Mobilising ASEAN Capital Markets for Sustainable Growth
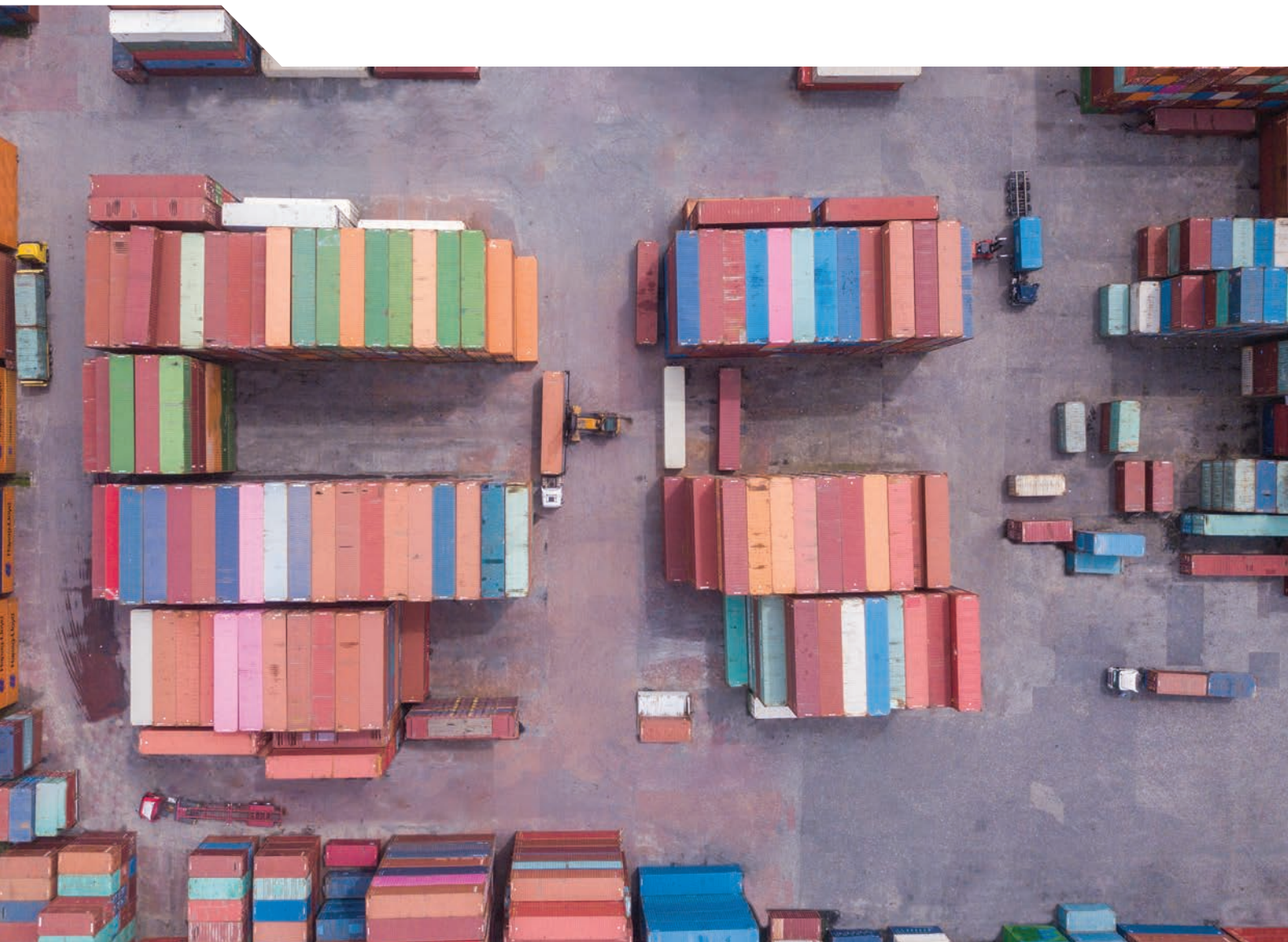
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Mobilising ASEAN Capital Markets for Sustainable Growth

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BETTER POLICIES FOR BETTER LIVES

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Foreword

This report reviews recent developments in the corporate landscape, equity and debt capital markets, corporate governance, artificial intelligence (AI) in finance and sustainable finance trends across ASEAN economies. Drawing on comprehensive analysis of market practices and institutional frameworks in the region, it provides key policy considerations to effectively seize opportunities and address barriers to mobilising capital markets for sustainable growth in ASEAN. This report mainly covers Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Singapore, Thailand and Viet Nam.

Chapter 1 analyses the capital structure, profitability and productivity indicators for listed corporations in ASEAN countries. It also examines ASEAN companies' use of public equity and bond markets alongside bank financing, secondary stock market liquidity, inclusion of ASEAN companies in global investment indices, the use of credit ratings in corporate bond markets and barriers to the development of corporate bond markets. It then proposes policy priorities to enhance the corporate sector's access to financing via capital markets, to stimulate investment, innovation and growth.

Chapter 2 starts examining key features of corporate ownership structures in ASEAN countries. After a brief description of regional initiatives to develop an integrated regional capital market including the ASEAN Corporate Governance Scorecard, the chapter analyses corporate governance policies and practices in the region. The chapter concludes with a set of policy considerations relating to the corporate governance framework, to stimulate the development of ASEAN capital markets while accounting for the differing features of corporate structures in each country.

Chapter 3 explores potential benefits and risks of the use of AI in finance and presents trends in this area across ASEAN economies. Based on an original machine learning (ML) model it provides evidence of increasing interest around AI in finance in major Asian economies. Based on this analysis, it examines national AI strategies in selected ASEAN member states, presents major risks and challenges of AI applications in finance, and provides policy considerations to address these without stifling innovation.

Chapter 4 focuses on the key characteristics of and trends in sustainable bonds in Asia with a particular focus on ASEAN economies, including a breakdown of the different types of instruments such as green bonds and social bonds. It outlines how region-specific and global frameworks are implemented in different countries and examines how metrics underpin such bonds and support broader monitoring of sustainable finance activities across the financial sector in Asia. Finally, it provides policy considerations to support the development of sustainable bond markets in the region, which can contribute to sustainability objectives.

A draft version of this report was presented and discussed at the Committee on Financial Markets' Roundtable on Capital Market and Financial Reform in Asia, jointly organised by the ADBI and the OECD with the financial support of the Government of Japan, on 14-15 March 2024 in Tokyo. The draft report was also discussed at the meeting of the Corporate Governance Committee on 8-9 April 2024.

