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Foreword

This *Survey* is published under the responsibility of the Economic and Development Review Committee of the OECD.

The economic situation and policies of Thailand were reviewed by the Economic and Development Review Committee on 17 July 2023 with participation of representatives of the Thai authorities. The draft report was then revised in the light of the discussions.

The Secretariat's draft report was prepared for the Committee by Kosuke Suzuki, Kyongjun Kwak, Jean Chateau, Wilailuk Poolee and Supatra Sripumphet under the supervision of Jens Arnold. Statistical research assistance was provided by Tony Huang and Paula Adamczyk and editorial assistance by Emily Derry, Robin Houng Lee, and Laura Fortin. The *Survey* also benefitted from contributions at various stages by Alvaro Pereira and Isabell Koske.

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The previous Survey of Thailand was issued in October 2020. Information about the latest as well as the previous Survey and more information about how Surveys are prepared is available at http://www.oecd.org/eco/surveys.

Table of contents

Foreword 3

Executive summary 8

1 Key policy insights 13
Structural reforms are needed to achieve robust and sustainable growth 14
The recovery from recent shocks has been protracted and gradual 16
Macroeconomic policies will need to work in tandem towards a smooth recovery 24
Boosting productivity growth through structural reforms 35
Strengthening the social safety net 44
Supporting access to quality jobs 47
References 56

2 Pursuing a strong and inclusive green recovery 62
The green transition combines opportunities and challenges 63
Achieving a coherent policy mix and ensuring strong policy coordination 67
Carbon pricing should be the key element of Thailand's decarbonisation strategy 68
Aligning environmental regulations with international good practice 74
Achieving net zero will require specific strategies for each sector 77
Raising energy efficiency presents scope for emission reductions 88
Investing in adaptation to climate change 93
Fostering green innovation 93
Towards a more circular economy 96
References 99

Tables

Table 1. A gradual recovery is expected 9
Table 1.1. Macroeconomic indicators and projections 20
Table 1.2. Low-probability events that could lead to major changes to the outlook 24
Table 1.3. Past OECD recommendations on macroeconomic policy 25
Table 1.4. Past OECD recommendations on monetary policy 26
Table 1.5. Past OECD recommendations on revenue enhancement 34
Table 1.6. Estimated medium-term fiscal impacts of policy recommendations 35
Table 1.7. Past OECD recommendations to boost productivity 38
Table 1.8. Past OECD recommendations on trade integration and services trade 42
Table 1.9. Past OECD recommendation on anti-corruption 44
Table 1.10. Past OECD recommendations on skills development and tackling informality 53
Table 1.11. Table of recommendations 54
Table 2.1. Past OECD recommendation on air pollution 77
Table 2.2. Past OECD recommendation on green infrastructure 80
Table 2.3. Main findings and recommendations from this chapter 98

Figures

Figure 1. Public debt remains elevated 9
Figure 2. Income convergence has stalled 10
Figure 3. Labour informality is high 10
Figure 4. Energy and transport are the largest emitters 11
Figure 5. Carbon prices are low 11
Figure 1.1. After a rapid catch up with the OECD average, incomes stagnated recently 14
Figure 1.2. Thailand's old-age dependency ratio is rising faster than those of peer countries 15
Figure 1.3. Recent macroeconomic developments 17
Figure 1.4. Thailand’s labour market showed strong resilience during the pandemic 18
Figure 1.5. Self-employed workers in agriculture have smoothed aggregate employment 18
Figure 1.6. Thailand’s unemployment rate is lower than that of other emerging market economies 19
Figure 1.7. Major exports and imports partners 21
Figure 1.8. Composition of goods trade with China 21
Figure 1.9. The currency recovered in early 2023 after weakening against the US dollar 22
Figure 1.10. Financial institutions appear solid, but private debt has increased 24
Figure 1.11. After peaking in mid-2022, inflation has decreased as interest rates rose 26
Figure 1.12. The fiscal deficit is narrowing but public debt has risen 27
Figure 1.13. Revenue enhancement is crucial to ensure fiscal sustainability 29
Figure 1.14. Education spending has declined and remains low 30
Figure 1.15. The population is ageing rapidly 31
Figure 1.16. Thailand’s tax revenue is small 32
Figure 1.17 The tax-and-transfer system could do more to reduce income inequality 32
Figure 1.18. Boosting productivity is crucial to sustain high economic growth 35
Figure 1.19. FDI to Thailand remained relatively low compared to peers in the region 39
Figure 1.20. Thailand has more stringent FDI restrictions than other countries 39
Figure 1.21. Thailand's trade facilitation performance has improved 41
Figure 1.22. Services trade faces tighter restrictions than in other countries 41
Figure 1.23. Corruption related indicators in Thailand remained relatively low 43
Figure 1.24. Thailand’s share of social security contributors is low 45
Figure 1.25. Social security coverage has gradually expanded 45
Figure 1.26. The share of informal labour has declined and is lower among young generations 47
Figure 1.27. Employment protection is rather strong in Thailand 49
Figure 1.28. Young people have been more affected by unemployment 50
Figure 1.29. The NEET rate has increased despite low youth unemployment 52
Figure 2.1. Thailand is committed to significant emission reductions 63
Figure 2.2. CO_2 emissions from road transport have increased rapidly 64
Figure 2.3. Energy is necessary for economic growth 64
Figure 2.4. Thailand’s coal dependence is lower than in peer countries 65
Figure 2.5. Lowering energy intensity has helped contain CO_2 emissions 66
Figure 2.6. Thailand’s current effective carbon prices are low 70
Figure 2.7. Energy subsidies remain in place for oil 70
Figure 2.8. Achieving net zero targets will be challenging 72
Figure 2.9. Low-income households spend relatively less on transport 73
Figure 2.10. Environmental policies are less stringent than in OECD countries, China and India 76
Figure 2.11. Renewable sources have increased in power generation 78
Figure 2.12. Thailand needs to increase the use of renewable energy sources 79
Figure 2.13. Motorisation is advancing in Southeast Asian countries 83
Figure 2.14. Energy consumption by product type 85
Figure 2.15. The electric vehicle market is still nascent in Thailand 85
Figure 2.16. Rail freight transport accounts for a small share in in Thailand 87
Figure 2.17. Industry and transport account for a large share of energy consumption 89
Figure 2.18. Energy efficiency has improved in recent years 90
Figure 2.19. Electrification has rapidly increased in the emerging Asian economies 91
Figure 2.20. Business energy efficiency has been declining and electrification has been slow 92
Figure 2.21. Thailand has rapidly increased R&D expenditure 94
Figure 2.22. R&D tax incentives are weaker than in other economies 95

Boxes

Box 1.1. Thailand's unemployment rate is one of the lowest in the world 19
Box 2.1. The OECD ENV-Linkages modelling framework 71
Box 2.2. OECD Environmental Policy Stringency Index 75
Box 2.3. GHG emission reductions in New Zealand's agriculture sector 88

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Basic statistics of Thailand, 2022*

(Numbers in parentheses refer to the OECD average)**

LAND, PEOPLE AND ELECTORAL CYCLE					
Population (million, OECD: 2021)	66.1		Population density per km² (OECD, 2021)	128.8	(38.7)
Under 15 (%)	16.0	(17.4)	Life expectancy at birth (years, 2021)	78.7	(78.7)
Over 65 (%)	13.1	(17.7)	Men (2021)	74.5	(75.9)
International migrant stock (% of population)	4.5	(13.2)	Women (2021)	83.0	(81.7)
Latest 5-year average growth (%)	0.3	(0.5)	Latest general election		May 2023
ECONOMY					
Gross domestic product (GDP)			Value added shares (%, OECD: 2021)		
In current prices (billion USD)	495.3		Agriculture, forestry and fishing	8.8	(2.6)
In current prices (billion THB)	17 370.2		Industry including construction	35.0	(26.6)
Latest 5-year average real growth (%)	0.8	(1.6)	Services	56.2	(70.8)
Per capita (thousand USD PPP, 2021)	17.1	(50.9)			
GENERAL GOVERNMENT Per cent of GDP					
Expenditure (2021)	27.3	(46.3)	Gross financial debt (2021)	58.4	(107.5)
Revenue (2021)	20.2	(38.8)			
EXTERNAL ACCOUNTS					
Exchange rate (THB per USD)	35.07		Main exports (% of total merchandise exports, 2021)		
PPP exchange rate (USA = 1, 2021)	12.04		Machinery and transport equipment	44.2	
In per cent of GDP			Manufactured goods	12.9	
Exports of goods and services	65.8	(33.3)	Food and live animals	12.2	
Imports of goods and services	68.1	(34.9)	Main imports (% of total merchandise imports, 2021)		
Current account balance	-3.5	(-1.1)	Machinery and transport equipment	34.4	
Net international investment position	0.3		Manufactured goods	18.0	
			Mineral fuels, lubricants and related materials	15.1	
LABOUR MARKET, SKILLS AND INNOVATION					
Employment rate (aged 15 and over, %, OECD: 2021)	66.9	(57.5)	Unemployment rate, Labour Force Survey (aged 15 and over, %, OECD: 2021)	1.3	(5.0)
Men	75.3	(65.4)	Youth (aged 15-24, %, 2021)	6.6	(10.9)
Women	59.2	(50.2)	Long-term unemployed (1 year and over, %)	0.4	(1.2)
Participation rate (aged 15 and over, %, OECD: 2021)	68.1	(60.9)	Tertiary educational attainment (aged 25-64, %, OECD: 2021)	20.5	(39.9)
Mean weekly hours worked	42.2	(36.5)	Gross domestic expenditure on R&D (% of GDP, 2021, OECD: 2020)	1.2	(3.0)
ENVIRONMENT					
Total primary energy supply per capita (toe, OECD: 2021)	1.9	(3.8)	CO2 emissions from fuel combustion per capita (tonnes, 2021)	4.2	(7.9)
Renewables (%, OECD: 2021)	20.7	(11.6)	Water abstractions per capita (1 000 m³, 2020)	3.1	
Exposure to air pollution (more than 10 µg/m³ of PM 2.5, % of population, 2019)	99.7	(61.7)			
SOCIETY					
Income inequality (Gini coefficient, 2021, OECD: latest available)	0.351	(0.315)	Education outcomes (PISA score, 2018)		
Poverty gap at USD 6.85 a day (2017 PPP, %, 2021)	2.4		Reading	393	(485)
Public and private spending (% of GDP)			Mathematics	419	(487)
Health care (2020)	4.4	(9.7)	Science	426	(487)
Education (% of GNI, 2021)	3.9	(4.4)	Share of women in parliament (%)	15.4	(32.5)
			Net official development assistance (% of GNI, 2017)	0.0	(0.4)

* The year is indicated in parenthesis if it deviates from the year in the main title of this table.
** Where the OECD aggregate is not provided in the source database, a simple OECD average of latest available data is calculated where data exist for at least 80% of member countries.
Source: Calculations based on data extracted from databases of the following organisations: OECD, International Energy Agency, International Labour Organisation, International Monetary Fund, United Nations, World Bank, National Statistics Office of Thailand, and Office of the National Economic and Social Development Council of Thailand.

Executive summary

The economy is still recovering from recent shocks

Thailand has achieved remarkable economic progress over the past decades, followed by several years of moderate growth prior to the pandemic. A strong and timely policy response helped to cushion the negative economic and social impact of the pandemic and of rising energy and food prices.

As tourist arrivals rebounded, the economy has been picking up rapidly since mid-2022 (Table 1). Real GDP is expected to grow by 2.7% in 2023 and to strengthen to 3.6% in 2024 and 3.2% in 2025. Private consumption is projected to remain strong, despite the gradual phase-out of government relief measures and high household debt. Robust exports will benefit from rising tourism revenues in the context of China's ongoing reopening since March 2023.

Table 1. A gradual recovery is expected

	2021	2022	2023	2024	2025
Real GDP	1.5	2.6	2.7	3.6	3.2
Private consumption	0.6	6.3	5.3	4.2	3.7
Private investment	3.0	5.1	1.8	3.7	3.8
Exports	11.1	6.8	2.5	6.6	4.3
Imports	17.8	4.1	0.7	6.3	4.2
Inflation (CPI)	1.2	6.1	1.6	2.2	2.0
Government budget balance*	-4.6	-3.9	-3.9	-3.1	-2.9
Public debt*	58.4	60.5	62.1	62.5	62.6

Note: Percent changes. * denotes a percentage of GDP.
Source: CEIC; NESDC; MOF; and OECD calculations.

Downside risks stem from Thailand's high dependence on trade and investment flows amid increasing global uncertainties. Tightening financial conditions in advanced economies may lead to weaker-than-expected external demand. As a large importer of oil, Thailand remains vulnerable to swings in global energy prices.

Fiscal and monetary policies need to work in tandem for a stable recovery

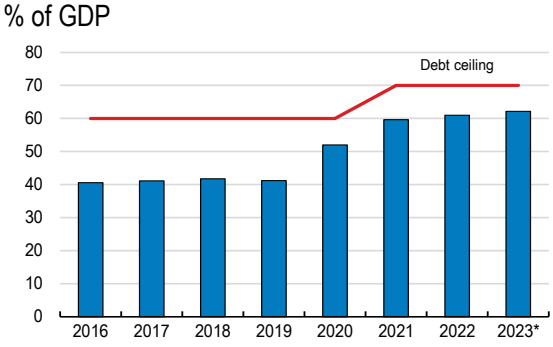
The most immediate short-term challenge for Thailand is the phase-out of special policy support measures introduced during the pandemic amidst high inflation. Fiscal and monetary policies should work hand in hand to rebuild fiscal buffers while closely monitoring remaining inflationary pressures.

Public debt has increased rapidly during the pandemic, and fiscal consolidation should continue at a gradual pace (Figure 1). Support for the most vulnerable population segments may be needed on a permanent basis. But it should be narrowly targeted to those most in need, for example by building on the recently expanded State Welfare Card benefit or non-contributory old-age pensions from the Old Age Allowance. A medium-term fiscal strategy should include a plan to lower the debt ceiling.

Current tax revenues of 16% of GDP will be insufficient to address future spending pressures. Rising social demands, population ageing and the green transition will likely call on additional public resources. A newly introduced property tax still awaits full implementation, personal income taxes could be expanded in a progressive manner and the reduction of the VAT rate from 10% to 7%, originally meant to be temporary, could be undone. Broadening the personal income tax base can also help increase tax revenues.

Maintaining the current monetary policy stance will help to anchor inflation expectations. Inflation has eased, after exceeding 6% in 2022 amid high energy and commodity prices. But demand pressures from the ongoing recovery will remain significant, and real interest rates remain low.

Figure 1. Public debt remains elevated



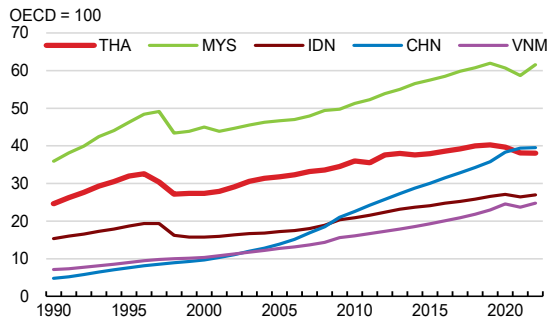
Note: * denotes the latest data as of September 2023.
Source: Ministry of Finance; NESDC.
StatLink https://stat.link/x6bman

Stronger productivity growth will hinge on structural reforms

Income convergence with OECD economies has stalled as productivity gains have failed to deliver stronger improvements in material living standards over the last two decades (Figure 2). Boosting productivity and mastering the transition towards more sustainable and inclusive growth will require stepping up delayed structural reforms.

Figure 2. Income convergence has stalled

GDP per capita relative to the OECD average, computed at 2017 USD PPP



Source: World Bank, World Development Indicators database.
StatLink https://stat.link/lyurtj

Competition remains limited across several sectors, likely due to market entry barriers and high regulatory burdens. This holds back innovation and productivity growth, and can deter both foreign and domestic investment. Previous regulatory reform efforts to reduce anti-competitive regulations have slowed, and a comprehensive review of existing regulations would help to eliminate or adapt outdated regulations. Despite considerable progress in trade facilitation, fees and charges remain an obstacle to international trade. Bilateral agreements have been key for integration into Global Value Chains, but their coverage remains limited. Economic governance could be improved through continued efforts to prevent and fight corruption.

Growth could become more inclusive

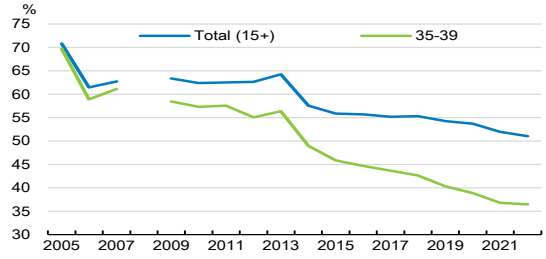
Despite remarkable resilience of the labour market during the pandemic, young people have been disproportionally affected, and many of them have become inactive. Moreover, more than half of workers lack formal employment, and social security does not cover most of them. This calls for stronger social safety nets, especially amid accelerating population ageing.

Many youths are struggling to find quality jobs. Around 15% of the those aged 15-24 are neither in employment nor training and are largely left without policy support. Stronger and better-coordinated policy support through better education and active labour market policies, including training, job-search support and career guidance would help youths better integrate into the labour market.

Widespread informality of workers and firms creates challenges for social protection. The current social protection system is highly fragmented, and coordination needs to be improved. Despite a gradual decline among younger generations, labour informality is persistent (Figure 3). Digitalisation has given rise to new types of informal workers, notably platform workers. A tax-funded social pension provides a minimum income floor for elderly people, but the allowance is small. Raising it could allow Thailand to make significant inroads in the fight against poverty and inequality. Job discrimination on the basis of age is not prohibited but remains a common practice, making it more difficult for older workers to remain attached to the formal labour market.

Figure 3. Labour informality is high

Share of informal labour in total employment, aged 35-39 and 15+



Note: Informal workers are those who are not protected or have no social security from work. Data cover only private sector workers.
Source: National Statistics Office, Informal Labour Survey.
StatLink https://stat.link/icum4s

The green transition requires bold and swift policy action

Thailand has pledged to achieve net zero greenhouse gas emissions by 2065. Like in

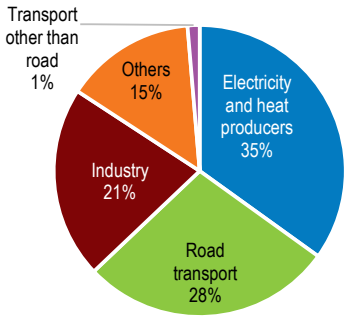
many other emerging-market economies, particular emphasis will need to be placed on making the green transition conducive to economic growth and further improvements in living standards.

Success will hinge on better policy coordination. Several ministries and agencies are involved in the design of environmental policies and there are different and sometimes overlapping plans, making policy coordination complex. A newly created leading environmental agency is tasked to coordinate the overall green transition strategy and monitor policy progress. Ensuring a strong mandate for this new agency will be paramount.

The energy sector is a major source of CO_2 emissions (Figure 4). Renewable power generation has advanced but is mostly limited to small-scale producers incentivised by feed-in tariffs. The overall share of renewable energy sources remains lower than in peer countries. More large-scale energy generation from renewable sources through public tenders and renewable energy certificates would help to address rising electricity demand and reduce emissions. That would require reducing private entry restrictions in the retail electricity market.

Figure 4. Energy and transport are the largest emitters

CO2 emissions from fuel combustion, %, 2019



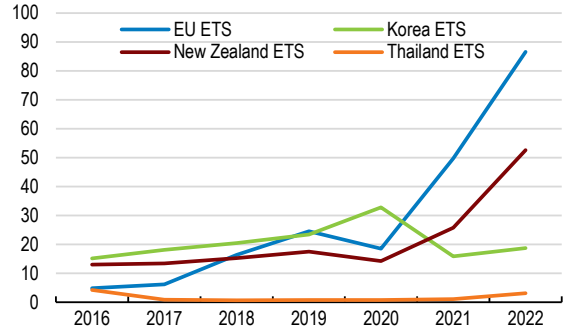
Source: IEA, Greenhouse Gas Emissions from Energy.
StatLink https://stat.link/12rsnw

An effective carbon pricing mechanism is still lacking. A voluntary emission trading system is in operation, but carbon prices are low compared with OECD countries (Figure 5). Plans for the introduction of carbon pricing still lack detail. Although explicit energy subsidies are small, regulated energy prices, such as a cap on diesel prices, weaken the effect of market prices and fossil-fuel taxes. A mandatory cap-and-trade system for key sectors complemented by a carbon tax for the rest, consistent with the planned emission trajectory to net zero, should become a backbone of the green transition.

Stricter environmental regulations should complement consistent carbon pricing. A mix of price-based and regulatory measures is likely to enhance the effectiveness and political viability of mitigation efforts. Stricter air pollution standards could be one way forward, including on coal power plants and internal combustion engine cars.

Figure 5. Carbon prices are low

USD/tCO2e



Source: World Bank, Carbon Pricing Dashboard.
StatLink https://stat.link/7ejdrn

Greening road transport is crucial. Biofuels are widely used, and the number of electric vehicles (EVs) is increasing rapidly, albeit from low levels. The government has strengthened tax incentives for EVs, aiming to boost new registrations of zero-emission cars. However, many vehicles do not meet current fuel economy standards, and the retirement of old cars is slow.

Green innovation could lead to new mitigation opportunities. Private green research and development has increased, and public investment is still low. A range of tax incentives for research and development exist, but limits on the carry-forward of unused allowances may hamper their effectiveness. Increased public-sector research and development in basic sciences and technologies could stimulate green innovation.

Promoting the circular economy could help to reduce the country's carbon footprint and improve resource efficiency. Management of municipal solid waste has improved, but recycling and reusing of secondary material resources still remains weak.

Main findings	Key recommendations
Pursuing robust and sustainable growth	
Inflation has fallen below the target range as monetary policy has tightened. Upside risks to inflation include the strength of the ongoing recovery and supply pressures from El Niño and geopolitical uncertainties.	Maintain the current monetary stance while closely monitoring remaining inflationary pressures.
Fiscal buffers have declined, while population ageing and the green transition will require additional resources. Public debt has reached 61% of GDP as the debt ceiling was increased to finance emergency relief measures.	Phase out remaining emergency measures. In the medium term, raise more tax revenues, while reducing energy subsidies and scaling up spending on social protection, education and the green transition.
Tax revenues remain low due to narrow tax bases. A planned new property tax still awaits full implementation. The statutory VAT rate was temporarily reduced from 10% to 7% in 1997 but has stayed there since.	Implement a broad tax reform including the following elements: - Bring more people into the personal income tax system - Fully implement the planned property tax - Return to the regular 10% VAT rate - Improve tax compliance
Enhancing the business climate and strengthening public integrity	
Competition remains limited in some sectors and entry barriers are high. Previous regulatory reform efforts to reduce anti-competitive regulations and cut red tape have lost steam without substantive outcomes.	Revive the comprehensive review of existing regulations with a view towards eliminating or adapting outdated regulations, lowering barriers to entry and strengthening competition.
Despite considerable progress in trade facilitation, fees and charges remain an obstacle to international trade. Bilateral agreements have been key for integration into Global Value Chains, but their coverage remains limited.	Further improve trade facilitation by reducing fees and charges. Expand preferential trade agreements, including by implementing the Thailand-EU Free Trade Agreement and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership.
Corruption indicators imply room for improvement. Anti-corruption agencies are decentralised without a focal point and the referral process among public integrity agencies is discretionary and lengthy.	Continue efforts to prevent and fight corruption and foster coordination among anti-corruption agencies.
Improving job opportunities and social protection	
Around half of the workforce is in informal employment, with no contributions to and no coverage by social security benefits.	Take comprehensive measures to reduce informality, including: - Reduce non-wage labour costs for low-income earners - Review labour market regulations - Step up enforcement, including through a wider use of digital tools
The job recovery among young people is lagging behind, and active labour market policies for young people are weak. Many are neither in employment nor training and are largely left without policy support.	Expand active labour market policies for young people, including training, job-search support and career guidance in a well-coordinated manner.
A social pensions programme has allowed substantial increases in pension coverage, but benefit levels are below the extreme poverty line.	Consider raising benefit levels of the Old Age Allowance, while continuing to strive for full coverage of all elderly persons in need.
A new transfer programme established in 2017 delivers well-targeted benefits electronically and has alleviated poverty.	Strengthen targeted support for vulnerable households and improve targeting, building on a rising number of State Welfare Card registrations.
Elderly people are struggling to find formal jobs and there is no legislation to ban job discrimination based on age.	Prohibit job discrimination based on age and ensure effective enforcement.
Designing effective policies for the green transition	
Many ministries and agencies are involved in the design of environmental policies and there are several different plans, making intra-governmental policy coordination complex.	Give a strong mandate to the newly created leading environmental agency, notably for the monitoring and surveillance of policy progress towards emission reduction targets.
Carbon prices are low compared with OECD countries. A voluntary emission trading system is in place, but plans for the introduction of a mandatory emission trading system still lack important details.	Introduce a mandatory cap-and-trade system, complemented by a carbon tax for the remaining sectors, consistent with the planned emission trajectory to net zero.
Although energy subsidies are small, a cap on diesel prices weakens the effect of market prices and fossil fuel taxes.	Allow retail fossil fuel prices to fluctuate more freely, while gradually phasing out the price cap on diesel.
Thailand's environmental policies operate mostly on a voluntary basis. The stringency of market-based and non-market-based policy instruments such as environmentally related taxes and regulations is low.	Make environmental regulations more stringent, including air pollution limits on coal power and combustion engine cars.
Renewable power generation has advanced rapidly, mostly due to small scale producers, but the share of renewables remains low.	Promote the use of renewable energy sources in large-scale producers through public tenders and renewable energy certificates.
The electricity market is dominated by state-owned enterprises, hindering competition and private investments in renewables.	Reduce private entry restrictions in the retail electricity market, including by allowing peer-to-peer trade.
A range of tax incentives for research and development is offered, but support to SMEs may not be sufficient compared with other countries.	Allow carry-forward of unused allowances for research and development tax incentives.

1 Key policy insights

Thailand has achieved remarkable economic and social progress over the past decades, followed by several years of more moderate growth prior to the pandemic. After a severe downturn, the recovery picked up rapidly, buoyed by a strong rebound of inbound tourism. Nonetheless, making the on-going recovery more solid and inclusive will require bold reforms. Strong fiscal support helped to avoid a sharp economic contraction, but public debt has increased rapidly over the past years, calling for a credible fiscal consolidation plan. The recovery of foreign investment is falling behind regional peers, but improvements in structural policies have the potential to reinvigorate strong investment. The labour market is recovering well, but young people have not fully benefited from this recovery. Reducing labour informality is the longstanding challenge. Against this background, this chapter discusses how macroeconomic and structural policies can help Thailand to return to a robust recovery path and how social policies can make the recovery more inclusive.

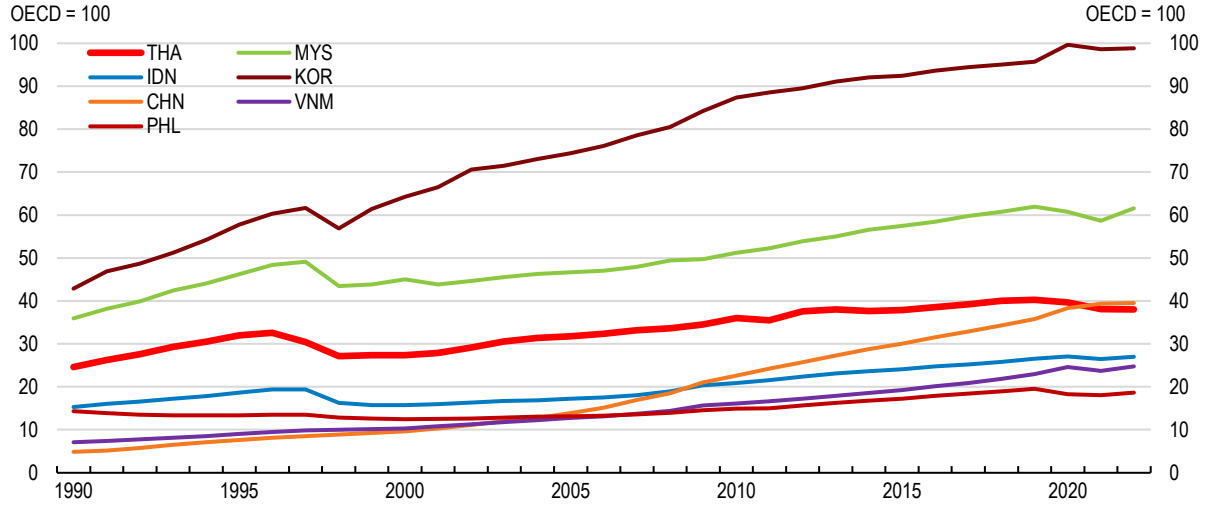
Structural reforms are needed to achieve robust and sustainable growth

Thailand has achieved remarkable economic and social development since the 1960s. Among countries in Southeast Asia, Thailand was one of the first to open its economy by pursuing an active integration into global value chains (GVCs) and attracting foreign direct investment (FDI), which enabled the country to undertake significant investment in infrastructure. Thailand's manufacturing sector was able to gain a competitive edge, while the tourism industry also flourished with increasing facilities for large-scale tourism. In the context of this continuous growth, Thailand became an upper-middle income country in 2011, following the classification used by the World Bank.

However, Thailand's growth has been losing momentum over the last decade. GDP per capita has stagnated at the same time as other countries in the region experienced more vigorous growth (Figure 1.1). In response, several policy initiatives have been launched to boost productivity, including by focusing on high value-added industries.

Figure 1.1. After a rapid catch up with the OECD average, incomes stagnated recently

GDP per capita relative to the OECD average, computed at 2017 USD PPP



Source: World Bank, World Development Indicators database.

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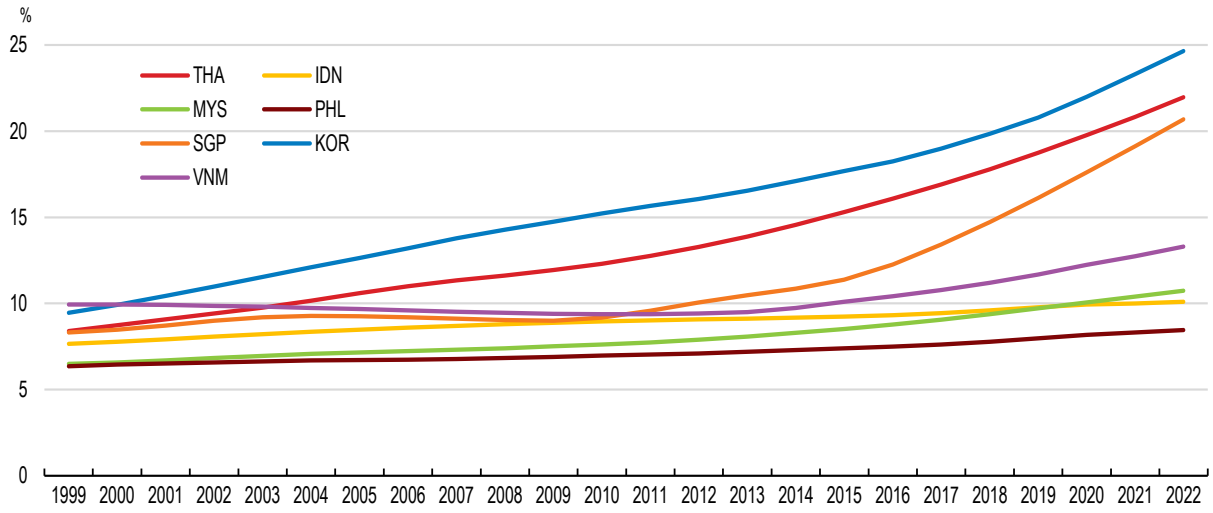
The already softer growth momentum was further weakened by the economic fallout from the pandemic. More recently, Thailand's economy was also heavily affected by rising energy and food prices in the context of Russia's war of aggression against Ukraine, which triggered a cost-of-living crisis and caused a delay in structural reforms. As the effects of both the pandemic and high energy prices are gradually receding, Thailand will now need to address a number of key structural challenges, including population ageing, the digital transition, possible reconfigurations of global value chains and the green transition. In fact, Thailand is faced with one of the most rapid processes of population aging in Southeast Asia, with the old-age dependency ratio more than doubling over the past two decades (Figure 1.2).

Further policy efforts to raise productivity will be key to rekindle and eventually accelerate the convergence process towards higher income levels. This will include continuing to attract foreign investment, which has been an engine of growth in the past. Stronger efforts to improve the business climate and foster competition will be key for this, including by relaxing remaining restrictions to foreign direct investment, especially in the particularly restrictive services sector, and expanding trade agreements.

Figure 1.2. Thailand's old-age dependency ratio is rising faster than those of peer countries



Source: CEIC; World Bank, World Development Indicators database.

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Against this background, the 13th National Economic and Social Development Plan for 2023-2027 aims to boost the transition towards a higher value-added and more sustainable economy. The 13th plan is embedded in the 20-Year National Strategic Plan 2018-2037, which is the first long-term strategy at the national level, guided by the objective to obtain high-income status by 2037.

Recent developments have also pointed to the need for Thailand to construct a more comprehensive social safety net to support the most vulnerable parts of the population. Income inequality has significantly improved since the 1990s, as evidenced by a substantial decline in the Gini coefficient from 0.44 in 1990 to 0.38 in 2021. Nonetheless, further efforts will be required to achieve more inclusive growth, as more than 50% of workers in Thailand are in the informal sector and remain outside the reach of the formal social security system.

Against this backdrop, the main messages of this Economic Survey are:

- Macroeconomic policies will need to strike a careful balance between supporting the still on-going recovery and containing inflation pressures. Monetary policy should maintain its current stance and remain vigilant to inflation pressures. Fiscal policy should support these efforts and revert to a firm consolidation path. Emergency support to households should be phased out, while protecting those most in need with regular social protection instruments.
- Structural reforms will need to continue. Regulatory reform will be key to reduce market entry barriers and boost competition. Efforts to prevent and fight corruption should be continued. Labour market and social policies will have to be stepped up to enhance social inclusion, while bringing down high labour informality and strengthening social safety nets for the unemployed and the elderly.
- Achieving current net zero emission pledges will require bold policy action. A comprehensive strategy for carbon pricing in combination with tighter regulations will need to be applied swiftly to frontload the green transition, while phasing out other government interventions in energy prices. Stronger incentives will be needed for both domestic and foreign investment in higher energy efficiency, renewables and green innovation.

The recovery from recent shocks has been protracted and gradual

The Thai economy has seen a substantially later and weaker recovery from the pandemic than other Southeast Asian countries, amid a protracted rebound in tourism and continuously high uncertainties around the global economic outlook, on which the economy is highly dependent. Annual growth returned to 2.6% in 2022, up from 1.5% in 2021, but this remains moderate in a regional comparison (Figure 1.3, Panels A and B).

Along with a steady rebound of private consumption and investment, exports increased rapidly in 2022, largely owing to the return of foreign visitors as Thailand lifted pandemic-related travel restrictions in September 2022. The number of foreign tourists rebounded to 11 million in 2022, up from only 0.4 million in 2021 (Figure 1.3, Panel F). Merchandise exports continued to decline in early 2023, but at a slower pace than before. The current account deficit has widened amid higher energy prices.

After having surged to 7.9% in August 2022, inflation has come down to -0.3%, below the target range. Domestic financial conditions have tightened as the Bank of Thailand raised its policy rate to 2.5% in September 2023, marking the eighth consecutive increase since August 2022 when the rate was at 0.5%. The monetary tightening successfully brought down inflation, albeit in combination with a temporary tax reduction on diesel fuel. The progressive pass-through of tighter financial conditions to households and corporates continues to weigh on domestic demand, compounding an already-high debt service burden of households and corporates.

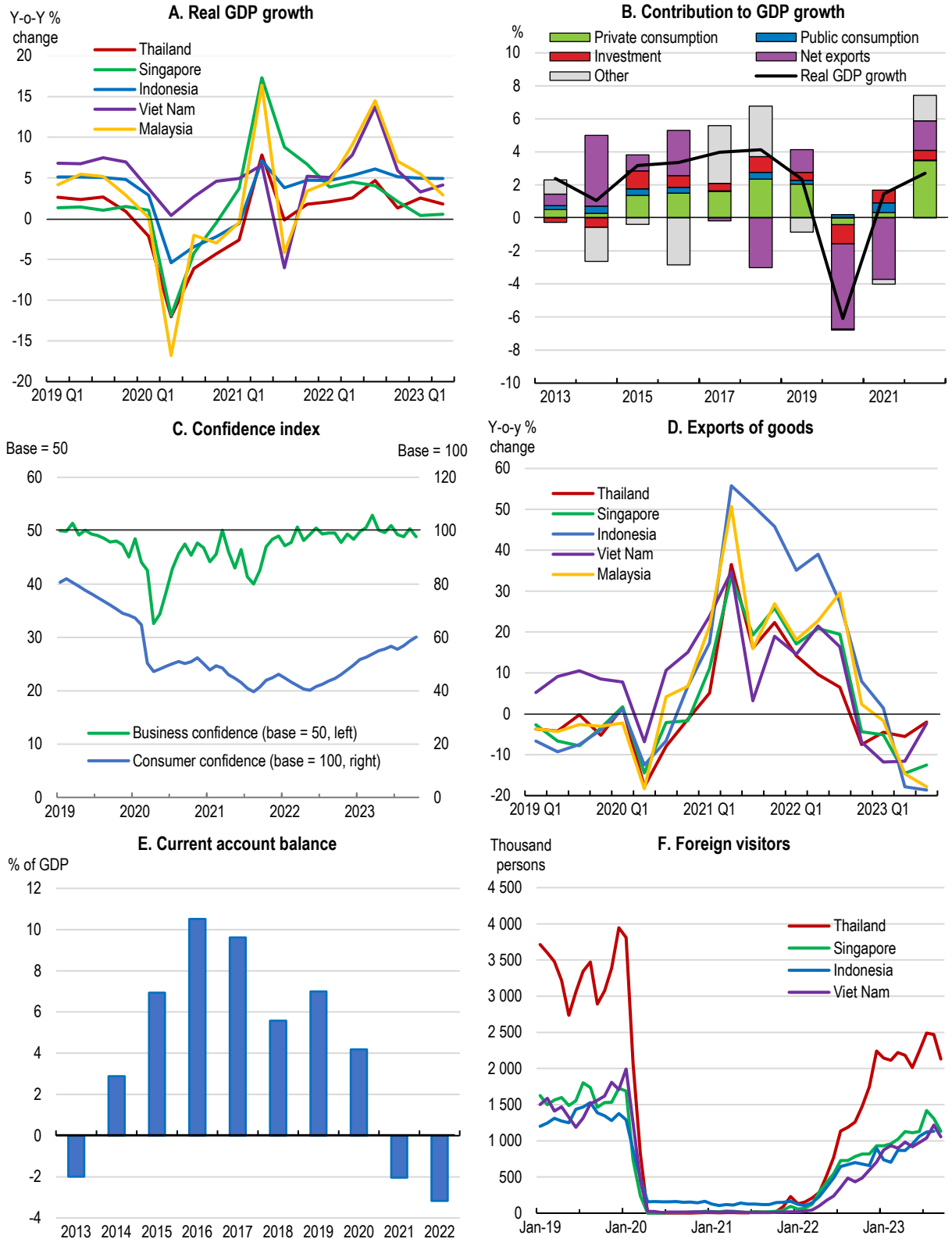
In late 2022, the economy experienced a soft patch due to weaker external demand. Quarterly real GDP contracted by 1.1% in the last quarter 2022 in seasonally-adjusted terms relative to the previous quarter, as export of goods declined (Figure 1.3, Panel D), reflecting subdued global demand amid tighter global financial conditions. This soft patch reversed in the first quarter of 2023 with positive GDP growth of 1.7% relative to the previous quarter, after accounting for seasonal influences, followed by weaker growth of 0.2% and 0.8% in the second and third quarters of 2023, respectively. In year-on-year terms, the economy has now been growing at a pace of 2.7%.

