develop them locally when appropriate—while mitigating their negative spillovers and risks. Some countries also aim to attract data centers for purposes of data sovereignty, cybersecurity, regulatory compliance, and digital resilience. Policies that attract data center are primarily policies that spur investment more broadly: energy and water resources, grid reliability, the quality of broadband connectivity, skilled labor, and the quality of governance are all associated with greater data center investments.

Skills

Four types of skills are needed to harness the potential of AI: foundational, digital, transversal, and advanced technical and managerial skills (Arias et al. 2025). This spans an ambitious policy agenda to address the market and policy failures that hinder skills development and determine appropriate roles for markets, the private sector and government in provision, financing, regulation, and information dissemination (Aedo et al. forthcoming). Governments could prioritize foundational and transversal skills development while the private sector—suitably

regulated—can play a bigger role in rapidly evolving technical and job-specific skills training. Public financing in tertiary education could prioritize tertiary fields with large positive externalities, like basic science and some STEM education.

Ensuring basic skills. A strong foundation of basic skills, literacy and numeracy, allows for more advanced skills to be built (Afkar et al. 2023). Investing in teacher training is estimated to produce benefits in terms of discounted lifetime earnings that are 10 times larger than the costs.

Investing in skills complementary to AI. Investments in education and training could emphasize the development of digital, cognitive, socioemotional and advanced technical and managerial skills that are required to work with AI technology. This involves:

- **Digital skills** to use digital devices, applications, and digital platforms that are increasingly powered by AI. In Japan, the Republic of Korea, and Singapore, digital skills are embedded in the curriculum, teachers’ continuous professional development and developed through digital textbooks, online learning platforms, and coding classes.
- **Transversal skills**—including core analytical skills like math and problem solving and socioemotional skills like communication and collaboration—to work alongside AI in tasks involving innovation, strategy, decision making and social interactions. Because these skills are required across occupations, they make workers more adaptable and serve as insurance against AI-related disruption. These skills are malleable and teachable in

school (Cipriano et al. 2023; Grant et al. 2017; Jones et al. 2021; Steponavičius, Gress-Wright, and Linzarini 2023). In Indonesia, structured lessons to develop a “growth mindset”—beliefs that intelligence and socioemotional qualities are not fixed, but develop with effort—had positive impacts on attitudes and basic literacy skills (World Bank Group 2019).

- **Advanced technical and management skills** to enable AI adoption and development. Despite the expansion of tertiary education, advanced technical skills, especially in STEM fields, and management capabilities remain in scarce supply in EMDEs in East Asia and Pacific (Aedo et al. forthcoming). In the Republic of Korea, the Meister high schools address critical technical skill needs in priority sectors, including semiconductor manufacturing and biotechnology, in collaboration with companies such as Hyundai Motor Company and Samsung Electronics. Countries like Malaysia and Viet Nam are strengthening workforce skills to move up in the AI value chain (World Bank Group 2025). Management consulting can improve firms’ management and innovation capabilities (Iacovone, Maloney, and McKenzie 2022).

Skill priorities by country context. Skill gaps and policy priorities vary across the region. Lower-income economies, from Cambodia and Lao PDR to the Pacific Islands, can prioritize foundational skills through universal access to quality basic education, while gradually investing in tertiary education to develop a cadre of skilled professionals and technicians. Even several middle-income economies in the region still face significant gaps in basic skills (Afkar et al. 2023).

Middle-income economies such as Indonesia, the Philippines, and Viet Nam need more technicians, engineers, managers, and a digitally proficient workforce. More innovation-driven economies such as China, Malaysia, and Thailand need a larger pool of these highly skilled professionals as well as scientists.

Financing

Access to finance. One of the main factors cited by East Asian firms as an impediment to AI adoption is its cost (figures 2.5). This calls for facilitating access to finance specifically designed to support AI technology adoption, especially for micro, small, and medium-sized enterprises (MSMEs). Advanced economies in the region show a path that other countries can follow. The Republic of Korea, for instance, introduced the “AX Sprint Preferential Track” in 2026, specifically designed to accelerate financing for companies pursuing AI transformation, as part of its SME Policy Fund. In Japan, the “IT Introduction Subsidy” has now been rebranded—as the “Digitalization & AI Introduction Subsidy”—to emphasize AI. In Singapore, the 2026 budget expanded the Productivity Solutions Grant to support a wider range of digital and AI-enabled solutions.