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Abbreviations and acronyms

ACRAA	Association of Credit Rating Agencies in Asia
AEs	Advanced economies
AI	Artificial intelligence
ASEAN	The Association of Southeast Asian Nations
Capex	Capital expenditures
CBI	Climate Bonds Initiative
COVID	Coronavirus disease (COVID-19)
CPI	Consumer price index
CRA	Credit rating agency
CSX	Cambodia Securities Exchange
ESG	Environmental, social and governance
FEAT	Fairness, ethics, accountability and transparency
GDP	Gross domestic product
GenAI	Generative artificial intelligence
GFC	Global financial crisis
GHG	Greenhouse gases
GRI	Global Reporting Initiative
GSS	Green, social and sustainability bonds
HOSE	Ho Chi Minh Stock Exchange
HNX	Hanoi Stock Exchange
ICMA	International Capital Market Association
IDX	Indonesia Stock Exchange
IG	Investment grade
IMF	International Monetary Fund
IPO	Initial public offering
KPI	Key performance indicator
Lao PDR	Lao People's Democratic Republic
LLM	Large language model
LR	Listing requirements - Bursa Malaysia
LSEG	London Stock Exchange Group
MAS	Monetary Authority of Singapore
ML	Machine learning
OECD	Organisation for Economic Co-operation and Development
PSE	Philippine Stock Exchange
OJK	Financial Services Authority of Indonesia
R&D	Research and development
ROA	Return on assets

ROE	Return on equity
SECP	Securities and Exchange Commission of Philippines
SET	Stock Exchange of Thailand
SGX	Singapore Exchange
SME	Small and medium-sized enterprises
SPO	Secondary public offering
SPT	Sustainability performance target
TCFD	Task Force on Climate-Related Financial Disclosure
TRBC	The Reference data Business Classification
UPCoM	Unlisted public company market
USD	United States dollar

Executive summary

The Association of Southeast Asian Nations (ASEAN) is one of the most dynamic and fastest growing regions in the world. In the last two decades, the region's real gross domestic product (GDP) has grown by 5% annually and its GDP reached USD 3.7 trillion in 2023, equivalent to 3.6% of the world's GDP. As a group, ASEAN economies were the fifth largest economy globally in 2023, up from eleventh in 2000.

This rapid economic expansion creates important challenges, including significant financing needs among the region's corporations and households, highlighting the need for efficient and resilient capital markets and financial intermediation. Well-functioning capital markets play a key role in supporting investment, innovation, job creation and in increasing the resilience of the corporate sector. Strong corporate governance frameworks are also essential to help businesses attract investments that translate into greater value creation and competitiveness, while also providing investors with appropriate safeguards. More dynamic capital markets and stronger corporate governance frameworks will be critical for ASEAN's continued expansion.

This expansion will also be strongly influenced by developments in two rapidly evolving areas, Artificial Intelligence (AI) and sustainable finance. The adoption of new AI technologies, including in the financial sector, creates significant opportunities for ASEAN economies. For example, AI technologies can enhance productivity, improve customer experience, and enable targeted services. However, they also carry important risks for markets which must be properly managed to protect consumers and investors, market integrity as well as stability.

Sustainable finance is also growing in the region and environmental and social considerations are increasingly being integrated into the financing of corporate activities. One emerging area is the issuance of sustainable corporate bonds, which, importantly, can contribute both to long-term risk-adjusted returns and to climate and broader sustainability objectives. ASEAN economies are already implementing policies and frameworks to support the scaling up of sustainable bond markets, and ensuring their efficiency and transparency will be important to their further development.

Key policy considerations to support policy makers in managing evolutions in capital markets, corporate governance, AI and sustainable finance in the ASEAN region are outlined below.

Policy considerations

The corporate landscape and the use of capital markets

Market-based financing is growing across ASEAN markets. However, corporations continue to rely heavily on bank financing, with lower levels of investment in research and development compared to the rest of Asia. The penetration of both bank- and market-based financing also remains low in many ASEAN economies, a sign that businesses are facing financial constraints. Moreover, liquidity of both equity and bond secondary markets remains low compared to international standards. Policy makers should prioritise efforts to strengthen capital markets to increase investors' participation and channel more capital to the

business sector. This includes efforts to encourage listings by non-financial corporations, working towards the inclusion of ASEAN companies in investable indices to attract foreign investment, and promoting access to long-term financing via corporate bonds. Increasing liquidity of secondary markets is also essential to attract more issuers and improve investor confidence and participation.

Corporate governance policies and practices

Improved corporate governance frameworks in ASEAN economies will enable well-functioning capital markets that support financing of the corporate sector. Policies should reflect the regional and national particularities of ownership structures and capital market conditions, especially when addressing risks and promoting positive outcomes such as sustainability and digitalisation. In particular, ASEAN policy makers should focus on promoting: effective oversight of publicly traded companies within company groups; effective engagement of institutional investors with listed companies; high-quality but proportionate sustainability-related disclosure; proper conduct of general shareholder meetings; effective board independence; and flexibility to establish board committee structures that best serve corporations' needs, within appropriate safeguards for minority shareholders.

Artificial intelligence in finance

Policy makers should monitor the fast-paced evolution of AI technologies applied in finance, to allow the potential benefits to materialise while effectively anticipating and managing emerging risks without stifling innovation. Particular attention should be given to governance arrangements of AI-based models, data management, risks of bias and discrimination, as well as the identification and management of potential financial stability risks that can arise from the wider deployment of such models by financial sector participants. Additionally, policy makers could consider supporting research and development to address the lack of explainability and predictability of AI decision-making, as well as identifying emerging cyber-security vulnerabilities, and ensuring that innovators identify, disclose and prevent dangerous or harmful capabilities of new AI models. To achieve these objectives, policy makers could consider using a risk-based, adaptive and human-centred approach to ensure guard-rails that protect consumers and markets are in place, and to future-proof the regulatory framework for AI in finance.

Sustainable bond markets

To encourage the development of sustainable bond markets, policy makers should focus on strengthening the regulatory framework to provide investors with trust in these products. This includes clarifying the rules about use-of-proceed stipulations and key performance indicators (KPIs) of these bonds; assessing the extent to which green, social and sustainability (GSS) bonds could be used to refinance existing projects that support sustainability-related objectives; encouraging, where appropriate, the use of contractual penalties to promote the proper use of GSS bond proceeds for sustainability projects; increasing the interoperability between Asian-specific standards for sustainable bonds and internationally recognised standards; and strengthening reporting requirements to ensure that metrics and methodologies are robust and decision-useful.

1 Corporate landscape and the use of capital markets in ASEAN economies

This chapter describes the current corporate landscape in ASEAN economies, provides trends in the use of equity and corporate bonds markets and discusses issues related to capital market development that deserve special consideration. It starts by describing the current use of market-based financing versus bank financing in the region and provides an overview of the current marketplaces for equity and corporate bonds in ASEAN economies. It follows by providing a characterisation of the corporate sector with respect to its capital structure, profitability and investment, and describes the trends in the use of equity and corporate bond markets. The chapter also discusses selected issues related to the development of capital markets in the region and policy considerations that deserve attention from ASEAN authorities.