Manufacturing activity suffered from renewed declines in new orders in early 2023. Retail sales, by contrast, rebounded visibly in early 2023, as steady declines in inflation support household spending. Recovering domestic demand is also visible in rising merchandise imports in early 2023, and both business and consumer confidence indices have improved recently (Figure 1.3, Panel C).

The recovery has also been visible in the labour market, especially since the resumption of economic reopening in early 2021. In early 2023, the unemployment rate returned to 1.1%, the same rate as in 2019. At the same time, around 8% of the labour force work less than 24 hours a week (less than 20 hours per week for agricultural workers).

The labour market has shown remarkable resilience over the past few years, especially when compared with regional peers and the OECD average. Even at the peak of the pandemic, employment declined only modestly, and the recovery has been strong (Figure 1.4, Panel A). During the COVID-19 crisis and subsequent recovery, women fared better than men in terms of employment. Among women, employment has risen by 8% since 2019Q4, compared with 4% for men. The overall robust employment was associated with a stable labour force participation, unlike in other countries where many people left the labour force during the pandemic (Figure 1.4, Panel B). The unemployment rate remained low and stable throughout the pandemic period, with a small increase of 0.7 percentage points from late 2019 to early 2021, from 0.7% to 1.4%.

Figure 1.3. Recent macroeconomic developments



Note: In panel B, Other covers the change in stocks and the statistical discrepancy. In Panel C, the Business (Consumer) Confidence Index above 50 (100) means that business (consumer) sentiment has improved and an index below 50 (100) means a deterioration.

Source: CEIC; Bank of Thailand; Office of the National Economic and Social Development Council; University of the Thai Chamber of Commerce.

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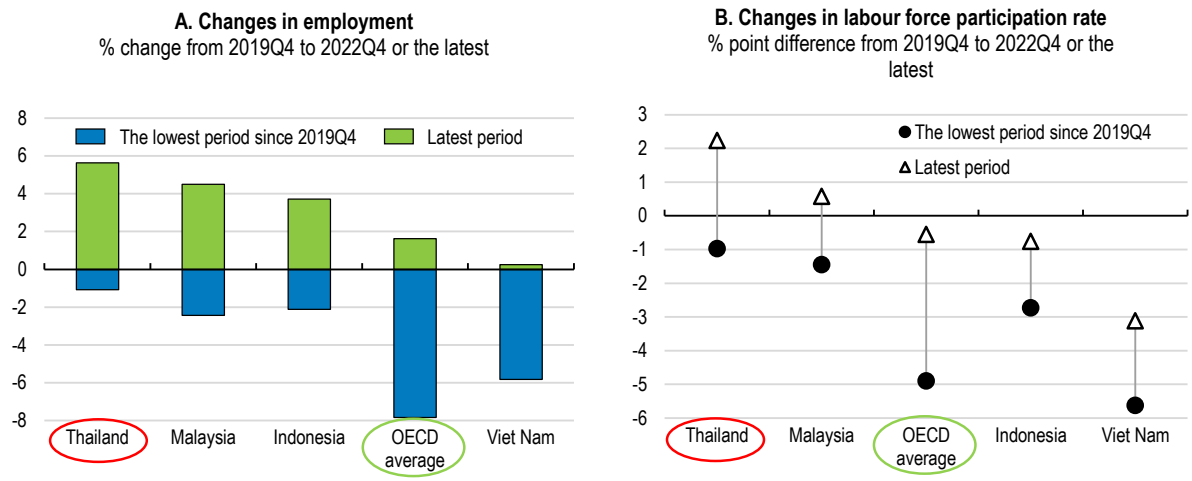
Figure 1.4. Thailand's labour market showed strong resilience during the pandemic



Note: Indonesia's data are semi-annual. Quarterly data for the Philippines end in January, April, July and October, and they are considered to correspond to Q1, Q2, Q3 and Q4 respectively. The labour force participation rate of Malaysia does not include aged over 65.
CEIC; and OECD, Labour Force Statistics (database).

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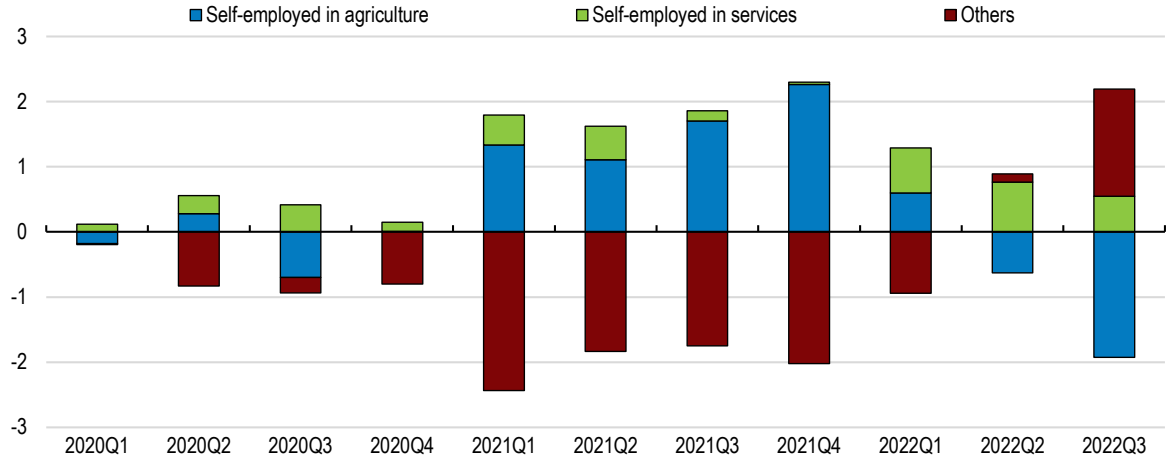
This labour market stability has partly been attributed to Thailand's diverse industrial structure (OECD, 2020[1]), a feature that often goes along with less volatility (WTO, 2021[2]), (Brown and Greenbaum, 2017[3]), (Carvalho, 2014[4]). In 2020 and 2021, the export-oriented electronics sector benefited from the pandemic-induced upsurge of external demand, followed by a gradual rebound in inbound tourism that started in 2022. In addition, there are also structural factors that can explain Thailand's persistently low levels of unemployment (Box 1.1). During 2021, for example, increases in the number of self-employed workers, especially those who worked in agriculture, offset decreases in other forms of employment, notably dependent workers, with some reversal in 2022 (Figure 1.5).

Figure 1.5. Self-employed workers in agriculture have smoothed aggregate employment

Employment, difference from the previous year, % of labour force



Source: ILO, ILOSTAT; World Bank, WDI; Department of Statistics Malaysia, Labour Force Survey Report, Annual Economic Statistics - Agriculture Sector.

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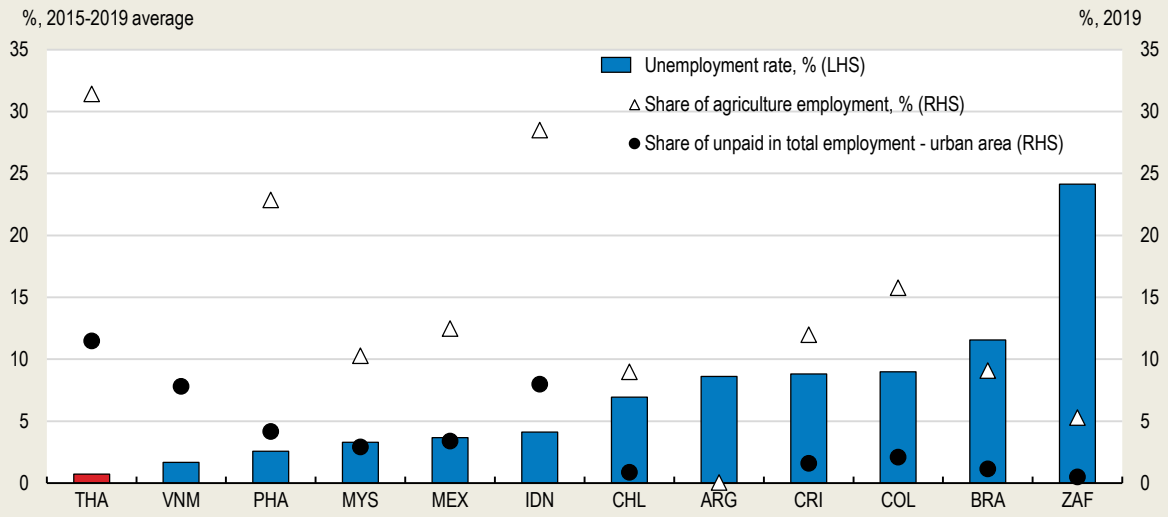
Box 1.1. Thailand's unemployment rate is one of the lowest in the world

Thailand's unemployment rate has been much lower than those of many other countries, mostly moving around 1-2% over recent years (Figure 1.6). Even at the height of the Asian Financial Crisis in 1998, it stood at 3.4%, lower than in other crisis-hit countries, notably Indonesia's 5.5% and Korea's 7%.

Figure 1.6. Thailand's unemployment rate is lower than that of other emerging market economies



Note: On the share of unpaid family workers, Malaysia's reference year is 2021 and data are not available for Argentina.
Source: World Bank, WDI; ILO, ILOSTAT; Department of Statistics Malaysia, Labour Force Survey Report.

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Previous studies have attributed this low unemployment to the large agriculture sector (Moroz et al., 2021[5]), an explanation that would be in line with pattern observed in other emerging market economies (Bein and Ciftcioglu, 2017[6]). Agriculture requires large amounts of labour with strong seasonal swings, and acts as spare labour capacity for the rest of the year, a pattern that may disguise higher unemployment than actually observed. Hours worked in agriculture are low, with an average 34 working hours a week per person in 2021, compared to 44 hours in other sectors. The ILO calculates underemployment by considering gaps between actual and desired working hours, suggesting that the sum of underemployment and unemployment in rural areas was 1.6% in 2019, or 1.4% country-wide, which was twice the nationwide unemployment rate of 0.7%.

Informal labour in urban areas may be another explanation for low unemployment. Unpaid family workers can adjust their working hours more easily and they account for over 10% of total employment in urban areas, which is high in international comparison (Figure 1.6). There are also seasonal movements between agriculture in rural areas and the informal sector in urban areas. During the dry off-season from February to May, workers in rural areas take up temporary jobs in urban areas (Asami, 2010[7]). These flows lend further flexibility to absorb labour market fluctuations, although these jobs are generally unstable and not well-paid.

Going forward, the Thai economy is projected to continue its gradual recovery. Real GDP is expected to grow by 2.7% in 2023 and to strengthen to 3.6% in 2024 and 3.2% in 2025 (Table 1.1). Private consumption is projected to remain strong, although the gradual phase-out of government relief measures and high levels of household debt will weigh on the purchasing power of households. Business investment will be vigorous as the economy rebounds and firms resume delayed projects after the pandemic, including in

tourism-related activities and manufacturing. Exports are projected to be robust, thanks to stronger services exports amid rising tourist arrivals. As China fully reopened in March 2023, further increases in tourist inflows are expected. There is still some way to go before reaching pre-pandemic levels of tourist arrivals, as these were almost 4 times higher in 2019 than in 2022.

Table 1.1. Macroeconomic indicators and projections

Percent changes from previous year unless specified

	2021	2022	2023	2024	2025
Output and demand					
Real GDP	1.5	2.6	2.7	3.6	3.2
Consumption	1.3	4.9	3.2	3.8	3.3
Private	0.6	6.3	5.3	4.2	3.7
Government	3.7	0.2	-4.1	2.0	1.8
Gross fixed investment	3.1	2.3	1.1	2.5	2.9
Private	3.0	5.1	1.8	3.7	3.8
Government	3.4	-4.9	-1.0	-1.1	0.3
Exports of goods and services	11.1	6.8	2.5	6.6	4.3
Imports of goods and services	17.8	4.1	0.7	6.3	4.2
Inflation and unemployment					
Consumer price inflation	1.2	6.1	1.6	2.2	2.0
Unemployment (% of labour force)	1.9	1.3	1.1	1.0	1.0
Public finances (% of GDP)					
Government budget balance	-4.6	-3.9	-3.9	-3.1	-2.9
Expenditures	19.8	18.1	17.7	17.6	17.2
Revenues	15.1	14.7	13.9	14.5	14.3
Public debt	58.4	60.5	62.1	62.5	62.6
Memorandum item					
Nominal GDP (THB trillion)	16 167	17 367	17 957	19 000	20 090

Note: Data for 2023, 2024 and 2025 are OECD projections.
Source: CEIC; OECD Economic Outlook database and OECD projections.

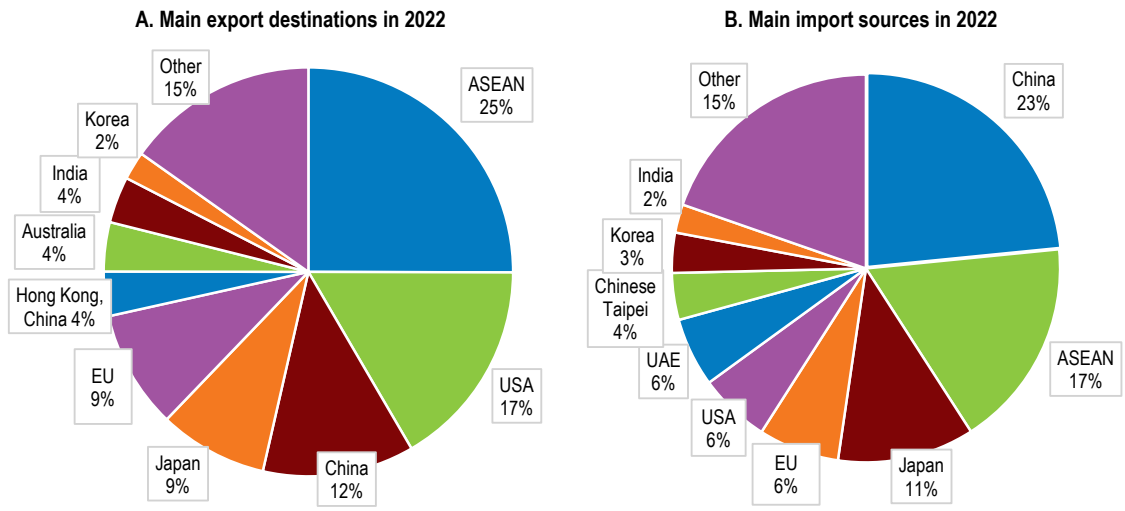
Both services and merchandise exports will continue to be buoyed by growth in China, which is Thailand's third biggest export destination, after ASEAN and the United States (Figure 1.7). Commodities such as plastic and rubber and agricultural products are the main merchandise export items to China (Figure 1.8). On the other hand, moderate demand from advanced economies, including the United States, EU, and Japan, which account for around 34% of exports, is expected to limit export growth.

The weakening global economy implies significant downside risks

Downside risks persist given the persistent uncertainties surrounding the global economic outlook. Central banks in major advanced economies have been raising policy rates to fight inflationary pressures. This could lead to weaker-than-expected external demand. If global trade continues to be subdued, Thai exporters, which are actively participating in global value chains, will be no exception to these weaker prospects.

As a large importer of oil, Thailand remains vulnerable to swings in global energy prices. Moreover, Russia's prolonged war against Ukraine could lead to a resurgence in supply chain disruptions and cause energy prices to rise again. Although Russia and Ukraine accounted for a small share in Thailand's total merchandise trade before the war, Thailand's high merchandise trade-to-GDP ratio (113% in 2022) renders the economy highly vulnerable to the uncertain external conditions caused by Russia's aggression against Ukraine.

Figure 1.7. Major exports and imports partners



Source: Bank of Thailand.

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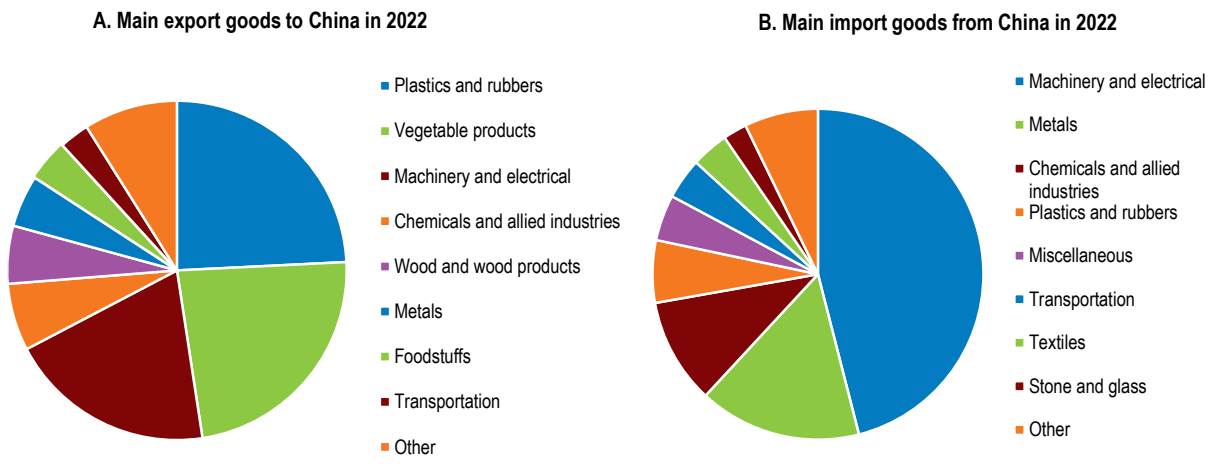
Figure 1.8. Composition of goods trade with China



Source: ASEANStatsDataPortal, International Merchandise Trade Statistics (IMTS); OECD Calculations.

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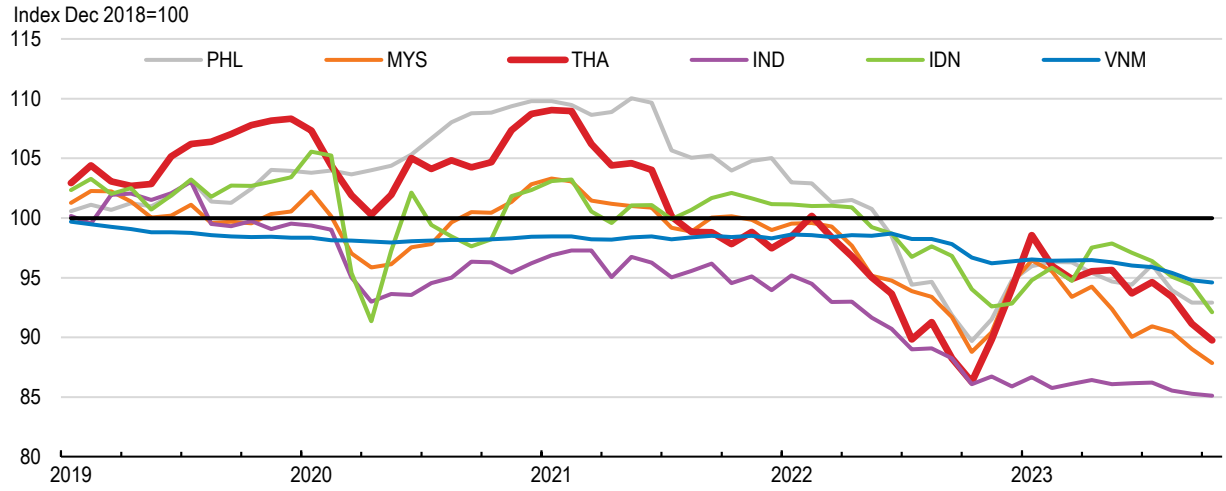
Thailand's economy has in the past proven vulnerable to sudden changes in market sentiment, which could exacerbate volatility in highly interdependent financial markets. Foreign exchange markets experienced an increase in volatility amid heightened uncertainties in global financial markets in 2022. After a sustained period of depreciation between 2021 and late 2022, the Thai baht started to appreciate against the US dollar in late 2022, along with other Asian currencies (Figure 1.9). The strength partly reflects a strong rebound of the Thai tourism sector. While this may partially help alleviate inflationary pressures, it may also weigh on the price competitiveness of Thai exporting companies. In late 2023, the Thai baht experienced a depreciation.

Amid tighter global financial market conditions, authorities will need to stand ready to respond swiftly if major downside risks were to materialise. The differential between the US policy rates and the Bank of Thailand's policy rate has reversed and widened from 0.3 percentage points in March 2022, when the policy rate was first raised in the United States, to -2.9 percentage points in October 2023. This differential

implies risks related to sudden changes in market sentiment that could trigger sudden portfolio capital outflows, which call for close monitoring.

Figure 1.9. The currency recovered in early 2023 after weakening against the US dollar

Nominal exchange rates, USD per local currency



Note: CEIC; Bank of Thailand; IMF, Financial Soundness Indicators Databases.

StatLink https://stat.link/20ldzb

Thailand's official foreign reserves remained ample at 226% of short-term external debt with less than one year maturity in late 2022, although down from 275% a year earlier. Reserves are now recovering with the rebound of tourism and re-evaluation effects. As of October 2023, foreign reserves reached 211 billion USD or 44% of 2022 GDP, close to the pre-pandemic level of 217 billion USD in 2019.

The capital account recorded a surplus in 2022, as residents' capital outflows and non-residents' capital inflows offset each other in most periods. Since the onset of the pandemic, authorities have granted greater flexibility to non-residents to support capital inflows. Under the newly introduced non-resident qualified company scheme in July 2021, some non-resident companies can now manage currency risks more freely without providing transaction proofs and without being subject to the account limit of THB 200 million (approximately USD 6 million). In April 2022, authorities also relaxed foreign exchange regulations on residents. For example, the previous limit of USD 50 million per year for lending to foreign companies and the purchase of foreign property has been removed. These relaxed regulations aim at allowing investors more flexibility as well as reducing transaction costs, which is expected to strengthen market resilience. Some studies suggest that in times of financial distress, past outflows of capital by residents could return, potentially injecting valuable liquidity into domestic markets and alleviating financial instability (Cavallo, Izquierdo and León-Díaz, 2020[8]), (Caballero and Simsek, 2020[9]). In the long term, upgrading the framework to international standards would help to facilitate a gradual liberalisation of capital flows while managing short-term disruptions.

Financial markets have been sound, but private debt is high

The financial sector appears sound overall, according to analysis by the Bank of Thailand (BOT, 2023[10]). Nevertheless, some segments warrant close monitoring over the near future. Commercial banks are well capitalised, with a capital adequacy ratio of 19.7% in April 2023, well above the minimum regulatory requirement of 11%. In 2023Q1, Thailand's capital adequacy ratio of 19.1% was higher than in peer economies such as the Philippines (15.8%) and Malaysia (18.6%) (Figure 1.10, Panel A). Banks also recorded a high liquidity coverage ratio at 196% in September 2023, almost twice the minimum requirement ratio of 100%.

High private sector debt remains a key risk, with household and corporate debt summing up to 178% of GDP in 2023Q1, up from 160% at the end of 2019 (Figure 1.10, Panel B). In a regional comparison based on 2021 data, Thailand's private debt to GDP ratio of then 180% was sizeable compared to regional peers such as Malaysia (143%) and Indonesia (42%), although smaller than in Singapore (221%). This reflects Thailand's progress in financial development, but high level of private debt will need to be carefully monitored in a context of rising interest rates.

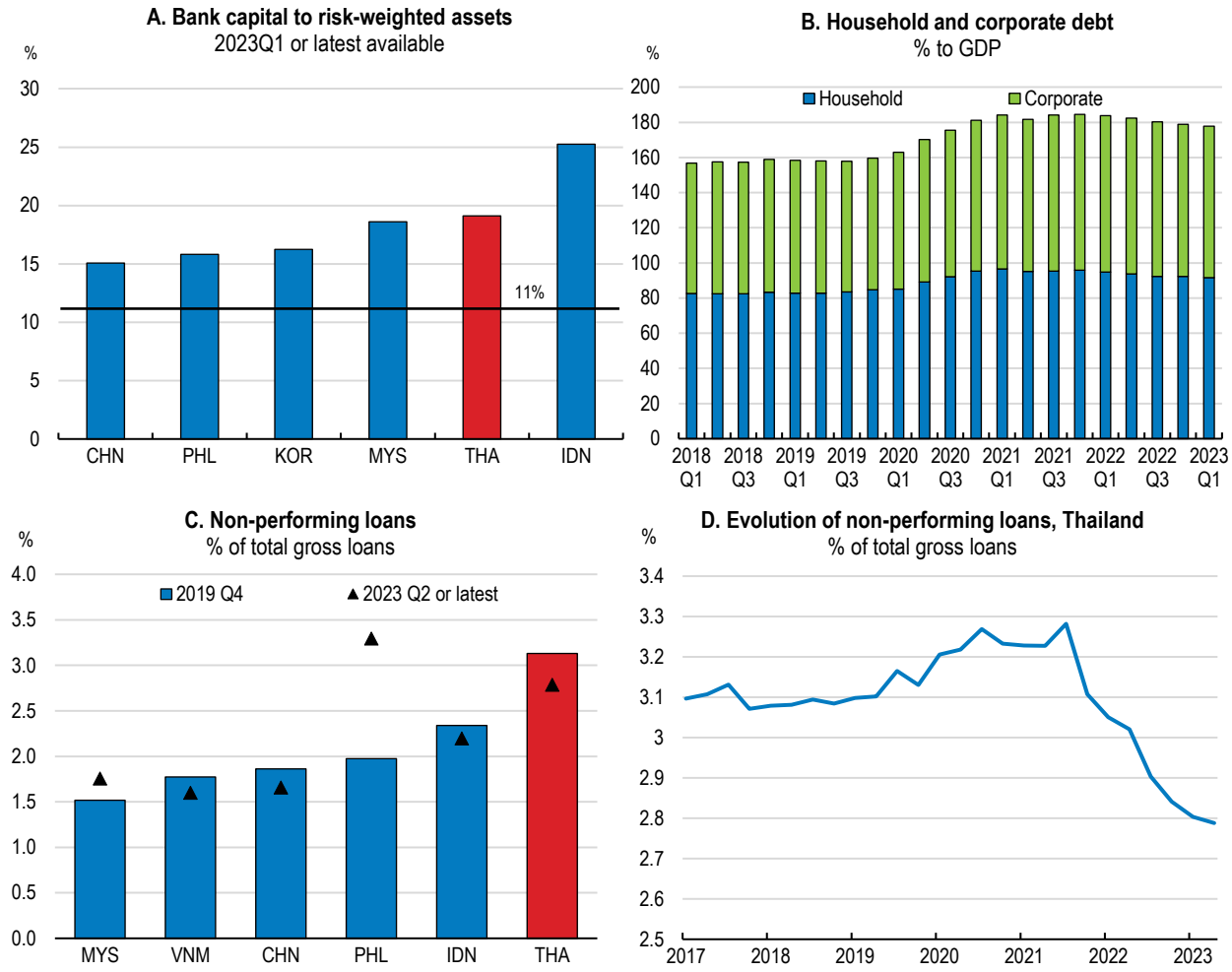
At present, the quality of banks' loan portfolios does not seem to be much affected. The share of non-performing loans (NPLs), at 2.8% of total gross loans in 2023Q2, is slightly lower than pre-pandemic levels, but higher than in peers like Malaysia (1.8%) and Indonesia (2.1%) (Figure 1.10, Panels C and D). Household mortgages accounted for 46% of total household loans in 2023Q1 and are mostly based on fixed interest rates.

Loans to small and medium enterprises (SMEs) have a higher non-performing loan (NPL) ratio than the remaining loan portfolio and have seen an increase in delinquency from 6.4% in 2020Q3 to 7.4% in 2023Q3. The authorities provided additional liquidity with a higher credit limit and longer maturities and provided access to loan guarantees targeted to vulnerable SMEs and households in 2021 to cushion the prolonged impact of the pandemic and introduced a new debt restructuring programme. These measures have been helpful to reduce the debt service burden of constrained SMEs and households and to support viable SMEs, but the additional liquidity measures should be phased out progressively to avoid contributing to a build-up of private sector debt.

The Bank of Thailand is undertaking regular stress tests of commercial banks and non-bank financial institutions, but the results of these tests are not generally disclosed. Regular disclosures of stress tests can help to monitor the build-up of systemic risks and allow proactive evaluations of financial vulnerabilities ahead of time (Marques et al., 2022[11]) (Puah, Kuek and Arip, 2017[12]). The disclosure of stress test results can also serve as an effective communication tool, providing the market with information on the risks of banks' balance sheets. Major central banks are also increasingly including climate risk assessments in their stress tests. Considering Thailand's susceptibility to climate risks in the region, implementing such assessments would be particularly relevant.

Current license requirements can act as an impediment for business to access financing. Hotels, for example, are required to comply with several laws and regulations, but a sizeable number of hotels and accommodations across the country fail to do so, effectively operating without a license. Enforcement of license requirements was halted during the pandemic. Reviewing those license requirements and assisting existing businesses on their way towards becoming compliant would allow these businesses to access loans.

Figure 1.10. Financial institutions appear solid, but private debt has increased



Source: CEIC; BIS; IMF, Financial Soundness Indicators Databases.

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Table 1.2. Low-probability events that could lead to major changes to the outlook

External shocks	Potential impacts
Climate-related disasters	Extreme floods or abnormally high temperatures due to El Niño could overwhelm the existing coping capacity and bring about wide-ranging dislocation of economic activity, including cuts in electricity supply and shortage of food.
Political instability	Political instability could affect policy stability and consistency and weaken consumption and private investment further, in particular foreign direct investment.
Geopolitical tensions	The escalation of tensions or other serious social unrest in the region would entail long-lasting supply chain disruptions and deteriorate sentiment of foreign investors.
Pandemic	The emergence of new deadly diseases or fatal variants of COVID-19 would dent the overall economy, especially in the tourism sector, and cause large-scale social distress.

Macroeconomic policies will need to work in tandem towards a smooth recovery

The most immediate short-term challenge for Thailand will be to move from the broad policy support measures designed in the context of Covid-19 and high inflation towards well-targeted permanent social protection instruments to support those most in need, while consolidating fiscal accounts. Fiscal and monetary policies should work hand in hand, avoiding conflicting impulses on the economy between the

two. This implies phasing out the emergency support measures put in place over the last years, including fuel tax reductions.

Table 1.3. Past OECD recommendations on macroeconomic policy

Recommendations in the past survey	Measures taken since October 2020
Extend the emergency support measures to vulnerable households and SMEs. Strengthen the capacity of public health system.	Vulnerable groups were supported with cash transfers and utility bill discounts, loans to SMEs and free medical treatment.
In the short run, maintain employment and stimulate demand. As the recovery becomes steady, boost the productive capacity of the economy by gradually shifting from income and employment supports to structural measures including the up- and re-skilling of workers.	Workers in heavily affected sectors benefited from targeted compensation schemes, while all sectors saw increased unemployment compensation, wage subsidies for newly graduated individuals and reduced social contributions. Domestic travel subsidies and VAT exemptions for medical products supported consumption.
In case further spending is required, use the available fiscal space within the fiscal constraints, and ensure cost-effectiveness and transparency.	The fiscal rule was eased to allow public debt to rise to 70% of GDP in 2022, up from 60% in 2021. Stimulus and pandemic relief measures amounted to THB 1.5 trillion during 2020 and 2021.

Maintaining the current monetary policy stance will help to anchor inflation expectations

High energy and commodity prices have dramatically changed Thailand's inflation environment. Global energy and commodity prices soared in 2021, pushing up energy prices and creating a gap between headline and core CPI inflation (Figure 1.11, Panel A). Inflation overshot the target range of 1%–3% in 2022, and inflationary expectations spiked to 4.8% in July 2022. Currency depreciation against a strong US dollar in late 2022 exacerbated the impact of high energy prices via imported fuel prices, although partly mitigated by fuel subsidies. The energy component of the CPI, about one eighth of the CPI basket, increased by 25.0% in 2022, accelerating from 11.9% in 2021. In addition, an outbreak of the African swine fever in January 2022 contributed temporarily to high inflation, raising meat prices by 21.1% in annual terms. Overall, headline inflation increased to 6.1% on average in 2022, up from 1.2% in 2021, recording the highest rate in the last two decades. The last time that inflation had been so high was in 1998, when it reached 8.0%. Core CPI inflation increased from 0.2% in 2021 to 2.5% in 2022.

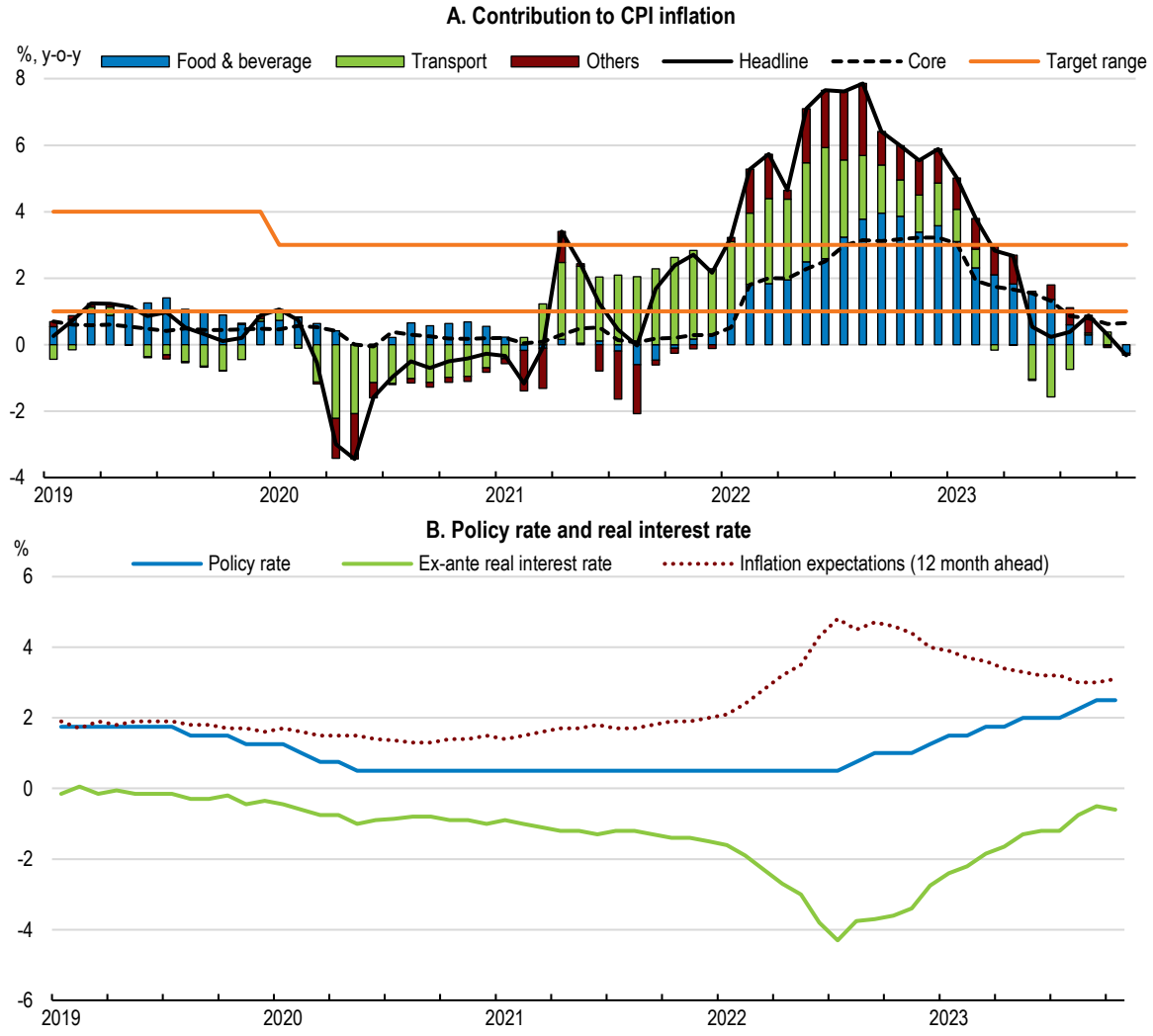
In response, the Bank of Thailand started to raise its policy rate in August 2022 (Figure 1.11, Panel B). The policy tightening was slower and more moderate than in other countries, including regional peers. With the tourism sector almost shut down, the economic recovery was still significantly weaker than in regional peers until mid-2022. On the other hand, energy imports implied high inflationary pressures, which were partly mitigated by price controls. Prices for 56 goods and 5 services including basic staples such as eggs, rice or medicines are controlled by the Central Committee on the Price of Goods and Services (CCP). As a result, inflation expectations remained rather stable throughout 2022, despite the large overshoot of actual CPI inflation, prompting the BOT to maintain an accommodative policy stance until mid-2022. As global energy prices receded and the temporary impact of the African swine fever dissipated, inflation started to decline gradually in the second half of 2022. Year-on-year headline inflation decreased to 2.7% in April 2023, falling back into the target range of 1%–3%, after having peaked at 7.9% in August 2022. Subsequently, headline inflation rate declined further to –0.3% in October 2023, below the target range, mainly due to further declines in oil prices, energy subsidies and base effects.

Looking ahead, pressures on core inflation are expected to remain in the short term due to the continued recovery of domestic demand and a continued rebound of international tourism. Rising input prices have compressed profit margins, but firms are expected to pass on some of these cost increases to consumers as domestic demand gains momentum. The recovery of the Chinese economy, including tourist inflows, is supporting growth but may add to inflationary pressures by boosting demand for energy and commodities. Moreover, labour shortages in several sectors including tourism are likely to exacerbate wage pressures. The minimum wage was raised in October 2022 and further increases are under consideration. In the second half of 2022, nominal unit labour costs rose rapidly as wage growth outpaced labour productivity

growth, with a year-on-year increase of 9.7% in the third quarter of 2022. This represents the most rapid increase of unit labour costs in a decade.

Against this background, the current monetary policy stance should be maintained. Inflation expectations for one year ahead remain at 3.1% as of October 2023, above current inflation and slightly above the 3% upper bound of the inflation target range. This implies a negative ex-ante real interest rate of –0.6%, which is close to the December 2019 level of –0.4%. Inflation is projected to reach 1.6% in 2023, rebound to 2.2% in 2024, before declining to 2.0% in 2025.

Figure 1.11. After peaking in mid-2022, inflation has decreased as interest rates rose



Note: The BOT has been targeting a headline inflation since 2015, changing from the previous core inflation targeting. On panel B, the ex-ante real interest rate is calculated by subtracting inflation expectation (12-month ahead) from the policy interest rate.
Source: CEIC; Bureau of Trade and Economic Indices; Bank of Thailand.

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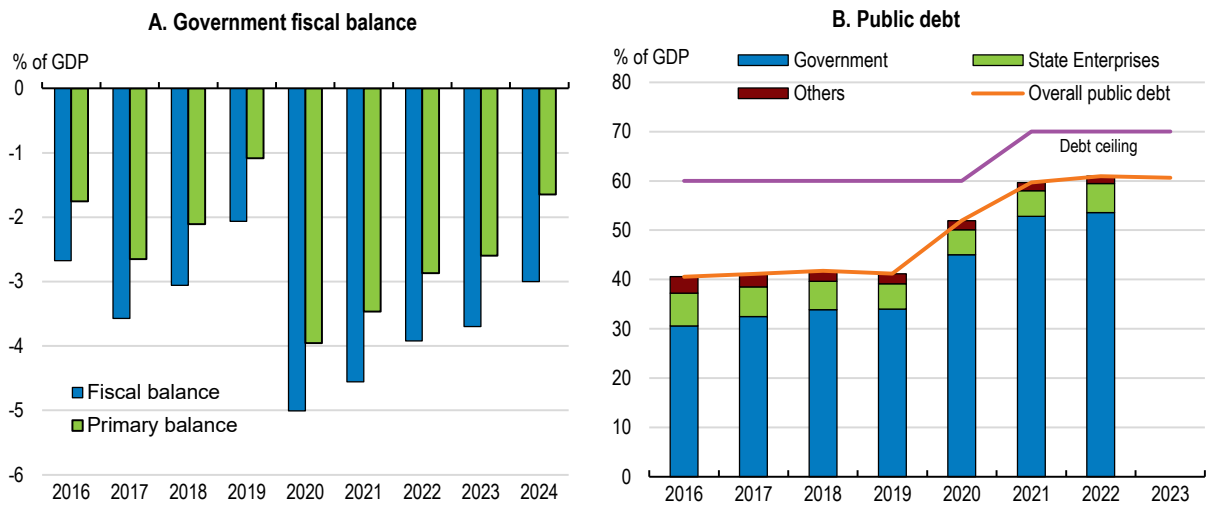
Table 1.4. Past OECD recommendations on monetary policy

Recommendations in the past survey	Measures taken since October 2020
Keep monetary policy very accommodative, and if downside risks materialise, reduce the policy rate further.	The key policy rate was lowered from 1.75% in July 2019 to 0.5% in May 2020, where it remained until July 2022.