Supporting AI adoption, adaptation and advancement

Prioritizing adoption and adaptation of small AI applications to local context. Most EMDEs can reap the benefits from AI by adopting and adapting AI tools developed elsewhere (World Bank Group 2026b). For many well-defined tasks, small AI applications derived from open-weight models are more cost-effective and can match the functionalities of general-purpose frontier models (Quách and Huang 2026). Because the weights are public and the model is already trained—the most expensive part—governments or firms only

need to pay for the adaptation to local languages and data at a fraction of the cost (World Bank Group 2026a). AI Singapore’s SEA-LION pre-trains multilingual models across 13 regional languages. Thailand’s ThaiLLM, Vietnam’s VinaLLaMA, Indonesia’s Cendol and the Philippines’ FiLLM are examples of locally adapted models to local languages and data. In Indonesia, Bahasa-first chatbots are serving the population through business and government services in ways that English-only tools never could. In Viet Nam, an AI coach tailored to Vietnamese speakers has become one of the country’s most popular language-learning tools, while AI-powered medical imaging systems are helping under-resourced hospitals improve diagnoses. Governments can catalyze such local adaptation initiatives by strengthening digital foundations—including high-quality, interoperable data in local languages and domains, trusted transactions, digital identity, and credentials—and by leveraging public procurement and digital government modernization.

Small AI in EAP can support jobs. Several countries in the region are already pursuing adoption and adaptation of small AI tools to improve business, social services, and jobs. In the Philippines, AI is enabling better irrigation and access to finance for smallholder rice farmers by leveraging satellite crop-health data and improved credit-scoring, and AI-powered forecasting tools are helping rural homestays and boutique hotels manage the deep occupancy slumps that monsoon season brings. In Viet Nam, AI-powered tools are helping small hotels and tour operators generate promotional visuals and dynamic pricing at much lower cost. Physical AI is being deployed in elderly care in Australia and Japan, where therapeutic robots have helped reduce loneliness and anxiety among dementia patients by augmenting rather than displacing care workers (Eggleston et al. 2026; Wang, Shen, and Chen 2022).

Strengthening innovation ecosystems.

Despite a pool of dynamic domestic firms in several economies in the region, an increasing share of locally developed AI tools still draws on foreign knowledge and is ultimately owned by foreign firms, limiting the value retained locally. Some of the binding constraints are in the innovation ecosystem: weak links between universities, foreign and local firms that limit access to knowledge on AI solutions, insufficient protection of intellectual property, and underdeveloped capital markets, as suggested by the previous evidence on firms' reported constraints to AI adoption and thin private AI patenting. Policy reforms can facilitate knowledge exchange through business development and technology extension services, strengthen protection of intellectual property rights, foster venture capital financing through public co-investment and blended finance, and boost demand for domestic AI providers through public procurement (De Nicola, Mattoo, and Timmis 2025; World Bank Group 2026a). For example, public procurement contracts with access to government data led to Chinese firms developing new commercial software (Beraja et al. 2023).

Positioning along the AI value chain.

Countries need not participate in every stage of the AI value chain to benefit from AI. Advanced chips, large-scale compute, and frontier AI models are highly concentrated and require investments and capabilities beyond most developing economies. Opportunities also vary along the value chain. China already participates across much of the AI value chain, including semiconductors, compute, AI models, and applications. In EMDEs in East Asia and the Pacific, selected upstream activities—such as semiconductor manufacturing and, where conditions are favorable, data centers—can complement larger gains from adapting and developing AI applications. Moving into

higher-value AI activities requires gradual capability building. Countries can sequence investments by sector while strengthening the skills, research capacity, firm capabilities, and knowledge links needed to adopt, adapt, and eventually advance AI. Strategic dependence can be reduced through diversified suppliers, interoperability, strong knowledge partnerships, and safeguards for sensitive data and critical infrastructure (World Bank Group 2026b).