1.1. Introduction

Following the 1997 Asian financial crisis, ASEAN economies made significant efforts to enhance market resilience. A series of reforms aimed at stabilising the macroeconomic landscape and extending jurisdiction-level initiatives into regional efforts were introduced. Against this background, operating as a block laid the foundations for economic growth in the region. ASEAN represents today a dynamic economic region characterised by diverse cultures, vibrant trade and robust economic growth. At the heart of this economic dynamism lies the corporate sector responsible for investing, innovating and creating jobs to ultimately contribute to sustainable economic growth.

This chapter delves into the pivotal role the corporate sector plays in driving economic growth and the essential role capital markets have in enabling this growth. Well-functioning capital markets provide corporations with the necessary funds to finance expansion, innovation and strategic initiatives. They offer corporations the flexibility to optimise their capital structure, manage risks and enhance shareholder value. Beyond the corporate realm, robust capital markets contribute to broader economic prosperity by channelling savings into productive investments, spurring job creation and driving technological advancements. They serve as engines of economic growth, facilitating the efficient allocation of resources and promoting financial stability. As such, well-functioning capital markets not only empower businesses to thrive but also underpin the foundation of a resilient, dynamic and sustainable economy.

1.2. The use of market-based financing in ASEAN economies

ASEAN economies have implemented various capital markets reforms to improve the availability of market-based financing for corporations, while also facilitating the allocation of resources towards innovative and sustainable businesses. While, globally, market-based financing has grown in importance representing in 2022 a larger share of GDP (99%) than bank credit (87%), ASEAN economies and Asia in general, still show a high reliance on bank financing (Figure 1.1).

Bank credit to the non-financial corporate sector in ASEAN economies represents 88% of GDP whereas in Asia bank financing represents 152% of the region's GDP. In Asia, despite the increasing use of public equity and corporate bonds, companies still heavily rely on bank credit to finance their activities. In ASEAN markets both market- and bank-based financing remain limited representing less that the region's GDP. Compared to Asia, the low share of bank financing in ASEAN economies is mostly driven by the limited size of the financial system.

The financing structure of corporations shows further differences across ASEAN economies (Figure 1.1). Only in Indonesia and the Philippines, market-based financing to GDP is slightly higher than bank-based financing. However, this is mainly driven by the small size of the total financing in these two economies. In other ASEAN economies bank-based financing dominates. Cambodia shows the highest reliance on bank financing and the lowest use of market-based financing. Bank credit to GDP represents 178% of GDP, while market-based financing accounts for only 8%. Thailand, on the contrary, shows the highest use of market-based financing at 120% of GDP and also a strong use of bank loans (131% of GDP).

Figure 1.1. Market-versus bank-based financing use by non-financial companies, end-2022
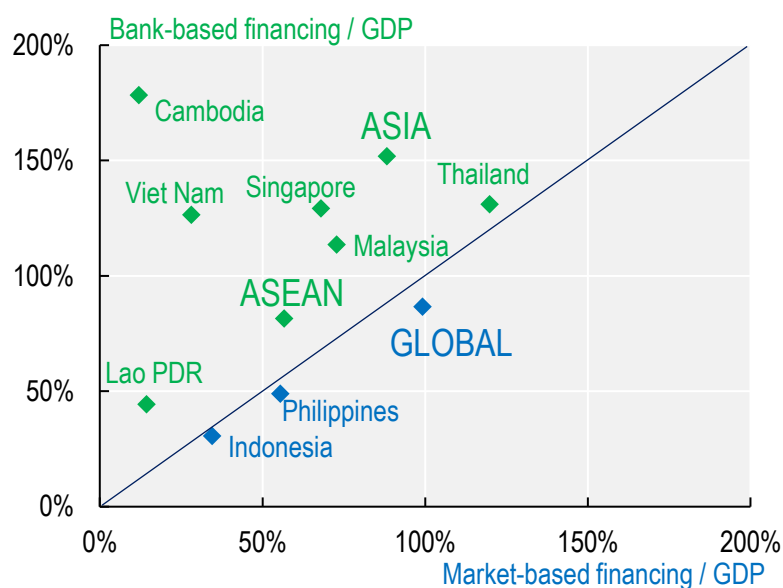
Notes: Market-based financing is defined as the sum of the market capitalisation of non-financial listed companies and the outstanding amount of non-financial corporate bonds. Bank-based financing is defined as bank credit to non-financial corporations. Both measures are expressed as share of GDP in the figure. For Lao PDR credit to non-financial corporations was not available and therefore credit to the private sector was used instead.

Source: OECD Capital Market Series dataset, Bank for International Settlements, World Bank, October 2023 World Economic Outlook dataset, LSEG.

1.3. Marketplaces for equity and corporate bonds in ASEAN economies

Marketplaces for listing and trading public equity and corporate bonds play a vital role in supporting the use of market-based financing by non-financial corporations and, at the same time, in attracting investors to capital markets. ASEAN economies have made great efforts to develop their marketplaces. All ASEAN countries covered in this report have one stock exchange, where both stocks and bonds can be traded. Viet Nam is the exception with two stock exchanges. The first stock exchanges in the region were established in Indonesia and Philippines in the early 1900s. However, these stock exchanges underwent significant changes since their establishment.[1] In contrast, Lao People's Democratic Republic (hereafter "Lao PDR") and Cambodia established their stock exchanges recently, in 2010 and 2011, respectively. Both stock exchanges were established as joint ventures with the Korea Stock Exchange, which still retains part of the ownership (Table 1.1). In Viet Nam, the Ho Chi Minh Stock Exchange (HOSE) and the Hanoi Stock Exchange (HNX) were established in 2007 and 2009, respectively.

Out of the nine ASEAN stock exchanges, five are state-owned,[2] three are publicly listed and the Indonesia Stock Exchange (IDX) is privately owned. Among the publicly listed stock exchanges, the Singapore Exchange was the first to go public in 2000, followed by the Philippine Stock Exchange in 2001 and Bursa Malaysia in 2005.

A majority of the ASEAN stock exchanges operate at least two different segments: a main market for established companies, and a market targeted to smaller and younger companies usually referred as growth market. However, the Lao Securities Exchange, and the Ho Chi Minh Stock Exchange only have a main segment. In Thailand and Indonesia, the stock exchanges offer additional segments. The Stock Exchange of Thailand (SET) further distinguishes between Thai medium-sized companies, traded on the *Mai segment*, and small companies and startups, traded on *Livex*. The Indonesia Stock Exchange offers an intermediate segment between the growth market and the main market, the *development market*.