Fiscal consolidation should continue at a gradual pace

Thailand's fiscal deficit widened in the fiscal year that began on October 1, 2020 (FY2021) as the government took a series of additional support measures against the economic fallout from the pandemic and later high energy prices (Figure 1.12). The general government headline fiscal balance reached a low of -5.0% of GDP in FY2020 and -4.6% in FY2021, before improving to a deficit of -3.9% in FY2022 as some of the pandemic relief measures were withdrawn and public expenditures declined. Two major pandemic relief packages announced in April 2020 and May 2021, amounting to 9.4% of GDP, have been almost fully disbursed at 96%, including cash transfers, and to a lesser extent health spending and measures to support economic growth. Further support measures in the second half of 2022 included a subsidy programme and cash transfers to mitigate the impact of rising energy prices. A cap on diesel prices is estimated to have caused a fiscal cost of 1.1% of GDP, although part of the cost was born by the State Oil Fund whose aim is to cushion the economy against oil price fluctuations (World Bank, 2022[13]).

Figure 1.12. The fiscal deficit is narrowing but public debt has risen



Note: On Panel A, data since 2023 are targets set under the Medium-Term Fiscal Framework.
Source: Ministry of Finance; NESDC; and OECD calculations.

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In the current fiscal year FY2023, existing relief measures will be gradually phased out, as global commodity and oil prices have receded. In particular, energy-related support will expire during 2023, with the excise tax cut on diesel by THB 5 per litre extended to July 2023, although the authorities are considering an additional two-month extension until September 2023. Spending will be lower overall, with a smaller budget for current expenses and more room for investment. In addition to lower spending, the robust rebound of economic activity is expected to push up tax revenues in 2023. This will help to achieve the current budget projections of a -3.7% of GDP general government fiscal balance in FY2023. Medium-term projections foresee further consolidation to -2.8% of GDP by FY2026.

In the short run, Thailand should continue to pursue the current gradual fiscal consolidation plans as domestic demand firms, including by withdrawing extraordinary policy support. This will also support monetary policy in its efforts to tame remaining inflationary pressures and help to rebuild a fiscal buffer to prepare the future shocks. A stronger fiscal position will also help Thailand meet the growing spending needs to address structural challenges, such as the transition to a green economy and population ageing.

Thailand's public debt stood at 62.1% of GDP in September 2023. This is similar to the average for emerging market economies, but should be evaluated in light of Thailand's low tax intake of 16% of GDP. The government raised the public debt ceiling to 70% in October 2021, departing from its self-imposed

fiscal rule to keep the public debt-to-GDP ratio below 60%, after the Public Debt Management Office (PDMO) announced two Emergency Decrees in 2020 and 2021 that allowed additional borrowing. The new fiscal rule was administered in line with the Fiscal Responsibility Act, which mandates revising the limit every three years. Although such flexibility helped Thailand implement relief measures in a timely manner, it also caused an inevitable delay in fiscal consolidation. (OECD, 2022[14])

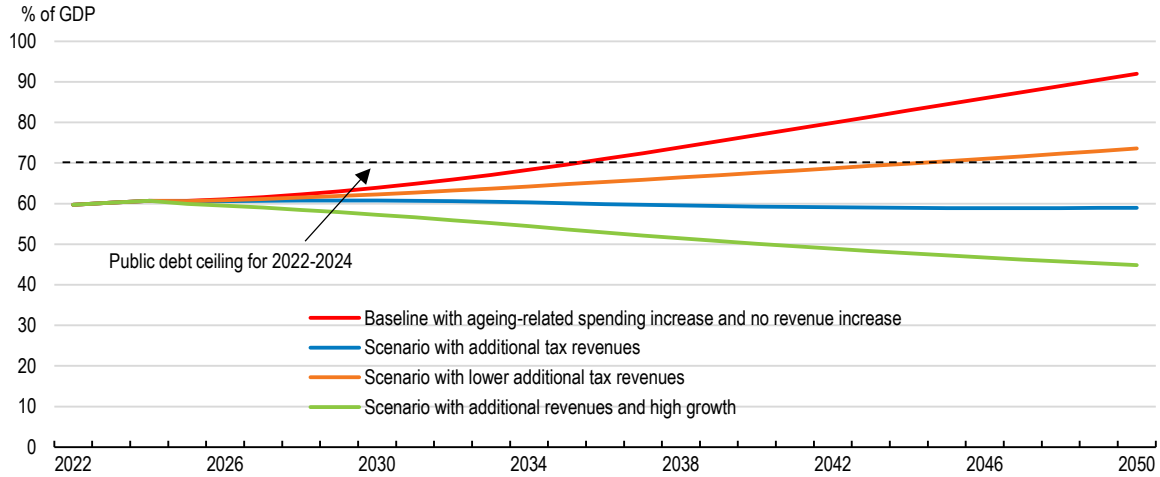
Medium-term fiscal planning is achieved through the Medium-Term Fiscal Framework (MTFF), which defines guidelines for next three to five years and is revised annually. Its long-term anchor is the public debt ceiling rule. Setting a clear timeline to lower the public debt limit back to the previous 60% of GDP in the medium term will strengthen the medium to long-term sustainability of fiscal accounts. Tighter fiscal rules can be one way to address growing fiscal pressures from rapid population ageing, an avenue recently chosen by Korea (OECD, 2022[14]).

According to the MTFF for FY2024-2027 released in December 2022, public debt is expected to stay below 62% of GDP, peaking at 61.8% in FY2025 and then falling to 61.3% in FY2027. Looking further ahead, population ageing will call for additional expenses, reaching up to an additional 1.4 percentage point of GDP by 2050, even under the conservative assumption of constant per-person spending for the elderly. This will push up social spending from the current 5% of GDP to 6.5%. To maintain the primary fiscal balance at -1% of GDP in the medium term, this additional spending will need to be financed through compensatory measures in the form of additional tax revenues. OECD simulations suggest that with these compensatory fiscal measures amounting to 1.7% of GDP fully implemented by 2035, gross public debt is expected to converge to around 60% of GDP by the mid-2040 (Figure 1.13). Even if only half of these compensation measures were implemented by 2035, public debt would not exceed the current 70% ceiling until 2045. However, if rising spending pressures are not met with additional fiscal measures, gross public debt would continue growing and rise as high as 90% by 2050. By contrast, higher real GDP growth, for example through productivity-enhancing reforms, would allow gross public debt to decline to below 50% of GDP.

Fiscal reforms will be inevitable to face future spending needs while ensuring debt sustainability. There is scope to create this additional fiscal space on the revenue side, but also by eliminating some unnecessary current expenditures, including fuel subsidies. Potential reforms to improve the structure of both public spending and revenues will be discussed in the subsequent sections, with a summary of their potential medium-term fiscal impact presented in Table 1.6.

Figure 1.13. Revenue enhancement is crucial to ensure fiscal sustainability

Public sector debt scenarios



Note: The baseline with ageing-related spending increase and no revenue increase scenario assumes long-term labour productivity of 2.7%, nominal interest rates at 2%, and inflation at 2%. Under this assumption, real GDP growth will decline gradually from 2.9% to 1.9% between 2025 and 2050, given demographic developments. The baseline scenario includes an ageing-related spending increase in social and health spending of 1 and 1.4 percentage points of GDP by 2035 and 2050, respectively, under the assumption of constant government spending per elderly person throughout the estimation periods. The baseline assumes that no additional revenue measures will be taken. The scenario with additional tax revenues assumes that primary balance will be maintained at -1% of GDP from 2035, financed through higher tax revenues. The additional tax revenues and high growth scenario assumes real GDP growth of 4% on top of the scenario with additional tax revenues. The scenario with lower additional tax revenues assumes that only half of these additional revenue measures will be implemented by 2035, implying a primary balance of -1.9% from 2035. All the scenarios assume a constant share of GDP for public sector debt that is not general government debt, most notably debt by state-owned enterprises.
Source: OECD calculations.

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Improving the spending mix can help boost long-term productivity

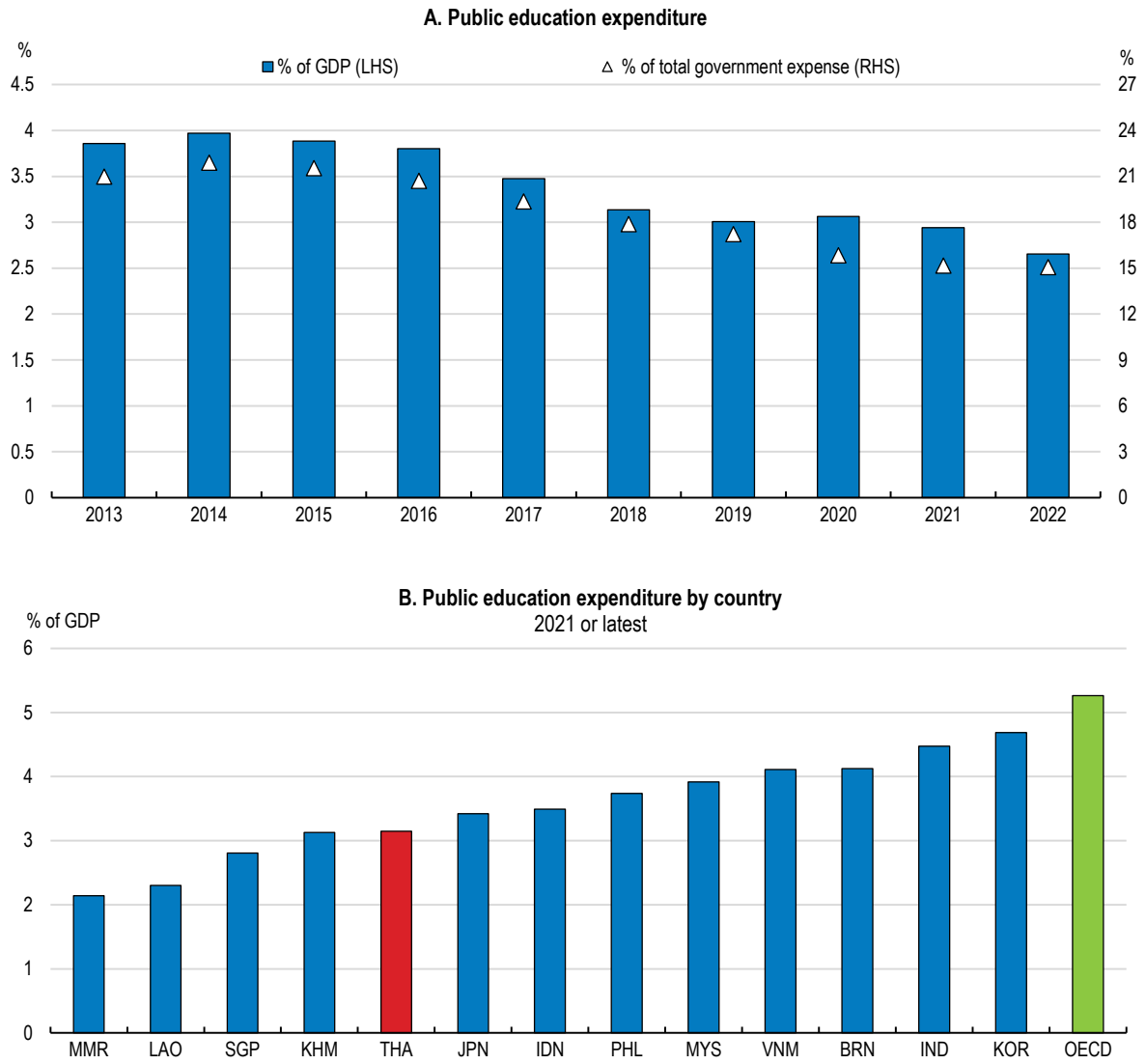
Public investment is key for enhancing productivity and the economy's long-term growth potential. A current fiscal rule earmarks at least the amount of new government borrowing and at least 20% of the annual budget for capital outlays. In FY2022, capital expenditure was far less than net borrowing and amounted to only 19.7% of the annual budget, although this was later addressed in a remedial plan that included additional investment.

Maintaining strong investment will be key for future growth, and urgently needed in the context of the green transition, but it will also become politically more challenging to sustain investment in the context of rising spending pressures, such as those resulting from population ageing. Over the last years, public investment has been financing mostly infrastructure projects including railways, roads, irrigation system and energy sector. Ensuring sufficient public investment is even more important as actual investment disbursements tend to fall short of the budget. While current expenditures in the budget were fully disbursed, only 68% of capital spending foreseen in the budget was actually disbursed. Actual capital expenditure thus accounted for 14% of total government expenditure, well below the budgetary minimum target of 20%. Disbursement procedures could be accelerated by giving a stronger role to the Committee on Government Budget Disbursement Monitoring and Acceleration chaired by the Minister of Finance, and ensuring frequent meetings of this Committee.

Beyond investing in physical capital, there is also a strong case to boost investment in human capital, which is one of the pillars of sustained productivity growth. In the aftermath of the pandemic, public education spending has become a priority for Thailand. The pandemic caused learning losses in most countries and particularly in developing countries, as education spending was often neglected (World Bank

and UNESCO, 2022[15]). Even before the pandemic, however, education spending was on a downward trend in Thailand, and this trend accelerated during the pandemic (Figure 1.14). Thailand's education spending accounted for 14.6% of total government expenses in FY2022, a significant decline from 21.9% in FY2014. Thailand's educational outcomes measured by PISA scores in reading, mathematics, and science are relatively low compared to regional peers such as Malaysia. The PISA score in reading fell to 393 in 2018, recording the lowest level since the introduction of PISA in 2000, and may have declined further during the pandemic. Higher spending efficiency in education, including through school funding linked to performance improvements would allow achieving better education outcomes in the future.

Figure 1.14. Education spending has declined and remains low



Source: Government Fiscal Management Information System; World Bank World Development Indicators; and OECD calculations.

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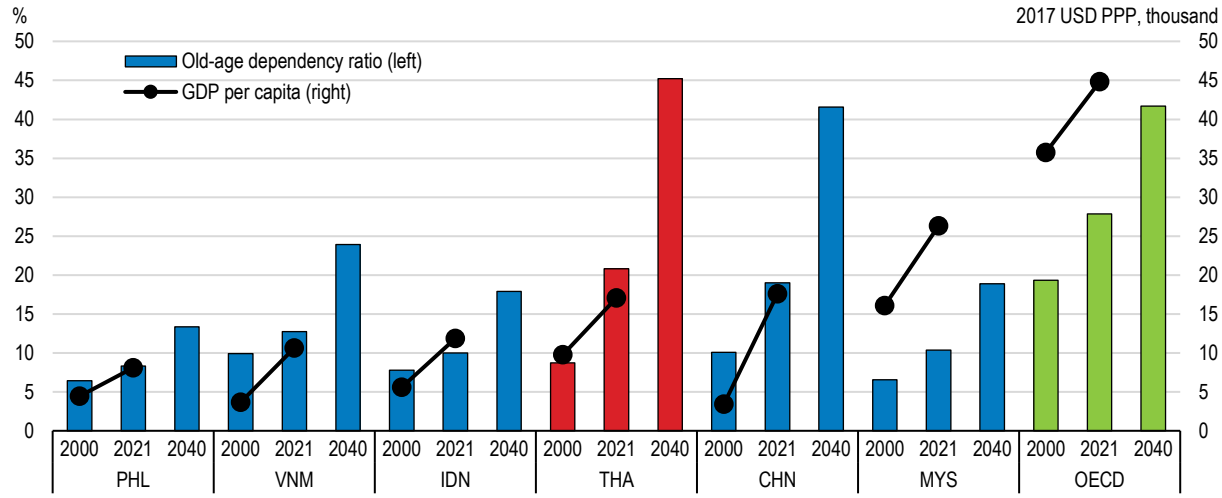
Higher and more progressive tax revenues will need to finance additional spending

Against the background of rapid population ageing, future spending pressures are likely to require higher tax revenues. Already, Thailand's old-age dependency ratio is not only higher than in other countries in the region, but it is also rising faster (Figure 1.15). The working-age population aged 15-64 is anticipated

to decline from 70% of the population in 2021 to 60% in 2040, while the proportion of those aged 65 and above will rapidly increase from 15% to 27% during the same period.

Figure 1.15. The population is ageing rapidly



Note: The old-age dependency ratio is defined as the number of persons aged 65 and over relative to the 15-64 years old population.
Source: United Nations, Department of Economic and Social Affairs, Population Division (2022). World Population Prospects 2022, Online Edition; World Bank, World Development Indicators database.

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At the same time, tax revenue collection in Thailand has declined due to emergency tax relief measures and lower economic activity during the pandemic. As relief measures are lifted and economic activity rebounds, tax revenues are expected to see a cyclical rebound, but that may not be sufficient to address the structural spending pressures stemming from an ageing population, the need for stronger social protection and the costs of addressing climate change.

Thailand's tax revenues are low in international comparison and could be raised by broadening tax bases and improving tax compliance (Figure 1.16). The low tax revenues reflect Thailand's narrow tax bases and a high degree of informality among firms and workers (OECD, 2020[1]). Informal workers currently account for more than 50% of the workforce. Even if the prospective short-term gains in tax revenues associated with bringing more workers into the tax system may in most cases be limited given the lower incomes of informal workers, this should be seen as a useful long-term investment into ensuring sustainable future tax revenues and could also help to improve workers' access to public social protection schemes and strengthen the delivery of targeted social benefits.

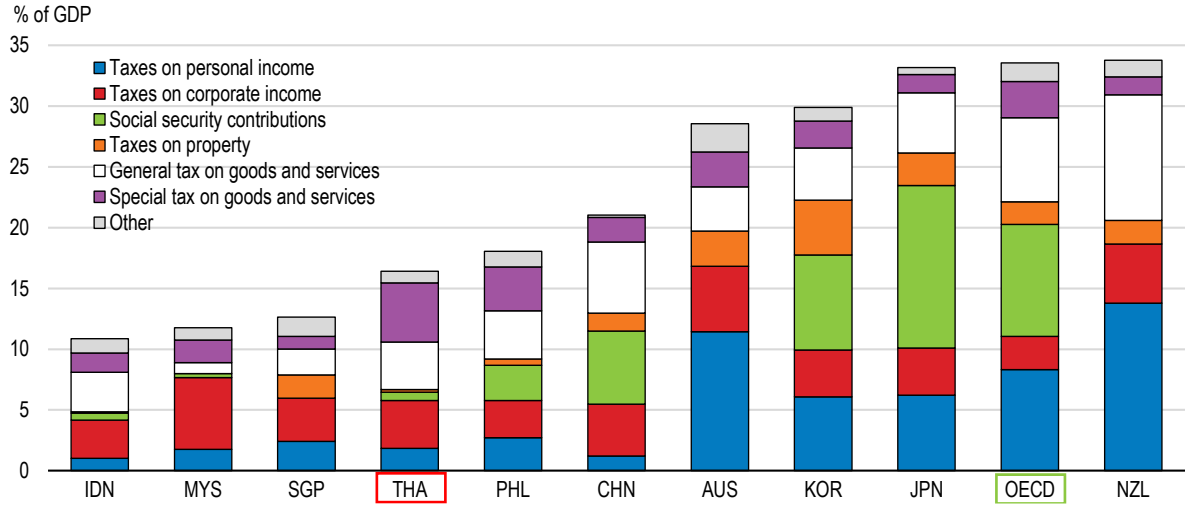
Making the tax system more progressive could help reduce income inequalities. These have improved over the past decades, but the tax and transfer system has played a relatively limited role in this process (Figure 1.17). More than 50% of total tax revenue comes from indirect taxes such as value-added taxes (VAT), which typically offer little scope for progressive taxation. Excise tax and import duties, which fall into the category of special taxes on goods and services, also have a stronger weight than in other countries. This contrasts with the personal income tax, which is used much less in Thailand than in the average OECD country. Less than 15% of the Thai population is subject to personal income taxes, partly related to the large informal sector.

One way to collect more revenues from the personal income tax would be to reconsider some of its current tax expenditures. Many of the current tax expenditures benefit households with higher incomes, such as the current tax allowances for life insurance premiums, mortgage interest payments and investments in long-term equity funds. Although these allowances are capped, the current cap of THB 100,000 for life insurance premiums or home mortgage interest amounts to more than half an average annual wage

income, and the allowance for long-term equity funds is even greater with a maximum of THB 500,000. Phasing out these allowances would clearly strengthen the progressivity of the personal income tax.

Figure 1.16. Thailand's tax revenue is small

Tax revenue, 2021 or closest year available



Note: Value-added tax and sales tax are classified in general taxes on goods and services.
Source: OECD, Tax Revenue database; OECD calculations.

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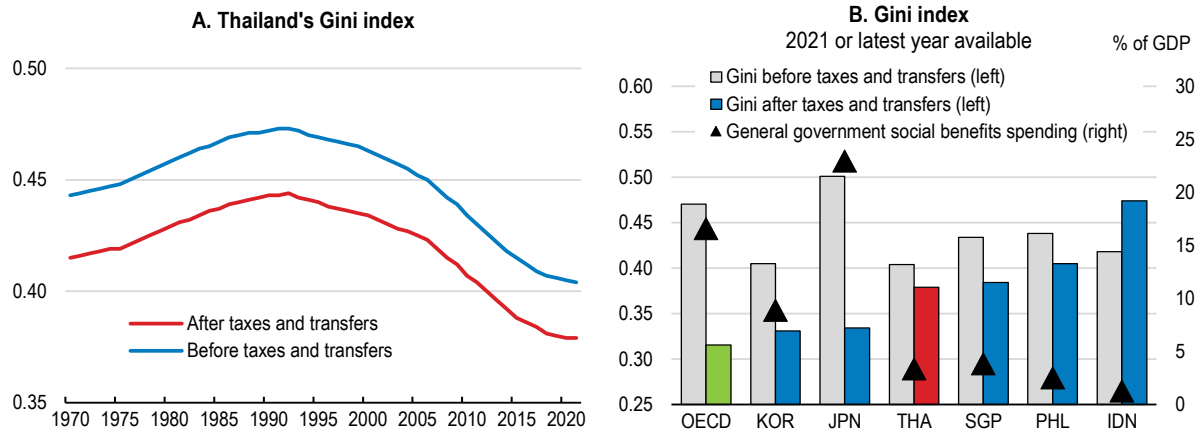
The current basic allowance exempts net annual income below THB 312,000 (USD 4,420) from personal income taxes, which is about 170% of the average wage income. As a result of this high threshold, even many university graduates are not subject to paying any personal income taxes on their salaries. Above this threshold, a first bracket starts with a 5% rate, and 19% of taxpayers currently fall into this range.

Figure 1.17 The tax-and-transfer system could do more to reduce income inequality



Source: OECD, Income Distribution Database; F. Solt (2020), "Measuring Income Inequality Across Countries and Over Time: The Standardized World Income Inequality Database", Social Science Quarterly 101(3):1183-1199, SWIID Version 9.4, November 2022; IMF, Government Finance Statistics database.

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A lower entry rate in personal income taxes will be helpful for bringing more individuals into the personal income tax system, which would be a first step towards a gradual expansion of the tax base. Above the

entry rate, a progressive rate schedule would allow more redistribution through the tax system, while a flatter schedule would imply lower disincentives to entrepreneurship and investment. In light of strong income inequalities and a current rate schedule with 6 additional income brackets and a top marginal tax rate of 35% that applies only to very high income levels, there appears to be scope for raising personal income tax revenues from the upper parts of the income distribution, without raising the top marginal rax rate and without increasing the tax burden on lower-income households.

Corporate income taxes also present scope for reviewing the effectiveness of tax expenditures, which are often generous and aimed at attracting investments. The introduction of the global minimum effective tax rate of 15% will make some of the generous tax incentives obsolete for firms within the scope of this tax, which include multinational enterprises with annual revenues above EUR 750 million (OECD, 2021[16]). Thailand approved in principle the introduction of the global minimum tax in March 2023, and the implementation into domestic legislation is now underway.

A new recurrent tax on immovable property, was introduced in 2019, which can also contribute to a more progressive tax system in Thailand. Local governments collect the land and building tax based on the value of property, which is measured by the Treasury Department of the Ministry of Finance. The tax only applies to immovable properties above THB 50 million (approximately USD 1.5 million) in property value, with varying rates based on their usage. Agricultural properties have a comparatively low maximum rate of 0.15%, while residential properties are taxed at up to 0.3%. Vacant or properties used for other purposes such as business activities can face rates of up to 1.2%. Another positive feature of this property tax is that it does not require individual filing. Instead, the Department of Land under the Ministry of Agriculture and Cooperatives directly collects information on the land use and imposes the tax, which improves administrative efficiency.

A full implementation of the recurrent tax on immovable property, however, is still outstanding. Due to the pandemic, the effective date of the tax was postponed until August 2020 and the tax rate was temporarily reduced by 90% in 2020 and 2021 to mitigate the burden on households. The rate then returned to what was planned initially, before being reduced again by 15% in 2023. The tax should now be fully implemented at its originally planned rates, including with enhanced monitoring to avoid possible tax evasion. Reports of idle urban properties being declared as agricultural land to avoid the higher tax rate on undeveloped land suggest that better monitoring of the actual land use, in line with zoning regulations, would be one way to get more revenues from the new property tax. Another way would be through more frequent re-evaluations of property values, which currently take place every 4 years. Singapore updates property values every year, while the Philippines do so every three years (OECD, 2023[17]). Information-sharing among related government agencies and local authorities could support the re-evaluation process and strengthen tax compliance.

Thailand's statutory VAT rate was originally set at 10% in 1997 but the effective rate was later reduced to 7% in the aftermath of the 1997 Asian Financial Crisis. The application of this lower rate has been extended numerous times since then, but it is relatively low compared to regional peers including Indonesia (11%), the Philippines (12%), Viet Nam (10%) and Malaysia (10%) and other emerging economies such as Mexico (16%), Colombia (19%) and South Africa (15%). The rate should now return to the original 10% and could even be raised further in light of rising future expenditure pressures. Apart from its low rate, Thailand's VAT appears to be relatively effective on the basis of available data, delivering 81% of potential revenues obtained by subjecting all domestic private consumption by the standard rate in 2022. This exceeds the OECD average of 56% in 2020 (OECD, 2022[18]).

Taxes on the transfer of wealth like inheritance and gift taxes can also be an effective way to reduce inequalities, including inequalities of opportunities. Compared to other taxes on wealth, inheritance and gift taxes can effectively reduce inequality with little harm to economic efficiency (OECD, 2021[19]). After decades-long debate, Thailand introduced inheritance and gift taxes in 2015, with a 10% rate on inheritances and 5% on gifts, which may provide room for arbitrage (Siriprapanukul, 2014[20]). Aligning the

rates of inheritance and gift taxes can help obtain neutrality between wealth transfers during lifetime and at death (OECD, 2021). The current inheritance and gift tax rates are also relatively low compared to other countries, and raising it further, including with progressive tax brackets, could be an option for the future. In addition, the automatic exchange of information (AEOI) can help ensure that tax residents declare and pay tax on capital income earned abroad, which could potentially raise tax revenue as well as progressivity and fairness of tax system. Thailand has committed to voluntarily undertake the first automatic information exchanges by 2023, which is a welcome step.

Besides potential changes in the tax code, a stronger enforcement of existing rules through better tax administration could also lead to further revenue improvements. One way to strengthen tax compliance would be to harness digital technologies, which could reduce the cost of enforcement for the authorities and lower the reporting burden for taxpayers. With its unique personal identifier assigned to each citizen on their national identity card, Thailand is well-prepared to make further inroads on tax enforcement through digital means. For example, a new electronic tax filing system enhanced service efficiency with enabling quick access to its online tax services in 2021.

E-commerce is an area that readily benefits from the application of digital technology. A 2021 law imposed VAT on cross-border digital services to non-VAT registrants resident in Thailand. Foreign platform operators with income from services provided in Thailand of over THB 1.8 million (around USD 51,800) are now required to register and pay VAT. The new tax rules on e-commerce aim to increase tax revenue and foster a level playing field between Thai and foreign companies in e-service markets.

Greater adoption of digital technologies in the government sector would allow strong synergies across different areas, notably, tax collection and social protection (OECD, 2022[21]). Digital tools and digitally integrated administrative data including tax registries can improve the targeting of various benefits and facilitate formalisation. Digitalisation of government services would also be useful for regulatory reforms, such as streamlining administrative procedures.

Table 1.5. Past OECD recommendations on revenue enhancement

Recommendations in the past survey	Measures taken since October 2020
Improve tax compliance, particularly in the personal income tax. Once the solid economic recovery is restored, broaden the tax base, with a full implementation of the new property tax.	E-registration, e-filing, e-payment, and a digital tax refund system (PromptPay) have been progressively implemented since 2016 and the tax verification system was linked to a major mobile payment application in 2023. Tax audits of high-potential businesses and multinational enterprises has increased. The implementation of the new 2020 recurrent tax on immovable property was delayed during 2020-2023 and the tax rate was reduced.

Table 1.6. Estimated medium-term fiscal impacts of policy recommendations

Policy measures	Fiscal impact, % of GDP
Revenue measures	3.9
Raise the VAT rate from the current 7% to 10%, while considering further increases in the future	1.5
Reduce tax expenditures in personal and corporate income taxes and bring more people into the personal income tax system	0.6
Fully implement the new recurrent tax on immovable property	0.1
Improve tax administration and tax compliance	0.5
Phase out subsidies on oil products	0.2
Introduce carbon pricing	1.0
Spending measures	-3.5
Raise spending on public investment and education	-1.3
Strengthen social protection by increasing benefit levels of non-contributory pensions and transfers to low-income households, while improving the targeting of the latter. The long-term fiscal burden of social protection reform is likely higher as the population ages.	-1.1
Strengthen training programmes, job-search assistance and career guidance services, especially for young people	-0.1
Recycle carbon pricing revenues as subsidies for low-income households and SME investment in energy efficiency	1.0
Net effect on fiscal balance	0.4

Note: Carbon pricing revenues are based on OECD simulation results (see Chapter 2).
Source: OECD calculations.

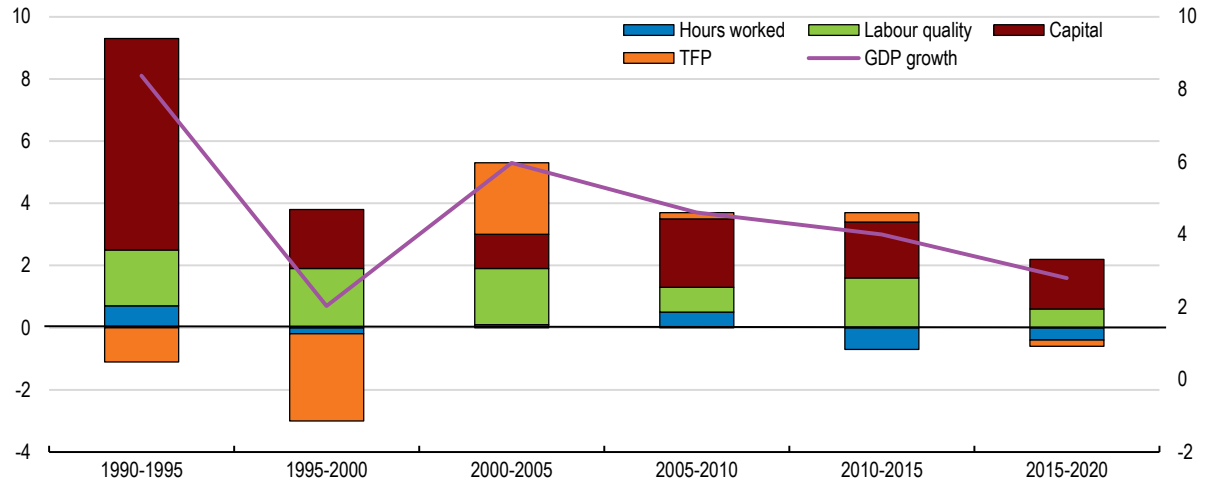
Boosting productivity growth through structural reforms

Stronger competition and better regulations could boost productivity

Strong competition is crucial for boosting productivity growth, which has been subdued over the last 20 years (Figure 1.18). Competition is the necessary force to allow the most productive and innovative firms to grow, including at the expense of less efficient incumbents. Only this creative destruction process provides the right incentives for firms to invest in constant improvements of products and processes. Where it is hampered, this can trap resources in low-productivity firms with fewer investment opportunities and curtail incentives for innovation and technological upgrading.

Figure 1.18. Boosting productivity is crucial to sustain high economic growth

Factors contributing to the Thai GDP growth, annual average, %



Source: Asian Productivity Organisation, APO Productivity database 2022.

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A large body of empirical evidence suggests a link between stronger competition and productivity gains. Regulations that hamper competition have been found to slow down the process by which countries with lower levels of productivity can catch up with high-productivity economies (Nicoletti and Scarpetta, 2003[22]; Arnold, Nicoletti and Scarpetta, 2011[23]). These effects can work through imposing greater discipline for eliminating inefficiencies and adopting the best technologies within the same sector (Syverson, 2004[24]), but they can also work across sectors through sourcing relationships, as competition in intermediate goods markets can improve productivity downstream (Bourlès et al., 2013[25]; Arnold et al., 2016[26]; Arnold, Javorcik and Mattoo, 2011[27]). In India, for example, stronger competition in services sectors has brought significant productivity benefits for downstream manufacturing sectors using these services as inputs (Arnold et al., 2016[26]).

Finally, stronger competition can also foster reallocations of resources towards more productive firms, either through the entry and rapid growth of more productive start-ups, or through accelerating the exit of low-productivity firms and freeing up resources for more productive competitors (Olley and Pakes, 1996[28]). Open markets with low entry barriers would allow high-performing small and medium enterprises to compete and prosper on a level playing field, which is currently not always guaranteed in the face of dominant market positions prevalent in some sectors. Reducing entry barriers may even provide more effective support to high-potential start-ups than specific support policies to SMEs, which often have much higher budgetary costs.

Moreover, economic rents can arise when policies shield parts of the economy from competition. These policies can then end up redistributing resources towards the affluent and even make the political decision-making process less transparent. At the same time, such policy settings reward firms for seeking political connections rather than performing better. Against this background, ensuring an equal playing field and low entry barriers in all sectors will be a key priority, both to reduce inequalities in incomes and opportunities and to boost productivity. Strengthening competition is also conducive to stimulating both foreign and domestic investments, including by SMEs.

Evidence suggests that a range of Thai industries are characterised by high concentration and low levels of competition, which tends to foster rigid industry structures in which strong performers find it more difficult to grow at the expense of low-productivity firms. Thailand ranked 85th out of 141 countries in an indicator about the extent of market dominance elaborated by the World Economic Forum, suggesting that many markets for products and services are dominated by a few players. Thailand's performance on this indicator is significantly behind that of regional peers such as Malaysia and Singapore. Analysis based on administrative data of Thai registered firms suggests an increase in market power among Thai firms, which coincided with lower business dynamism (Apaitan et al., 2020[29]).

Structural impediments to competition have been identified across a wide range of sectors, perhaps most notably in services where regulatory constraints inhibit effective competition (ADB, 2015[30]). This has coincided with weak services productivity growth, in stark contrast to other Asian economies (ADB, 2015[30]). In October 2022, a merger of two big telecommunication companies was approved, creating a market leader with a total of 55 million subscribers in a country of 71 million inhabitants, surpassing the previous market leader, which had 44 million subscribers. This duopoly may have a risk of weakening the competitive climate of the mobile network operator market. Also, an acquisition of a big retail supermarket by its competitor in 2020 has led to a strong and potentially dominant market position in the retail sector. Beyond services, restrictive alcohol laws hamper market entry into several alcoholic beverage markets including beer brewing, which is highly concentrated.

Market dominance is a notable feature of the energy sector, particularly in the natural gas and electricity industries. Since its inception in 1981, the gas industry has been dominated by a state-owned enterprise with substantial investments and long-term contractual agreements. For instance, power plants typically sign contracts that span up to 25 years, and individual contracts do not expire simultaneously, making it challenging for new entrants to compete. Furthermore, the structure of the electricity industry, with its

dominance of the Enhanced Single Buyer Model purchasing electricity from Independent Power Producer and Small Power Producer to distribute to consumers under the retail tariff, hampers the efficient and effective transmission of electric energy to end-users.

The dominance of conglomerates in Thailand has been steadily growing over the past few decades. The top 5 percent of companies now control over 85 percent of the total revenue, and this trend is expected to continue. This concentration of business ownership is not limited to a few select industries; it is prevalent across various sectors, including liquor production, beer production, beverage and tobacco retail, and plastic production (Apaitan et al., 2019[31]). High concentration often affords greater market power, as reflected in higher markups, and it also has a negative impact on productivity and investment in the domestic market (Apaitan et al., 2020[29]). Firms that do not face strong competitive pressures at home will also face challenges in competing abroad and expanding their presence in foreign markets, which ultimately affects the country's competitive position on the international stage.

State-owned enterprises (SOEs) remain present in a number of sectors, at times competing with private enterprises. This may give rise to an uneven playing field between private companies and SOEs, which is likely to hamper competition. The 2017 competition law, repealing and replacing the previous law in 1999, eliminated an exemption for state-owned enterprises in a broad range of business sectors. Nonetheless, some sectors, such as telecommunications and energy, are not covered by this law, and SOE activities that concern national security and public interest are exempted. Cooperation between the competition authority and regulatory authorities of these sectors can be strengthened to ensure coherent competition policies across the economy. Clarifying the scope of SOE activities concerning and the public interest exemption is also important (OECD, 2020[1]). One step forward would be to require state-owned enterprises to keep separate accounts for those activities where they fulfil a public-interest mandate and those activities where they do not, to avoid cross-subsidies towards the competitive segments.

Given the size of Thailand's SOEs, their performance has significant implications for public finances. Some SOEs in the public transportation sector have been making losses, and the government has developed a rehabilitation plan for these SOEs. Further losses could potentially present financial risks for public accounts. Aligning SOE governance frameworks with the OECD Guidelines on Corporate Governance of State-Owned Enterprises would reduce the likelihood of such losses in the future, and level the playing field for competition with private enterprises (OECD, 2015[32]).

Although strengthening competition should become a priority focus for a wide range of policies, the institutional framework for competition policy is the 2017 competition law, which was widely perceived as a step towards international standards. This law established the Trade Competition Commission (TCC) as Thailand's competition authority, as well as addressing some concerns regarding market dominance and anticompetitive agreements. The law applies to a broad range of business sectors; nonetheless, some key services sectors such as telecommunications and energy have been excluded from this law. Looking ahead, there is scope for mainstreaming competition principles across the whole of government. Clearer guidance in the National Development Plan could lay the institutional basis for this, as it would encourage agencies and ministries to give more priority to promoting competition.

Providing more resources to the competition authority would allow it to spend more efforts on monitoring both concentration and conduct, including through market studies. Most investigators are currently working on merger cases, with little resources left for structural reviews and stocktaking exercises in specific sectors.

A comprehensive competition review in key sectors could help to identify regulations that stand in the way of stronger competition. This may include scope to reduce administrative burdens and streamline licensing procedures for new businesses, or to review sector-specific regulations that were originally designed for another purpose but end up creating barriers to competition. Widespread price controls could also be reviewed more systematically to see if they are still needed, and new price controls could include built-in sunset clauses. The OECD's Competition Assessment Toolkit (OECD, 2019) can provide guidance not

only for identifying but also for revising policies that unduly restrict competition. Although Thailand conducted a regulatory reform with the "Regulatory Guillotine" and "Simple and Smart Licence" programme in 2017 to repeal or revise outdated regulations (OECD, 2020[1]), the reform lost steam over the past few years. There has nonetheless been some progress during the pandemic, when a number of laws and regulations were amended to adapt to emergency situations, such as legalising telemedicine and relaxing work permits for foreign workers.