The role of the public sector

In addition to implementing policy to ensure the above fundamental enablers of AI, governments can leverage AI's potential as users and as regulators of AI, while guarding against AI's risks (World Bank Group 2026b). Governments can also enact policies aimed at increasing consumers' protections and promote intra-regional cooperation.

Governments as AI users: public procurement.

Public procurement can play an important role in supporting adoption and adaptation, including by creating opportunities for local solution providers where local language, data, and institutional context matter. Thailand, for instance, is pursuing procurement reforms intended to expand opportunities for startups and innovative suppliers to participate in government markets and position public procurement as a tool to support innovation and economic transformation. While these reforms remain at an early stage and evidence of large-scale AI procurement is still limited, they illustrate how governments can use demand-side policies to encourage development and adoption of locally adapted digital and AI solutions.

Governments as AI users: provision of public services. Countries in East Asia can benefit from AI also by using it to improve the provision of public services. Advanced

economies provide successful examples. The *OneService* Chatbot in Singapore, for instance, enables residents to report municipal issues through a simple interactive online interface. The chatbot processes more than 30,000 cases each month, automating key tasks such as extracting case details, predicting issue categories, and routing cases to the appropriate agencies. This saved an estimated 2,000 man hours each month and reduces resolution times by up to two working days. Another example comes from the Republic of Korea, where the national water utility has deployed predictive AI across more than 40 water treatment plants, including for energy management and predictive equipment maintenance. These positive examples also highlight the importance of putting in place the right safeguards, which typically include clear legal authority, human oversight for consequential decisions, audit trails, independent review, and accessible channels to challenge automated decisions.

Governments as AI regulators. As regulators, governments help establish the institutional conditions for digital trust through robust data governance, trusted data-sharing arrangements, and effective safeguards for privacy, security, and responsible use. The *World Development Report 2026* argues that the most effective approach to AI regulation is iterative: policymakers can begin by assessing the regulatory landscape and identifying gaps, then design policy instruments, build enforcement and compliance capacities, and continuously monitor and adapt (World Bank Group 2026b). Following the EU's landmark AI Act of 2024, several countries have enacted horizontal AI laws, including Japan, the Republic of Korea, and Viet Nam. Other countries, such as China, are following a more “risk-scenario-by-risk-scenario” approach to AI regulation. While different contexts are better served by different approaches, sound AI regulation is an important determinant of AI adoption. Because regulatory uncertainty

remains a significant impediment to AI adoption and adaptation, effective governance frameworks will also need to address bias and fairness, data privacy and security, and the transparency of automated decisions (including their accountability). Existing frameworks—including those on data protection, consumer protection, cybersecurity, competition, and non-discrimination—may already address many AI-related risks, but their effectiveness will depend on adequate institutional and regulatory capacity and implementation. Digital foundations—such as digital identity, digital public infrastructure, and verifiable credentials—can help speed AI adoption. Getting these frameworks right matters beyond compliance: public trust in AI is a prerequisite for sustained adoption, and early signs of backlash in advanced economies, discussed in Chapter one, suggest that trust cannot be taken for granted.

Governments' role in ensuring online safety and cybersecurity. Large-scale, cross-border scam-center operations have emerged in parts of East Asia and Pacific, where fraud schemes are targeting victims worldwide through telecommunications networks, payment platforms, and money-laundering channels (UNODC 2025). AI is making these operations cheaper, more scalable, and more convincing. Tools like deepfake impersonation, multilingual phishing, synthetic identities, and automated social engineering allow scammers to target victims across languages and geographies. The financially and digitally vulnerable are particularly exposed, as they may struggle to avoid scams or absorb resulting losses. Addressing this problem requires digital and financial literacy programs, accessible complaint channels, mechanisms for rapid fund recovery, and clearer responsibilities for financial institutions, payment providers, telecommunications companies, and digital platforms in detecting and disrupting AI-enabled fraud.