Moreover, among companies listed on the main market, the Indonesia Stock Exchange further classifies companies depending on their technological intensity. Those highly intense in the use of technology to create innovative products and services are listed on the *main-new economy market.*

Growth markets in the region are characterised by less stringent listing requirements and lower fees to allow younger and smaller companies to access funding. Companies applying to be listed on the *ACE market* in Malaysia and on the *catalist market* in Singapore do not need to satisfy any operating track record or profit requirement. In Indonesia, the *acceleration market* does not set any operational requirement, against the 36 months needed to be listed on the main market. As examples of lower fees on the growth markets, in Cambodia, the initial listing fee on the main market is more than twice that on the growth market.[3] Similarly, in the Philippines the minimum annual listing fee on the main market corresponds to the maximum annual fee on the *SME* market. [4]

Table 1.1. Stock Exchanges in ASEAN economies

Jurisdiction	Stock Exchange	Year of establishment	Ownership structure	Segments
Cambodia	Cambodia Securities Exchange	2011	State-owned by the Ministry of Economy and Finance (55%) and the Korea Stock Exchange (45%)	• Main market • Growth market
Indonesia	Indonesia Stock Exchange	1912	Privately-owned	• Main market • New Economy (main market) • Development • Acceleration (growth market)
Lao PDR	Lao Securities Exchange	2010	State-owned by the Bank of Lao PDR (51%) and the Korea Stock Exchange (49%)	• Main market
Malaysia	Bursa Malaysia	1964	Publicly-owned	• Main market • ACE (growth market) • LEAP (growth market for qualified investors)
Philippines	The Philippine Stock Exchange	1927	Publicly-owned	• Main market • SME (growth market)
Singapore	Singapore Exchange	1973	Publicly-owned	• Main market • Catalist (growth market)
Thailand	The Stock Exchange of Thailand	1962	State-owned	• SET (main market) • Mai (medium-sized companies) • Livex (growth companies)
Viet Nam	Ho Chi Minh Stock Exchange	2007	State-owned	• Main market
	Hanoi Stock Exchange	2009	State-owned	• Main market • UPCoM (unlisted public companies)

Notes: The year of establishment refers to the date when the first stock exchange was established in the country. For Indonesia it refers to the year the stock exchange was established by the Dutch East Indies government as a branch of the Amsterdam stock exchange. For Thailand it refers to the year the Bangkok Stock exchange was established (failed in the early 1970s).
Source: Stock exchanges website, links are provided in the "Stock Exchange" column of the table.

1.4. Corporate landscape in ASEAN economies

This section provides an overview of the corporate landscape in ASEAN economies with a specific focus on companies using market-based financing. In particular, it provides a description of the number and size of listed companies in the region, their capital structure, profitability and investment developments, and compares it with global and Asian figures.

A total of 3 891 companies were listed on ASEAN exchanges by the end of 2023, with a market capitalisation representing 66% of the region's GDP (Figure 1.2). The size of the listed sector differs widely across countries, ranging between 84% and 97% as share of GDP in Singapore, Malaysia and Thailand, to much lower levels in Lao PDR, Cambodia, Viet Nam, Philippines and Indonesia. Lao PDR and Cambodia have smaller equity markets with market capitalisation to GDP ratios of only 4% and 17%, respectively. Although Indonesia is the biggest market in terms of market capitalisation (USD 757 billion), as share of GDP is relatively low, at 53%. Measured by the number of listed companies, Malaysia ranks first by listing 25% of all the listed companies in ASEAN markets.

An important feature of equity markets in ASEAN economies is the large share financial companies represents in total market capitalisation compared to Asia and globally. In ASEAN markets, financial companies represent 28% of the total market capitalisation as opposed to 16% in Asia and 18% globally. Lao PDR has the highest share of financial companies (54%) in total market capitalisation, followed by Viet Nam (41%) and Malaysia (39%).

Figure 1.2. Listed companies in ASEAN economies, end of 2023

	No. of companies	Market cap. (USD billion/trillion)	Share of financial companies by market cap.	% of GDP
By region				
World	42 545	117 T	18%	112%
Asia	23 475	31 T	16%	94%
ASEAN	3 891	2 T	28%	66%
ASEAN economies				
Indonesia	899	757 B	32%	53%
Thailand	627	495 B	23%	97%
Singapore	371	418 B	15%	84%
Malaysia	990	376 B	39%	87%
Philippines	264	221 B	16%	51%
Viet Nam	719	201 B	41%	46%
Cambodia	11	5 B	20%	17%
Lao PDR	10	1 B	54%	4%

Notes: "T" stands for trillion and "B" stands for billion. The GDP used in the calculations corresponds to 2023 forecast. Market capitalisation for Cambodia was collected from the Securities Commission of Cambodia.

Source: OECD Capital Market Series dataset, LSEG, Securities Commission of Cambodia, October 2023 World Economic Outlook dataset, see Annex for details.

Excluding the financial sector, the consumer non-cyclicals industry is prominent in ASEAN economies, representing 20% of the regional market capitalisation (Figure 1.3). This is well above the levels observed in Asia and globally, where consumer non-cyclicals accounts for only 10%. At the country level, the consumer non-cyclicals industry is dominant in Philippines (33%), Singapore (30%) and Malaysia (19%); and is the second most important in Viet Nam (20%) and Indonesia (17%). In Thailand, consumer non-cyclicals companies only represent 13% of total market capitalisation, while Cambodia and Lao PDR do not have listed companies from that industry.

In ASEAN markets, technology despite ranking third, is less prominent compared to Asia and globally. Indeed, it only represents 12% of market capitalisation against 25% in Asia and 30% globally. Contrary to most ASEAN peers, Viet Nam's market is dominated by real estate companies representing 28% of the market capitalisation. Notably, in Lao PDR two-thirds of the market capitalisation corresponds to utilities, and in Cambodia 42% corresponds to industrial companies.

Figure 1.3. Top 3 industries by market capitalisation in ASEAN economies, end of 2023
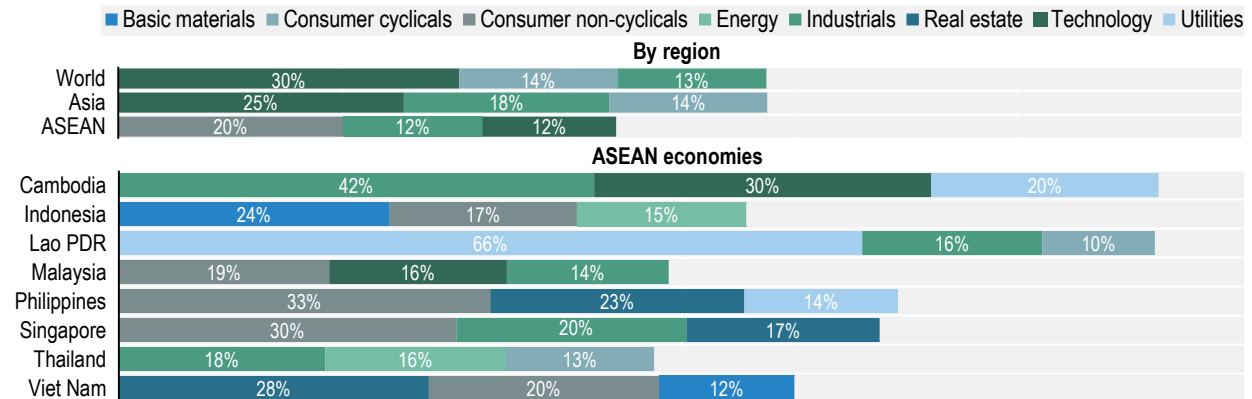
Notes: This figure shows only the top three industries (excluding financials) by the share they represent in total market capitalisation.
Source: OECD Capital Market Series dataset, LSEG, Securities Commission of Cambodia, see Annex for details.