Table 1.7. Past OECD recommendations to boost productivity

Recommendations in the past survey	Measures taken since October 2020
Gradually extend regulatory and administrative reforms in special economic corridors to the rest of the economy.	Four additional special economic corridors were set up in 2022.
Continue the on-going review of the existing laws and regulations with an effective implementation scheme.	A comprehensive review of existing laws and regulation has been conducted, leading to lower regulatory burdens for hospital business operations and working permits for foreign workers.
Review size-dependent policy measures, including taxes.	No action taken.
Shift to more market-oriented policies and encourage farmers to cultivate higher value-added products, such as organic farming.	A new Organic Agriculture Action Plan will promote organic farming over the period 2023-2027.

Improving the conditions for foreign trade and investment

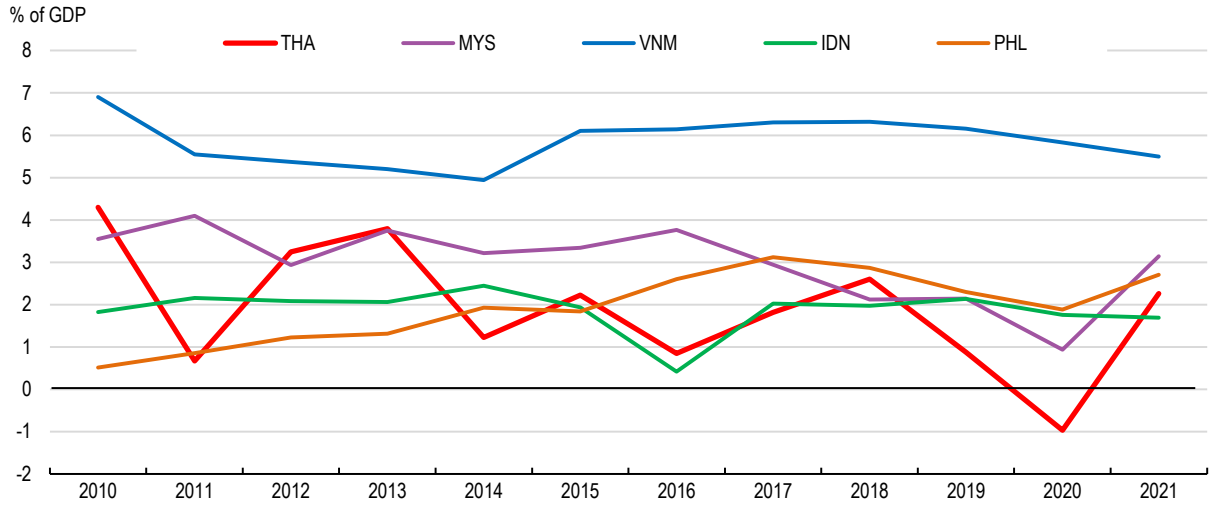
Thailand has reaped significant productivity benefits from foreign direct investment (FDI), which has fostered its integration into international production networks. Compared to other Southeast Asian countries (Figure 1.19), however, inward FDI stocks still have scope for further increases. While countries like Indonesia and Malaysia experienced a substantial increase in foreign investment in 2021 and 2022, Thailand saw only a minor improvement. The current geopolitical context may provide opportunities for Thailand to attract further investment as multinational companies revisit their investment portfolios with a view towards diversifying their exposure across countries in Asia.

Thailand's new FDI strategy adopted in October 2022, the 5-Year Investment Promotion Strategy for the New Economy for 2023-2027, focuses on promoting high-technology, innovation, and green industries such as electric vehicles. A planned extension of the special economic corridors (SECs) into four new geographic areas will complement current policy initiatives focused on the existing Eastern Economic Corridor (EEC). Each new SEC will target specific industries based on close cooperation with regional universities to promote innovation. These plans can build on previous experiences learned in the current special economic corridor and should put more emphasis on cooperation among these corridors.

The new strategy has been complemented by efforts to attract high-skilled foreign workers. A special visa programme of 2018, called the SMART Visa programme, expedites immigration procedures for skilled workers. For 13 targeted industries such as automobiles and digital technology, the programme provides a four-year visa instead of the standard one-year visa. In September 2022, the authorities expanded the programme by adding five additional targeted industries such as national defence and aviation and aerospace industry. In September 2022, a new Long-Term Resident (LTR) Visa programme was established to attract high-skilled foreign workers and wealthy pensioners with diverse tax and non-tax benefits, including a reduced PIT rate of 17% and full tax exemption for overseas income. The programme offers a 10-year renewable visa as well as an exemption from the requirement to employ 4 Thai workers for every foreign worker.

Figure 1.19. FDI to Thailand remained relatively low compared to peers in the region

Inward foreign direct investment, flows, % to GDP



Source: UNCTAD.

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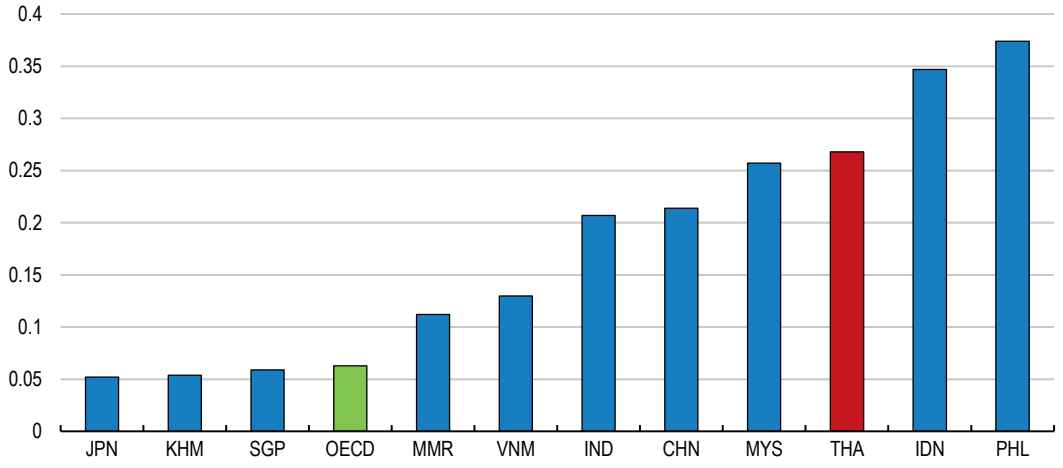
Further policy efforts to stimulate FDI inflows could include easing existing restrictions. Based on the OECD FDI Restrictiveness Index, Thailand's policies are more restrictive than in regional peers, and this holds particularly true for many services sectors (Figure 1.20). Specifically, foreign equity restrictions and the FDI screening and approval process are more stringent than in OECD and ASEAN countries (OECD, 2021[33]). Regulatory reforms such as those required to strengthen competition and enhance the business climate will also be instrumental to attract more FDI. Indonesia, for example, has taken this road by enacting the Omnibus Law on Job Creation in October 2020, revising 79 laws and eliminating thousands of regulations across 10 broad areas, including a labour reform and improvements in the ease of doing business (OECD, 2022[34])

Figure 1.20. Thailand has more stringent FDI restrictions than other countries

OECD FDI regulatory restrictiveness index, scaled from 0 (open) to 1 (closed), 2022



Note: The OECD FDI Regulatory Restrictiveness Index covers only statutory measures discriminating against foreign investors (e.g. foreign equity limits, screening & approval procedures, restriction on key foreign personnel, and other operational measures). Other important aspects of an investment climate (e.g. the implementation of regulations and state monopolies, preferential treatment for export-oriented investors and special economic zones regimes among other) are not considered. See Kalinova et al. (2010) for further information on the methodology.
Source: OECD FDI Regulatory Restrictiveness Index database, http://www.oecd.org/investment/fdiindex.htm.

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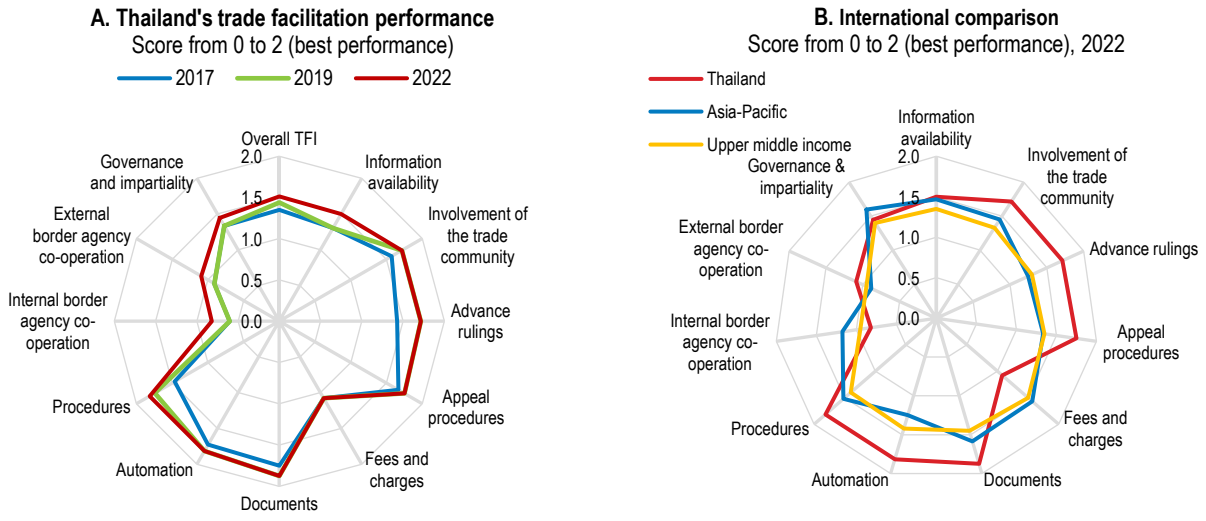
In light of the recent disruptions in global supply chains, trade facilitation has attracted increasing attention. Thailand has made good progress since the ratification of the Trade Facilitation Agreement of the World Trade Organisation in October 2015. The rate of implementation commitments is 98.7%, surpassing the Southeast Asian average rate of 82.9%. Judging by its score on the OECD Trade Facilitation Indicators, Thailand made significant progress in trade facilitation between 2017 and 2022, with a higher score than the average upper-middle income country and the average Asia-Pacific country, especially in the areas of appeal procedure and automation (Figure 1.21). Room for further improvement exists with respect to fees and charges, suggesting that Thailand could further facilitate trade by reducing services fees as well as by improving online access to information on applicable fees and charges.

Additional export opportunities could arise from stronger trade integration, by expanding the current network of preferential trade agreements (PTAs). In November 2021, Thailand ratified the Regional Comprehensive Economic Partnership (RCEP), which took effect in January 2022. With 15 members countries, accounting for around 30% of global GDP, the RCEP will enable Thai exporters to gain better market access in the Asia Pacific region with reduced tariffs. In March 2023, Thailand and the EU announced to resume negotiations on the Thailand-EU Free Trade Agreement (FTA), which had stalled in 2014. This bilateral FTA is expected to boost trade and investment flows with the EU, strengthening the two countries' well-established trade relationship. The first negotiations took place in September 2023, and the second round is scheduled for January 2024. Thailand has yet to decide on its participation in the Comprehensive and Progressive Agreement for Trans--Pacific Partnership, another major free trade agreement.

Opening up services markets to competition and foreign direct investment will be key for moving into higher-value ladders of global value chains. Evidence suggests that access to more competitive services inputs, including as a result of foreign direct investment in services, can have significant productivity benefits for downstream manufacturing companies (Arnold et al., 2016[26]; Arnold, Javorcik and Mattoo, 2011[27]). While Thailand has made progress towards stronger foreign competition in services, the pace of reforms has slowed in recent years. Thailand's score of the OECD Services Trade Restrictiveness Index is rather high compared to other countries, indicating a relatively stringent regulatory environment (Figure 1.22). Accounting and rail freight services are the most restrictive sectors. In particular, restrictions to foreign entry including screening of foreign investments, residency requirements for management staff and restrictions related to cross-border transfer of personal data contribute to this relatively unfavourable score, in addition to restrictions related to the movement of people such as duration of stay for service suppliers and labour market test for foreign workforce. Thailand's Foreign Business Act (1999) restricts market access for certain services, for instance in construction services, distribution services and computer services.

Figure 1.21. Thailand's trade facilitation performance has improved



Source: OECD, Trade Facilitation Indicators, https://www.oecd.org/trade/topics/trade-facilitation/

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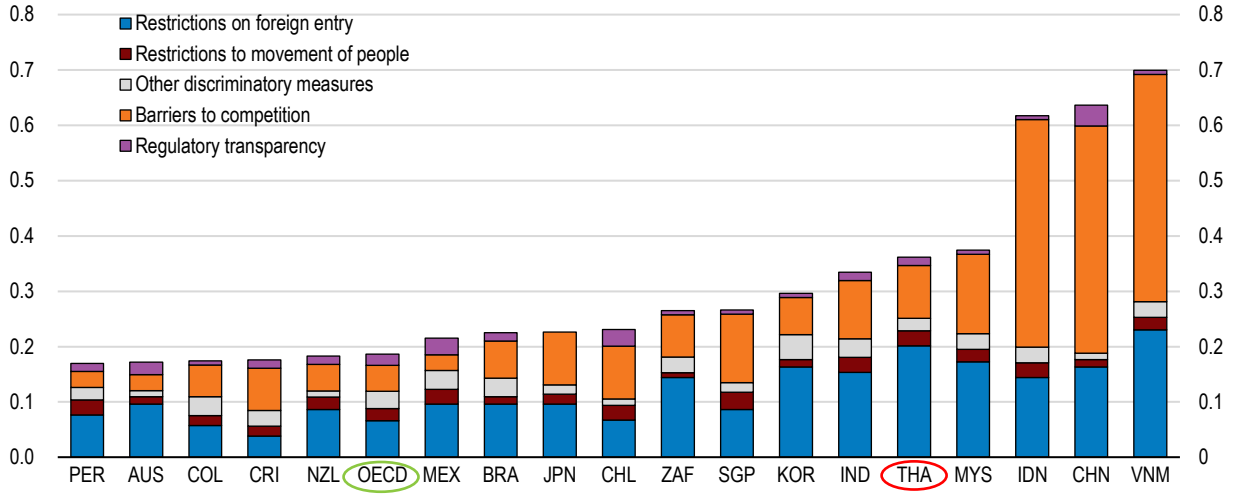
Figure 1.22. Services trade faces tighter restrictions than in other countries

Services Trade Restrictiveness Index in telecommunications, ranging from 0 (open) to 1 (closed), 2022



Source: OECD, Services Trade Restrictiveness Index database.

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Table 1.8. Past OECD recommendations on trade integration and services trade

Recommendations in the past survey	Measures taken since October 2020
Remove barriers in restricted sectors, particularly regarding the international mobility of skilled workers by expanding the coverage of Smart Visa.	A special long-term visa programme was launched in 2021 to attract skilled foreign workers. The targeted skills categories of Smart Visa were expanded in 2022.
Remove obstacles to FDI by relaxing the rules of capital thresholds and narrowing listed sectors.	No action taken.
Pursue Preferential Trade Agreements that contain ambitious regulatory reforms.	Thailand ratified the Regional Comprehensive Economic Partnership (RCEP) and is now negotiating a large FTA with the European Union.
Encourage further digitalisation of the tourism industry. Involve wider local communities to retain broader environmental resources, including the management of water and waste.	The government approved a new 5-year plan in January 2023 to promote high value and sustainable tourism.

Stronger anti-corruption coordination will help make the business environment fairer and more predictable

Thailand has made consistent progress in strengthening its anti-corruption policy framework. Many government agencies, including the Ministry of Industry and the Board of Investment, recently pledged a no-gift policy to display transparency. In January 2023, the authorities issued strict guidelines on accepting gifts for public officials and their families.

Nonetheless, corruption indicators suggest considerable room for improvement relative to other countries in the region, including Malaysia and Viet Nam. Thailand ranked 101st out of 180 countries on the Corruption Perceptions Index in 2022 (Figure 1.23, Panel A), improving only slightly compared to the previous year. Performance on the World Bank's Control of Corruption indicator also remains low, continuing the stagnation of past years (Figure 1.23, Panels B, C and D).

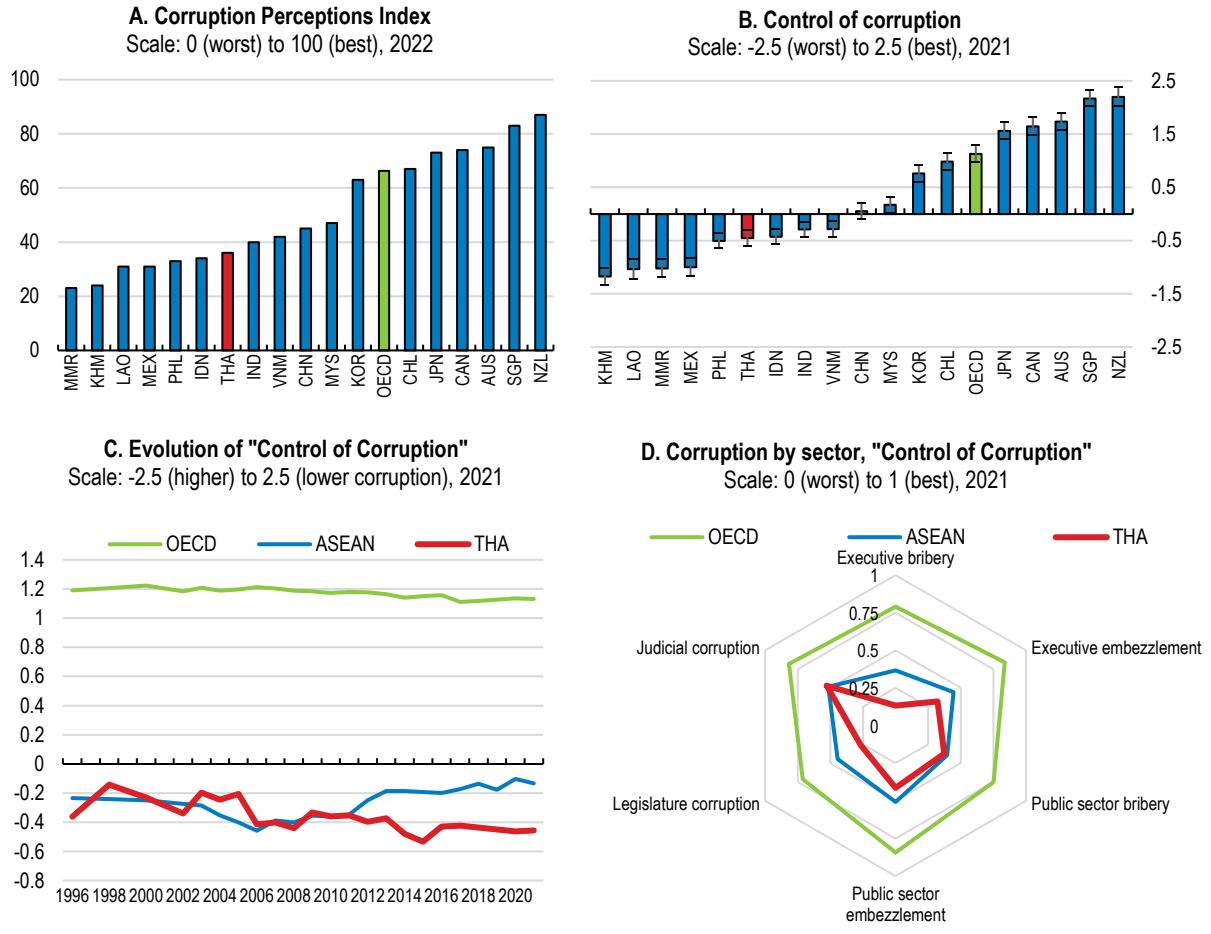
The efficiency and effectiveness of the anti-corruption policy framework are still hampered by the overlapping and conflicting mandates of anti-corruption agencies, weakening the enforcement of integrity policies (OECD, 2021[35]). For example, the National Anti-Corruption Commission (NACC) and the Public Sector Anti-Corruption Commission (PACC) are both entitled to investigate public officials, while NACC has an exclusive jurisdiction on the cases committed by high-level officials. In practice, the NACC investigates the corruption of high-level officials and refers relatively minor cases with lower-level officials to the PACC or the police. However, the referral procedure is discretionary and lengthy, creating a backlog of unresolved low-level cases as the NACC gives priority to high-level cases (Prateeppornnarong, 2020[36]). Clearer guidelines for the referral procedure as well as development of an electronic case management tool would allow a more timely investigation of corruption allegations. Some countries in the region have been successful with anti-corruption agencies specialising in the corruption of high-ranking officials. Korea, for example, established the Corruption Investigation Office for High-Ranking Officials (CIO) in 2021 (OECD, 2022[14]). The CIO is an independent agency that investigates the abuse of authority or bribery of high-ranking officials or their families. The CIO Act clearly defines the scope of investigation, including the President and the Prime Minister, and the types of crimes subject to its jurisdiction.

Stronger co-operation among anti-corruption agencies could be fostered by establishing an integrity network between anti-corruption agencies. Such a network could organise regular meetings to allow sharing good practices and lessons learned, even they are informal. Many OECD countries including Canada, Sweden, Austria and Germany have public sector integrity networks to enhance the effectiveness of their overall anti-corruption policy implementation (OECD, 2020[37]).

Collaboration with the private sector is also crucial to counter corruption effectively. In Thailand, this collaboration among anti-corruption organisations in the public and private sectors lacks a focal point, which weakens the collaboration (Yomnak and Ruckchart, 2021[38]). The NACC, for example, has been working closely with the Anti-Corruption Organization of Thailand (ACT) and the Private Sector Collective Action against Corruption (CAC), which participated in the Watch Dog campaign and the drafting of the

Anti-Bribery Guidelines. Holding regular meetings and seminars to exchange information on recent measures and good practices would be beneficial to both integrity agencies and private organisations.

Figure 1.23. Corruption related indicators in Thailand remained relatively low



Note: Panel B shows the point estimate and the margin of error. Panel D shows sector-based subcomponents of the "Control of Corruption" indicator by the Varieties of Democracy Project.
Source: Panel A: Transparency International; Panels B & C: World Bank, Worldwide Governance Indicators; Panel D: Varieties of Democracy Project, V-Dem Dataset v12.

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Thailand has made good progress in tackling money laundering and terrorism financing. According to the Asia/Pacific Group on Money Laundering (APG), Thailand demonstrated generally good compliance on 31 out of 40 the Financial Action Task Force (FATF) Recommendations in 2021, up from 25 in 2017 (2021[39]). In particular, the APG pointed out that Thailand has a robust policy and implementation framework through the National Coordinating Committee. The Anti-Money Laundering Office (AMLO), a pivotal government agency in both policy coordination and enforcement, stepped up its efforts. In 2022, AMLO disseminated the updated National Risk Assessment, after 2012 and 2016, which helped formulate the 2022-2027 National Strategy on AML/CFT (Anti-Money Laundering and Combating the Financing of Terrorism) to keep pace with international standards amid rapidly evolving financial technology.

While most OECD countries have dedicated whistle blower protection laws, Thailand does not have such a dedicated law (OECD, 2016[40]). Whistle blowers are partially protected under the Witness Protection Act and the Organic Act on Anti-Corruption, but there is no single dedicated law. The NACC can grant protection such as security arrangements for officials or providing a safe house, but the coverage is limited

to qualified whistle blowers related to serious criminal cases. Many whistle blowers do not necessarily qualify for witness protection and are hence only partially protected under the witness protection laws (OECD, 2016[40]). As recommended in the previous OECD Economic Assessment of Thailand, developing a single dedicated law to protect whistle-blowers could lead to further progress in the fight against corruption (OECD, 2020[1]).

Table 1.9. Past OECD recommendation on anti-corruption

Recommendation in the past survey	Measures taken since October 2020
Consider developing a single dedicated law to protect whistleblowers.	As a first step, a Witness Protection Act was enacted in 2022.

Strengthening the social safety net

Social protection coverage has increased, but benefit levels remain low

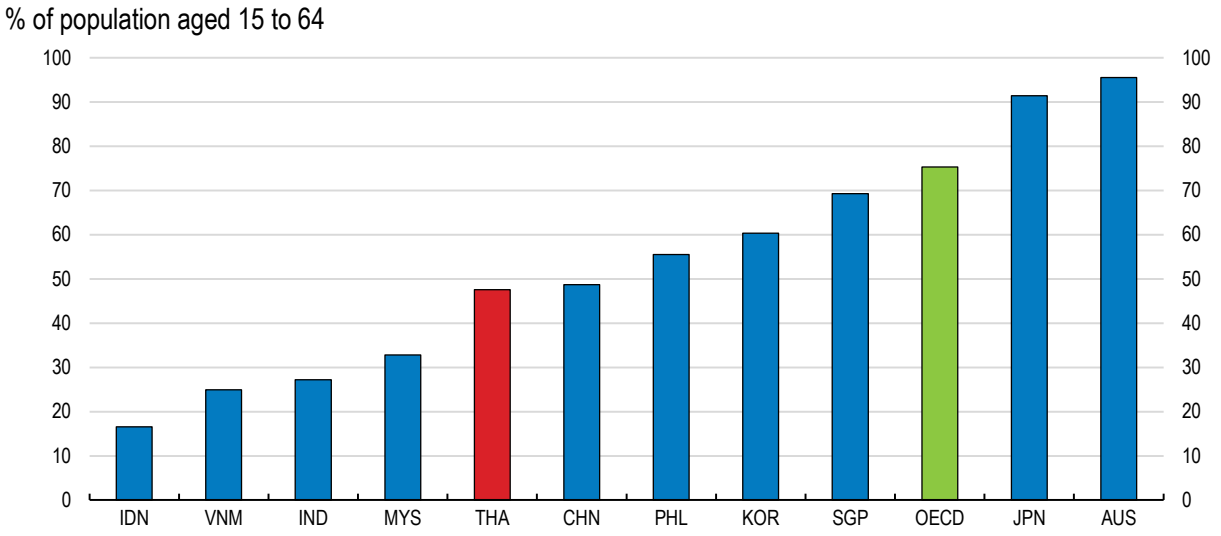
Thailand's social protection instruments have mostly been established over the last 25 years and are organised in a number of parallel systems, which has led to significant fragmentation. Over those years, Thailand has strengthened its social safety net and achieved significant expansion in coverage, including among those not formerly covered by social protection policies. A universal public healthcare system was established in 2002. Building on this progress, Thailand can do more to reduce poverty and inequality through improvements in social protection. The main challenges for the future will be to achieve fully universal coverage with basic benefits, reconsider benefit adequacy for some benefits and improve the organisation of benefit delivery, ideally moving from a fragmented system to a single system that can deliver different tiers of benefits depending on the specific situation of beneficiaries.

Social security benefits are currently provided to contributing formal-sector employees, but these amount to only 50% of the workforce, substantially less than in other countries (Figure 1.24). The main social security scheme called Section 33 was established under the Social Security Act in 1999 and provides formal private-sector employees in registered enterprises with old-age pensions (for those aged above 60) and healthcare insurance, and since 2004 also unemployment benefits. Its financing relies on mandatory contributions of 5% of the salary for both workers and employers, topped up by a government contribution of 2.75%, for a total contribution of 12.75% of salaries. Coverage has expanded progressively since its inception in 1991, starting initially with those who worked in registered enterprises with 20 or more employees. Workers in enterprises with 10 or more employees were included in 1993, until a further expansion to all regular employees in registered enterprises regardless of their size in 2002. A separate Workmen's Compensation Fund covers workers contributing to social security against job-related injuries, with a contribution rate of 0.2-1.0% of wages depending on the sector.

The fiscal cost of the social security scheme for private sector workers is approximately 0.85% of GDP, allowing it to charge relatively low social security contributions. But this is likely to change as more people covered by this relatively young programme reach the retirement age, as the system was only established in 1999. As it reaches maturity, the scheme's sustainability is not guaranteed, and contribution rates will have to rise, unless other financing sources can be identified. By some estimates, a continuation of the current benefit levels would require total contribution rates to rise above 30% of salaries (ILO, 2022[41]).

Civil servants are covered by a separate contributory social security scheme, which provides pensions and healthcare services for civil servants and workers in state-owned enterprises, at a fiscal cost of around 1.7% of GDP. Benefits are higher than those of private-sector social security.

Figure 1.24. Thailand's share of social security contributors is low



Source: OECD (2022), Pensions At a Glance Asia/Pacific 2022.

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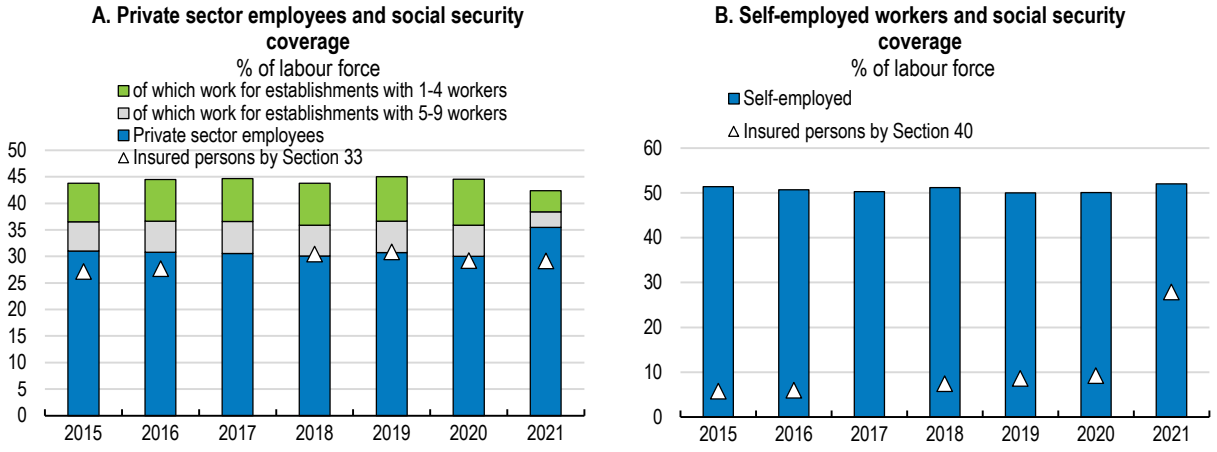
Thailand also maintains a voluntary contributory programme for self-employed workers, called Section 40, providing different combinations of pensions and healthcare. In 2019, the upper limit for contributors' age was increased from 60 to 65. This scheme workers had failed to attract many participants before the pandemic (Figure 1.25, Panel B). During the pandemic, the government made remarkable progress in boosting participation in Section 40 scheme through cash transfers of THB 10,000 (USD 300) conditional on applicants' participation in Section 40. The main purpose was to reach out to informal workers who were severely affected by the economic downturn. This conditional cash handout and temporary reductions in contributions approximately doubled the voluntary participation across all age groups. To what extent this higher participation achieved during the pandemic will continue in the future without financial support is not certain. A planned Independent Workers Protection Act intends to set up a new workmen's compensation fund to provide insurance against job-related injuries for workers officially classified as independent, such as platform workers. However, given the already fragmented social security system, it is crucial to avoid adding more complexity to the system.

Figure 1.25. Social security coverage has gradually expanded



Note: The number of government sector employees in establishments with 1-9 persons is assumed to be zero.
Source: National Statistics Office, Statistical Yearbook; ILO, ILOSTAT, Social Security Office, Social Security Fund Statistics.

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The current coverage of social security benefits of slightly below 50% of the population is far below the OECD average and largely related to widespread labour informality. For various reasons, the coverage of social security pensions is even lower, currently reaching only 20% of the elderly. Although in principle private firms of all sizes should participate in the section 33 social security scheme, in practice the coverage is largely limited to people working in large registered enterprises (Figure 1.25, Panel A).

Migrant workers with a regular residence or work permit accounted for around 6% of the labour force before the pandemic and originate mostly from neighbouring Myanmar, Cambodia and Lao PDR (International Organization for Migration, 2021[42]). Although no official data are available, estimates suggest an almost equal number of migrant workers without a regular residence status (International Organization for Migration, 2021[42]). Migrant workers, many of whom are seasonal or domestic workers, are more likely to be in informal employment than natives, and therefore not covered by the social security system.

The fact that a large share of the population is excluded from social security benefits is a common feature across many emerging-market and developing economies, not only in Asia but also in Latin America and Africa. Many governments have complemented formal social security with noncontributory social assistance benefits over the last two decades, and this has also been the case in Thailand.

One pillar of these non-contributory, tax-financed benefits is a non-contributory pension, called the Old Age Allowance, granting non-contributory pension benefits to all aged 60 and above, except for those who are covered by civil servant pensions. This benefit reaches over 70% of the population over the eligibility age of 60, bringing total pension coverage up to 91%. The basic benefit of THB 600-1 000 depending on age, however, is only about USD 17-28 per month in nominal terms, or 25-41% of the poverty line of USD 5.50 per day at purchasing power parity for beneficiaries aged 60-69, with slightly higher benefits for those of higher age (ILO, 2022[41]). This level of benefits has not been adjusted for inflation for over a decade and is insufficient, and raising it would go a long way towards reducing old-age poverty. At 0.5% of GDP, the fiscal cost of this programme is currently low, but its poverty reduction impact is high. Raising it to the current poverty line would cost around 1.2% of GDP, according to World Bank calculations based on 2019 data (World Bank, 2023[43]). This would reduce poverty by 2.7 percentage points, from a starting point of 6.2% in 2019. Raising benefit levels to half the poverty rate would cost 0.45% of GDP and reduce poverty by around 1.4 percentage points. Targeting of the Old-Age Allowance could be improved by restricting it to those in need who do not receive a social security pension.

A second pillar is the Universal Healthcare Coverage Scheme, which has allowed Thailand to achieve almost universal health care coverage, with a comprehensive benefit package, despite a focus on primary care. Launched in 2001, it covers general medical care and rehabilitation services, high-cost medical treatment, and emergency care for all citizens with no healthcare coverage by social security schemes. This scheme has allowed to reduce the incidence of dramatic health expenditures when household members are affected by severe illness and has helped to improve coordination of healthcare delivery through universal health information systems and beneficiary datasets (ILO, 2017[44]).

A third and more recent pillar of non-contributory benefits consists of means-tested in-kind transfers, delivered through a State Welfare Card that allows beneficiaries to make purchases of certain goods at designated stores, up to an amount of THB 200-300 per individual and month, equivalent to USD 8.50 or 13% of the poverty line. Launched in 2017, this card system was successfully used to distribute emergency support to poor households during the pandemic and currently covers 19% of the population (World Bank, 2023[43]).

The State Welfare Card system is administered by the Ministry of Finance rather than the Ministry of Social Development and Human Security that delivers the bulk of social assistance benefits, and the underlying registries are not shared across ministries. This adds to the fragmentation and significantly hampers the effectiveness of targeting of the State Welfare Card. Among the 20% of the population with the lowest incomes, around 35% receive these benefits, while still around 20% of the middle quintile of the income distribution receive this benefit. The effectiveness of the State Welfare card would hinge on improving its

targeting (Phattarasukkumjorn, 2021[45]). The current number of recipients is larger than the number of people below the national poverty line (Yang, Wang and Dewina, 2020[46]), and the self-registration process could be enhanced further to reach out to all eligible people (Durongkaveroj, 2022[47]). Moving its administration to the Ministry of Social Development and Human Security while unifying the registries underlying different social assistance benefits would be key initial steps in that direction. Once its targeting has been improved, the State Welfare Card can in principle be a useful tool for delivering targeted of support measures to compensate vulnerable households for the effects of higher energy prices in the medium run, when energy prices may rise in the context of the green transition (see Chapter 2). World Bank calculations suggest that improving the targeting of the State Welfare Card by excluding higher income households and covering more low-income households while raising benefit levels to 30 of the poverty line would have a fiscal cost of around 0.4% of GDP, while reducing the poverty rate from 6.2% to 3.2% (World Bank, 2023[43]).

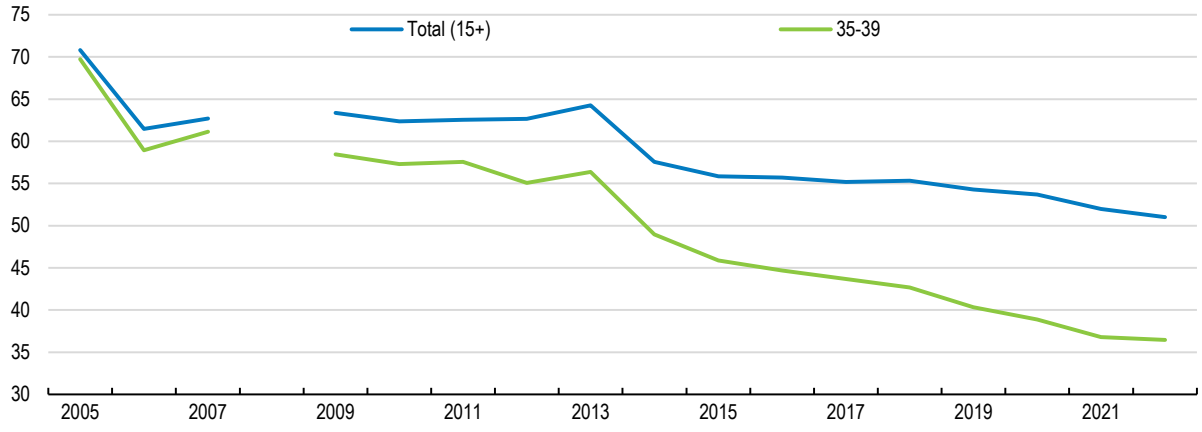
Supporting access to quality jobs

Reducing labour informality

Labour informality affects more than one in every two workers in Thailand. These workers are not contributing to formal social security, nor can they access social security benefits or do they benefit from employment protection legislation. Labour informality is a multi-faceted challenge that is unlikely to disappear in the short run or be solved by economic growth alone, and tackling it calls for policy action along several dimensions, including improvements in incentives for formal job creation and stronger enforcement. Informality has already seen some declines over the years, as it affected almost 75% of workers at the turn of the millennium (Figure 1.26). Evidence suggests that people who became informal workers by their mid-30s often tend to stay informal for the rest of their working lives.

Figure 1.26. The share of informal labour has declined and is lower among young generations

Share of informal labour in total employment, Aged 35-39 and 15+, %



Note: Informal workers are those who are not protected or have no social security from work. Data cover only private sector workers.
Source: National Statistics Office, Informal Employment Survey.

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Social protection is one of the areas where reforms could strengthen formalisation incentives. While non-contributory benefits have helped to alleviate poverty and inequality and could achieve more inclusive growth with better targeting and higher benefit levels, they have also reduced the incentives to participate in the formal labour market. A more desirable medium-term solution would be to integrate social

programmes covering formal and informal workers, which would include reducing the incidence of informality among workers and firms.

A unified social protection scheme building on existing programmes could ensure basic pensions and cash transfers to vulnerable households without any contributions, with a view towards making substantial inroads in poverty reduction. Means-tested cash benefits could also serve as insurance against unexpected income losses from dismissals, provided that they can be disbursed swiftly once such income losses occur.

Making this basic benefit tier, focused on poverty reduction, largely tax-financed would require strengthening efforts to raise more tax revenues, but it would reduce non-wage labour costs for low-income workers in the formal sector, and hence strengthen incentives for formal job creation. Low-income segments are typically the ones most affected by high informality rates. The current social security contributions of 10% of salaries drive a wedge between the cost of creating a formal job and the cost of hiring a person informally, and as the social security system matures and more people receive social security benefits, contribution rates will have to rise significantly above their current level, thus increasing the relative cost of formal job creation. Basic tax-financed or low-contribution benefits could also make it easier to provide protections for an increasing number of platform workers. The number of riders working for five large online platforms reached nearly 1 million in 2021 (Leenoi, 2021[48]).

Colombia's 2012 tax reform that reduced some social contributions shows that reducing non-wage labour costs can help to reduce informality. In the aftermath of the reform, labour informality declined visibly. Available impact evaluations suggest that the reform led to a reduction in the informality rate of several percentage points (Kugler, Kugler and Prada, 2017[49]) (Morales and Medina, 2017[50]) (Fernández and Villar, 2017[51]) (Bernal et al., 2017[52]).