Leveraging regional cooperation. AI adoption and innovation vary widely across the region, which includes both economies at the technological frontier and those that still lack basic capabilities. Deeper intra-regional cooperation could narrow these gaps by enabling leaders to help build capacity in the rest through shared access to computing infrastructure, trusted data, talent mobility and cross-border collaboration in research and public sector solutions. Shared infrastructure raises data-security concerns that common standards for data flows and cybersecurity could help address. The ASEAN Framework on Cross-Border Cloud Computing, for instance, harmonizes data-governance rules and establishes “trusted data corridors” for secure cross-border data flows, and can be leveraged to support AI adoption in the ASEAN countries and other less developed EAP economies (World Bank Group 2026a). Countries can leverage other recent ASEAN initiatives such as the Digital Economy Framework Agreement to harmonize digital trade rules and the ASEAN Guide on AI Governance and Ethics to help organizations and governments design and use AI responsibly (Quách and Huang 2026). Lastly, countries can develop regional policy frameworks to strengthen cross-border cooperation responses to AI-enabled scams. An example of such a framework is represented by the forthcoming Bangkok Blueprint for Combating Online Scams and Cyber-Enabled Fraud, which is being co-developed by the World Bank Group and International Monetary Fund.

Annex 2.1 Individual AI use

Data. Publicly available data from the February 2026 release of Anthropic’s Economic Index provide country-level indicators of Claude usage patterns across 176 economies. Each observation is classified along two dimensions: use case—work, coursework, or personal—and mode of

interaction—automation or augmentation. In automation, Claude performs a task largely on the user’s behalf with minimal human intervention, such as formatting a document or generating an output in response to a well-defined request. In augmentation, Claude works alongside the user through an iterative process, such as refining ideas, explaining concepts to support learning, or reviewing work and providing suggestions.

Method. The following equation is used to estimate the association between GenAI use and country-level characteristics:

$$Y_i = \beta_0 + \beta_1 \text{Internet users}_i + \beta_2 \text{Urban}_i + \beta_3 \text{Education}_i + \beta_4 \ln(\text{GDP per capita}_i) + \varepsilon_i,$$

where i indexes countries. The dependent variable is either the log of Claude usage per million people or the log of Claude usage classified as work per million people. The covariates are the share of the population using the internet, the upper-secondary educational attainment rate among people ages 25 and older, the urban population share, and the log of GDP per capita. All covariates are drawn from the World Bank’s World Development Indicators and averaged across available years from 2022 onward to reflect recent conditions. The regression results are reported in table A.2.1.1.

Annex 2.2 Measuring skill demand using Online job postings

2.2.1 Data

Data collection. The analysis uses millions of online job postings (OJPs) between March 2025 and April 2026 across eight East Asia and Pacific economies—Indonesia, Japan, Malaysia, the Philippines, the Republic of Korea, Singapore, Thailand,

and Viet Nam—and four comparator economies—India, Mexico, Chile and Poland. Skills were extracted from vacancies from country-specific platforms aggregated from Careerjet and Indeed public websites. These two large job aggregators index vacancies from hundreds of underlying job portals, company career pages, and recruitment agencies, providing broad coverage of online recruitment channels within each market. Regular collection maximizes capturing vacancies that remain visible for only a limited period. The analysis extracts skills required from job descriptions and subsequently mapped to a common taxonomy, as described below. The resulting dataset contains extracted job titles, occupations and employers' stated skill requirements, allowing consistent comparisons of skill demand across economies and occupations. Data were independently collected from publicly available sites under protocols designed to protect data security and privacy. Because of the collection, deduplication, text-extraction, and mapping methods used, the dataset may differ from official job-platform data in coverage, compatibility, and completeness.

Sample representativeness. OJPs do not represent the entire labor market. They disproportionately capture formal-sector, mid- and high-skill recruitment: managers, professionals, and associate professionals are overrepresented, while elementary and craft occupations are underrepresented. Coverage also varies across economies, and employers differ in how explicitly they describe skill requirements in vacancies. The results should therefore be interpreted as measures of skill demand visible through online recruitment, particularly in the formal and higher-skill segments of the labor market, rather than as representative estimates of skill demand across all employment.