1.4.1. Capital structure

The aggregate balance sheet of ASEAN listed companies expanded substantially over the past years, growing in real terms 126% between 2006 and 2022, in line with the expansion in the number of listed companies in the region (Figure 1.4, Panel A). While a larger aggregate corporate balance sheet is auspicious, in recent years, this has been mainly driven by a rapid increase in liabilities. Between 2017 and 2020, liabilities grew 25% while equity grew only 6%. The rise in liabilities is also reflected in the fall of the capitalisation ratio (equity over assets) over the same period (Panel B). In 2020, the capitalisation ratio fell to 43%, the lowest level since 2006, as a result of increased borrowing in the wake of COVID-19 pandemic. In general, capitalisation levels in ASEAN corporations have been converging to those observed in Asia and globally.

Figure 1.4. Balance sheet of non-financial listed companies
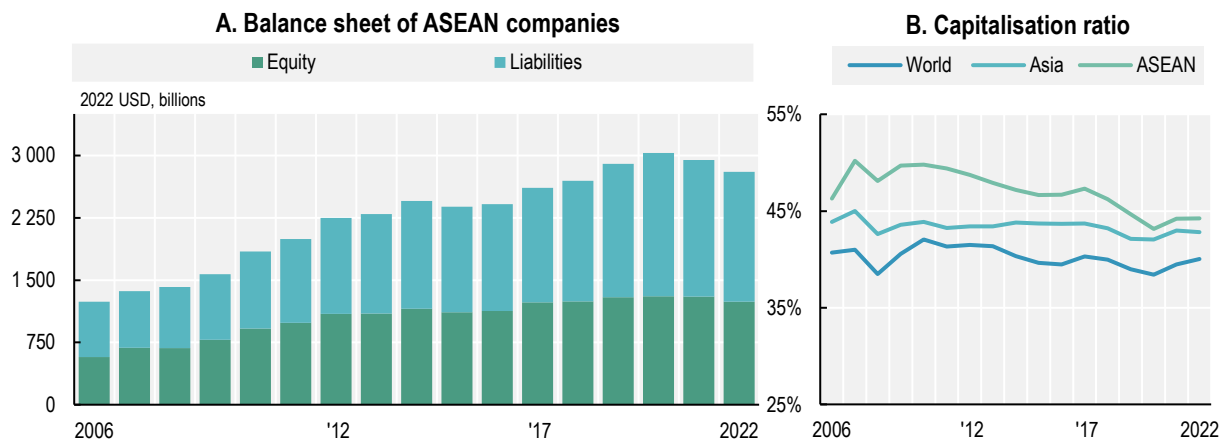
Source: OECD Capital Market Series dataset, LSEG, see Annex for details

Liabilities of ASEAN corporations, primarily consisting of financial debt and accounts payable, have steadily increased from 2006 to 2022, reaching a peak in 2020 due to heightened borrowing requirements and financial distress caused by the COVID-19 pandemic. Total liabilities increased from USD 666 billion in 2006 to USD 1 563 billion in 2022, representing an annualised growth of 5.5% (Figure 1.5, Panel A). However, both in 2021 and 2022, total liabilities contracted 5% compared to the previous year.

Similarly, aggregate liabilities to total assets have grown considerably, reaching 56% in 2022 from the lowest level of 50% in 2007 (Figure 1.5, Panel B). However, from 2006 to 2022 liabilities in ASEAN corporations have consistently remained lower compared the levels observed in Asia and globally. Notably, financial debt (bank loans and debt securities) has consistently grown in ASEAN corporations since 2006 and has always surpassed the levels observed in Asia and globally. The share of financial debt over total liabilities reached 65% in 2020, the highest level since 2006, before falling to 63% in 2022 (Panel C).

Figure 1.5. Liabilities' structure of non-financial listed companies
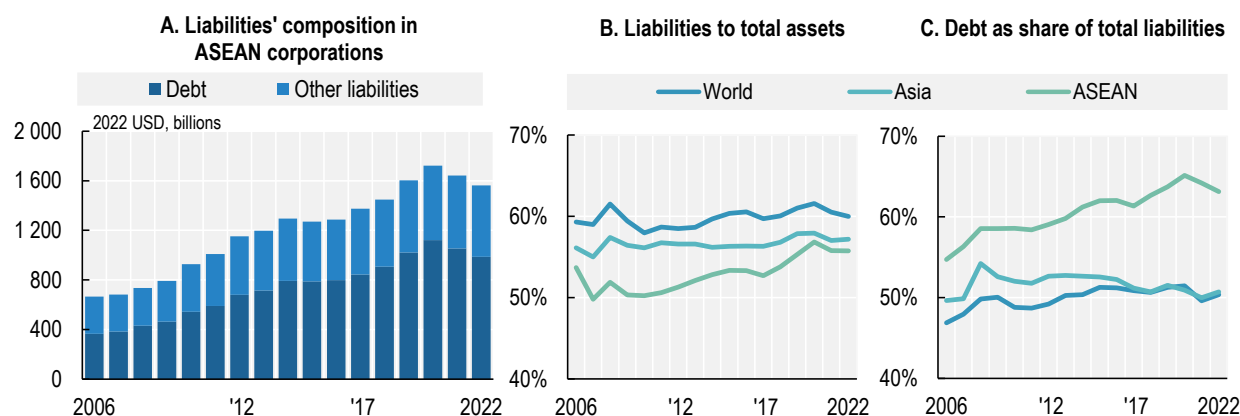
Source: OECD Capital Market Series dataset, LSEG, see Annex for details

When measuring leverage as debt over total assets, ASEAN companies' leverage stood at 35% in 2022, higher than that of companies in Asia (29%) and globally (30%) (Figure 1.6, Panel A). At the country level, corporate leverage also shows significant differences. In 2022, aggregate leverage in companies from the Philippines and Thailand was 42% and 41%, respectively, considerably higher than that of companies in other ASEAN economies. Moreover, leverage in ASEAN corporations experienced a surge during the COVID-19 pandemic and returned to 2019 levels in 2022, consistent with global trends. Thailand and the Philippines were the exception to that trend since corporate leverage further increased 5 and 2 percentage points between 2019 and 2022, respectively.