Basic social protection benefits could alternatively also be delivered through a negative income tax or an earned income tax credit. Evidence suggests that the Earned Income Tax Credit in the United States has raised labour force participation (Hoynes and Patel, 2017[53]). There are also positive effects on poverty reduction, as the programme rewards work and supplements the income of low-wage workers. Similar programmes have also decreased informal employment in developing countries (Gunter, 2013[54]).

Those with higher incomes could receive additional benefits financed through social security contributions from a second tier of the social protection system, whose focus would be on delivering adequate benefit replacement ratios and facilitating consumption smoothing between working lives and retirement, rather than poverty reduction. Contributions for this second tier could become mandatory only for workers with salaries at some distance from the minimum wage, where the argument of minimising formalisation disincentives is less pressing and probably overshadowed by the need for higher benefits that ensure a decent replacement rate.

One possible example would be for mandatory social security contributions to be charged on the part of private-sector salaries that exceeds 150% of the minimum wage. This would imply some losses in social security contributions as salaries up to the contribution threshold would no longer pay contributions, estimated at 0.02% of GDP, but this could be compensated through higher contribution rates for those with higher incomes, or a lower basic allowance in personal income taxes, with an overall progressive distributional impact. This could also be accompanied by raising the maximum monthly income considered for the calculation of social security contributions of currently THB 15,000, equivalent to USD 375 or approximately 9 minimum wages. Similar multi-tier social protection setups are currently under discussion in several Latin American countries (Levy and Cruces, 2021[55]; Tuesta and Bhardwaj, 2023[56]), and have also been recommended in OECD Economic Surveys on Colombia, Chile and Peru (OECD, 2022[57]; OECD, 2022[58]).

Incentives for formalisation could be further strengthened by reviewing labour market regulations, especially employment protection legislation, which is typically only enforceable in formal labour contracts.

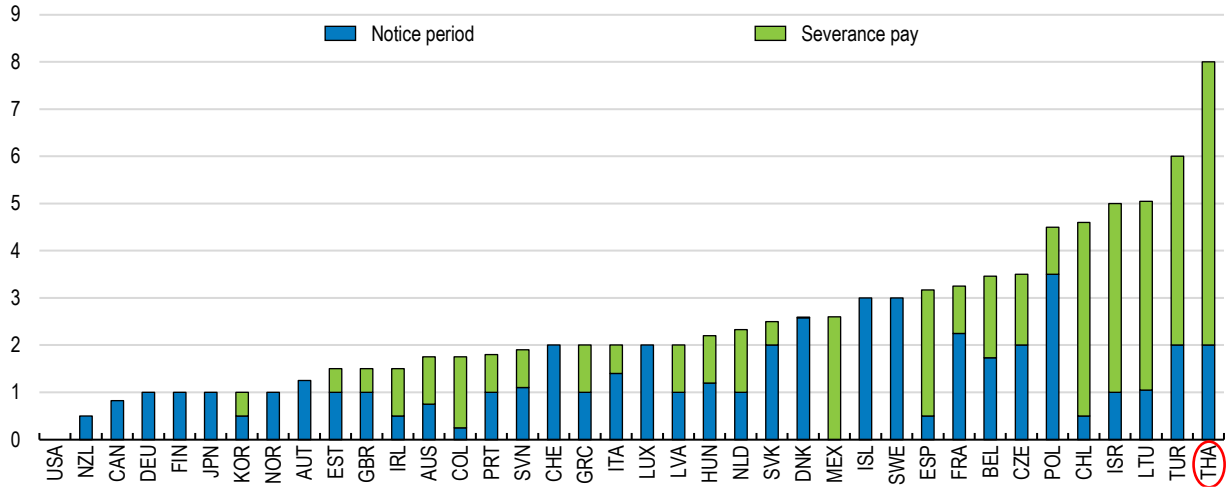
High costs of dismissals may make firms reluctant to create formal jobs in the first place. Thailand ranks comparatively low in international comparisons of labour market flexibility. For example, it ranks 102 out of 141 countries in the World Economic Forum's index of labour market flexibility (World Economic Forum, 2019[59]). A thorough review of employment protection legislation with a view towards improving the incentives for formal job creation could help efforts to bring more people into the formal labour market and improve their coverage with social protection benefits.

One area that would merit further consideration is a potential reduction of severance payments. While long notice periods and high severance pay reduce the economic burden of a layoff on workers, the costs related to this could lead firms to hire fewer formal workers in the first place. The number of months that a firm must give notice before dismissal and the amount of severance pay varies among OECD countries. Compared with OECD countries, Thailand's level of employment protection is high, especially in severance pay (Figure 1.27).

Efforts to improve formalisation incentives should be complemented by stronger enforcement efforts on several fronts. Employers often do not comply with reporting requirements, particularly when they are not registered companies themselves, and after reducing non-wage labour costs for employers, the case for more frequent labour inspections to enforce reporting requirements would be much stronger. In particular, enforcement capacity of social security offices is weak due to limited resources. Stronger enforcement efforts should be put in place with respect to corporate income tax, VAT, social security contributions and the respect of labour regulations, underpinned by broad information-sharing arrangements across different agencies. Using digital technologies and collaborating with local governments would support these efforts (ILO, UNICEF, IOM, and UN Women, 2022[60]). Thailand already uses a unique 13-digit personal identifier on national ID cards, and these could be linked to taxpayer records relatively easily.

Figure 1.27. Employment protection is rather strong in Thailand

Months, notice period and severance pay for individual dismissals of regular workers with four years of job tenure, 2019



Note: These values are for individual (not collective) dismissals. They take the average of dismissals for personal and economic reasons.
Months, notice period and severance pay for individual dismissals of regular workers with four years of job tenure, 2019.
Source: OECD Employment Protection Legislation Database; national sources.

StatLink https://stat.link/bp0hq7

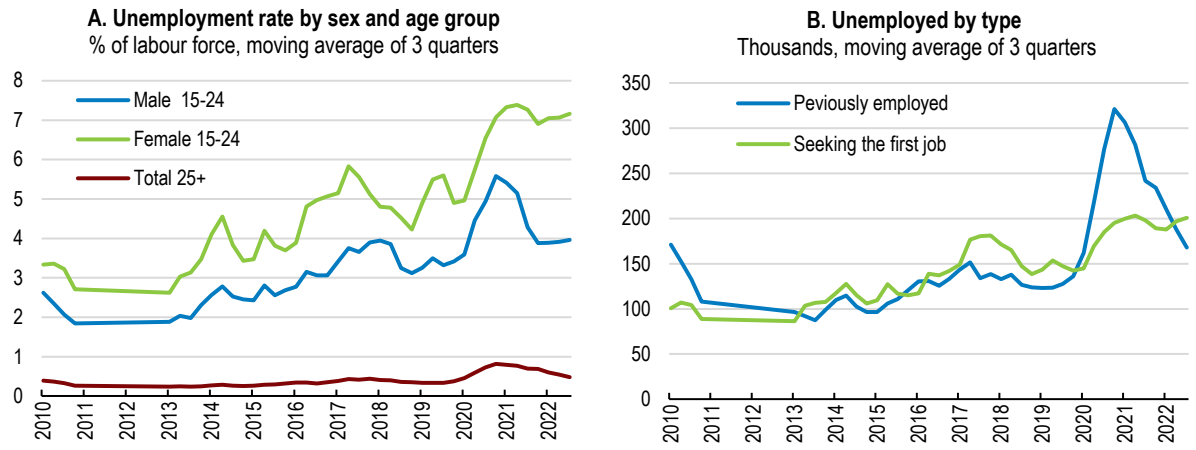
Improving labour market prospects for youths

The general resilience of Thailand's labour market does not apply to young people, and the pick-up of youth employment has been weak compared with the job recovery in other age groups. Although lower than in many other countries, youth unemployment remains at record high-levels in historic comparison,

especially for young women (Figure 1.28, Panel A). In addition, long-term unemployment has become more prevalent among young job seekers, with 25% looking for a job over six months, compared to below 20% prior to the pandemic. The situation of new entrants to the labour force in search of a first job has not yet shown signs of improvement (Figure 1.28, Panel B).

This high rate of youth unemployment may undermine youth's future employability if their unemployment period is prolonged. Previous studies suggest that a population cohort that experienced high unemployment at young ages is more likely to be unemployed in later periods (OECD, 2021[61]). As part of emergency measures taken during the pandemic, many countries put particular emphasis on containing the rise of youth unemployment through measures such as targeted hiring subsidies and financial support for apprenticeships and students in need (OECD, 2021[62]), (OECD, 2022[63]).

Figure 1.28. Young people have been more affected by unemployment



Source: ILO, ILOSTAT.

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Thailand has experience with hiring subsidies. One of the most recent measures was a 2022 job creation programme that targeted people who recently completed tertiary education or who were recently laid off. The programme intends to provide subsidies for hiring around 70,000 people in the Bio-Circular-Green sector, allocating 0.02% of GDP. Eligible projects, mostly community-based, received a grant for three months and are supposed to provide on-the-job training. Going forward, the case for hiring subsidies may weaken as the economy recovers and young people with good qualifications would likely find jobs even without these subsidies.

On the other hand, a strong case remains for strengthening a well-balanced set of active labour market policies (ALMPs), including professional training for young people in unemployment (Thasanabanchong, 2020[64]). Various training programmes have targeted unemployed people, such as a 30-hour training package for workers in selected industries, SMEs and unemployed, with a focus on specific technologies (OECD, 2020[1]).

Professional training can be combined with job-search assistance, career guidance and counselling. This has been the role of the Public Employment Offices, which have been progressively strengthened over the years. In 2015, 87 Smart Job Centres were launched nationwide to provide online one-stop shop services to jobseekers. During the pandemic, the government launched another online platform, "Thai Me Ngaan Tham", and actively promoted these online services to reach out to people in need, including young people. Still, participation in career guidance programmes declined between 2019 and 2021, while the number of unemployed people aged 15-24 increased by one third. Although the avoidance of physical contact may explain part of this, the number may nonetheless hint at room for improvement in the services provided. Especially during the pandemic, a number of countries scaled up resources for labour market services to

address rising demand for such services (OECD, 2021[65]). The Thai government decided to continue the Thai Me Ngaan Tham platform in collaboration with private placement firms, which is likely to help job seekers, especially for young people.

Active outreach to the young unemployed should become a priority. Previous studies suggest that only half of young unemployed Thais receive career guidance services, as many young people in need are not aware of these government services (UNICEF, 2022[66]). Cooperation with local civil society organisations that maintain close links with young people in need, particularly in rural areas, may be an effective complement (OECD, 2021[67]) (OECD, 2021[68]). The current collaboration is often ad-hoc and temporary, and career training programmes by Public Employment Offices are mostly provided in urban areas (UNICEF, 2022[66]). Belgium, for example, launched an employment support programme in 2020, in collaboration with private partners that provide a range of services from outreach to personalised guidance and follow-up support after labour market integration, among others (European Commission, 2021[69]).

In addition, reaching out to young people while they are still in school could also raise awareness of the services offered by Public Employment Offices. Previous studies comprising several OECD countries suggest that career guidance would be more effective if started before the age of 15 (OECD, 2021[70]). In the United Kingdom, the government launched a programme to connect workplace volunteers and schools in 2012, achieving more than 2.5 million interactions (OECD, 2021[70]). In Thailand, the Ministry of Labour encourages to set up networks of volunteer experts to provide career information for students and teachers, which could be enhanced further with collaboration of employers.

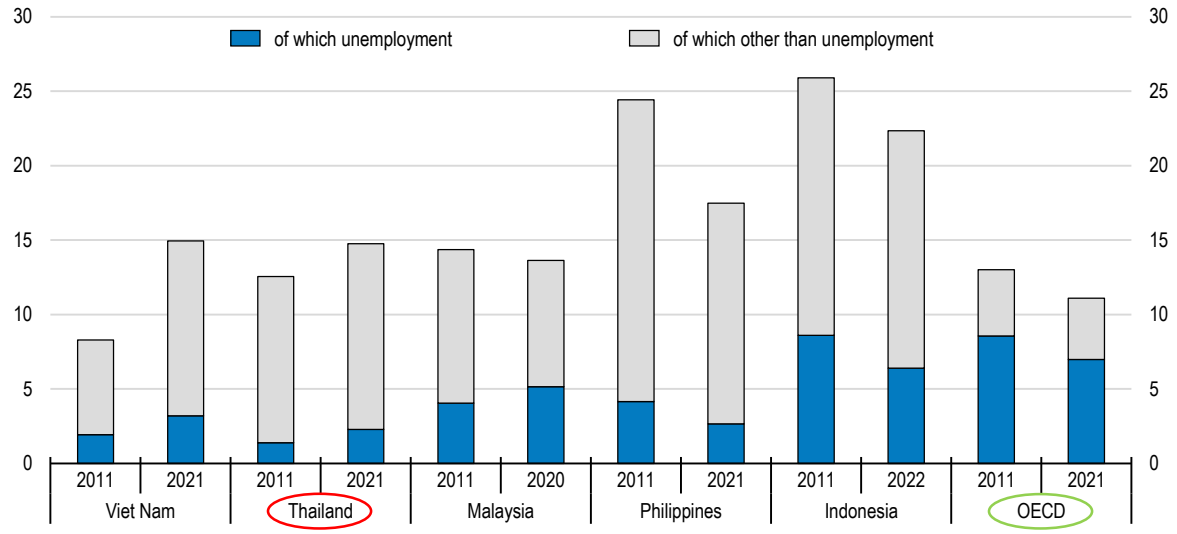
The education system could do more to prepare young people for a successful start in the labour market. Thailand should increase both the spending efficiency and the budget for education to provide adequate resources for learning and human capital development. A high proportion of small schools with tiny class sizes, especially in primary schools, leads to an inefficient allocation of teachers, which is exacerbated by a lack of educational materials (World Bank, 2023[43]). Reallocating resources by merging some of the small schools over time could improve educational outcomes and competencies. More resources for vocational education and training, including with better IT infrastructure, can also help to build up digital skills which are facing growing demand.

Young people who are not employed are ultimately at risk of becoming detached from the labour market, working only informal jobs or becoming inactive altogether. Indeed, informal labour is highly prevalent among young workers, at 45% for the youth aged 15-24 against 51% of all age groups. In addition, the share of people aged 15-24 who are not in education, employment or training (NEET) has gradually increased over the past decade, surpassing the OECD average, although still lower than in some regional peers (Figure 1.29). In the context of a declining young population, getting young people engaged in the labour market and investing in their human capital will become increasingly relevant.

A number of countries have stepped up support to young NEETs. Korea has a comprehensive Vision Plan Programme targeting young NEETs (Osborne and Vandenberg, 2022[71]). The services provided by the programme are broad, stretching from academic and vocational training to psychosocial support and courses to develop social skills. The programme also includes family coaching and involves local communities. Previous studies suggest that the programme was able to reduce the probability of participants' remaining in a NEET status by 7% (Park et al., 2020[72]). In Belgium, the government launched an employment support programme for NEETs in 2020, in collaboration with private partners that provide a range of services from outreach to personalised guidance and follow-up support after labour market integration, among others (European Commission, 2021[69]). Owing to the partnership with private intuitions, the programme can provide services without a time limit, which allows young people to continue the programme easily.

Figure 1.29. The NEET rate has increased despite low youth unemployment

NEET rate, % of population aged 15-24



Source: ILO, ILOSTAT.

StatLink https://stat.link/nfxsw4

Addressing gender imbalances in the labour market

Overall, Thailand performs well in terms of the gender gap in the labour market. The labour force participation of women relative to men was 0.79 in 2021, higher than the OECD average of 0.77 and most regional peers, although lower than in Viet Nam where it stood at 0.88. Wage gaps for similar work are also relatively small (World Economic Forum, 2023[73]). However, despite recent improvements, women continue to be a minority in senior and middle management positions, accounting for 32% in total managers in 2021. Thailand could consider introducing a quota system for managers' positions, which have proved to be effective in a number of OECD countries, including Germany and France (OECD, 2020[74]).

Bringing more people into formal jobs will also require putting an end to discriminatory hiring practices based on age. Biases against hiring workers of higher age are widely observed in a number of countries, including Thailand (OECD, 2019[75]) (Moroz et al., 2021[5]). Explicit references to age limits are not prohibited in job vacancy announcements in Thailand and are frequently used. Over the last decades, all OECD countries have prohibited old-age discrimination, following an ILO recommendation issued in 1980, originally submitted by Thailand. In the United States, for example, any job-related discrimination against people aged over 40 is forbidden. Some countries have complemented a prohibition with public awareness campaigns. In addition, a strong enforcement mechanism is crucial for success (OECD, 2019[75]). In the Netherlands, job vacancy advertisements are screened and employers announcing job vacancies with age limits are adverted with an official letter (OECD, 2014[76]).

Table 1.10. Past OECD recommendations on skills development and tackling informality

Recommendations in the past survey	Measures taken since October 2020
Develop robust tools to regularly assess skill needs at the national, regional and sectoral level.	Student data, job vacancies and standard skills assessments are being consolidated across two ministries.
Consolidate the implementation of school curricula and improve education infrastructure in rural areas.	A 5-year plan was adopted in 2023 to develop a new core curriculum for basic education and provide subsidies and resources to schools in some rural areas such as islands.
Pair skills policies with policies that stimulate the demand for high-level skills in the labour market.	A platform was launched in 2021 to provide skilled STEM workers with job vacancy information and offer investment promotion benefits to enterprises that aim at STEM workforce development.
Sufficiently use labour market information to develop relevant policies and adult learning programmes.	A survey was conducted in 2020 to understand critical functional workforce competencies in strategic industries.
Promote targeted support (e.g. career guidance and trainings on skills in high demand) for workers in jobs with high risk of significant changes.	A programme was launched in 2022 to help workers improve their skills and competencies, focusing on ICT and technology skills.
Lower the costs of formalisation by reviewing the stringent employment protection policies, preparing customised policy measures and reaching out to female informal workers.	No action taken.

Table 1.11. Table of recommendations

MAIN FINDINGS	RECOMMENDATIONS (Key recommendations in bold)
Pursuing robust and sustainable growth	
Inflation has fallen below the target range as monetary policy has tightened. Upside risks to inflation include the strength of the ongoing recovery and supply pressures from El Niño and geopolitical uncertainties.	**Maintain the current monetary stance while closely monitoring remaining inflationary pressures.**
Foreign exchange markets have seen increased volatility and the flexible exchange rate has been a successful shock absorber, but capital market regulation remains rigid.	Closely monitor capital flows and stand ready to react swiftly in case of unexpected events or sudden swings in investor sentiment. Align foreign exchange regulations with international standards while gradually facilitating capital account liberalisation.
Despite a sound financial sector, private debt levels remain elevated and can weigh on domestic demand.	Expand the disclosure of periodic stress test results and promote well-targeted support to vulnerable sectors by enhancing debt restructuring towards long-term and fixed loans.
Fiscal buffers have declined while population ageing and the green transition will require additional resources. Public debt has reached 61% of GDP as the debt ceiling was increased to finance emergency relief measures.	**Phase out remaining emergency measures for high energy prices.** **In the medium term, raise more tax revenues, while reducing energy subsidies and scaling up spending on social protection, education and the green transition.**
Capital expenditure remains important for productivity and long-term growth potential, but it has fallen below the budgetary minimum target of 20% of total government expenditure.	Increase public investment spending in line with careful cost-benefit analysis, both with respect to budgeted investments and actual disbursements.
Education spending has been on a downward trend, while learning outcomes have fallen, exacerbated by the pandemic.	Increase spending efficiency and budget for education to provide adequate resources for learning and human capital development.
Tax revenues remain low due to narrow tax bases. A planned new property tax still awaits full implementation. The statutory VAT rate was temporarily reduced from 10% to 7% in 1997, but has stayed there since.	**Implement a tax reform, including the following elements:** **- Bring more people into the personal income tax system** **- Fully implement the planned property tax** **- Return to the regular 10% VAT rate** **- Improve tax compliance**
Although income inequality has improved over the past decades, taxes and transfers have contributed little to a more equal income distribution. Income taxes are only paid by 15% of the population.	Expand the application of personal income taxes to more people with significant progressivity by phasing out some allowance favourable to high-income households**.**
Enhancing the business climate and strengthening public integrity	
Competition remains limited in some sectors and entry barriers are high. Previous regulatory reform efforts to reduce anti-competitive regulations and cut red tape have lost steam without substantive outcomes.	**Revive the comprehensive review of existing regulations with a view towards eliminating or adapting outdated regulations, lowering barriers to entry and strengthening competition.**
FDI stocks are relatively low compared to other Southeast Asian countries, and rules governing foreign direct investments are more restrictive than in other countries.	Further reduce FDI restrictions, particularly in services sectors.
Despite considerable progress in trade facilitation, fees and charges remain an obstacle to international trade. Bilateral agreements have been key for integration into Global Value Chains, but their coverage remains limited.	**Further improve trade facilitation by reducing fees and charges.** **Expand preferential trade agreements, including by implementing the Thailand-EU Free Trade Agreement and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership.**
Services like engineering can play a crucial role in the green transition, but foreign entry and cross-border mobility of skilled workers remain heavily restricted.	Reduce services trade restrictions including residency requirements for management bodies and authorisation requirements on services provision.
Corruption indicators imply room for improvement. Anti-corruption agencies are decentralised without a focal point and the referral process among public integrity agencies is discretionary and lengthy.	**Continue efforts to prevent and fight corruption and foster coordination among anti-corruption agencies.**
The coverage of whistle-blower protection is limited to qualified whistle-blowers related to serious criminal cases.	Consider developing a single dedicated law to protect whistle-blowers.

MAIN FINDINGS	RECOMMENDATIONS (Key recommendations in bold)
Enhancing social protection and inclusiveness	
Around half of the workforce is in informal employment, with no contributions to and no coverage by social security benefits.	**Take comprehensive measures to reduce informality, including:** **- Reduce non-wage labour costs for low-income earners** **- Review labour market regulations** **- Step up enforcement, including through a wider use of digital tools.**
A social pensions programme has allowed substantial increases in pension coverage, but benefit levels are below the extreme poverty line.	**Consider raising benefit levels of the Old Age Allowance, while continuing to strive for full coverage of all elderly persons in need.**
A new transfer programme established in 2017 delivers well-targeted benefits electronically and has alleviated poverty.	**Strengthen targeted support for vulnerable households and improve targeting by building on the increased number of State Welfare Card registrations.**
Providing better job opportunities for young people	
The job recovery among young people is lagging behind, and active labour market policies for young people are weak. Many are neither in employment nor training and are largely left without policy support.	**Expand active labour market policies for young people, including training, job-search support and career guidance in a well-coordinate manner.**
Career guidance programmes are insufficiently funded and the coordination among government agencies could be improved.	Improve career guidance programmes for youth by increasing their budget and strengthening intra-ministerial coordination.
Elderly people are struggling to find formal jobs and there is no legislation to ban job discrimination based on age.	**Prohibit job discrimination based on age and ensure effective enforcement.**

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2 Pursuing a strong and inclusive green recovery

Thailand's current pledge to achieve carbon neutrality by 2050 and net zero emissions by 2065 will require dramatic policy changes. Given that the economy is in a process of catching up with advanced economies, particular emphasis will need to be placed on making the green transition conducive to economic growth and further improvements in living standards, which requires bold and -well-designed reforms. Thailand has already started these efforts. Biofuels are being widely used for road transport, and the role of other renewable energy sources has also been increasing. Investments into greener production technologies and a more responsible use of resources have received strong attention. However, most current initiatives are voluntary, which will not be sufficient to achieve the country's climate goals. Against this background, this chapter discusses Thailand's green growth policy framework with a focus on the right policy mix and institutional setup.

The green transition combines opportunities and challenges

Thailand has made significant pledges for the way towards achieving net zero carbon emissions. These pledges include reaching carbon neutrality by 2050 and net-zero greenhouse gas (GHG) emissions by 2065 (Figure 2.1). The latter concept includes not only the reduction of CO_2 emissions, but also methane (CH_4), nitrous oxide (N_2O) and other hydrofluorocarbons. Moreover, after eliminating the use of chlorofluorocarbon (CFC) gases completely by 2010, Thailand now aims to terminate hydrochlorofluorocarbons (HCFC) before 2030. Implementing these pledges will most likely be the major economic policy challenge for the decades to come.

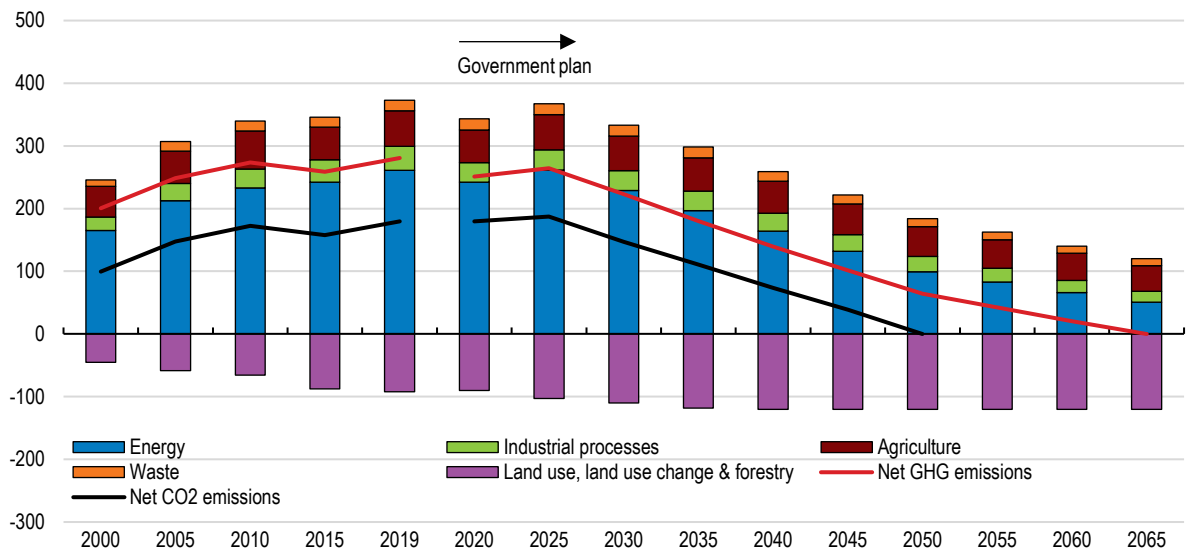
While mastering the green transition is challenging for all countries across the world, it is even more so for an emerging market economy like Thailand. The green transition will require major investments and policy changes, to induce the required changes in economic structures, scaling down activities that are not compatible with achieving climate goals while fostering those that are.

For an emerging economy like Thailand that is still aspiring to catch up with the income levels of advanced economies, designing a green transition pathway that is supportive of economic growth is particularly important. This need is exacerbated by Thailand's rapid population ageing, the fastest in the region, which will weigh on economic growth over the next decades. As a result, boosting productivity will become an ever more crucial policy goal.

However, achieving net zero in the coming decades can also provide opportunities to attain both more sustainable and more inclusive growth. Less emission-intensive growth often brings tangible benefits for disadvantaged households, for example when climate mitigation polices improve air quality or reduce urban congestion by making public transport systems more efficient. Greening economic activity can also create new jobs, such as those in sustainable agriculture and tourism.

Figure 2.1. Thailand is committed to significant emission reductions

GHG emissions by source and net CO_2 emissions, Mt CO_2eq per year



Note: Data for 2000-2019 are from the Fourth National Communication, and those from 2020 are from the Long-term Low Greenhouse Gas Emission Development Strategy.

Source: Ministry of Natural Resources and Environment, Fourth National Communication and Long-term Low Greenhouse Gas Emission Development Strategy.

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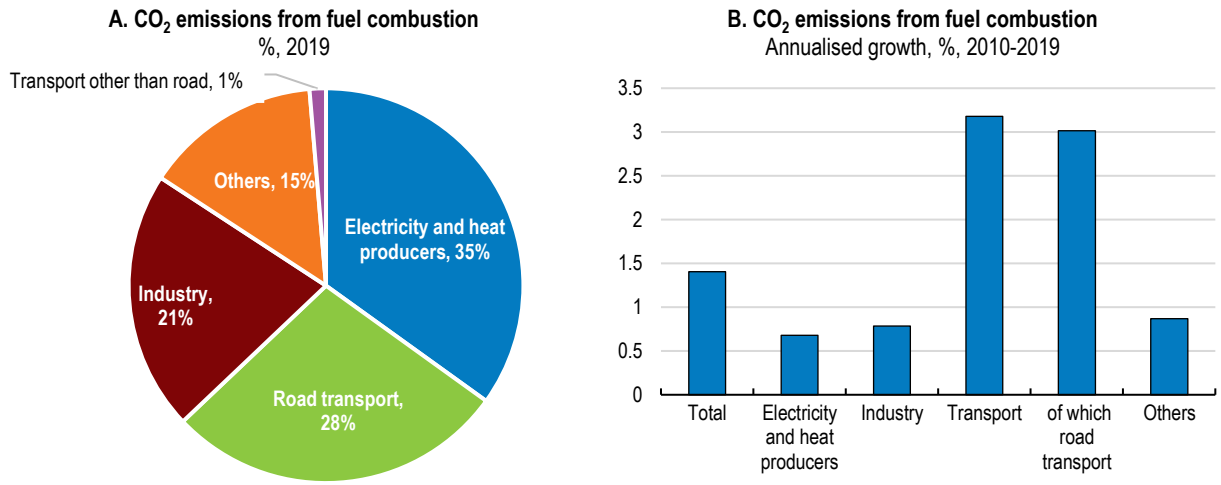
The largest source of GHG emissions is currently the energy sector, which includes energy used by the power sector and transport, among others, followed by agriculture and industrial processes, while land use, land use change and forestry have increasingly subtracted from GHG emissions. In terms of CO_2 emissions, transportation is the second largest source in Thailand, after energy suppliers, and its contribution to total emissions has increased rapidly (Figure 2.2, Panels A and B). Like in many other emerging market economies, Thailand's high economic growth has been underpinned by the increasing use of energy (Figure 2.3, Panel A).

Figure 2.2. CO_2 emissions from road transport have increased rapidly



Source: IEA Greenhouse Gas Emissions from Energy.

Energy demand typically increases as activity expands and incomes rise, as evidenced by the strong association between a country's income level and energy input (Figure 2.3, Panel B). Sustaining Thailand's high economic growth will require further increases in energy supply, while supply bottlenecks would constrain economic growth (Stern, 2011[1]).

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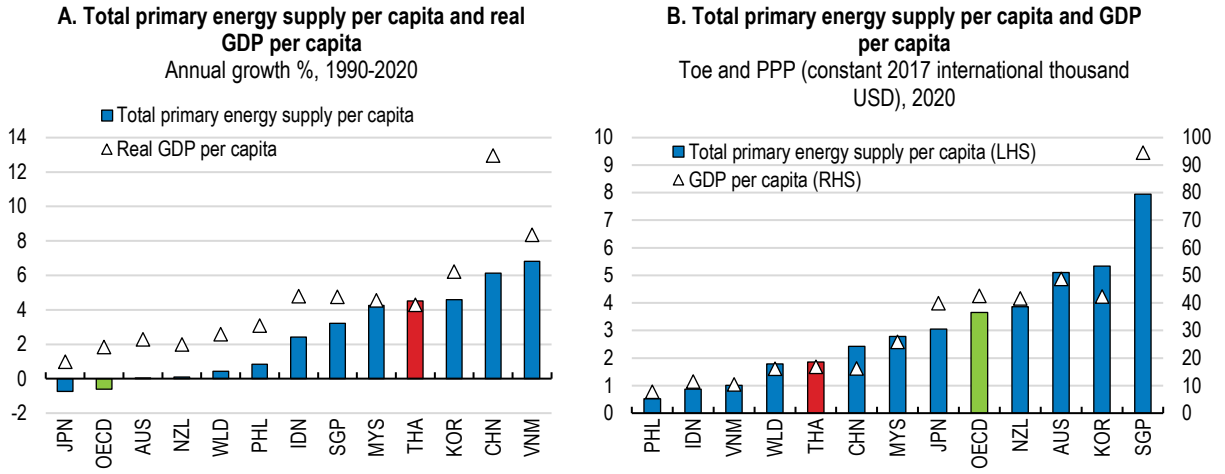
Figure 2.3. Energy is necessary for economic growth



Source: OECD Green Growth Indicators; and World Bank World Development Indicators.

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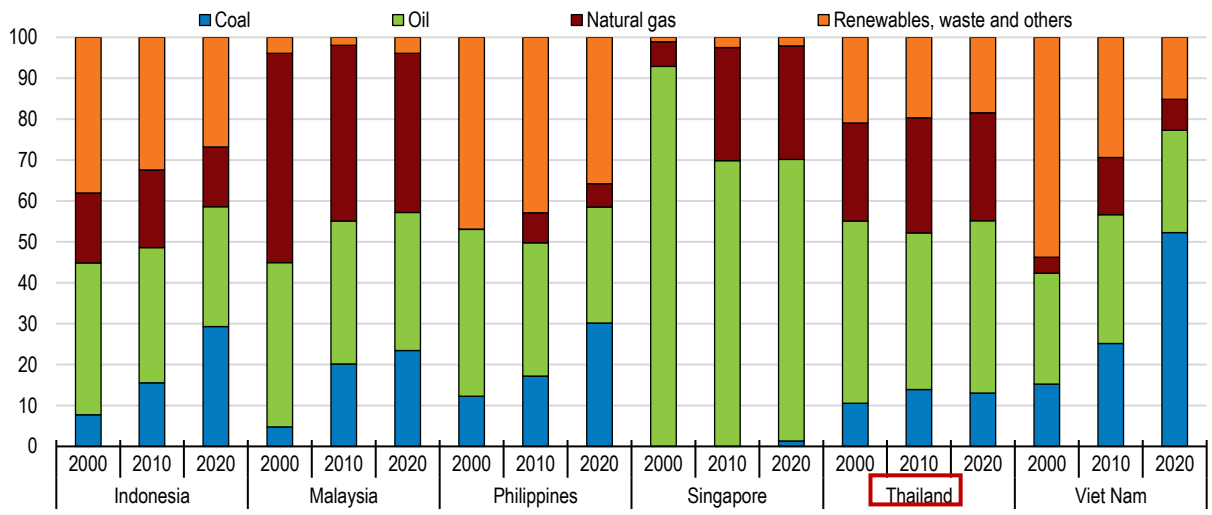
This continuous expansion of energy supply will require massive investments in renewable energy sources as the only way to reconcile future economic development with carbon neutrality. Like in many other countries, the burning of fossil fuels is Thailand's major CO_2 emission source. Reducing CO_2 emissions from energy supply and consumption is therefore expected to play the leading role in achieving the country's net zero pledges (Figure 2.1).

In contrast to other Southeast Asian countries that are heavily reliant on coal, Thailand expanded natural gas use long before others and has tapped into bioenergy sources, such as gasohol and biodiesel for land transport, for years (Figure 2.4). This has helped contain increases of CO_2 emissions to some extent over the years. However, reversing the rising trend of its CO_2 emissions trajectory within a short period will require significant additional policy efforts. The high share of natural gas means that Thailand should quickly move to further expanding renewables. Some renewable sources, such as solar photovoltaic (PV) electricity generation, are actually more readily available for Thailand than fossil fuels.

Figure 2.4. Thailand's coal dependence is lower than in peer countries

Total energy supply by source, share %



Source: IEA, World Energy Balances.

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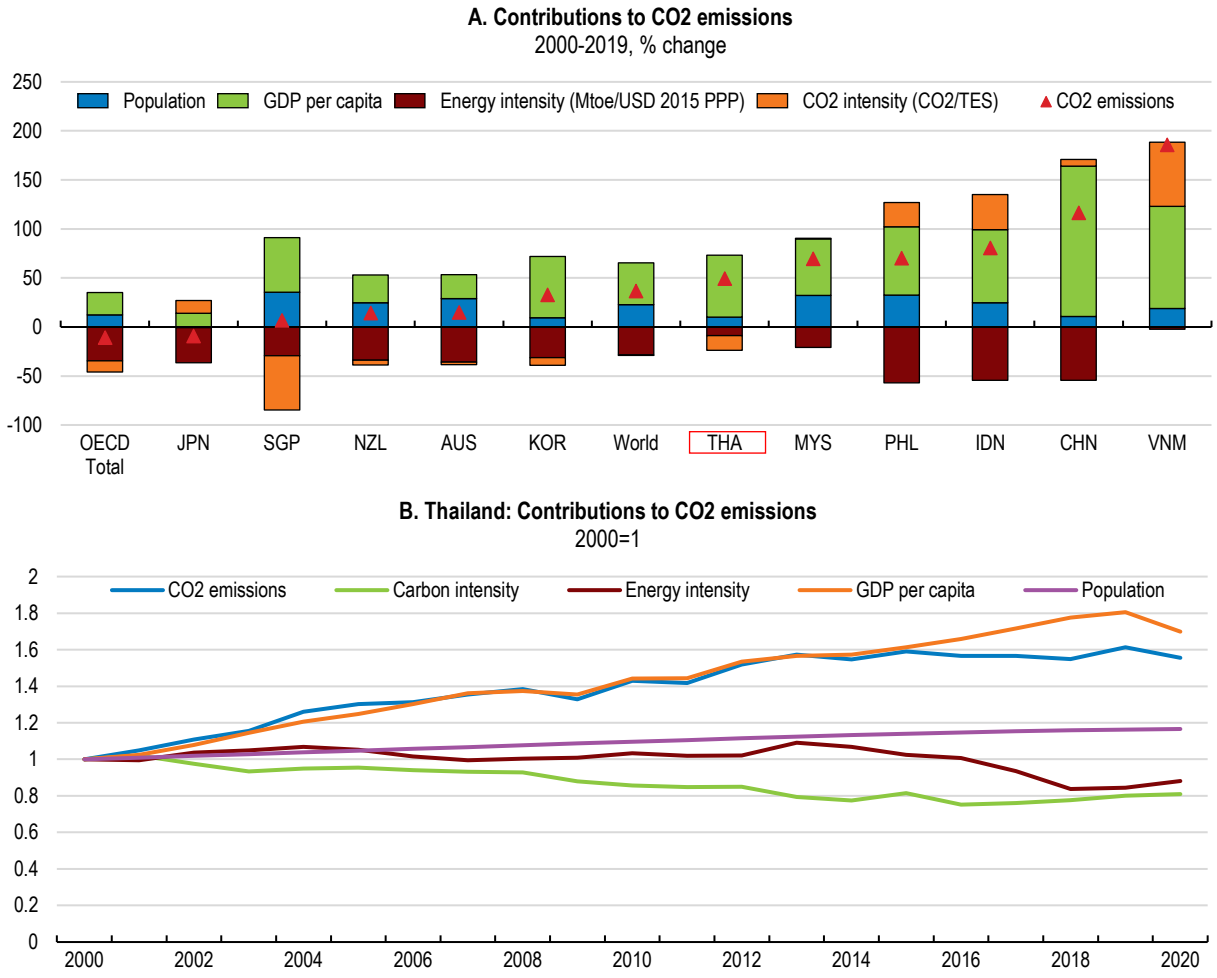
Besides expanding electricity supply, meeting emission pledges will also require limiting electricity demand growth by improving energy efficiency. Indeed, some improvements in efficiency may be easier to achieve in the short run than expansions in renewable energy generation capacity. Over the last two decades, Thailand has become less energy intensive, suggesting that various sectors' efforts to improve energy efficiency have played a key role to contain increases in CO_2 emissions, while the growing share of the services sector could also contribute to low energy intensity (Figure 2.5, Panels A and B). At the same time, other countries in the region have achieved stronger energy efficiency gains, suggesting scope for further efforts in Thailand.

Thailand is one of the most vulnerable countries to climate change in the world and will also need to invest into climate change adaptation. Frequent severe floods and droughts affect its agricultural production, which has become a concern. Therefore, investments in climate change adaptation will have to go hand in hand with mitigation efforts.

A successful green transition will require enhanced policy coordination efforts, in particular flanking policies that can mitigate the impact on low-income households, which could be disproportionally affected by higher fossil fuel prices during the transition. These households are already typically more vulnerable to changes in weather patterns, such as severe droughts and floods.

Figure 2.5. Lowering energy intensity has helped contain CO_2 emissions



Note: Decomposition is based on the Kaya identity, CO2 emissions = (Carbon intensity)*(Energy intensity)*(GDP per capita)*(Population). Carbon intensity is calculated as carbon emissions divided by total primary energy supply, and energy intensity is calculated as total primary energy supply divided by real GDP.
Source: World Bank World Development Indicators; OECD Green Growth Indicators.