2.2.2 Methods

Skill extraction and occupational classification. Job descriptions are processed using a natural-language-processing pipeline to identify skill requirements and map them to the European Skills, Competences, Qualifications and Occupations (ESCO) taxonomy, which contains about 13,000 skill concepts. Non-English postings are translated into English before skill extraction. Job titles are separately standardized and mapped to occupational classifications, allowing skill demand to be compared consistently across occupations and economies. Further details on the text-processing and classification pipeline are provided in Aedo et al. (forthcoming). The major ESCO skills groups analyzed in this report are shown in table A.2.2.1.

Digital-skill classification. ESCO skills are classified as non-digital or as basic, intermediate, or advanced digital skills, adapting the approach of Chinen and Montorsi (2025). Basic digital skills cover standard tools for accessing, managing, and communicating information, such as office software, e-services, and preset digital interfaces. Intermediate skills involve domain-specific software, digital tools, and digitally controlled equipment, while advanced skills involve digital-system development, complex data analysis, modeling and simulation, and advanced technology applications such as machine learning and semiconductor design.

The digital-skill taxonomy was developed using a human-in-the-loop classification procedure: experts first manually classified about 600 ESCO skills, and a further 900 skills were classified using large language models with human review of disagreements and low-confidence cases, creating a verified set of more than 1,500 skills. This verified

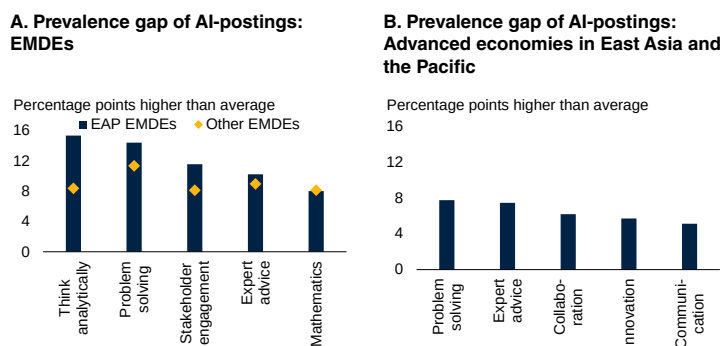
set was then used to classify the remaining ESCO concepts. Table A.2.2.2 provides five representative examples for each digital skills category.

AI- and semiconductor-related skills.

Within the digital-skill taxonomy, the analysis separately identifies ESCO concepts directly related to AI and semiconductors. AI-related skills include capabilities such as machine learning, deep learning, artificial neural networks, natural language processing, computer vision, data mining, and predictive modeling. Semiconductor-related skills cover semiconductor and microelectronics design, fabrication, assembly, and testing.² These classifications are used to measure the level, composition, and evolution of AI- and semiconductor-related skill demand across economies.

Identifying AI-adjacent skills. To identify skills that employers demand together with AI-related skills, the analysis compares each skill's prevalence in postings requiring AI-related skills with its prevalence in all postings. The prevalence ratio measures how disproportionately a skill appears in AI-related postings. It is computed by dividing the share of AI-related job postings requiring that skill by the share of all job postings that also require the skill. A high ratio means the skill is distinctive in AI recruitment—disproportionately demanded relative to the average job posting. A complementary measure is the *prevalence gap* which measures the absolute

FIGURE A.2.2.1 Complementarity of skills: AI skills bundles (prevalence gaps)



Sources: Aedo et. al (forthcoming); World Bank Group.

Note: Skills are mapped to the European Commission's ESCO classification (European Skills, Competences, Qualifications and Occupations). Data is constructed from millions of online job postings from March 2025 to April 2026. Prevalence gap refers to share of artificial-intelligence postings requiring the skill minus its share of all postings (percentage points), which is how many times more likely a skill is to appear in an AI-related posting than in an average one; a difference in posting shares, not a wage premium. Simple, unweighted.

A. Bars show the average prevalence gap for top five non-technical skills in EAP EMDEs and diamonds in other EMDEs for the same skills. EAP EMDEs include Indonesia, Malaysia, the Philippines, Viet Nam, and Thailand. Other EMDEs include India, Mexico, Chile and Poland.