In line with higher aggregate indebtedness of ASEAN corporations, the share of companies with significantly high leverage is also larger in ASEAN economies. While 6 out of 10 ASEAN companies have leverage levels over 40%, in Asia and globally this is the case only for 43% and 45% of the companies, respectively. At the same time, the share of ASEAN companies with low leverage is around a half of that in Asia and the world. At the country level, Thailand accounts for the largest share of highly indebted companies (72%), followed by the Philippines and Singapore (Figure 1.6, Panel B). In general, higher leverage lowers the ability of corporations to withstand sudden shocks.

Figure 1.6. Corporate leverage of non-financial listed companies

A. Aggregate leverage (debt-to-assets)

■ 2022 ◆ 2019 ▲ 2006

By region

World
Asia
ASEAN

ASEAN economies

Indonesia
Malaysia
Philippines
Singapore
Thailand
Viet Nam

0% 10% 20% 30% 40% 50%

B. Share of companies by leverage levels, 2022

■ 0-20% ■ 20-40% ■ over 40%

By region

	0-20%	20-40%	over 40%
World	11%	44%	45%
Asia	12%	45%	43%
ASEAN	6%	33%	61%

ASEAN economies

	0-20%	20-40%	over 40%
Indonesia	12%	36%	52%
Malaysia	8%	37%	55%
Philippines		33%	65%
Singapore	6%	35%	59%
Thailand		25%	72%
Viet Nam	14%	53%	33%

0% 20% 40% 60% 80% 100%

Notes: Debt-to-assets ratio is calculated using only financial debt. In Panel B, the distribution of leverage by levels is made based on the share of financial debt that falls in each interval of leverage.

Source: OECD Capital Market Series dataset, LSEG, see Annex for details.

1.4.2. Profitability

ASEAN corporate sales have continuously increased between 2006 and 2014, almost doubling in real terms from USD 784 billion to USD 1 549 billion (Figure 1.7, Panel A). However, since 2014 sales have fluctuated without showing the growth observed in the previous period. Notably, in 2020, sales contracted by 14% as a result of the COVID-19 pandemic. Profitability, measured as net income over sales, followed a declining trend in the ASEAN region for most of the analysed period (Panel B). Only in 2009 and 2010, during the recovery from the global financial crisis, and during 2021 and 2022, after the sharp decline experienced during the COVID-19 pandemic, profits were on the rise. Notably, profitability among ASEAN corporations experienced a stronger contraction during the COVID-19 pandemic compared to corporations in Asia and globally. In 2022, both sales and profits continued to increase, with sales hitting the highest level (USD 1 675 billion) since 2006, and profits recorded 7% of sales. Overall, profits in ASEAN corporations are converging to Asian and global levels.

Figure 1.7. Sales and profits of non-financial listed companies

A. Sales in ASEAN companies

2022 USD, billions

2 000
1 500
1 000
500
0

2006 '12 '17 2022

B. Profits as share of sales

— World — Asia — ASEAN

12%
10%
8%
6%
4%
2%
0%

2006 '12 '17 2022
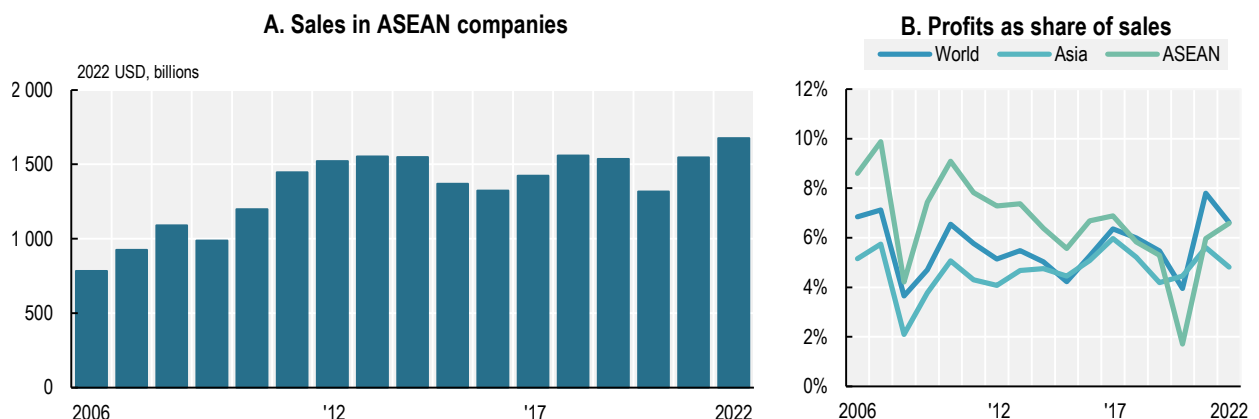
Source: OECD Capital Market Series dataset, LSEG, see Annex for details.

Profitability, both measured in terms of return on assets (ROA) and return on equity (ROE), has also been declining in the majority of ASEAN economies since 2006, with a sharp drop observed between 2010 and 2019 (Figure 1.8). For instance, ROA in ASEAN companies recorded a decline from 6% to 3% between 2010 and 2019 while ROE fell from 12% to 6% over the same period. While the decline in profitability was also observed in Asia, and across the globe, it was much more pronounced for ASEAN corporations. In 2020, profitability contracted across regions as a result of the COVID-19 pandemic. In 2022, ASEAN corporate profitability recovered considerably with ROA and ROE reaching 4% and 9%.

A similar trend is observed across ASEAN markets, however some differences are worth noting (Figure 1.8). Despite the overall decline in profitability observed in all ASEAN markets and globally during 2020, Viet Nam experienced a moderate decline compared to regional peers. Indeed, in Viet Nam, corporate profitability has been higher than its peer countries. In 2020, ROA and ROE only fell from 5% to 4%, and 12% to 10%, respectively. These levels were considerably higher compared to those observed in other ASEAN economies where profitability fell more sharply in 2020. It is also worth noting that Indonesian and Malaysian companies recovered quickly from the contraction observed in 2020 reaching high profitability levels in 2022.