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Comprehensive and well-coordinated reforms will be required to master the planned green transition. This chapter will discuss different climate change mitigation policies and how these policies can be harnessed to boost productivity and economic growth, while also enhancing inclusiveness. Key messages of this chapter are:

- A comprehensive strategy for carbon pricing that covers key emission sectors as early as possible is a key pillar of a strong climate change mitigation strategy. Fiscal revenues from carbon pricing should be used for targeted support to vulnerable households to alleviate the economic impacts of climate mitigation efforts and to SMEs to support necessary investments in their transition to cleaner production technologies.
- Reducing government interventions in energy markets will lay the grounds for a successful green transition, as regulated prices and subsidies currently weaken the necessary incentives for improvements in energy efficiency.
- Aligning environmental regulations with international good practice will play an important role to accompany price-based measures and strengthen the political acceptability of mitigation efforts.

Achieving a coherent policy mix and ensuring strong policy coordination

Getting the policy mix right is crucial for Thailand's decarbonisation strategy. Achieving carbon neutrality over the coming decades will require significant transformations of economic structures and will require the use of several policy instruments in a coordinated fashion. Key tools that can be deployed include emission pricing, regulatory measures, and subsidies for cleaner alternatives. A broad range of policy tools should consistently be deployed to maximise their complementarities (D'Arcangelo et al., 2022[2]), (Blanchard, Gollier and Tirole, 2022[3]). At the same time, favourable framework conditions will be needed to facilitate the required structural changes and foster business dynamism, for example through the removal of market entry barriers or operational restrictions.

Appropriate carbon prices that internalise some of the climate impacts of carbon emissions are one key instrument for directing resources towards lower-emission uses. From an economic perspective, using price signals to direct resources is highly attractive and efficient because a single carbon price equalises the marginal abatement costs across sectors (D'Arcangelo et al., 2022[4]). The price signals can help attract private investments into low-carbon production technologies. Carbon pricing can be implemented in different ways and can also generate government revenues depending on its design.

However, carbon prices alone are unlikely to be sufficient to drive the changes required to reach net zero emissions, and there may also be other environmental externalities to be taken into account beyond climate change, such as air pollution. High carbon prices alone may also not be enough to stimulate adoption and innovation in low-carbon technologies if uncertainty about policies and technology renders the required investment excessively risky. More stringent environmental regulations, for example, can support price-based measures and reduce the usage of fossil fuels.

Ensuring rapid progress through the deployment of different policy instruments calls for stronger policy coordination. Thailand currently has over 30 national and regional energy and climate policies in effect. These plans have been updated every 3-5 years to reflect the latest developments on various fronts, including technological advances. In addition, several government ministries and agencies have their own policy measures, and taken together, this creates a complex system.

Current policies include policies to promote energy efficiency, sustainable transport and the transition to clean energy sources. A pilot programme for emission trading is currently part of the Climate Change Master Plan. The Long-Term Low Greenhouse Gas Emission Development Strategy serves as an overarching policy strategy. The principal energy policy relevant to reducing GHG emissions is Thailand's Integrated Energy Blueprint, which encompasses several long-term plans, notably the Alternative Energy Development Plan, Power Development Plan and Energy Efficiency Plan. A new National Energy Plan is expected to replace the current Energy Blueprint as an overarching framework. In addition, the 13th National Economic and Social Development Plan provides guiding principles to connect economic development and climate policies.

These different policy plans also imply that the responsibility for climate and environmental policies is scattered across many different agencies (IEA, 2021[5]). 25 public bodies are responsible for drafting, implementing and enforcing climate policies, which adds to the complexity of steering Thailand towards meeting its climate commitments. Several extra-budgetary funds have been established for similar purposes. In addition to taxes, charges and fees that are imposed by different ministries and agencies, a number of tax incentive programmes exist, potentially leading to policy inconsistencies.

Redesigning and streamlining these complex institutional settings will be a policy priority, with a view towards better coordination within the government. Currently, the National Committee on Climate Change Policy chaired by the prime minister acts as the leading body on climate policies, and a department at the Ministry of Natural Resources and the Environment oversees climate policies. However, policy coordination and consistency concerning climate policies could be strengthened further. To achieve this, the government is planning to introduce the first-ever Climate Change Act and set up a new department,

the Department of Climate Change and Environment, which is meant to serve as the secretariat for the National Committee on Climate Change Policy.

The new Department of Climate Change and Environment is currently being established and this process could be accelerated. Its mission will be to define a strategy and measures to deal with climate change and reduce greenhouse gas emissions across the country. As part of the function of the Office of Natural Resources and Environmental Policy and Planning under the same ministry will be transferred to the new department, the division of labour between the two departments should clearly be defined. Overcoming the current coordination challenges will hinge on giving this newly created department a strong mandate, including the necessary leverage to ensure the consistency of policies by other ministries and actors with the overall mitigation strategy.

Better coordination of climate action will also require tying climate objectives more directly to long-term decision processes and budgets, while undertaking regular monitoring and follow-up. Like other Southeast Asian countries, Thailand has a long history of economic development planning. Its 5-year Economic and Social Development Plans serve as a guide to various sectoral plans. Effective monitoring and evaluation is an essential part of any planning system, and a number of countries have made efforts to improve monitoring and evaluation. Setting quantitative targets and providing regular follow-up, including potentially through a direct link with budget management, is equally important as the planning itself (World Bank, 2007[6]). Thailand has an electronic monitoring and auditing system that cover key projects of all ministries and agencies.

Thailand has established a well-organised performance evaluation system for public spending. However, the quality of annual key performance indicators varies among government agencies and a large number of indicators of around 9 000 appears to complicate the evaluation process (OECD, 2020[7]). A number of countries have encountered similar difficulties. France recently reduced the number of indicators used for monitoring and Austria strengthened quality assurance through regular interventions by the Federal Performance Management Office (OECD, 2020[7]).

Another instrument that could be harnessed for this purpose are Strategic Environmental Assessments. These assess the environmental impact of broad policy or individual project plans in the initial phase (OECD, 2012[8]). Thailand plans to formally introduce Strategic Environmental Assessments in several areas of government planning such as energy and transport. The same instrument has been used in the European Union to ensure high levels of environmental consideration in various government plans such as energy and transport (European Commission, 2001[9]).

Knowledge sharing with other countries can also be useful. A case in point is a memorandum of understanding between Thailand and Switzerland of 2022. This collaboration aims at a mutual exchange of experiences and at helping Thailand achieve its net zero emission targets through knowledge transfer and expert advice.

Carbon pricing should be the key element of Thailand's decarbonisation strategy

Carbon pricing will be an essential building block of reducing carbon emissions. Appropriate carbon prices internalise part of the negative external effect of carbon emissions and induce market participants to favour low-carbon solutions. This will generally reduce emissions in cost-effective ways, taking into account different abatement opportunities, including through creating strong incentives for enhancing energy efficiency and boosting research and innovation into low-carbon technologies. The two main types of explicit carbon pricing are emission trading systems, such as cap-and-trade programmes, and carbon taxes (OECD, 2022[10]). For example, the EU-ETS, the emission trading system of the European Union, has effectively reduced CO_2 emissions of regulated firms (Dechezleprêtre, Nachtigall and Venmans, 2018[11]).

Thailand launched a pilot emissions trading system (ETS) on a voluntary basis in 2015. The first phase between 2015 and 2017 established and tested the market's design features and the measurement, reporting and verification system. Under the voluntary system, participating businesses can acquire knowledge and experience about emission trading, including estimation of emission numbers stemming from their activities. During the second phase between 2018-20, the government aimed to encourage wider participation and develop participants' trading capabilities. The pilot trading scheme has helped to gather valuable experience and capacity with carbon markets, and Thailand now has the legal framework to establish an effective emission trading system. The government also plans to include SOEs within the system from 2024. However, the voluntary nature with no stringent emission cap and low carbon prices prevalent under the ETS have implied that the carbon prices generated by the current system are not effective to reduce GHGs (Figure 2.6, Panel A). In addition, Thailand's excise tax on fossil fuels is low, which results in a low effective tax rate on carbon in international comparison (Figure 2.6, Panel B).

Plans for mandatory carbon pricing are currently underway. A draft law about the framework of a mandatory system is set to be submitted to the cabinet for approval in 2023. When the new law comes into force, the private sector is required to report the data regarding activities involving GHG emissions to the government, with administrative penalties for failures to report. However, a final decision on whether the mandatory system will take the form of an emissions trading system, carbon taxes, or a mix of the two policy tools, is still outstanding, as is the sectoral coverage of the new system.

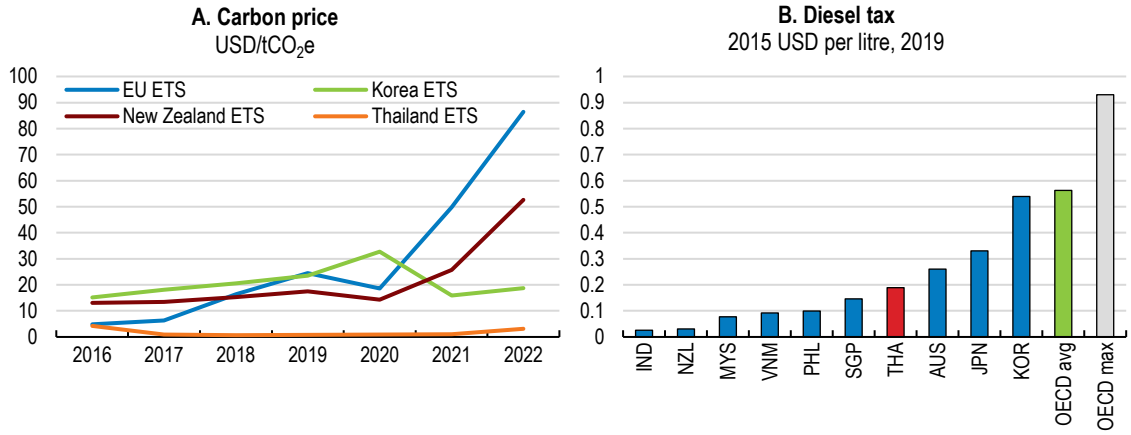
Irrespective of the carbon pricing policy chosen, the new system should be as comprehensive as possible. Carbon pricing for only a narrow set of sectors would be insufficient to make the necessary progress towards a net zero target. If carbon pricing is applied to limited sectors, activities and resources would move to other sectors not covered by the pricing system, resulting in high emissions and overall low average carbon prices. Stronger emission reduction contributions would then have to come from other policy tools, such as energy saving measures or regulations. To achieve the same emission reduction target through price-based measures, a narrow sectoral coverage would require higher carbon prices compared with a wider coverage.

Building on the experience of the voluntary programme, a cap and trade system with an extensive sectoral coverage could be placed at the centre of Thailand's carbon pricing strategy (IEA, 2021[5]). In particular, the energy and industry sectors should be among the first to participate in such a scheme. In the early stage, allowances could be allocated for free to some industry sectors in order to prevent carbon leakage to other countries with lower carbon prices. Industrial process could then be included once the new framework is in full operation. In addition to CO_2 emissions, a broader set of GHG emissions could be covered.

A cap and trading system has the advantage that it can explicitly set emission caps consistent with a path to the net zero targets, although it may be more challenging to implement from an administrative perspective, including with respect to the allocation of initial allowances, than a fuel-based carbon tax. Emission allowances should eventually be auctioned off among emitters rather than handed out for free, as this will generate fiscal revenues, especially during the transition period. These revenues can then be used to cover additional spending needs related to climate change policies, including those for adaptation or support for those households most affected by carbon pricing.

Recognising that not all emissions can be included in a cap and trade system, complementing such a cap and trade system with a carbon tax for sectors not covered by the scheme would allow to expand the scope of carbon pricing. For example, a carbon tax could be more suitable to reduce emissions from road transport, especially transport emissions originating from households. Allocating allowances to private passenger car users would not be practical, while a carbon tax on fossil fuels could be easily implemented at the pump. As the fossil fuel taxes already exist, reforming the tax rate according to the climate costs of these fuels would be a straightforward option (OECD, 2021[12]).

Figure 2.6. Thailand's current effective carbon prices are low



Source: OECD Green Growth Indicators; US Department of Energy, Maps and Data - Fuels Taxes by Country; National sources; World Bank Carbon Pricing Dashboard; Thailand Greenhouse Gas Management Organisation, Carbon Market information.

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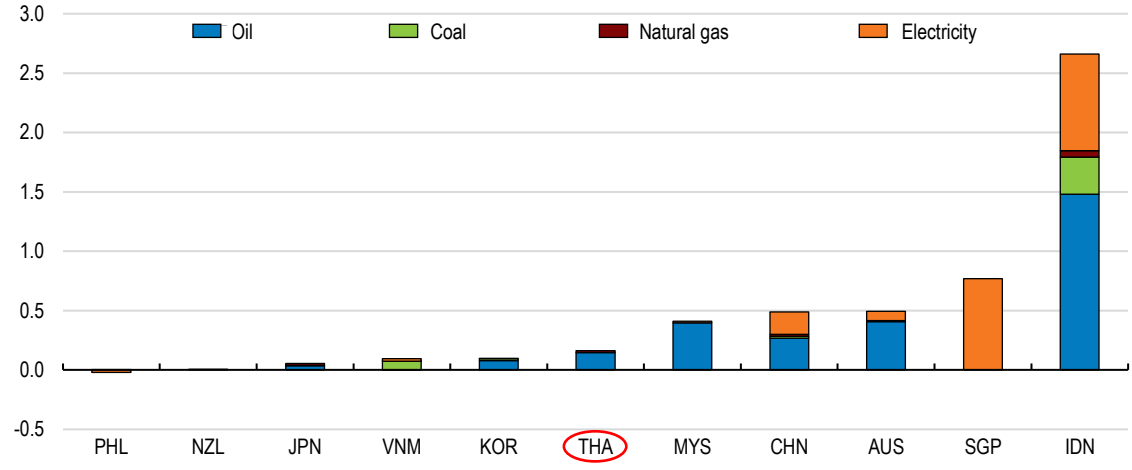
Tax rates should ideally align carbon prices with those envisaged in a cap and trade system to achieve emission cuts consistent with sectoral targets. That, however, would imply phasing out current subsidies, even though these are lower than in some OECD countries and regional peers (Figure 2.7). Total energy subsidies still amount to almost 0.2% of GDP and consist almost entirely of subsidies on oil and petroleum products. The government regularly intervenes to reduce price volatility of petroleum derivatives such as diesel and gasoline through the Oil Fund (Boonpramote, 2017[13]), (Asian Development Bank, 2015[14]). In addition, an explicit cap on retail diesel prices keeps the price at currently THB 34.44 per litre (USD 1.00). These interventions into market prices should be phased out along with the establishment of the emission trading system. Fossil fuel subsidies weaken price signals and are inconsistent with an efficient use of carbon prices to attain emission reduction objectives (D'Arcangelo et al., 2022[2]).

Figure 2.7. Energy subsidies remain in place for oil

Energy subsidies, % of GDP, average 2015-2019



Source: International Institute for Sustainable Development and OECD; FossilFuelSubsidyTracker.org.

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Model simulations prepared for this chapter simulate emission trajectories and the carbon prices required to achieve them, assuming that no other, non-price-based measures are taken. These simulations are based on the OECD-ENV Linkages model, described in Box 2.1. The simulations, shown in Figure 2.8,

consider a number of different cases for carbon pricing, all of which achieve the current emission targets, which imply a stark reduction of CO_2 emissions relative to a business-as-usual scenario (Panel A, based on (Ministry of Natural Resources and Environment, 2022[15])).

The results of these simulations suggest that carbon price levels would need to rise substantially when relying on carbon pricing alone to achieve emission targets (Panel B). This strengthens the case for deploying a combination of price-based and regulatory measures to reduce carbon emissions. Moreover, the breadth of sectors covered by carbon pricing plays an important role for the level of carbon prices required to reach current net zero targets. A carbon pricing mechanism with only partial coverage comprising the energy and industry sector would require substantially higher carbon prices than if all sectors were included in the carbon pricing mechanism (Panel B). With an even narrower application of carbon pricing to the energy sector alone, achieving emission targets would be out of reach, at least if the other sectors continued to consume fossil fuels without any restrictions. These results underline the importance of aiming for a broad coverage of the carbon pricing mechanism chosen.

Moreover, a partial application of carbon pricing to energy and industry only would entail higher economic costs (Panel C). While the level of GDP is projected to be around 2.5% lower in 2040 on account of the costs of mitigation measures, this loss would amount to almost 4% in the case of only partial coverage. This is due to the fact that the entire mitigation burden would then be put on the energy and industry sector, a scenario that would entail very high economic costs in these sectors (Panel D).

The coverage of carbon pricing could be expanded over time. SMEs with small GHG emissions could be included more gradually into the system, starting with those segments of the SME sector where the complexity of inclusion into the system are lower. The European Union, for example, has progressively expanded the coverage of its emission trading system since 2005. In the first phase until 2007, the system only included CO_2 from power generators and energy-intensive industries but now covers more gases, such as N_2O, and more sectors, such as aviation, and is to be extended to maritime transport.

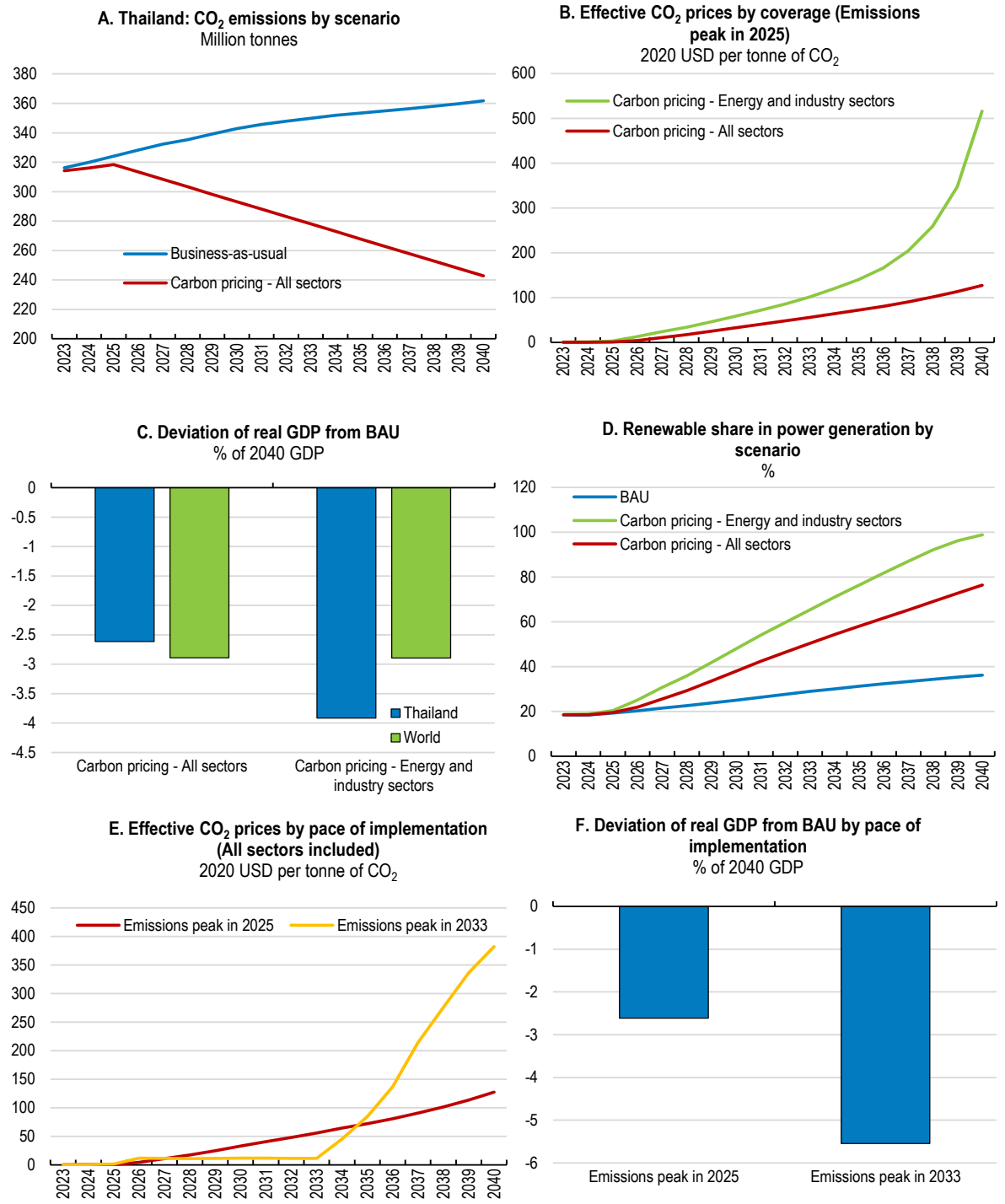
Box 2.1. The OECD ENV-Linkages modelling framework

A long-term projection of the interaction between environmental pressures and economic activities is essential to help countries meet their environmental targets. In particular, analysing the long-term impacts of environmental policies on climate challenges and economic growth enables countries to identify more cost-effective policy mixes to effectively achieve green and sustainable growth. The OECD developed the ENV-Linkages model, a recursive dynamic computable general equilibrium (CGE) model, in the early 2000s.

The ENV-Linkages model describes economic activities of different sectors and regions and links them to the drivers of environment pressures. The model fully conforms with the OECD ENV-Growth model, which provides the baseline scenario in the absence of new environmental policies. Therefore, the ENV-Linkages model can assess the impacts of climate change mitigation policies in diverse scenarios. Thanks to its multi-sectoral and multi-regional features, the model enables the analyses of the medium- to long-term effects of policy shifts that require reallocation across sectors and regions, as well as the associated spill-over effects. It also helps countries identify least-cost policies on issues including environmental tax reform and phasing out fossil fuel subsidies.

Source: (Château, Dellink and Lanzi, 2014[16])

Figure 2.8. Achieving net zero targets will be challenging



Note: Simulations based on the OECD ENV-Linkages model. In the business as usual (BAU) scenario, Thailand's long-term labour productivity growth is assumed at 2.7%. Consumption shares of necessary goods such as electricity and food are assumed to decline as incomes rise. The all-sectors carbon pricing scenario assumes that non-OECD countries will achieve net zero GHG emissions, including from LULUCF, by 2060, and OECD countries by 2050. For Thailand, carbon neutrality will be achieved by 2050, following the emission trajectory shown in the revised version of Thailand's Long-term Low Greenhouse Gas Emission Development Strategy (Ministry of Natural Resources and Environment, 2022[15]). The partial carbon pricing scenario assumes that Thailand adopts sectoral carbon pricing restricted to energy and industry to achieve the same carbon neutrality target, and the other countries apply full-sector carbon pricing. The end point of the simulation is set in 2040 to obtain robust estimation results. The peak of net CO2 emissions is set to occur in 2025, except in the delayed scenario where this is assumed to happen in 2033.

Source: OECD ENV-Linkages model.

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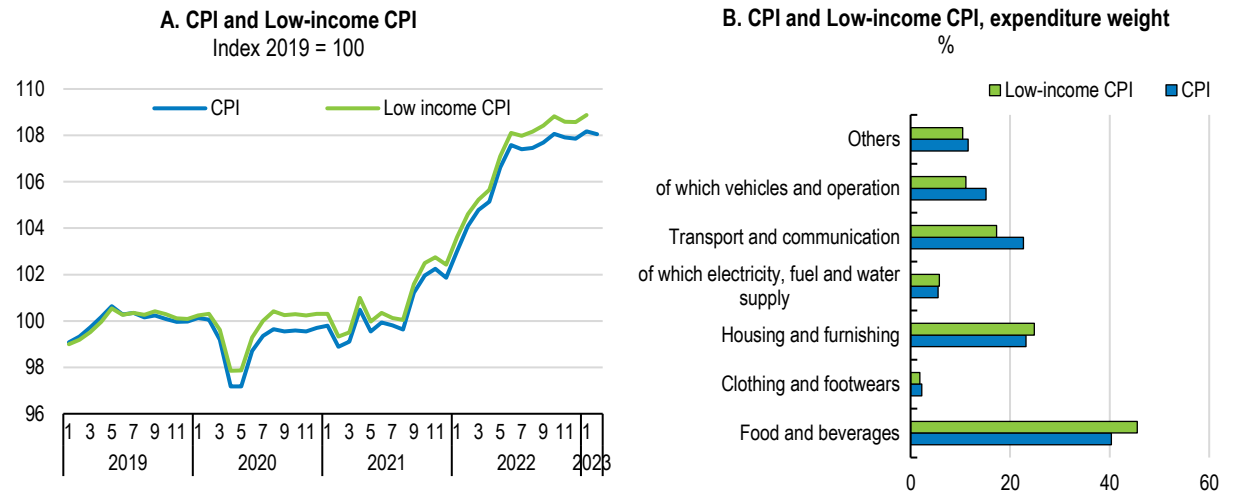
Even with a gradual expansion of coverage, however, it is important to frontload the implementation of carbon prices to ensure compliance with the current government targets of reaching a carbon emission peak in 2025, followed by gradual declines as shown in Panel A. If the turning point were delayed due to a slower implementation of carbon pricing, more efforts than in the frontloading scenario would be required to reach the same amount of cumulative emissions reductions (Panel E). This in turn would imply higher economic losses, both in terms of real GDP and per-capita incomes (Panel F).

As high prices of fossil fuels and carbon-intensive goods and services entailed by carbon pricing could disproportionally affect low-income households, it is crucial that fiscal revenues from carbon pricing are available to support those who would be affected (D'Arcangelo et al., 2022[2]). Large income inequalities may hinder the green transition through low public support, which could particularly be the case in emerging market economies like Thailand. In emerging market economies, consumption of fossil fuels typically has a larger share in total expenditure for high-income households than for low-income households due to differences in car ownership rates and availability of traditional biomass, such as firewood (Dorband et al., 2019[17]). This would make tend to give carbon pricing a more progressive footprint, although the impacts may differ among countries and fuels (Steckel et al., 2021[18]). The negative effects on low-income households could be exacerbated by associated increases of food prices, which has a large spending share among low-income households (Figure 2.9).

Figure 2.9. Low-income households spend relatively less on transport



Source: CEIC.

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Support could go beyond households. Switzerland, for example, recycles most of the revenues of its carbon tax on fossil fuels introduced in 2008. Two thirds of the tax revenue are redistributed to households on per capita basis and to businesses based on payroll and the rest is used to an energy efficiency programme and a technology fund (Hintermann and Zarkovic, 2020[19]). Singapore introduced a CO_2 emission tax on the energy and industrial sectors in 2019. Although not directly linked to the carbon tax revenues, the Singaporean government at the same time provides strong support to business investments in energy efficiency, especially to SMEs, recently raising the grant rate from 50% of the investment costs to 70%. Part of the revenues from carbon pricing can also be used for other people, such as to smooth the job transition of those whose jobs are expected to disappear as the economy shifts away from high-emission activities. Recycling revenues from carbon pricing does not necessarily require earmarking these revenues, as long as they are allocated to the above-mentioned purposes.

Thailand has support programmes to low-income groups in place under which low-income electricity consumers who use less than 50kWh per month are exempt from electricity bills, financed through cross-

subsidies from other users such as the industrial sector (Asian Development Bank, 2015[14]). Revenues from carbon pricing could ideally be used to support families through a targeted cash transfer, which requires a frequently updated poverty list. Thailand launched a digital welfare card programme for a cash transfer to poor people in 2017. This programme has the potential for achieving strong targeting if its underlying household registry were updated more frequently (Phattarasukkumjorn, 2021[20]). Once its targeting has been improved, the State Welfare Card, which has already included an energy subsidy component, can in principle be a useful tool for delivering targeted of support measures to compensate vulnerable households for the effects of higher energy prices in the medium run.

While market-based carbon pricing introduced by the pilot ETS are likely to be a pillar of Thailand's decarbonisation policy, pollution taxes are useful policy tools that could complement the ETS in specific cases, as in the case of taxes on air pollutants. The economic rationale for such taxes would be the negative externalities from these pollutants, which often go beyond their climate impact.

A number of OECD countries adopted pollution charges, such as on nitrogen oxides (NO_X) and sulphur oxides (SO_X), by the late 2000s. In response to accelerating soil acidification and water eutrophication, Sweden started to impose a high tax on nitrogen oxides emissions from industrial combustion plants equivalent to USD 6000/tonne in 1992 (OECD, 2013[21]). As the tax is designed to refund all the revenues to taxpayers in proportion to generated energy, it works as a transfer from plants with high emission intensity to those with low emission intensity. By 1995, average emissions per unit of energy had declined by 40%. Starting from large plants, the coverage of the system has been progressively expanded. Sweden has also seen sulphur dioxide emissions declining since 1991 when it started a tax on sulphur dioxide (SO_2) (European Union, 2021[22]). The tax is levied based on sulphur contents in fuels and, if emissions are reduced by cleaning or binding them to ashes, part of the tax is reimbursed to the emitter.

In the case of Thailand, imposing an air pollutant tax on the energy and industrial sectors could be an interesting option, although it may require additional administrative efforts. Sulphur dioxide levels have been lower than the WHO standards (Nikam, Archer and Nopsert, 2021[23]), and its emissions have declined by an annual 1%, but it is still a major source of air pollution (Ministry of Natural Resources and Environment, 2022[24]). Around 80% of sulphur dioxide emissions come from fuel combustion by the manufacturing and construction sector. By contrast, nitrogen oxide emissions continue to increase mostly due to transport activity, which is concentrated in urban areas and discharges half of nitrogen oxides emissions. In addition, the energy sector, emits approximately 20% of nitrogen oxides, mostly from coal power plants.

Aligning environmental regulations with international good practice

Tighter environmental regulations could help Thailand reduce GHG emissions at modest economic costs. One example for this are regulations on air pollutants. While high-pollution sectors will be penalised by more stringent environmental regulations, many highly dynamic sectors and firms would likely fare well despite strict regulations (OECD, 2021[25]). At the macro level, the adverse effects of more stringent environmental regulations on economic activity would likely be modest. Moreover, regulations, such as strict pollution standards, could induce innovation and stimulate demand for innovative products (OECD, 2011[26]). Welfare gains from these policies will be significant as environmental degradation, especially low air quality, imposes high health costs on Thailand (Kummetha, 2022[27]). Previous studies suggest that the social cost stemming from PM2.5 was equivalent to 11% of GDP in 2019 (Attavanich, 2021[28]). Moreover, as energy-related air pollutants and CO_2 emissions often stem from the same sources, an integrated approach to tackle both would be highly beneficial (IEA, 2021[29]).

In this context, assessing Thailand's current environmental regulations can be a useful starting point. The OECD has developed an Environmental Policy Stringency index that aims at capturing rigidity and intensity of a country's environmental policy from three dimensions: market-based, non-market based and

technology support policies (Box 2.2). The indicators compile information on some major policy tools, such as pollution standards and taxes. Calculations prepared for this chapter suggest that overall, Thailand's environmental policies are less stringent than those of OECD countries, placing Thailand in a middle position vis-à-vis the emerging market economies for which data are available (Figure 2.10).

Like some of these peers, Thailand has increased its overall policy stringency over the past decade. One key example is the introduction of feed-in-tariff programmes for electricity from renewable sources. With respect to market-based instruments, however, Thailand's policies are weaker than those of other countries. Carbon prices are low due to the voluntary nature of the emissions trading system and environmentally-related taxes are also low, with some at zero rates. With respect to non-market policies, Thailand has seen no change since 2010 when it tightened its air pollution regulations, in contrast to OECD countries where the restrictiveness of non-market policies has increased over the past decade.

Box 2.2. OECD Environmental Policy Stringency Index

There is a growing interest in cross-country comparisons of environmental policy instruments as many countries are setting environmental targets to tackle climate change. The cross-country comparison can help evaluate the impact of environmental policies on pollution as well as their economic and social effects, which is crucial for finding the effective policy tools and identifying relevant sectors. Provided that quantifying diverse environmental policies with a single index is not simple, the OECD developed the Environmental Policy Stringency (EPS) indicators based on selected environmental policy measures with a focus on climate and air pollution. Introduced in 2014 and revised in 2021, the indicators serve as a comprehensive index and enable the comparison of environmental policies across 33 countries in the periods of 1990 and 2020.

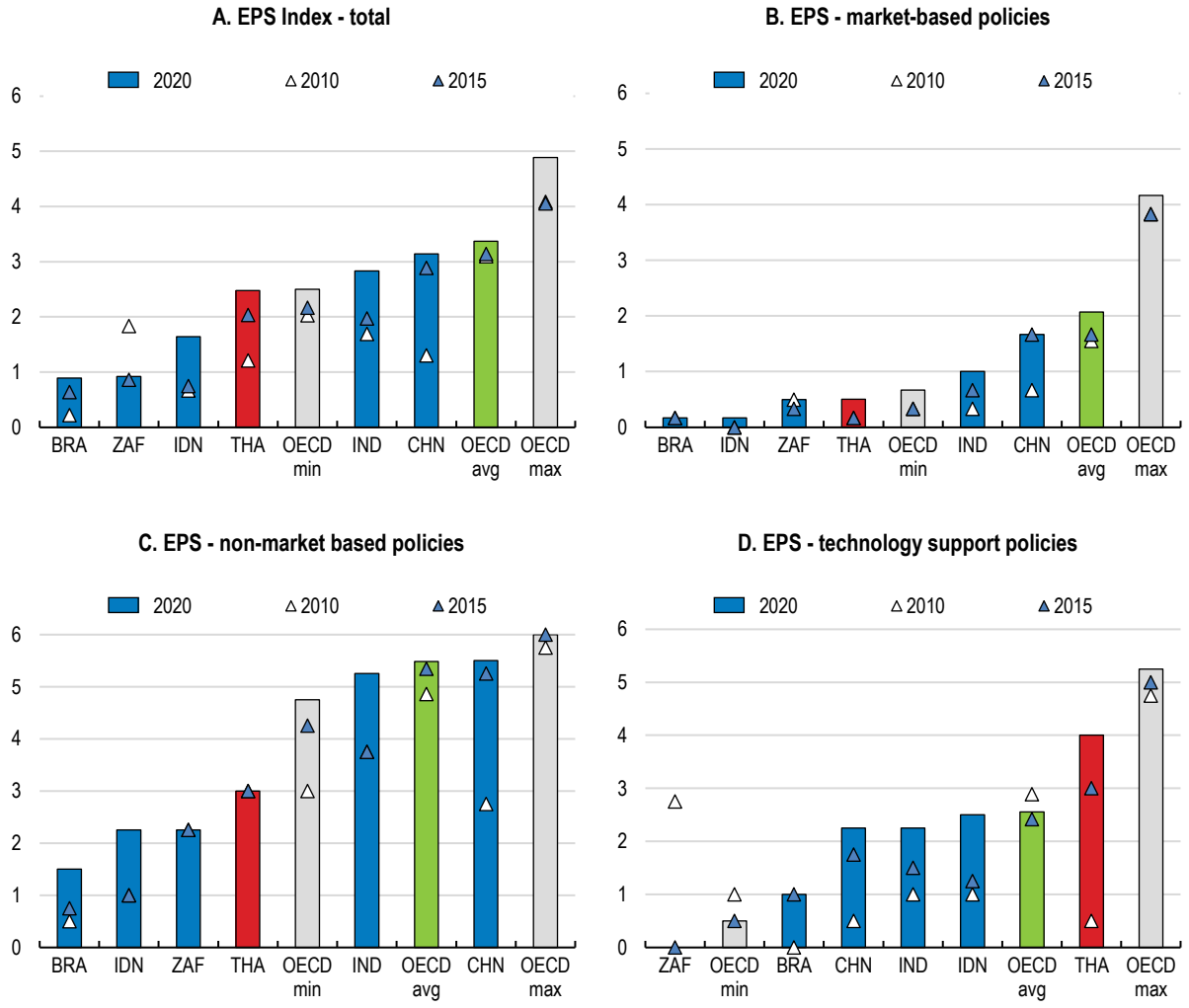
The EPS indicators are widely used in empirical studies and policy recommendations as one of the key benchmark indices on the stringency of an environment policy. Stringency is defined as the degree to which environmental policies place explicit or implicit costs on pollution or environmentally harmful behaviour. For example, new taxes on pollutants will directly raise the costs of polluting firms, and would be counted as more stringent environmental policy. New subsidies to R&D or price support to renewable energy can also be interpreted as more stringent environmental policy in a sense that such subsidies will increase the opportunity cost of polluting. The index aggregates market-based policies, non-market-based policies, and technology support with simple weighting of scores from 0 (no policy) to 6 (most stringent).

The index for market-based policies, accounting for one third of the overall index, consists of six sub-indices including, for example, taxation on CO_2 emissions. Based on the threshold, each sub-index has a score range from 0 to 6. The non-market-based policies index uses the emission limit value (ELV) of four kinds of pollutants as a benchmark to estimate stringency. The technology support index reflects the R&D expenditure to GDP ratio as well as adoption support proxied by the level of price support for solar and wind energy technologies.

Source: (Kruse et al., 2022[30]), (Bottai and Koźluk, 2014[31])

Figure 2.10. Environmental policies are less stringent than in OECD countries, China and India

Environmental Policy Stringency (EPS) Index, scale 0 (least stringent) to 6 (most stringent)



Note: Government R&D investment on low-carbon technologies is calculated based on the assumption that its share in the total government R&D investment is proportional to half of the share of environment-related patents in total patents.
Source: OECD, OECD Environmental Policy Stringency Index; OECD calculations.

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Thailand has made progress in some areas that are not captured in the Environmental Policy Stringency index. A case in point is the new building energy code effective from 2018 that requires nine categories of buildings, such as offices and hotels, to ensure high energy efficiency through energy-efficient insulation, lighting, air conditioning, and hot water supply. In 2019, the regulation only covered newly constructed buildings with a total area larger than 10 000 m^2 but was rapidly expanded to those with above 2 000 m^2 by 2021. The government intends to introduce similar compulsory measures for manufacturing factories.

Introducing more stringent environmental regulations would be one way forward for Thailand, especially concerning air pollution. While there are large differences among OECD countries in terms of policy stringency both for market-based and for technology-support instruments, the stringency of non-market instruments has converged over the past decade. Some non-OECD countries, notably China and India, also introduced strong air pollution controls, including those on coal power plants, reaching levels similar to the OECD average. Against this background, Thailand's non-market instruments are now less stringent compared not only to OECD countries but also relative to China and India. The convergence of policy

stringency among OECD countries as well as some emerging market economies suggests that technologies to meet strict regulatory requirements have now become widely available at affordable costs. In terms of tailpipe emission regulation on newly sold motor vehicles, Thailand plans to move from EURO4 to EURO5 in 2024, which is a step in the right direction. Emission standards for coal power plants will also need to become stricter, potentially including an acceleration of the planned coal phase-out.

Table 2.1. Past OECD recommendation on air pollution

Recommendation in the past survey	Measures taken since October 2020
Make the national standards for air pollution stricter in line with international standards.	New ambient air standards have reduced acceptable PM2.5 levels from mid-2023.

Achieving net zero will require specific strategies for each sector

Decarbonising the power sector by expanding renewable energy sources

The power sector is currently the largest emitter, accounting for around 35% of national CO_2 emissions. Reducing emissions from electricity generation presents therefore the largest scope for action and should be the highest policy priority, notably through raising the use of renewable sources. The importance of reducing this kind of emissions is also underlined by the expected rising demand for electricity as electrification advances.