B. Bars show the average prevalence gap for top five non-technical skills in EAP advanced economies, which include Japan, the Republic of Korea, and Singapore.

difference between the two shares, that is, the frequency the skill is required in AI-related jobs minus the frequency in which it is required in all job postings;

$$\text{Prevalence ratio} = \frac{P(s \mid \text{AI-related posting})}{P(s \mid \text{all postings})}$$

and

$$\text{Prevalence gap} = P(s \mid \text{AI-related posting}) - P(s \mid \text{all postings}),$$

where $P(s \mid \text{AI-related posting})$ is the share of AI-related postings that require skill s , and $P(s \mid \text{all postings})$ is the share of all postings that require skill s .

Figure A.2.2.1 reports the top 5 AI-adjacent skills with the largest prevalence gaps. Rarely demanded skills may score highly on the prevalence ratio: math, for instance, is uncommon overall but emerges as an AI-specific niche skill. While a broadly demand skill like communication may have a lower ratio and a larger prevalence gap. Taken together, the two measures identify that skills such as problem solving, critical thinking,

² AI-related skills comprise 17 ESCO concepts covering areas such as computer vision, predictive modeling, data mining, artificial neural networks, recommender systems, deep learning, machine learning, natural language processing, speech recognition, and human-robot collaboration. Semiconductor-related skills comprise 24 ESCO concepts covering microelectronics and semiconductor design, fabrication, assembly, wafer processing, and testing.

communication and collaboration are not only a fingerprint of AI-work recruitment but their demand could also be amplified as AI diffuses.

Annex 2.3 Identification of AI patents

Data. Patent data are drawn from the Autumn 2024 edition of PATSTAT. The database records close to 130 million patent documents from national patent offices around the world, including those of the ASEAN economies, China, Japan, Republic of Korea, and the United States, as well as filings at the European Patent Office and international applications under the WIPO-managed PCT. For each application, the database reports the title and abstract, application and priority dates, the names and locations of applicants and inventors, and technology classifications (Cooperative Patent Classification, CPC and International Patent Classification, IPC). AI patents are identified following the methodology in OECD (2025), which combines patent classification codes with text analysis. An application is classified as AI if it meets either of two conditions. Applications meeting neither condition are not classified as AI.

Condition 1: core AI, code alone. The application is assigned to at least one of five core AI CPC groups, which qualify on the classification code alone without any keyword confirmation.

- G06N3: Computing arrangements based on biological models (for example, neural networks).
- G06N5: Computing arrangements using knowledge-based models.
- G06N7: Computing arrangements based on specific mathematical models.
- G06N20: Machine learning.
- G06F18: Digital data processing: pattern recognition.

Condition 2: AI-related, code and keyword. The application is assigned to at least one of 95 AI-related CPC groups and at least one of 274 AI keywords appears in its title or abstract.

Implementation following the OECD method (2025). First, an application is classified as AI if any of its CPC codes satisfies the conditions; no fractional counting is applied and the classification is not restricted to the primary technology field. Second, some offices record applications under the IPC rather than the CPC; for applications with no CPC code, the CPC codes of the corresponding patent family are used, and for applications with neither, the IPC code is used where available. Third, because the keyword step requires English text, keyword confirmation is performed on the title and abstract. The earliest filing year is used in counting the patents each year. Patents are attributed fractionally across economies, so a patent with inventors in two economies contributes one-half to each. Patent Cooperation Treaty (PCT) filings are used because international protection is costly and applicants reserve it for their more valuable inventions, making counts comparable across economies without the distortion of very different domestic-filing volumes. The final sample includes 1.3 million AI patent applications worldwide, of which more than 100,000 are PCT filings, between 2009 and 2024.

Identification of inventor and applicant locations. Each patent document records its inventors and applicants as persons. Inventors are the researchers who created the invention; applicants are the entities, commonly firms and institutions, that file the patent and hold the resulting property rights. Both are recorded with a country code, but in the raw PATSTAT data, 47 percent of persons have no country code. Missing country codes are identified by harmonizing person identifiers in PATSTAT, checking the person's name and address, identifying the first application office, the first publication office, and the co-applicant

or co-inventor location. AI patents in emerging East Asia and Pacific countries are largely owned by non-domestic entities and are built on U.S. and in recent years, Chinese knowledge (figure A.2.3.1).