Figure 1.8. Profitability of non-financial listed companies
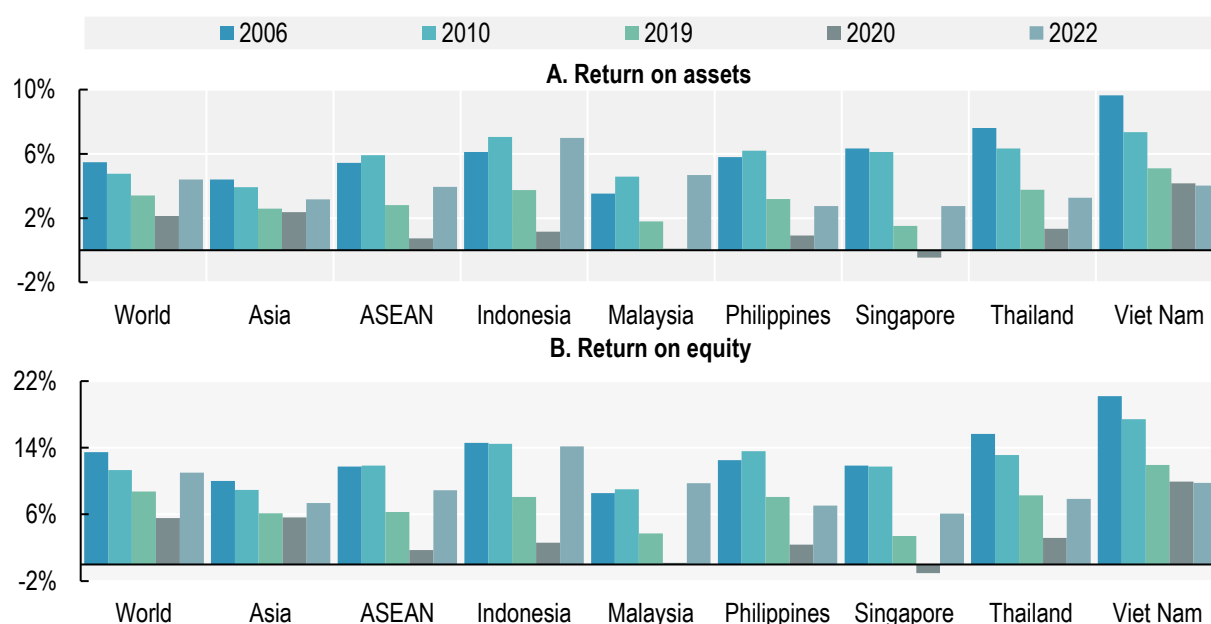
Source: OECD Capital Market Series dataset, LSEG, see Annex for details.

1.4.3. Productivity and investment

Productivity[5] of non-financial listed companies in ASEAN markets has decreased over the 2006-22 period, following Asian and global trends. This decline reflects a mismatch between rapidly expanding assets (see Figure 1.4) and stagnant sales, suggesting a loss of operating efficiency for corporations in ASEAN economies. The median turnover ratio in ASEAN corporations fell from 70% to 58% between 2006-17 (Figure 1.9, Panel A). In 2020, the asset turnover ratio hit 49%, the lowest level observed since 2006. This ratio recovered in 2022 driven by an increase in sales.

The level of asset turnover varies also varies across regions. In the ASEAN region, 42% of companies has asset turnover of less than 50%, meaning that one dollar in asset generates less than 50 cents in sales (Figure 1.9, Panel B). This compares with lower levels of less productive companies of 40% at the global

level and 35% in Asia. The share of companies with asset turnover between 50-100% is only 31% in the ASEAN region, lower than the 36% in Asia and 34% globally. The share of productive companies with asset turnover ratios over 100% stood at 27% in the ASEAN region, in line with the global share and below that of Asia at 29%.

Differences in companies' productivity are more visible across countries (Figure 1.9, Panel B). While the Philippines has the highest share of less efficient companies at 68%, this share stands at 41% for Indonesia, Singapore and Thailand. Viet Nam has the lowest share of less productive firms at 32% and the highest proportion of productive companies (asset turnover over 100%) at 42%. Less differences are observed in the share of companies with asset turnover between 50-100%, ranging from 26% to 34%. Again, the Philippines stands out with only 20% of companies having an asset turnover between 50-100% and only 12%, the lowest share among ASEAN economies, of most efficient companies.

Figure 1.9. Asset turnover ratio of non-financial listed companies
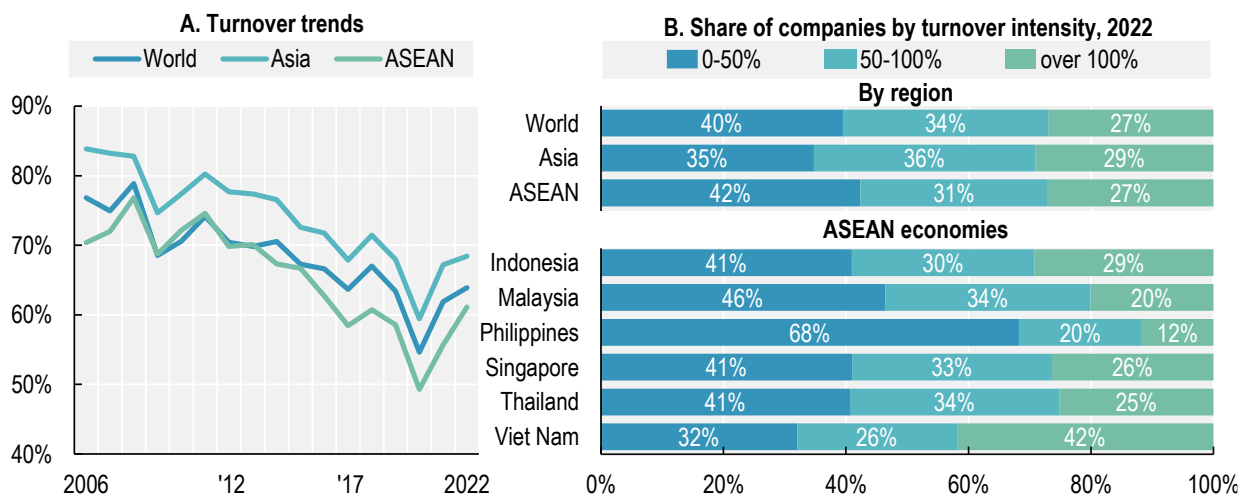
Notes: Asset turnover ratio is measured as total sales divided by total assets. Panel A shows for each region the median values.
Source: OECD Capital Market Series dataset, LSEG, see Annex for details.

Investment in capital expenditure (capex) by ASEAN corporations has moved closer to global and Asian trends. Across region, investment in capital expenditure has been on a declining trend since 2011 reaching the lowest point in 2020 (Figure 1.10, Panel A). The contraction in investment in 2020 was stronger in ASEAN corporations and the recovery has been slower than in other regions.

In 2022, the ASEAN region showed the largest share of companies (65%) with low levels of investments (less than 3% of the assets) when compared to Asia and globally at 58% and 57% respectively (Figure 1.10, Panel B). Moreover, differences are more pronounced at the country level. Across ASEAN economies, Malaysia, Singapore and Viet Nam stand out with a high share of companies with low investment in fixed capital. Indonesia not only few companies with low investment, but also has almost one-quarter of firms investing in capex over 6% of assets.