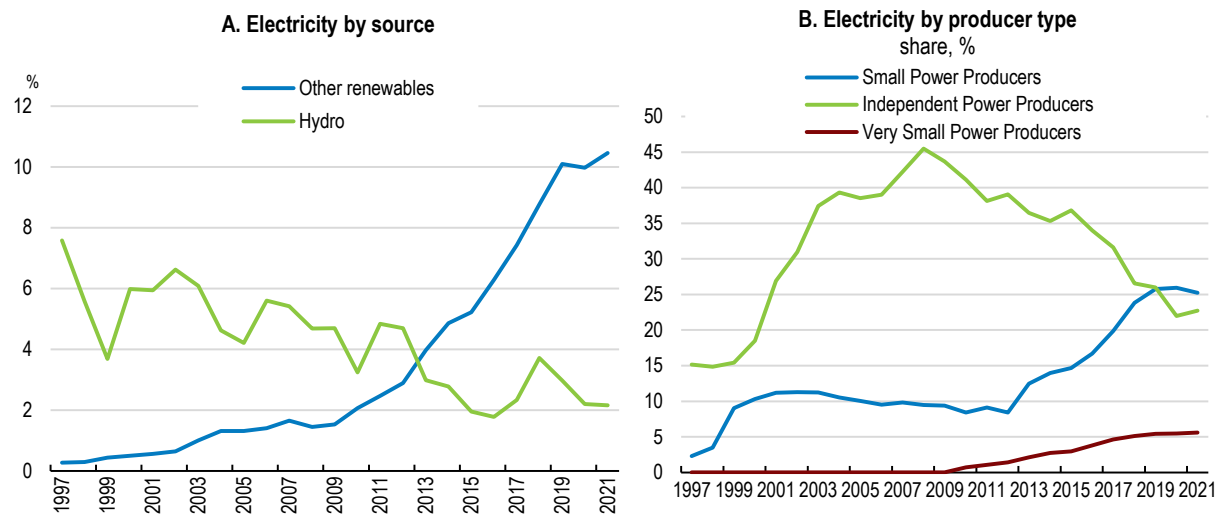
A rapid depletion of domestic natural gas reserves further strengthens this need to move towards renewable sources rapidly. Domestic gas reserves are expected to last only for 4.4 years (BP, 2021[32]). In 2020, 70% of the natural gas used in Thailand was domestically produced, and 80% of the total supply was consumed by the power sector. From the perspective of the sector itself, this implies that 60% of total energy consumption by the power sector came from natural gas.

Against this background, the use of renewable energy sources has been actively promoted for some time. In the Alternative Energy Development Plan 2018-2037, the authorities aim at increasing the share of renewable sources in power generation to 30% by 2037, from the current 17%. Among renewable sources, solar is expected to account for around 40% of total energy production from renewables, followed by biomass at 25% and wind at 10%. The draft Power Development Plan due for publication in 2023, a more ambitious target considers reaching 50% of electricity from renewable sources by 2037. Higher electricity imports, such as from the neighbouring Lao PDR that has abundant hydro-energy sources, are also planned and could complement the wider use of renewables in domestic power generation. Thailand could benefit from enhanced cross-border power trade within ASEAN (IEA, 2019[33]).

Past increases in the share of renewable sources in Thailand's electricity generation have been significant, especially starting from the mid-2010s (Figure 2.11). The Electricity Generating Authority (EGAT), a state-owned enterprise, is the dominant power producer, accounting for around 45% of total electricity sales in 2021. Around one third of sold electricity was imported. EGAT also holds majority shares of some private power generators. Nevertheless, the generation market had been open to private actors, both large-scale independent power producers with capacity over 90 MW and small-scale producers with capacity between 10 and 90 MW (ERIA, 2019[34]). Feed-in tariffs were established for the first time in 2006, allowing electricity produced from renewables to be purchased above retail electricity prices. This allowed very small-scale producers with a capacity of less than 10MW to sell electricity directly to two state-owned distributors, the Metropolitan Electricity Authority (MEA) and the Provincial Electricity Authority (PEA). In 2013, the government introduced specific feed-in tariffs for roof-top solar electricity generation. In 2015, this was expanded to electricity generated from other renewable sources. These programmes successfully increased the share of renewables, especially solar.

Despite increases over the past years, the share of renewable energy sources in electricity generation is still low compared with peer countries (Figure 2.12). Further increases are planned in the 2018 Power Development Plan envisages raising the share of very small-scale power producers from currently 6% to 25%. While this will be useful if implemented as planned, it cannot replace a wider use of renewables among large-scale producers, most notably EGAT, whose own energy production is 93% from non-renewable sources, although its imports are mostly from hydro energy. While continuing to stimulate private investment, the government should also use its ownership position to promote renewable investments by EGAT (OECD, 2022[35]).

Figure 2.11. Renewable sources have increased in power generation



Source: Ministry of Energy, Energy Statistics of Thailand.

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The expansion of renewables in large-scale electricity generation will require new instruments beyond feed-in tariffs. For example, renewable energy certificates and public tenders are widely used in a number of countries (IRENA, 2022[36]), (Ang, Röttgers and Burli, 2017[37]). Indonesia recently launched a renewable energy certificate programme and a state-owned power generator and sole distributor, Perusahaan Listrik Negara, participates in the programme (OECD, 2021[38]).

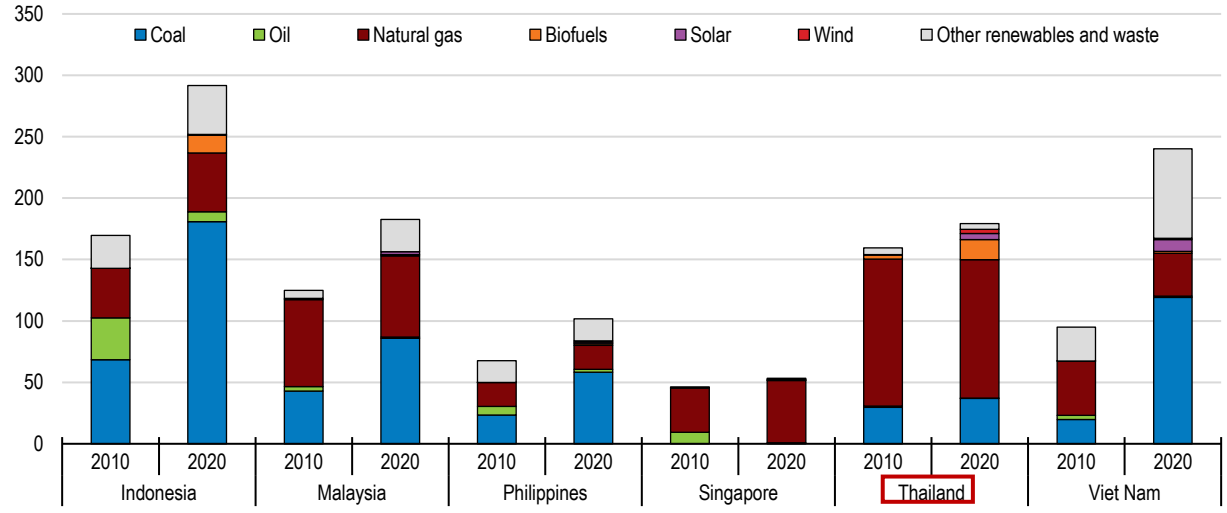
A wider use of renewable sources, which are typically more intermittent, will also require backup energy sources and investments into the power grid to accommodate more volatile electricity supply. These swings in supply which have caused technical difficulties such as over-voltage in the past (Gamonwet, Dhakal and Thammasiri, 2017[39]). Demand response, such as the time shift of peak demand through storage, could be required. The National Smart Grid Development Master Plan adopted in 2015 as a pilot project is meant to address these challenges.

Phasing out coal power would be a first important step and should be accelerated. The share of coal in total power sources is already lower than in other Southeast Asian countries, partly because of Thailand's strong reliance on natural gas, and has hovered around 20%. Thailand has large domestic coal reserves, likely to last for around 80 years (BP, 2021[40]). However, similar to other countries, growing demand has been met by increases in imports. In 2020, imported coal accounted for around 80% of total supply (in energy terms) and half of that supply was used in the power sector. To achieve the net zero pledges, the authorities plan to phase out coal power by 2050 (Ministry of Natural Resources and Environment, 2022[15]), and announced the closure of a coal plant by state-owned enterprise. However, recent high international natural gas prices prompted the government to postpone the closure of the plant. The draft new Power Development Plan 2023-2037 no longer foresees the construction of any new coal plants. This is an important step but Thailand should prepare a clear phase-out plan for the existing coal power plants.

Thailand has abundant solar energy resources across the country with less seasonal fluctuations. In particular, the northeast and central regions covering 25% of the surface, are endowed with high irradiance sunlight. By 2022, the installed power generation capacity of solar power reached 3 GW, accounting for 25% of the total installed power generation capacity from renewable energy. The government plans to increase it to 12 GW by 2037. Previous studies suggest that a realistic estimate of the technical potential of solar energy would be around 17GW (IRENA, 2017[41]), although roof-top solar generation could be further expanded to 38 GW even if only 10% of the potentially available space is used (OECD/IEA, 2018[42]).

Figure 2.12. Thailand needs to increase the use of renewable energy sources

Electricity generation by source, TWh



Source: IEA Electricity Information.

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In order to expand distributed renewable energy sources, Thailand introduced net-metering for roof-top solar in 2019, under which surplus electricity can be sold to the distributors with an annual accounting period. The uptake was initially low but has gradually been increasing. In 2021, the household sector added 7MW to its capacity, totalling 12MW, although still much lower than the potential.

The potential of roof-top solar could be exploited more than at present. Policies to reduce investment costs, such as tax incentives and subsidies, appear to be effective in a number of countries (IEA, 2019[43]). A higher feed-in tariff could enhance incentives for roof-top solar expansion without overcompensation or economic losses for power utility companies. Currently, the feed-in tariff is set at 2.2 THB/kWh for households and 1.0 THB/kWh for the hospital, academic and agricultural sectors, lower than the average wholesale price of 2.73 THB/kWh (OECD/IEA, 2018[42]). A number of countries have set the remuneration rate above wholesale prices but below retail prices, while shortening accounting periods to less than a year (IEA, 2019[43]). Retail tariffs could also be differentiated according to the time of day and aligned with the cost structures of power utility companies.

In the combination with storage, distributed roof-top solar electricity can provide greater demand-side flexibility. This is important because the high potential of renewable energy sources cannot be fully harnessed without addressing misalignment in peak hours of demand and supply. Previous studies suggest that smart electric vehicle charging for example, which has become widely available at affordable costs, could help shift Thailand's peak demand from the evening hours to the daytime, when more solar photovoltaic energy is produced (OECD/IEA, 2018[42]). This could also reduce fuel consumption by

conventional power producers in the evening hours. Increases in the self-consumption of solar photovoltaic electricity can also accelerate the cost recovery of household investments in storage.

Wind energy potential is also large despite monsoon-related seasonal fluctuations. Although most potential generation locations are far away from high demand areas, the northeast, western and southern regions have strong potential. The Gulf of Thailand also has potential with an average wind speed of 6.4 meters per second at 50-meter height. Previous studies suggest that technical potential across the country could reach 6 GW, but be expanded to 17 GW, if advanced turbine technologies are used (IRENA, 2017[41]). The technical potential is far larger than the current installed capacity of 1.5 GW in 2021 and the planned capacity of 3 GW in 2037.

Expanding renewable energy generation will require further investments, which will require a need to attract increasing amounts of private financing. That in turn will require policy certainty and stable framework conditions. When regulatory frameworks change frequently, or unexpected ad-hoc policy interventions led to less predictable business conditions, investors will demand risk premiums that can raise the economic costs of the green transition unnecessarily. Frontloading the regulatory reforms and defining the broad contours of the business environment early on will help to minimise the costs of reaching net zero.

Enhancing grid connection across areas is also important for an efficient use of solar and wind energy, whose production is unevenly distributed among regions and not necessarily taking place in high-demand areas. This would require additional investment by the network operator EGAT. In Chile, government investment to connect renewable-intensive regions with high demand centres stimulated a significant expansion of renewables in the former areas (Gonzales, Ito and Reguant, 2022[44]). In the case of Thailand, transmission planning and renewable energy promotion are conducted separately by different government departments. Expanding renewable energy would require more coordinated planning between the two to avoid concurrent under-investment in transmission and renewables (OECD/IEA, 2018[42]). In particular, location-specific considerations should be taken into account for transmission planning.

Table 2.2. Past OECD recommendation on green infrastructure

Recommendation in the past survey	Measures taken since October 2020
To attain a sustainable high growth path, invest in green infrastructure, particularly strengthen the capacity of renewable energy production.	The Ministry of Energy developed a medium-term plan for smart grid commercialisation.

Reforming energy markets as a precondition for price signals to work

The electricity sector remains subject to restrictive rules on market entry and prices, which will eventually stand in the way of using price signals to guide the expansion of renewable electricity sources and shifts in consumer behaviour.

While generation is open to independent power producers, the state-owned Electricity Generating Authority of Thailand (EGAT) is the sole transmitter. Distribution is dominated by two state-owned enterprises, both under the egis of the Ministry of Interior. Prices are regulated and government approval is required for price changes by distributors, namely three state-owned enterprises, although electricity prices are updated regularly in line with changing market conditions, such as overall input costs and fuel costs.

The experience of EU countries highlights the potentially positive link between competition and the expansion of renewables. Portugal, for example, opened up its electricity market since the mid-1990s, unbundling transmission, distribution, generation, and end-user supply (OECD, 2019[45]), (OECD, 2012[46]). This helped increase supply form renewable sources, which account for more than 50% of electricity generation today. Enhancing the scope for competition among several actors in Thailand's electricity sector is likely to create a more fertile ground for the expansion of renewable energy sources. The recent

introduction of a pilot programme under which consumers can purchase green electricity at premium rates is one step towards a further market-driven expansion of renewable energy sources.

Creating a transparent wholesale market is an important steppingstone for developing a competitive electricity market. Currently, wholesale prices are flat across the country and throughout the year. Allowing wholesale prices to reflect cost differences across time and location can provide the right signals for investors and generators and guide investment decisions (OECD, 2022[47]). In particular, introducing cost-based location-specific wholesale prices would make fossil fuels more expensive in areas where the actual cost of shipping these fossil fuels such as coal and gas is higher. That could make renewable energy sources more attractive in such areas, even if they are away from demand centres. This systematic price gap in different locations could also incentivise the two state-owned distributors to increase the electricity purchase from more regionally dispersed roof-top solar production (OECD/IEA, 2018[42]).

In addition, reducing price regulation in the electricity market is a precondition for effective carbon pricing. If wholesale and retail electricity prices are heavily regulated, the carbon price signal will have limited impact on investments and consumption. Experience from other countries suggests that a gradual transition is a viable option, introducing more flexible price structures over time (IEA, 2020[48]). In Korea, where retail electricity prices are regulated, the emission trading system includes end-users' indirect emissions to incentivise them to use electricity more efficiently. In California's cap-and-trade system, private electricity utilities are required to sell the freely allocated allowances in the trading system and repurchase them, which helps carbon price discovery, while part of the revenues from this trade is used to maintain retail prices stable.

In sharp contrast to electricity markets, the scope for market forces in other parts of the energy sector over the past decade. This includes lower degrees of price intervention as retail price caps and import restrictions on natural gas for vehicles and liquefied petroleum gas have been removed. Private companies are now allowed to import liquefied natural gas, which was previously a public monopoly. The removal of these price caps occurred in tandem with third-party access to natural gas pipelines owned by a government-owned energy company. Price caps have been temporarily re-introduced as an emergency measure for the pandemic since 2020, but as the economy is now recovering strongly, these temporary measures should be removed quickly.

For as long as natural gas is still used for electricity generation, some current regulations could be reviewed to reduce emissions. Under the current long-term power purchase agreements, private power generators with conventional energy sources are required to maintain high minimum generation levels. In addition, EGAT is obliged to use a certain amount of natural gas that is purchased from PTT. While these requirements have contributed to stable electricity supply in the past, they could now become constraints on the expansion of renewable sources, which requires flexible supply adjustments by conventional power generators (IEA, 2021[49]), (OECD/IEA, 2018[42]). Moreover, Thailand maintains high levels of capacity margins of around 30% for security reasons (IEA, 2021[49]), and requires large-scale private power generators from conventional energy sources to secure excess capacity, which may be pushing up wholesale prices unnecessarily.

Reducing transport emissions

The transport sector is the second-largest source of CO_2 emissions, and the continuous strong increase in emissions have made transport, and in particular road transport, increasingly central in the quest towards net zero targets. In the short run, improving the energy efficiency of internal combustion engine cars, i.e. through better fuel economy, can reduce fossil fuel consumption and CO_2 emissions from transport. In the medium term, policies should strongly promote public transport and zero-emission cars.

The rapid advancement of motorisation makes transforming road transport into a greener sector a challenge, but it is also an opportunity. Like many other emerging market economies, the number of motor vehicles per population has been steadily increasing over the years (Figure 2.13, Panel A). Thailand has

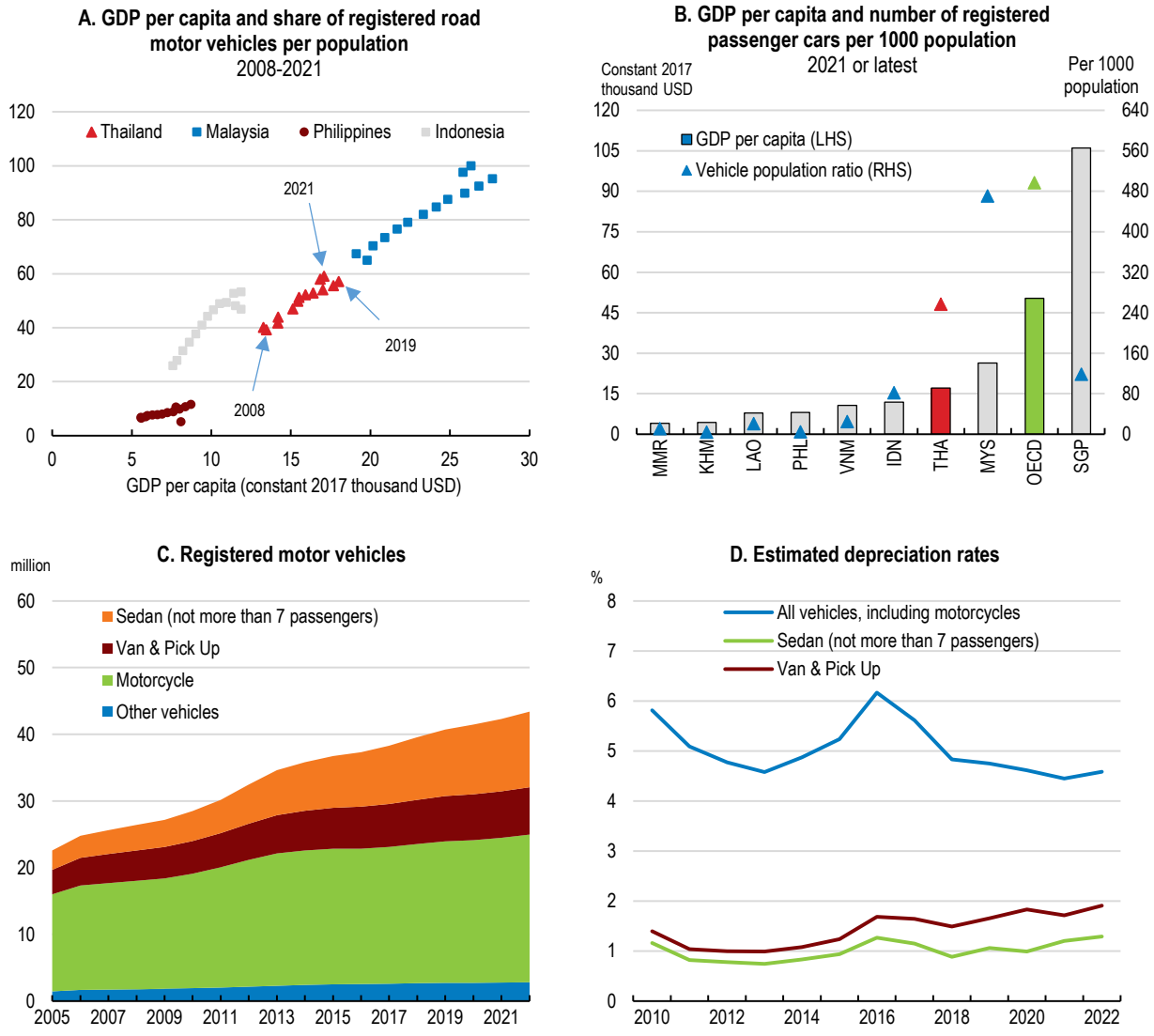
a large automobile production that is strong in exports but also contributes to the evolution of the domestic market. Domestic new motor vehicle sales have been robust with annual sales of new passenger cars hovering around 450 thousand between 2015 and 2019. Given a still rather low level of passenger car ownership (Figure 2.13, Panel B), the rise of the motorisation rate is expected to continue in the coming decades in line with rising incomes (ASEAN Secretariat, 2019[50]). This implies that inflows of new cars in the domestic market will also be increasing.

At the same time, the rapid motorisation is also associated with increases of old car stock. As new cars are still out of reach for many households, the used-car market is evolving especially for passenger cars. While the stock of passenger cars is growing rapidly, the number of transferred registrations has exceeded that of new registrations. As a result, vehicles remain in operation for a long time, reflected in a low estimated depreciation rate (Figure 2.13, Panels C and D). A strong demand for used cars will imply a slow replacement of the existing old stock and vehicles with low fuel efficiency or high emissions will likely remain on the road for many years to come.

The government has stepped up policy measures to improve fuel economy and emissions standards of newly sold cars. Building on a strong automobile manufacturing base, Thailand has one of the most advanced policy settings in the region (ITF, 2022[51]), (ASEAN Secretariat, 2019[50]). Labelling of fuel economy and CO_2 intensity has been mandatory for new cars since 2016, and their measurement is based on an advanced international benchmark, the United Nations Regulation No. 101. A one-off registration tax on new cars has been applied at different tax rates based on their CO_2 emission intensity per kilometre as of 2016. Importing used cars is banned. From a perspective of reducing the emissions of the vehicle fleet, this ban may be helpful currently as used cars are generally older models with low fuel efficiency and high emission intensity, but this may no longer be the case as the market for used EVs expands in the future.

The next step would now be to introduce minimum regulatory requirements on fuel economy and CO_2 emissions of newly sold cars, especially passenger cars. This regulation could also be applied to a car fleet. Given the expanding passenger car fleet, policies that can improve the green footprint of today's new cars is important as these vehicles could be used as second-hand cars for a long period. Adding minimum regulatory requirements for fuel economy and CO_2 emissions of new cars to the existing policy mix can enhance the whole policy framework (ITF, 2022[51]). Previous studies based on data from the United States suggest that such requirements would likely have large effects: the impact of a 10% increase of the US Corporate Average Fuel Economy standards would be 2-3%, while a 100% increase of gasoline prices could increase the average vehicle fuel efficiency by 6-11% (Tikoudis, Mebiame and Oueslati, 2022[52]). By 2015, around 90% of the global market were under some regulatory requirements (ASEAN Secretariat, 2019[50]). China has progressively tightened its minimum fuel economy requirements for newly sold cars since 2005, achieving an annual 1.3% reduction in fuel consumption per kilometre by 2019 (IEA, 2021[53]). For newly sold light-duty vehicles, Thailand has imposed emission standards at the EURO 4 level since 2012. Around 95% of in-road vans and pick-ups are diesel-powered.

Figure 2.13. Motorisation is advancing in Southeast Asian countries



Note: On Panel A, motor vehicles include motorcycles. On Panel B, the OECD average is calculated as an average of 30 members where data are available. On Panel D, the depreciation rate is calculated from the following equation: (Registered vehicles of year t) = (Registered vehicles of year t-1)*(1 - depreciation rate) + (Newly registered vehicles in year t)

Source: ASEAN, ASEANStatDataPortal; World Bank, World Development Indicators; Department of Land Transport, Vehicle Registration Information; OECD, OECD.Stat.; and OECD calculations.

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Given the growing stock of used cars, enhancing the annual vehicle tax, a recurrent tax on car ownership and use, could encourage the phase-out of vehicles with low fuel economy or high emissions. A number of OECD countries levy recurrent taxes on car ownership and use based on environmental considerations such as fuel efficiency and emission intensity, with lower rates for hybrid or electric vehicles (OECD, 2022[54]). In Thailand, the annual vehicle tax is based on vehicles' engine size, age and weight. The tax rate declines with the age of the car. However, aged cars typically entail high environmental costs. Japan imposes an additional 10% on diesel fuel cars aged over 11 years and gasoline cars aged over 13 years. Thailand could raise the annual vehicle tax rate for aged cars, although linking the tax rate more directly to fuel economy and CO_2 emissions would be preferable (ASEAN Secretariat, 2019[50]).

The increasing use of biofuels has contributed to containing the acceleration of CO_2 emissions from transport (Pita, Winyuchakrit and Limmeechokchai, 2020[55]). Molasses, sugar cane and cassava are used

to produce bioethanol, while biodiesel is mostly made from palm oil. Thailand has promoted biofuel blending in transport fuels. Biofuel consumption in road transport almost tripled between 2010 and 2019, accounting for around 75% of total biofuel consumption in 2019. Gasoline with 10% of ethanol (E10) was first introduced in 2003 and highly blended gasoline at 20% (E20) and 85% (E85) became available as of 2010. The biodiesel blending rate in diesel has been raised gradually from 5% (B5) since 2005 to 10% and 20% (B10 and B20), although B20 is only for heavy-duty vehicles. Biofuel blending is being promoted through differentiated excise tax rates according to blending rates, while the new vehicle registration rate has a discount for biofuel compatibility. Biofuel blending in diesel became mandatory in 2011, raised from 7% to 10% in 2020. However, older vehicles can still use B7 diesel, and the mandatory 10% rate was temporarily reduced in 2021 in an attempt to stabilise retail diesel prices.

The usage of biofuels could be further promoted, to the extent that this can reduce emissions. The government plans to gradually phase out low-blending-rate fuels such as E10 and B7, intending to make E20 gasoline the main product by the mid-2030s. Phasing in higher mandatory blending rates more rapidly could be considered, especially as all vehicles produced in Thailand as of 2008 need to be compatible with E20 gasoline. Some countries have increased the usage of biofuels in road transport with remarkable success (Figure 2.14). Indonesia raised its mandatory blending rate of ethanol in gasoline from 5% to 10%, although these new rules are not yet enforced, and biodiesel from 20% to 30% in 2020, while planning to increase the mandatory rate of ethanol further to 20% by 2025 (United States Department of Agriculture, 2022[56]). The Indonesian government also aims for a high 40% biodiesel blending, although such high rates require technology advancement to avoid engine deterioration (IEA, 2022[57]). Sweden reduced the energy and carbon tax for biofuels as early as 2007, later modified to apply only to high-blending-rate fuels such as 85% or 100% as of 2018. Since then fuel suppliers are required to reduce CO_2 emissions from fuels by a certain rate every year though blending biofuels (IEA, 2021[58]), (The Ministry of Infastructre, 2020[59]).

The sustainability of biofuels is an important element to consider in each specific case. The life cycle GHG emissions of biofuels typically range from around 30% to nearly 100% of those of fossil fuels (IEA Bioenergy, 2023[60]). In addition, a rapid expansion of biomass feedstock production could result in inefficient land use and degrade biodiversity. This latter argument does not apply to producing biofuels from agricultural residues and waste, which can also help ease domestic supply constraints. Nascent technologies are available for this but need to be improved through research and development.

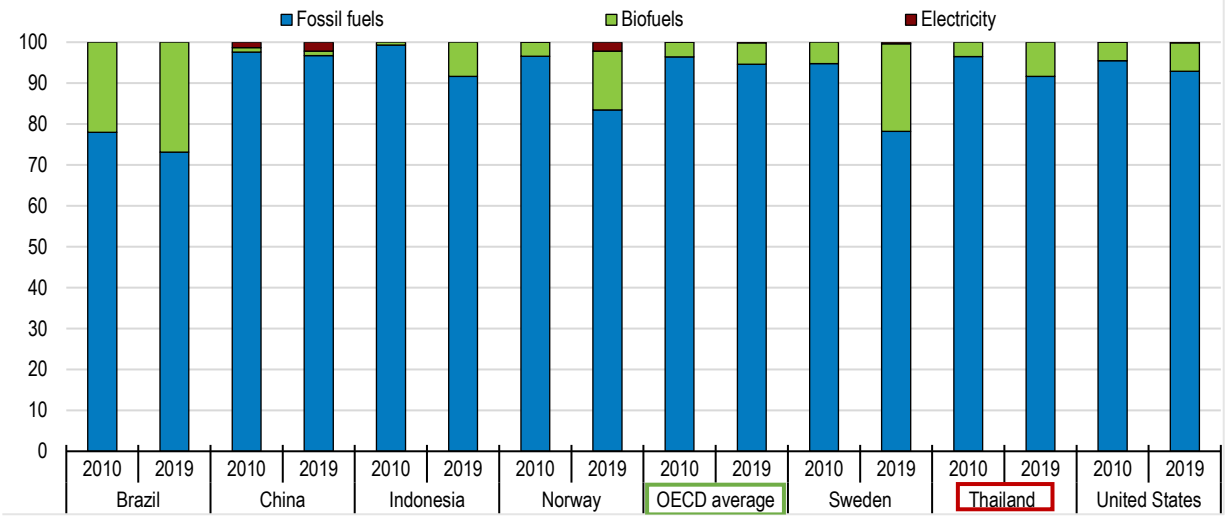
Current restrictions on imports of biofuels could be eased, especially as domestic biofuel supply has been volatile due to weather and other conditions that cause supply fluctuations of feedstock (OECD/FAO, 2022[61]), (United States Department of Agriculture, 2022[62]). Despite a progressive expansion of biofuel production, the government has struggled to secure sufficient feedstock crops to meet biofuel blending targets (Koizumi, 2014[63]). Higher mandatory blending requirements would only make sense if sufficient supply of sustainable biofuels can be ensured.

A strong shift to electric vehicles will be necessary to achieve the net zero targets. Even if transport is placed outside of an emissions trading system (ETS), electrification of the transport sector can accelerate decarbonisation of the whole economy through higher demand for electricity generated from renewable sources, on the condition that the power sector is included in the ETS. In addition, using electric vehicles is more energy-efficient than conventional vehicles, as they consume one third of energy per kilometre compared with internal combustion vehicles (Lindberg and Fridstrøm, 2015[64]).

Lowering both upfront capital and running costs can stimulate demand for electric vehicles. Despite the recent decline, sales prices of electric vehicles are higher than those of internal combustion, with a typical price differential in the range of 40-50% in the case of Europe and the United States in 2021 (IEA, 2022[65]). Some countries have dramatically boosted the penetration of electric vehicles over the past years (Figure 2.15).

Figure 2.14. Energy consumption by product type

Road transport, %



Note: Energy consumption is measured in the tonne of oil equivalent (ktoe).
Source: IEA World Energy Balances.

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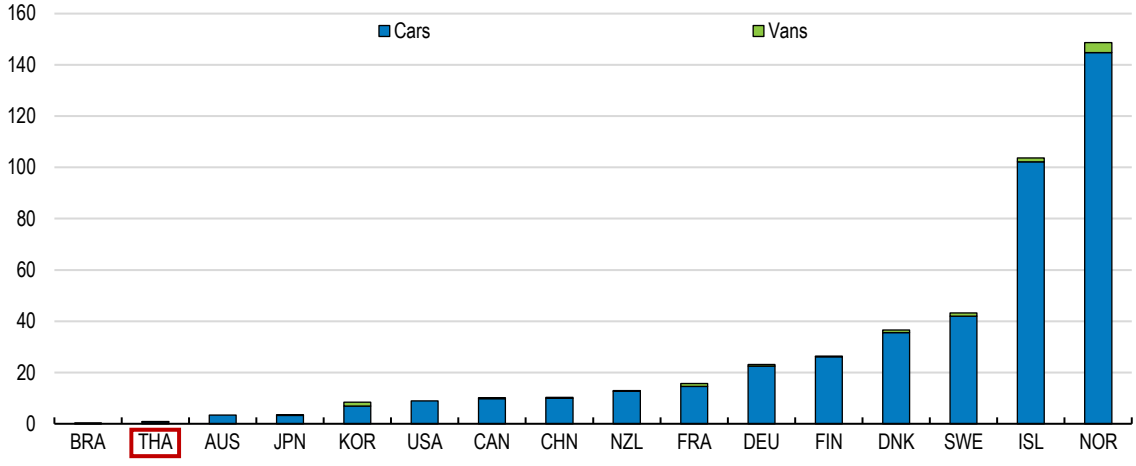
Thailand aims for boosting new registrations of zero emission vehicles. Policy levers used include rebates in excise and annual vehicle taxes as well as import duties for electric vehicles. Subsidies for electric car purchase amounting to USD 2000 or 4300 per car were also introduced in 2022. Simple calculations suggest that to increase the share of zero emission passenger cars in new registrations from the current 2% to 100% by 2035, the new registrations need to grow by 37% each year. Some mature markets have seen such strong growth of electric vehicle sales. In Germany, the share of electric vehicles in new car sales increased from 1% in 2016 to 26% in 2021, while, in Norway, it continued to grow from 29% to 86% during the same period (IEA, 2022[66]).

Figure 2.15. The electric vehicle market is still nascent in Thailand

Electric vehicles stock per thousand of population, 2022



Note: Electric vehicles include battery electric vehicles and plug-in hybrid electric vehicles. For Thailand, vans are defined as microbuses, passenger vans, other vans and pick up cars. Cars are defied as vehicles under the Motor Vehicle Act, excluding vans and motorcycles. As of end 2022, there were 56 636 cars and 78 vans in Thailand. For the other countries, vans are defined as light commercial vehicles with gross vehicle weight below 3.5t.
Source: IEA, Global EV Outlook 2023; World Bank, World Development Indicators; Department of Land Transport, Vehicle Registration Information.

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In Thailand, although the registrations of zero emission passenger cars increased by 130% in 2022, this was mostly related to the low starting point and keeping up high sales growth will likely require strong policy support and a rapid price decline. Without accelerating the replacement of older internal-combustion cars, only around one fifth of registered vehicles would be zero emission cars by 2035. Building on the strong international manufacturing hub of conventional vehicles, the government intends to raise the domestic production capacity for electric vehicles, aiming for a share of 30% by 2030. This could reduce production costs of electric vehicles and improve domestic EV sales.

Increasing the number of charging stations across the whole country is crucial to address users' range anxiety associated with electric vehicles. Thailand had around 1500 public charging stations as of 2021 (IEA, 2022[65]) and aims at increasing the number almost tenfold by 2030. Norway's experience suggests that, while the government has provided financial support since 2010, private operators have been active in building fast-charging stations (D'Arcangelo et al., 2022[2]). Korea is another example highlighting the role of public financial support to increase the number of charging stations (IEA, 2022[65]). One private Thai operator already runs more than 400 stations and the state-owned electricity company EGAT also plans to install charging stations across the country (Khan et al., 2022[67]). In Thailand, there may be a case for focusing government support on remote areas, given the limited government financial resources. In addition, regulations could complement government support. In Canada, for example, local governments require that operators should install charging stations at petrol stations and in commercial carparks (OECD, 2023[68]).

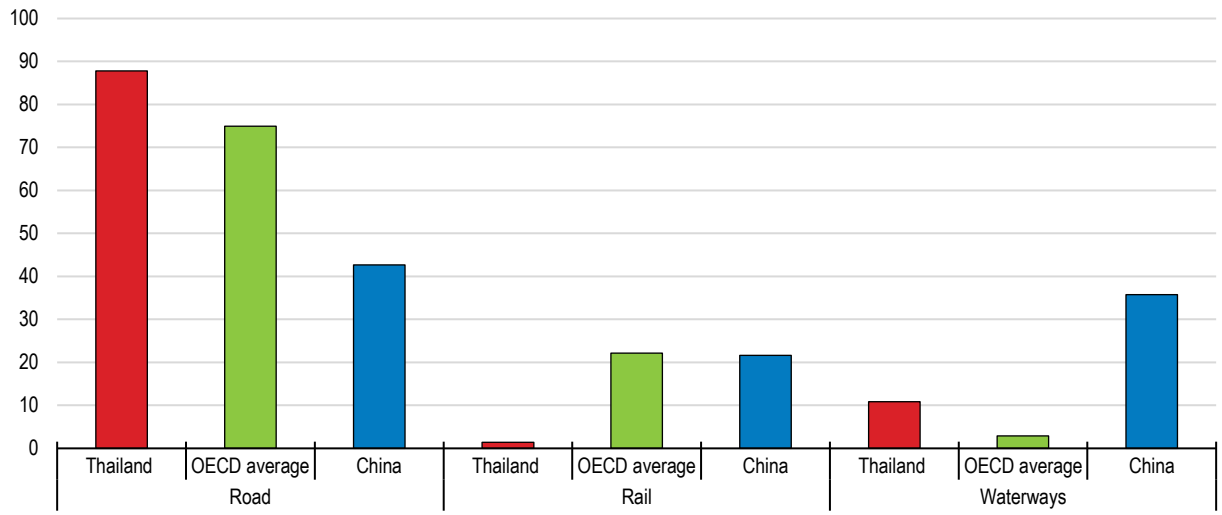
Public transport, especially rail transport, will also need to play an increasing role in reducing transport emissions. This can also contribute to greening the logistics sector and could raise Thailand's industrial competitiveness. Improving public transport can also be an essential tool to facilitate a just transition, as low- or zero-emission vehicles would not be affordable for the poorest households. Similar to other emerging market economies, roads are the main mode of transport for people and goods, while the public transportation system is rather weak (Figure 2.16). Less than 20% of intercity rail networks are double- or triple-track, which limits transportation capacity. Underinvestment in infrastructure, including operation systems such as signals, undermines transport efficiency. Most intercity railways are not electrified and the scope for greening rail transport is large.

Although most railways are owned by the state-owned enterprise, improving public transport will require more investment from both the private and public sectors, including through public-private partnerships and foreign investments. The Transport Infrastructure Development Strategy 2015–2022 intended to allocate THB 1.9 trillion (11% of GDP) to a number of projects, including expanding double-track intercity rail networks and connecting key production areas to neighbouring countries. More recent plans envisage developing 177 railway stations throughout the country. However, around 80% of the government budget is allocated to road network development. In this context, putting more emphasis on inter-mode operability, i.e. the connection between rail and other transport systems, such as public bus or private cars, which is currently weak, could increase the investment impacts.

Urban public transport in the Bangkok Metropolitan Region has progressively developed. However, compared to the growing population in the region, the number of people who use public transport remains limited, resulting in persistent traffic jams. The Mass Rapid Transit Master Plan intends to build 12 additional lines (509 km) of new urban railways. In order to reduce urban road transport congestion, congestion charges could be an effective tool to be considered (van Dender, 2019[69]). In Singapore, a road charge is automatically levied on car users through an electronic system when they use expressways and main urban roads (Theseira, 2020[70]). The time-varying charge rates are reviewed every quarter to keep traffic speeds within certain ranges.

Figure 2.16. Rail freight transport accounts for a small share in in Thailand

Inland freight transport, share, %, 2019



Note: Calculations are based on tonne-kilometre data. The OECD average is calculated as an average of 26 members where data are available. Air and pipeline transport is not included.
Source: ASEAN Railways, Data & Statistics; ITF Transport Statistics.

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Reducing emissions from agriculture

GHG emissions from agriculture constitute 15% of the country's total GHG emissions. Half of agriculture GHG emissions stems from rice farming, and livestock accounts for around one fourth. Like in many countries the agricultural sector lags behind other sectors in terms of GHG emission reduction. Setting out a long-term strategy for the sector's transformation is thus increasingly important.

Low-emission technologies and practices for rice farming exist, but their uptake could be accelerated. Thailand has promoted rice cultivation techniques that generate less methane emissions, such as an "alternative wetting and drying" method that intermittently wets rice fields rather than keeping them wet, to reduce methane emissions by 30%-70%. This technique could be applied more widely, possibly with public support during a transition phase.

Improving access to irrigation water may also help. Currently, less than 30% of farmers have access to irrigation system, limiting their production period in the year (World Bank Group, 2022[71]). Better access to water can improve the crop yields of small-scale farmers who depend on dryland agriculture, potentially helping them to diversify crops. Improved irrigation systems can also strengthen the sector's climate resilience, especially among small-scale farmers.

Boosting agricultural productivity through greater scale of production can also contribute to reducing emissions. Most farmers are small-scale producers, and their income levels are low (World Bank Group, 2022[71]). Evidence from a government extension programme suggests that large-scale collective rice farming is more productive and emits less GHG emissions than small-scale individual farmers (Arunrat et al., 2021[72]). Diversification of production into higher-value crops may also offer opportunities to reduce emissions (World Bank Group, 2022[71]).