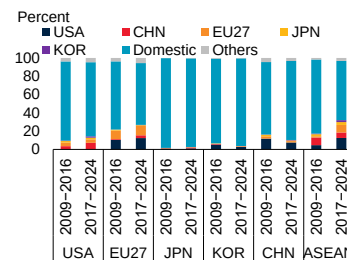
Illustrative examples of AI patents by subfield. AI inventions before 2017 were typically oriented toward applications, especially computer vision; more recent inventions are concentrated in the underlying methods, such as deep learning and machine learning, and the hardware that runs them. Each patent can be retrieved on public patent databases by its publication number. The following patents illustrate AI inventions across the main technique and application subfields.

Human capital. STEM graduates are tertiary graduates in natural sciences, mathematics, and statistics; information and communication technologies; and engineering, manufacturing, and construction (ISCED-F fields 05, 06, and 07). Values are averages over 2020–24 where available, and over 2017–19 where later data are missing. STEM graduates come from the following

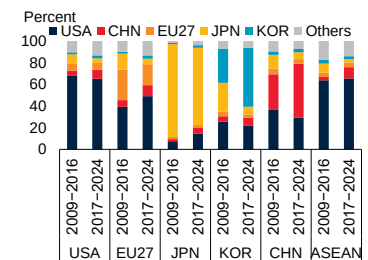
FIGURE A.2.3.1 Ownership and knowledge source of AI patents

AI patents invented in emerging East Asia and Pacific countries are largely owned by non-domestic entities and built on U.S. and increasingly Chinese knowledge.

A. Ownership of AI-patents in PCT



B. Source of citations in AI-patents in PCT



Sources: OECD (2025); PATSTAT 2024 AutumnPC; World Bank Group.

Note: For country code abbreviations, refer to the International Organization for Standardization, <https://www.iso.org/obp/ui/#search>. Bars show the composition of AI-patents in PCT ownership (A) and the composition of source of citations in AI-patents in PCT (B) in selected economy or economy group in 2009–16, and in 2017–24. Values for economy groups are simple averages across the economies included.

sources: 1) the OECD education database, which reports STEM graduate counts directly for OECD members and partners; 2) official national statistics for key economies outside the OECD collection; and 3) estimates constructed from UNESCO Institute for Statistics (UIS) indicators only where neither of the first two is available. The first two provide actual counts; the third is a reconstruction, used as a fallback.

Annex Table A.2.1.1 Correlates of individual GenAI use and its use for work

Variables	Dependent variable	
	Log of Claude usage per million people	Log of Claude usage for work per million people
Internet users (percent of population)	0.009* (0.005)	0.013** (0.005)
Urban population (percent of total population)	-0.004 (0.003)	-0.005 (0.004)
Upper secondary education (percent)	-0.007* (0.004)	0.006 (0.005)
GDP per capita (log)	0.650*** (0.098)	0.618*** (0.117)
R-squared	0.850	0.824
Observations	115	108

Sources: Anthropic (2026); World Bank Group.

Note: The dependent variable is the log of Claude usage per million people in column 1 and the log of Claude usage classified as work per million people in column 2. Upper secondary education is defined as the share of the population aged 25 and older that has attained at least upper secondary schooling. Heteroskedasticity-robust standard errors are reported in parentheses. * p < 0.10; ** p < 0.05; *** p < 0.01.

Annex Table A.2.2.1 Taxonomy of skills and competences

Code	Skill category	Description
S1	Communication, collaboration, and creativity	Conveying and exchanging information, working jointly with others, and generating original ideas and solutions.
T1	Core skills and competences	Language, numeracy, measurement, and operation of digital devices and applications that underpin learning and work.
T2	Thinking skills and competences	Information processing, analytical and critical thinking, planning, problem solving, and creative or innovative thinking.
T3	Self-management skills and competences	Personal organization, adaptability, resilience, initiative, management of learning, and regulation of behavior and emotions.
T4	Social and communication skills and competences	Clear communication, empathy and support, teamwork and networks, leadership, and ethical conduct.

Sources: Aedo et al. (forthcoming); European Commission, ESCO version 1.2.1; World Bank Group.

Note: The table lists the broad groups used for reporting complementary skills. Occupation-specific and transversal skills can coexist in the same posting.

Annex Table A.2.2.2 Illustrative examples of digital skills by proficiency level

Basic digital skills	Intermediate digital skills	Advanced digital skills
Track changes in text editing	Use accounting systems	3D modelling
Transcribe texts	Use CAD software	Build recommender systems
Use e-services	Color grading	Deep learning
Type on electronic devices	Design web-based courses	Develop automated software tests
Use barcode scanning equipment	Collect customer data	Design cloud architecture

Sources: Aedo et al. (forthcoming); World Bank Group.

Note: Examples are illustrative. Complexity refers to the digital knowledge and capabilities required to perform each skill, not to the overall skill level of the occupation or worker.

Annex Table A.2.3.1 Examples of AI patents by subfield

Primary field	Subfield	Publication no.	Year	Illustrative content	Applicant
Technique	Machine learning	US10489430	2019	Matches employees' e-mails and calendar meetings to customer records in a business database.	People AI
Technique	Deep learning	US11037330	2017	Compresses data through a convolutional neural network's layers so deep learning runs efficiently on chips.	Intel
Technique	Generative AI	US10657436	2020	A recurrent generative neural network that composes an image step by step on a canvas.	DeepMind
Technique	General AI	US20210319098	2021	Hardens AI inference systems against model theft and adversarial attacks.	Intel
Application	Computer vision	US8793034	2012	Recognizes a vehicle's occupants to configure the car's console and devices.	Flextronics
Application: other	Transportation	US11820507	2023	Autonomous drone delivery with automatic route-planning and precision landing.	Matternet
Application: other	Health / life sciences	US10213157	2019	A wearable headset that reads brain and muscle signals and trains neural networks to infer user state.	Bose

Sources: PATSTAT 2024 Autumn; World Bank Group.

Note: Table shows examples of AI patents by subfield.

Annex Table A.2.3.2 Number of STEM graduates by economy

Economy	Number of STEM graduates	Source	Period
India	2,521,000	All India Survey on Higher Education	2021–22
China	2,117,500	Ministry of Education	2020–22
United States	844,200	OECD education database	2020–24
Philippines	247,600	Commission on Higher Education	2017–18
Indonesia	200,000	National data (CSET compilation)	2020
Japan	197,000	OECD education database	2020–24
Republic of Korea	182,300	OECD education database	2020–24
Malaysia	93,400	Ministry of Higher Education	2023
Thailand	89,500	UIS estimate	2020–24
Viet Nam	71,700	UIS estimate	2016
Singapore	19,900	Dept. of Statistics	2020–24

Sources: All India Survey on Higher Education (AISHE); Department of Statistics Singapore; Ministry of Education of China; Ministry of Higher Education of Malaysia; OECD education database; World Bank Group.

Note: Table shows the sources of STEM graduates for the countries of interest.

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In East Asia and Pacific, a global surge in AI-related activity is lifting growth in countries that participate in AI supply chains, while high energy costs are weighing on growth elsewhere, particularly in Pacific Island economies. Growth in the region is slowing, but considerably less than anticipated previously and is forecast to remain robust. The influence of AI is unmistakable in the region's industrial sector, but it is less apparent in the rest of the economy. Like in many other emerging markets and developing economies, AI use in East Asia and Pacific is less prevalent than in advanced economies. Firms cite costs, a lack of relevant knowledge, and concerns about security and privacy as barriers to AI adoption. Nevertheless, AI adoption is beginning to reshape skills demand as firms' requirements for AI-related skills are often paired with complementary analytical and soft skills. The region's dependence on AI-related industrial activity has been a source of strength, but it could become a weakness if global AI activity slows or reverses. Growth could also be weaker if energy shortages or damage from an unusually strong El Niño increase inflation and borrowing costs. To sustain growth and foster more productive jobs, AI can be leveraged through investments in infrastructure and skills, which encourage AI use while also supporting growth. Scaling up energy generation capacity, especially from renewables, can help meet strong electricity demand and lessen the risks of imported fossil fuel dependence.