Reducing field burning is also an urgent policy priority. Agricultural burning accelerates deforestation and causes air pollution, especially with PM 2.5. Appropriate measures should include stronger incentives to discourage farm burning and restrictions on burning practices.

A pricing system could help facilitate GHG emission reductions, including through facilitating low-emission technologies and practices. However, although agriculture could be included in an economy-wide GHG pricing system, many countries to date exclude the sector due to competition and food security concerns, and implementation challenges. New Zealand plans to introduce a sectoral pricing framework for the agriculture sector, which may provide useful guidance for Thailand (Box 2.3).

Box 2.3. GHG emission reductions in New Zealand's agriculture sector

Agriculture is one of the most important sectors in New Zealand. More than half of the country's GHG emissions come from agriculture, mostly livestock. Although the agriculture sector is not included in the country's emission trading system, a legally binding target is imposed on the sector, like many other sectors. The Climate Change Commission, an independent government body, monitors progress of each sector's emission reduction. In addition, the government set up a partnership programme with the sector to equip farmers to measure, manage and reduce on-farm agricultural greenhouse gas emissions and adapt to climate change.

Based on the discussion of the partnership, the government plans to introduce a farm-level emission pricing system in 2025. In doing so, all farmers need to know their annual emissions numbers. In 2020, guidance was developed for farmers to measure and manage GHG emissions. By 2025, all farms will have a written plan in place to measure and manage their GHG emissions. Emissions of different types of gases will be priced separately considering their greenhouse gas effects.

Source: (OECD, 2022[73]), (NZ Ministry for the Environment, 2022[74])

Raising energy efficiency presents scope for emission reductions

Energy productivity has improved over the recent years

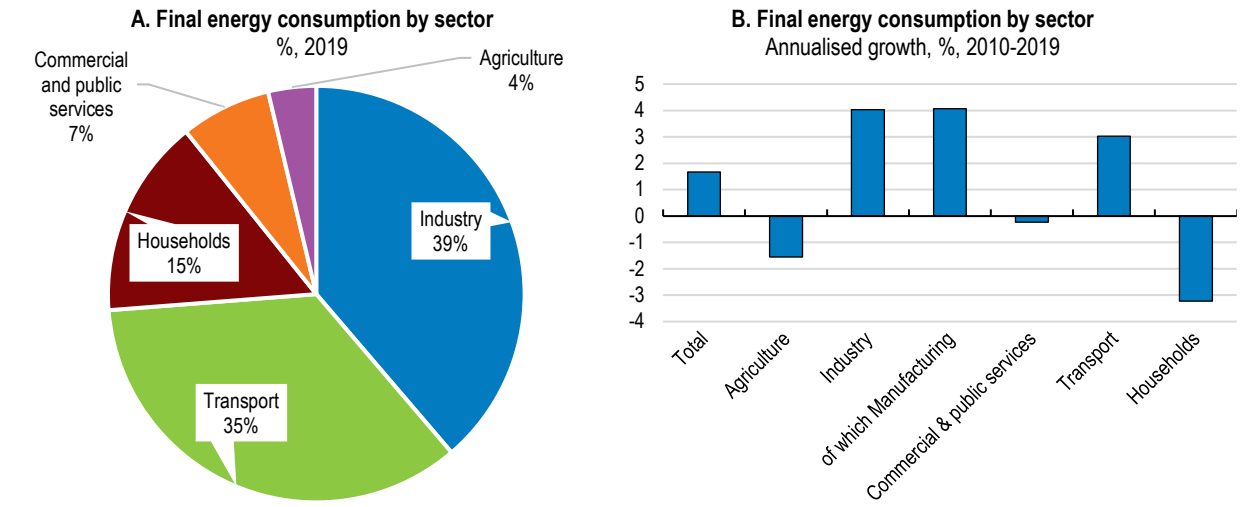
Thailand has made strong efforts to improve its energy efficiency. After adopting its first plan on energy efficiency in 2011, the government revised the plan twice, most recently in 2018, and is preparing a new draft plan. The current Energy Efficiency Plan 2018-2037 aims at reducing the economy-wide energy intensity by 30% by 2037, relative to 2010. The plan includes a wide range of policy instruments, including regulation on buildings, energy efficiency standards for equipment and machinery and a revision of excise tax rates on fuels and vehicles to improve fuel efficiency. Although mostly voluntary, energy-efficiency labelling has been highly encouraged. Minimum efficiency standards are applied only to a few products, including air conditioners and refrigerators, washing machines and small diesel engines.

Improvements in energy efficiency within sectors can increase aggregate energy productivity. In addition, a country's industrial structure also matters. Like in many other countries, the manufacturing sector is one of the largest energy consumers (Figure 2.17), while the services sector, which has been growing in Thailand (OECD, 2020[75]), uses less energy.

Decompositions prepared for this chapter suggest that energy productivity measured as value-added per final energy input has improved over the past years, after a decade-long stagnation across a wide range of sectors and sub-sectors (Figure 2.18). The largest improvements have been realised in the household sector, where energy efficiency has more than doubled over the last three decades. Within the business sector, composition effects suggest that a growing weight of services, whose efficiency gains exceed those in manufacturing, has contributed to aggregate energy productivity improvements. In contrast, energy productivity has been on a declining trend in manufacturing, although there have been improvements in recent years.

Within the manufacturing sector, the machinery sector has improved its energy productivity, in contrast to other sectors such as the non-metal and chemical products sectors. A growing share of machinery production with better energy productivity has contributed to overall improvements in manufacturing. In other words, structural changes in the economy from heavy manufacturing with low energy productivity to more sophisticated manufacturing activities with higher energy productivity have supported overall energy efficiency gains in the manufacturing sector. While raising energy productivity of the existing manufacturing sectors is vital, further upgrading into more sophisticated manufacturing activities would hence present ample scope for improvements in energy productivity.

Figure 2.17. Industry and transport account for a large share of energy consumption



Note: Non-energy use is not included.
Source: United Nations Energy Balances.

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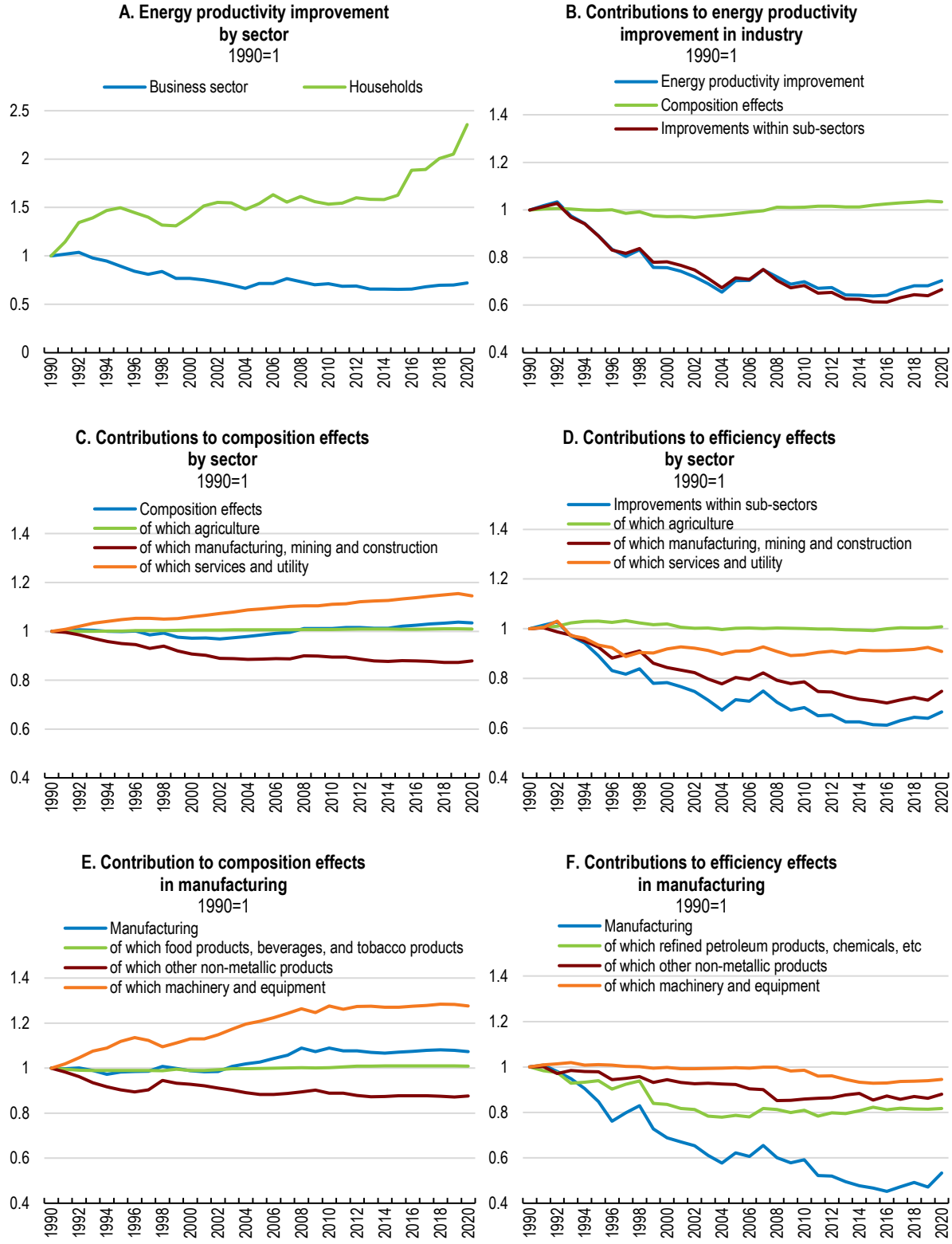
Figure 2.18. Energy efficiency has improved in recent years



Note: Energy productivity improvement for industry is defined as real GDP divided by final energy consumption. For households, it is calculated as an inverse of energy intensity, i.e. household consumption divided by final energy consumption. Panels E and F show sub-sectors' contributions to energy productivity improvement in manufacturing. The calculation methodology is based on (Nomura, 2017[76]).

Source: United Nations, Energy Balance; Asia Productivity Organisation, APO Productivity database; National Economic and Social Development Council, Input-Output Tables; and OECD calculations.

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Advancing electrification can help improve energy efficiency

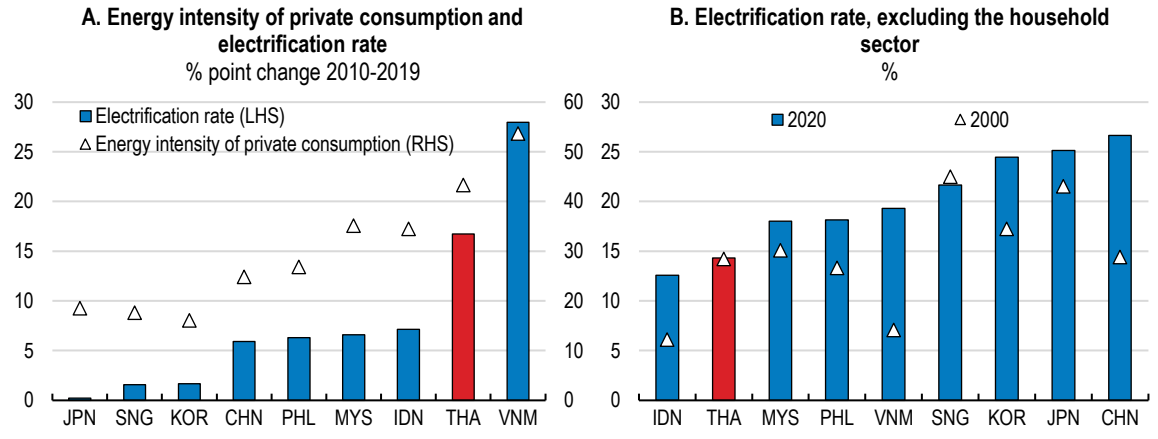
Beyond its direct potential for emission reductions through the use of more renewable energy sources in the power and transport sector, accelerating the electrification of a broader range of economic activities could also contribute to climate change mitigation by improving energy efficiency. Among the different forms of energy, electricity is one of the most efficient ones. Despite some transmission losses, electricity can easily be transmitted and converted for diverse uses in a way that's more efficient than fossil fuels, from lighting a bulb to running a car (IEA, 2022[77]). Therefore, although generating electricity from other energy forms entails some losses, economic development is often associated with a rising rate of electrification.

Households have steadily increased their electricity use relative to other forms of energy. Like in other Southeast Asian countries, universal access to electricity across the population was achieved by the early 2000s. The share of electricity in households' final energy consumption has seen a rapid rise from 17% in 2010 to 34% in in 2019, excluding for transport activity. This explains much of the improvement in the energy efficiency of the household sector (Figure 2.19, Panel A). The pandemic reinforced this trend further, and the electricity share in household energy consumption reached 50% in 2020.

Looking ahead, further efficiency gains could be achieved from putting more emphasis on efficiency improvements of household appliances, such as air conditioning and LED lighting. Around 35% of households had air conditioners by 2021, and this rate is expected to grow. Progressively raising compulsory energy performance standards for cooling system is therefore increasingly important (IEA, 2019[78]). In India, LED adoption increased dramatically through a government mass procurement programme that contributed to lower retail prices for LEDs.

Thailand's business sector, by contrast, lags behind its regional peers. By 2000, Thailand had achieved comparatively high levels of electrification but other countries, such as China and Viet Nam, have caught up rapidly and surpassed Thailand (Figure 2.19, Panel B).

Figure 2.19. Electrification has rapidly increased in the emerging Asian economies



Note: Energy intensity is calculated as final energy consumption divided by real private consumption. A positive change reflects improvements in energy intensity. The electrification rate is calculated as the ratio of electricity to total energy in final energy consumption.
Source: IEA World Energy Balances; World Bank World Development Indicators; Asia Productivity Organisation, APO Productivity Database 2022; and OECD calculations.

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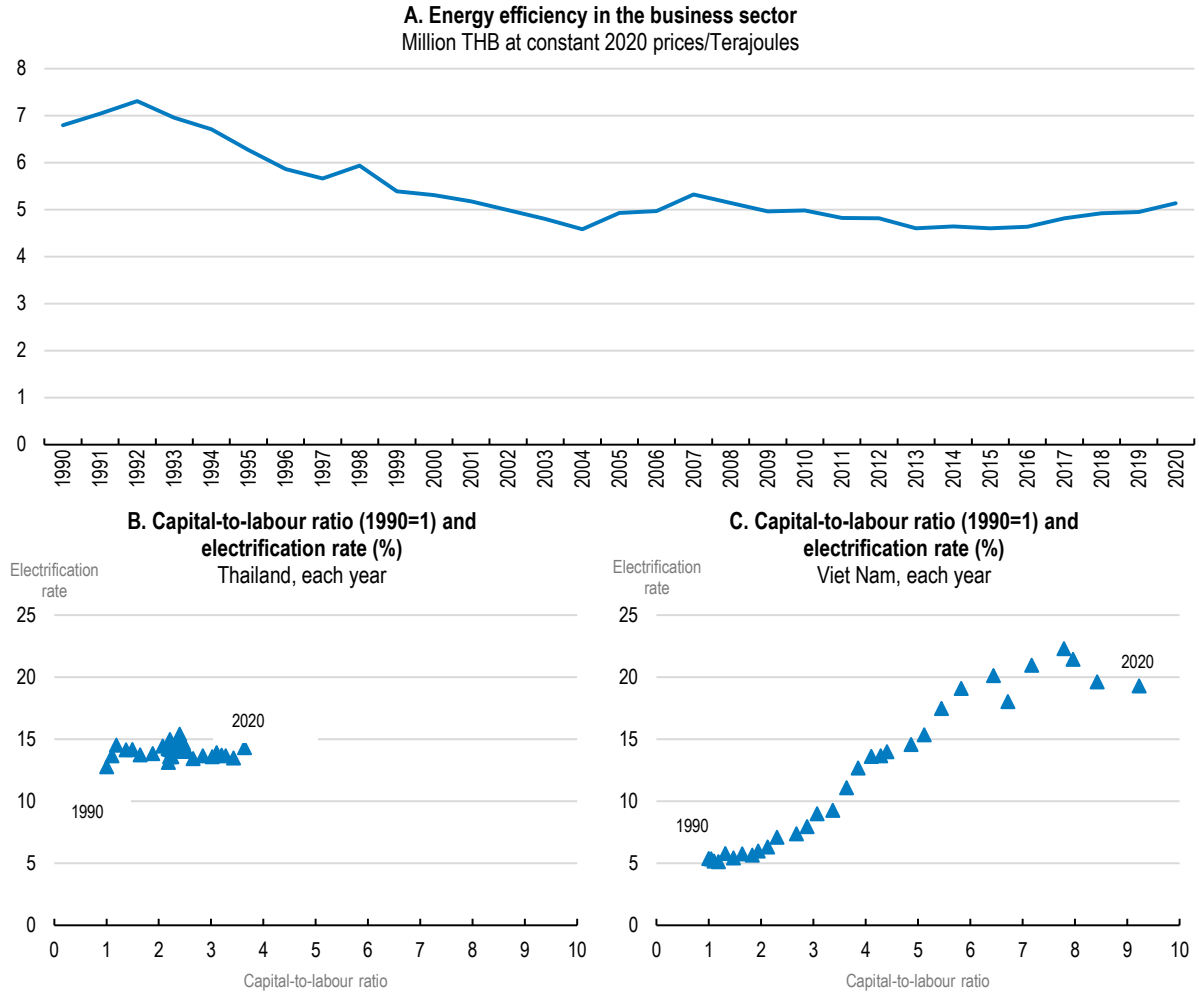
The business sector could invest more to improve energy efficiency

In the business sector, energy efficiency, defined as output produced per energy unit, has deteriorated over the last three decades, before improving again as of 2014 (Figure 2.20, Panel A).

A comparison between Thailand and Viet Nam reveals interesting differences (Figure 2.20, Panels B and C). As Viet Nam's economy employed increasingly more capital relative to labour between 1990 and 2020, it shifted more and more towards electricity among the different sources of energy. In contrast, electrification has increased much less over the same period in Thailand, while capital intensity rose strongly, albeit less so than in Viet Nam. One potential explanation for this could be that in contrast to Thailand, Viet Nam has invested more into equipment powered by electricity, which is generally more energy-efficient and less emission-intensive.

Figure 2.20. Business energy efficiency has been declining and electrification has been slow



Note: Panel A shows energy efficiency developments in the business sector. Panels B and C: The electrification rate is calculated as the ratio of electricity to total energy in final energy consumption.
Source: United Nations, Energy Balance; Asia Productivity Organisation, APO Productivity database; National Economic and Social Development Council, Input-Output Tables; IEA World Energy Balances; World Bank World Development Indicators; and OECD calculations.

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Ensuring that firms have access to the latest and most energy-efficient equipment when they invest in their capital stock will therefore be crucial. It is also vital that they have the right incentives to choose the most energy-efficient technologies available. Getting price signals right, for example through higher and broadly applied carbon prices, will be one way to achieve this, but there may also be more specific constraints that

keep business sector investment into energy-saving technologies below what is possible. Beyond pricing, energy efficiency standards and tax incentives could also play a role to promote energy efficiency. Investment in research and development is also a priority to advance energy efficiency technologies. This should be the focus of further investigation to identify the investment bottlenecks that firms of different sizes are facing. Measures to foster the allocation of credit into business investments that raise energy efficiency may be one option to consider, if and when it is considered that the private returns from such investments fall short of the social returns.

Investing in adaptation to climate change

Climate change could severely affect Thailand's prosperity. The extreme weather events that Thailand experienced over the past two decades, such as severe floods and tropical cyclones, generated the third largest economic losses in the world, with an average loss of 0.8% of GDP (Eckstein, Kunzel and Schafer, 2021[79]). However, future potential costs could be larger, in the range of 10-20% of GDP (World Bank Group, 2023[80]). Thailand's long coastline has become more vulnerable to rising sea levels due to the longstanding deforestation of mangrove trees. Many urban areas are on low-rising flood-prone ground, and the rapid land subsidence caused by overextraction of groundwater adds another threat to Bangkok's climate resilience. Thailand's key economic sectors, especially agriculture and tourism, are susceptible to changes in weather patterns. In particular, severe droughts have become more frequent than before, often causing a significant loss to the agriculture sector with its many small-scale farmers, while increased temperatures could curb labour productivity and increase healthcare costs.

Tackling the climate adaptation challenge will likely require considerable policy efforts. An adaptation plan established in 2015 covers all critical sectors such as water, agriculture and public health. By some estimates, Thailand needs to invest an annual 1.1% of GDP into climate change adaptation measures (IMF Asia and Pacific Department, 2022[81]). Besides, climate risks would be disproportionally high for vulnerable people, such as small-scale farmers in rural areas affected by droughts. This implies not only a need for adaptation investments such irrigation infrastructure, but also stronger social safety nets, which in turn would require additional revenue mobilisation, as discussed in Chapter 1 of this Survey.

As financial institutions play a key role in channelling climate finance, including for adaptation, making them more robust to climate risks is increasingly important. A number of financial supervisors have introduced climate risk scenarios to the stress tests of financial institutions. For example, the European Central Bank conducted its first climate risk stress-testing major banks in 2022 (European Central Bank, 2022[82]). Similarly, the Bank of Thailand encourages credit institutions to disclose their climate-related risk exposure (Bank of Thailand, 2023[83]). Building on this exercise, adopting a more systematic approach would a useful next step.

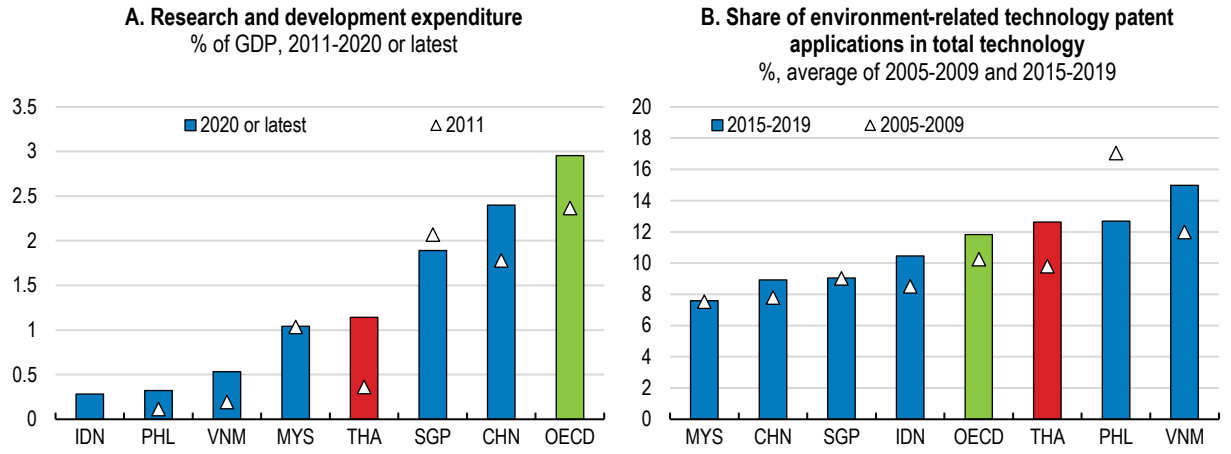
Fostering green innovation

Strengthening capacity for green innovation can help Thailand to realise the green transition in a growth-friendly manner (Thampanishvong, Channuntapipat and Witoonchart, 2021[84]). Application of new scientific insights and technologies can directly help businesses and households reduce GHG emissions. Innovation of affordable technologies can accelerate renewable expansion. Diffusion of new technologies can also boost productivity through higher energy efficiency (OECD, 2015[85]). In addition, new eco-friendly products may allow businesses to create higher value-added products.

The benefits from innovation can stem from both technological advances designed in Thailand, but also for green technologies invented abroad. Absorbing and diffusing imported innovations may not happen automatically, but it will also require some amount of technical knowledge. As innovation occurs in diverse spheres, governments need to find the right mix among various policy tools, such as financing and regulation, and the right targeting.

The Thai authorities have put strong emphasis on innovation over the past years, in particular the promotion of investments into research and development. Owing to these policy efforts, overall research and development investments have increased remarkably since the late 2010s (Figure 2.21, Panel A). This strong growth was mostly driven by the private sector, which accounted for around 70% of total investments in 2020. Moreover, innovation outcomes compare well with other emerging market economies (Figure 2.21, Panel B). Recently, SMEs and domestic businesses appeared to become more active in innovation activity than before. Between 2010 and 2019, the number of small businesses that were granted a patent increased by 14.7%, faster than the national average 12.6%, and the number of patents owned by domestically-owned businesses also increased faster than the number of total granted patents during the same period, although the majority of existing patents are still owned by foreign-owned businesses (Rattanakhamfu and Itthiphatwong, 2020[86]).

Figure 2.21. Thailand has rapidly increased R&D expenditure



Note: Data are not available for Indonesia in 2011. In 2013, it was 0.08%.
Source: World Bank World Development Indicators; OECD Green Growth Indicators.

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Direct funding and tax incentives are supporting research and development

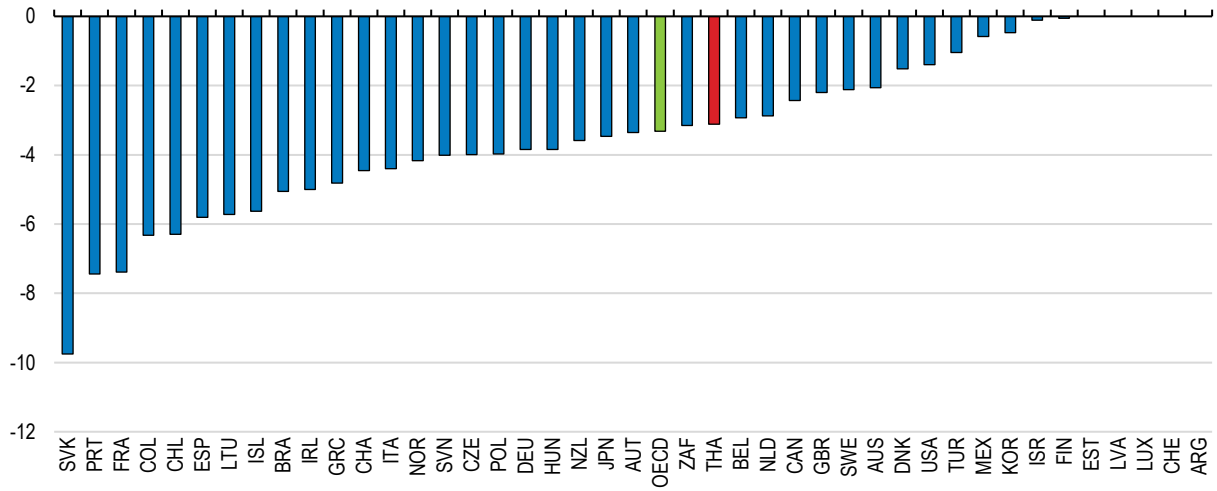
Public spending on research and development can have an important catalyst role (Rattanakhamfu and Tangkitvanich, 2018[87]). On average, governments in OECD countries financed research and development around 0.6% of GDP in 2019, twice as much as Thailand. Compared with basic research, green technologies are often only meaningful when they are widely used on a commercial basis, for example in the case of technologies that enable energy saving. In addition to research directly conducted by public institutions, government support should therefore also focus directly on the private sector, for example through direct grants to SMEs.

In addition, indirect government support through tax incentives can help to overcome the financial constraints of SMEs. In line with the 2016 comprehensive industry strategy “Thailand 4.0”, the new allowance covers up to 200% of research and development investments, (OECD, 2018[88]). While a ceiling on the maximum corporate income tax allowance was removed in 2019 (OECD, 2021[89]), large companies cannot carry unused allowances forward. By contrast, SMEs can use unused allowances for up to five years, but their typically lower corporate income tax rate reduces the effective tax allowance rate, and will generally keep it below the statutory 200% (OECD, 2021[90]). Due to limited resources, SMEs may find the administrative work in applying for these incentives more burdensome than large firms. Against this background, application procedures for a corporate income tax allowance were streamlined in 2017, with a self-declaration tool for small projects

A number of countries provide stronger tax incentives than the OECD average (Figure 2.22). The Slovak Republic, where the corporate income tax rate is 21%, grants a 200% corporate income tax allowance to businesses investing into research and development, with no ceiling. An additional 100% allowance is given to half of incremental investments compared to two years earlier and businesses can carry forward unused tax allowances for five years. This hybrid system introduced in 2015 increased the number of SME recipients fourfold by 2019 (OECD, 2021[91]). In addition, some countries provide additional incentives for green innovation. In Belgium, in addition to the standard research and development, investments in environmentally friendly patents or research and development are also eligible for a further tax incentive, either in the form of a corporate income tax credit or an allowance (OECD, 2021[90]).

Figure 2.22. R&D tax incentives are weaker than in other economies

Reduction in the cost of capital due to the enhanced treatment of R&D, % point, 2021



Note: This indicator measures by how much R&D tax incentives reduce the taxation of R&D investments that make zero profit. It is obtained by comparing the cost of capital for an R&D investment including the impact of R&D tax incentives to that of a comparable investment to which R&D tax incentives do not apply.
Source: OECD, OECD R&D tax incentive indicators.

StatLink https://stat.link/xlm9q1

Adopting advanced green technologies embodied in foreign direct investment is also important. The Board of Investment (BOI), a government investment promotion agency, has promoted foreign direct investment for green innovation through various tax incentives, including a corporate income tax exemption up to 13 years and an import duty exemption (OECD, 2021[92]). While some sectors important for green innovation, such as electric vehicles, are included in the targeted sectors, the coverage is rather broad, as it is not specifically designed for green innovation.

Strengthening collaboration between businesses and research institutions can help businesses to expand their innovation capacity. Human resources are a major bottleneck for Thailand's business sector, especially in SMEs, often outweighing financial constraints. Investment in human capital, such as technical vocational education and training should be strengthened. The recently introduced special visa programme is expected to attract high-skilled foreign workers. Besides, science-industry collaboration can be a useful tool to tackle this human resource constraint. The government has developed various initiatives to lead science-industry collaboration (EC-OECD, 2023[93]), including the Innovation and Technology Assistance Programme. The programme dispatches experts to SMEs while funding up to 50% of the project costs, subject to a cap. A government-led consortium, the Higher Education for Industry Consortium, also provides similar consultancy services to businesses with the collaboration with five universities.

Science-industry collaboration can also be promoted through tax incentives. Some OECD countries like France and Hungary condition tax benefits on the collaboration or sub-contracting with research institutions

(OECD, 2021[90]). In Thailand, the tax incentives provided by the Board of Investment require businesses in targeted sectors, such as software, to collaborate with designated domestic universities or research institutions. However, the sectors where this is applied are rather limited, and many key sectors for the green transition are not included.

Striking the right balance between direct and indirect government support is important, as these policies often complement each other. Amid growing fiscal constraints, a number of OECD countries have favoured tax incentives over direct support over the last years on the grounds that businesses are better placed to make technology choices than governments (OECD, 2021[94]). However, evidence from 20 OECD countries suggest that tax incentives and direct government support tend to stimulate similar amounts of additional business investments in research and development (OECD, 2020[95]). While the effect of tax incentives tends to be larger for experimental development than for basic and applied research, direct support would be likely to more effective for the latter. In this context, direct government support is essential to develop some nascent green technologies, such as advanced bioenergy technologies, which have a long lead time to commercialisation.

Towards a more circular economy

Thailand could reduce material use and with that carbon emissions by recycling more used materials (OECD, 2019[96]), (Böhringer and Rutherford, 2015[97]). Recycling and reusing materials could strengthen energy efficiency. For example, producing secondary aluminium requires 5% of the energy required for primary production and establishing a recycling system for various metals can significantly reduce GHG emissions (OECD, 2019[98]). Global efforts to reduce carbon emissions are therefore expected to stimulate strong demand for secondary metals (Watari, Nansai and Nakajima, 2021[99]). Moreover, the environmental impact of recycled materials during the production phase is often smaller than that of primary materials (OECD, 2019[98]). As a country with relatively few natural resources for production, Thailand could also benefit in many ways from the recycling of essential materials. This would, for example, strengthen the resilience against supply chain disruptions (World Bank, 2022[100]).

Better waste management would be at the core of a more circular economy. Thailand made significant progress in municipal solid waste management over the past years. Responding to growing concerns among citizens about rising waste levels, the government has given an exceptionally strong mandate to provincial governors to instruct autonomous local governments since 2014 (Funatsu, 2019[101]). Under this new policy framework, waste management activities by small neighbouring local governments, especially those with weak financial resources, are merged to improve the efficiency of waste collection and treatment. Local governments are regularly asked to report to provincial governors on the progress of their waste management plans. Budget allocations to local governments for waste management rose by an annual 80% between 2013 and 2016. This strong intervention has considerably reduced improper waste treatment, such as open burning and illegal dumping, while rapidly increasing the recycling rate of collected waste from 23% in 2015 to 38% in 2019 (Kumagai, 2022[102]).

More recycling efforts in the spirit of a circular economy would provide new opportunities and more could be done to tap into secondary material resources. Compared with its large automobile manufacturing industry and the growing used car market, recycling and reusing end-of-live cars are still nascent and often rely on small, often informal, dismantlers with outdated technologies (Jamaluddin et al., 2022[103]). The absence of an end-of-life framework for motor vehicles has also spurred exports of very old used cars to neighbouring countries (Kojima, 2018[104]). In the future, a growing number of electric vehicles will require an appropriate policy framework to recycle and reuse batteries.

Against this background, Thailand should accelerate the introduction of an extended producer responsibility (EPR) framework. EPR is a useful tool to increase collection and recycling of targeted products. It can include recycling rate targets or end-of-life treatment requirement (OECD, 2016[105]). Most

OECD countries have such EPR frameworks, covering a number of products from simple packaging to end-of-life motor vehicles, including used tyres (OECD, 2019[96]). Thailand intended to set up an EPR law for electrical and electronic equipment waste in the mid-2010s, but no such law has been passed. The Plastic Waste Management Plan 2019-2030 includes proposals to reduce plastic waste such as packaging and could cover a wider range of e-waste, including LEDs.

Source separation is a crucial pre-condition to implement EPR effectively, especially for some types of waste like packaging. Poland enforced a law that makes municipal governments responsible for the separate collection of recyclable waste in 2013 (OECD, 2015[106]). In the case of Thailand, national law allows local governments to conduct source separation, but many local governments have not yet issued the necessary local ordinances to implement this (Vassanadumrongdee and Manomaivibool, 2022[107]). Financial constraints of local governments to do so could be alleviated through larger budget allocations, conditional on passing local legislation and making effective progress. Stronger engagement with producers of recyclable waste is also crucial.

Given the significance of the tourism sector in the Thai economy, moving towards more sustainable tourism activities could be an important of moving towards a more circular economy. This could not only to reduce the environmental burden from tourism but also increase the sector's value added. Excess burdens on limited resources could be avoided by reducing the concentration of tourism in few places and moving towards more sustainable types of tourism, as set out in the government's recent Strategic Plan for sustainable tourism. Estonia, for example, has successfully mainstreamed sustainable tourism in its tourism strategy. In addition to financial support to the sector, strong knowledge-sharing and awareness campaigns, including enhanced application of eco-labelling, have supported an increased international recognition of the country's green tourism potential, including through several reputable international awards (OECD, 2022[108]).

Table 2.3. Main findings and recommendations from this chapter

MAIN FINDINGS	RECOMMENDATIONS (Key recommendations in bold)
Enhancing policy frameworks for the green transition	
Many ministries and agencies are involved in the design of environmental policies and there are several different plans, making intra-governmental policy coordination complex.	**Give a strong mandate to the newly created leading environmental agency, notably for the monitoring and surveillance of policy progress towards emission reduction targets.**
Fragmented government plans with overlapping timeframes make effective monitoring of quantitative policy targets difficult.	Consider streamlining the overall planning framework by defining a clear hierarchy among plans and streamlining some of them.
Designing an effective carbon pricing mechanism and promoting renewables	
Carbon prices are low compared with OECD countries. A voluntary emission trading system is in operation. Plans for the introduction of a mandatory emission trading system still lack important details.	**Introduce carbon pricing consisting of a mandatory cap-and-trade system for key sectors and a complementary carbon tax for the remaining sectors, consistent with the planned emission trajectory to net zero**.
Although energy subsidies are small, a cap on diesel prices weakens the effect of market prices and fossil fuel taxes.	**Allow retail fossil fuel prices to fluctuate more freely, while gradually phasing out the price cap on diesel.**
Higher carbon prices would affect low-income households, both through high fossil fuel prices and the resulting higher food prices.	Recycle revenues from the mandatory emission trading system to compensate low-income households for higher energy and food prices.
Tightening environmental regulations	
Thailand's environmental policies are mostly on a voluntary basis. Regulations are less stringent than in many other countries.	**Make environmental regulations more stringent, including air pollution limits fon coal power and combustion engine cars.**
Decarbonising the power sector	
Renewable power generation has advanced rapidly, mostly due to small scale producers, but the share of renewables remains low.	**Promote the use of renewable energy sources in large-scale producers through public tenders and renewable energy certificates.**
Plans to retire existing coal plants exist, but the initial plan for one of the plants was postponed.	Set clear timelines for phasing out power generation from coal.
The electricity market is dominated by state-owned enterprises, hindering competition and private investments in renewables.	**Reduce private entry restrictions in the retail electricity market, including by allowing peer-to-peer trade.**
Greening land transport	
For newly sold vehicles, mandatory labelling of fuel economy and excise tax rates varying with emission intensity were introduced in 2016. However, no minimum requirement is applied.	Introduce compulsory fuel economy requirements on newly sold cars.
The number of registered vehicles has increased rapidly, while retirement of old cars is slow. Many vehicles do not meet current fuel economy standards.	Consider raising the annual vehicle tax for old-aged cars to accelerate the de-registration of energy-inefficient vehicles.
Biofuels for motor vehicles are widely used owing to compulsory blending and subsidies. The government plans to phase out low-blending-rate gasoline by 2037.	Frontload the current phase-out plan for gasoline with low biofuel blending.
Starting from low levels, the number of electric vehicles is rapidly increasing. The government has strengthened tax incentives for EVs, to boost sales of zero-emission vehicles.	Consider introducing a revenue-neutral rebate system to reward purchasers of low- or zero-emission vehicles, financed by levies on high-emission vehicle purchases. Provide incentives for investing into charging stations across the whole country.
Stimulating green innovation	
Private green research and development has increased, but public investment is still low.	Increase public-sector research and development in basic sciences and technologies for green innovation.
A range of tax incentives for research and development is offered, but support to SMEs may not be sufficient compared with other countries.	**Allow carry-forward of unused allowances for research and development tax incentives.**
Science-industry collaboration has been strengthened but there is scope for improvement.	Make collaboration with education or research institutions eligible for the tax incentives for research and development.
Towards a more circular economy	
Management of municipal solid waste has improved, including through enhanced collaboration among different government entities, including local governments. Still, recycling and reusing of secondary material resources remains weak, partly due to low rates of source separation.	Introduce an extended producer responsibility framework for plastic package, waste electric equipment and motor vehicles. Encourage local governments to require and enforce waste separation at the source, while providing financial support and capacity building.

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THAILAND

Thailand has achieved remarkable economic progress over the past decades. A strong and timely policy response helped to cushion the economic and social impact of the pandemic, and of high energy and food prices. While bold fiscal support prevented the economy from falling into a recession, public debt has risen and fiscal consolidation should now continue at a gradual pace. Rising social demands, population ageing and the green transition will likely add to public spending pressures and call for raising additional tax revenues. Boosting productivity and mastering the transition towards more sustainable and inclusive growth will require stepping up delayed structural reforms. Competition remains limited across several sectors, likely related to market entry barriers and high regulatory burdens. More than half of workers lack formal employment and social security does not cover most of them. Social pensions provide a minimum income floor for elderly people, and raising them could allow significant inroads in the fight against poverty and inequality. Meeting climate pledges will require bold and well-organised reforms. Renewable power generation has advanced, but the overall share of renewable energy sources remains lower than in peer countries.

SPECIAL FEATURES: BOOSTING PRODUCTIVITY; INCLUSIVE RECOVERY; GREEN GROWTH

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