Figure 1.10. Investment in capital expenditure by non-financial listed companies

A. Capex trends

World — Asia — ASEAN

Capex/assets (y-axis from 2% to 8%, x-axis from 2006 to 2022)

B. Share of companies by capex intensity, 2022

0-3% — 3-6% — over 6%

By region

	0-3%	3-6%	over 6%
World	57%	20%	22%
Asia	58%	21%	22%
ASEAN	65%	18%	17%

ASEAN economies

	0-3%	3-6%	over 6%
Indonesia	59%	18%	23%
Malaysia	67%	18%	15%
Philippines	61%	20%	18%
Singapore	73%	15%	12%
Thailand	62%	22%	17%
Viet Nam	67%	16%	17%
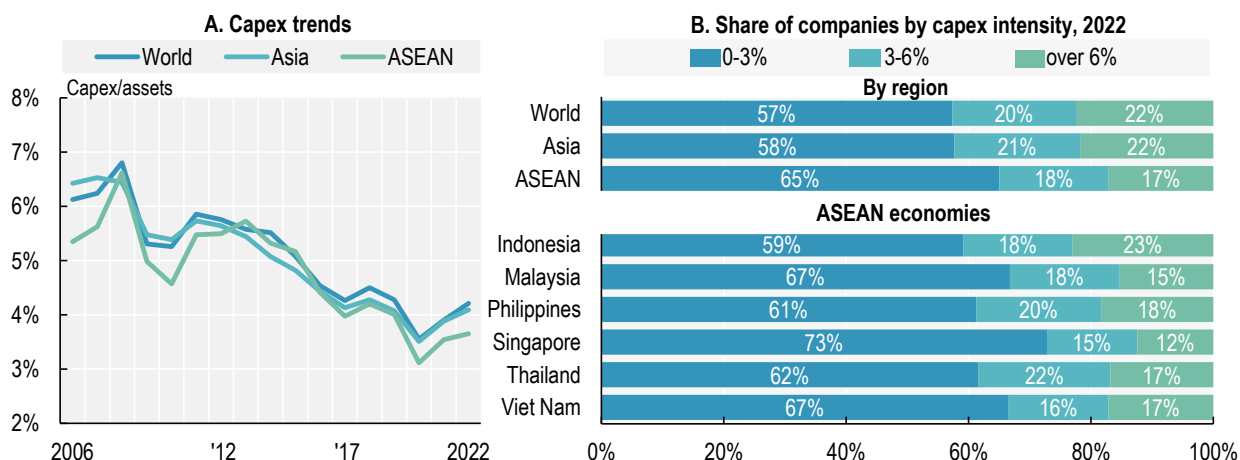
Source: OECD Capital Market Series dataset, LSEG, see Annex for details.

Differently to investment in capital expenditure, investment in research and development (R&D) is much lower in the ASEAN region compared to Asia and globally (Figure 1.11, Panel A). While R&D has been increasing globally and in Asia over the last years, the increase has been minor in the ASEAN region. Investment in R&D is a key driver of economic growth and enhances the competitiveness of economies and corporations in the global market. Moreover, it fuels the development of new industries, improves productivity and creates high-quality jobs. However, the success of R&D investment is highly uncertain and the resulting assets are intangible, therefore, the use of debt is of limited value for this type of investment. Debtholders in general prefer to use physical assets to secure loans and are reluctant to lend when the project involves substantial R&D investment. Well-functioning capital markets, in particular equity markets, allows corporations to fill the R&D financing gap enabling economies to exploit the benefits of innovation in terms of productivity and growth.

Figure 1.11. Investment in research and development by non-financial listed companies

A. R&D trends

World — Asia — ASEAN

R&D/assets (y-axis from 0.0% to 2.0%, x-axis from 2006 to 2022)

B. Share of companies reporting R&D investment, 2022

By region

World	43%
Asia	50%
ASEAN	4%

ASEAN economies

Indonesia	7%
Malaysia	3%
Philippines	6%
Singapore	8%
Thailand	1%
Viet Nam	1%
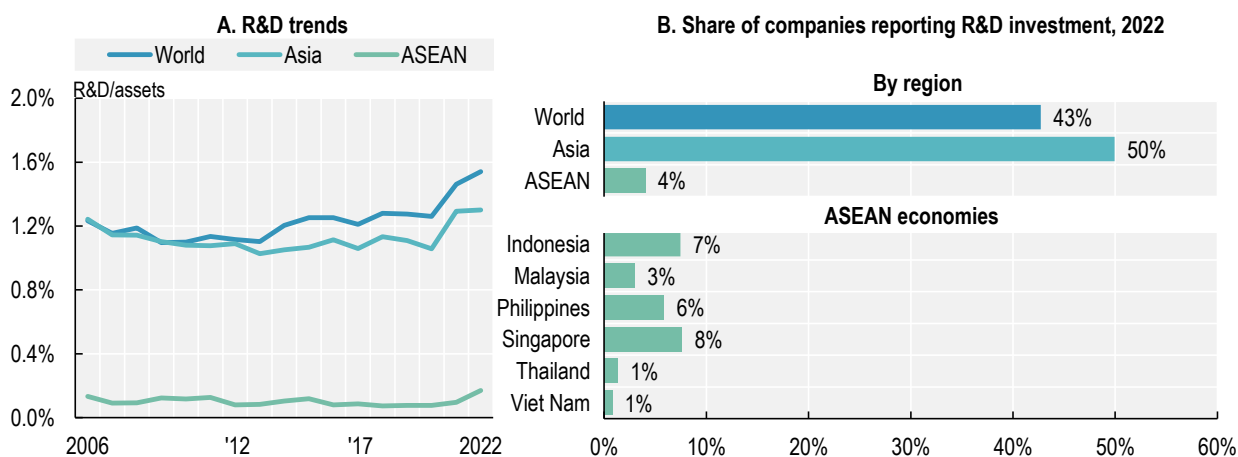
Source: OECD Capital Market Series dataset, LSEG, see Annex for details.

The difference is also striking when looking at the share of companies investing in R&D (Figure 1.11, Panel B). While globally and in Asia, 43% and 50% of listed companies, respectively, reported R&D in 2022, only 4% of companies did so in ASEAN economies. At the country level, the share of companies

investing in R&D remains small. Countries like Indonesia, Singapore and Philippines show a higher share of companies investing in R&D relative to the regional aggregate. On the other end, not many firms invest in R&D in Malaysia, Thailand and Viet Nam.

Most of the R&D investment across regions is done by large companies (Figure 1.12, Panel A). They account for more than 95% of the total R&D investment in Asia, ASEAN and globally. This holds true at the country level, with the exception of Philippines and Thailand, where the contribution of large companies was considerably lower than their regional peers, at 66% and 41% respectively. Smaller companies have a minor contribution to aggregate R&D. However, when investment in R&D is scaled by assets, the relationship reversed, and smaller companies show a higher R&D ratio globally, in Asia and in the ASEAN region (Panel B).

Figure 1.12. R&D investment of non-financial companies by size, end of 2022

A. Contribution of large companies to corporate R&D

By region

B. R&D to total assets by small and large companies
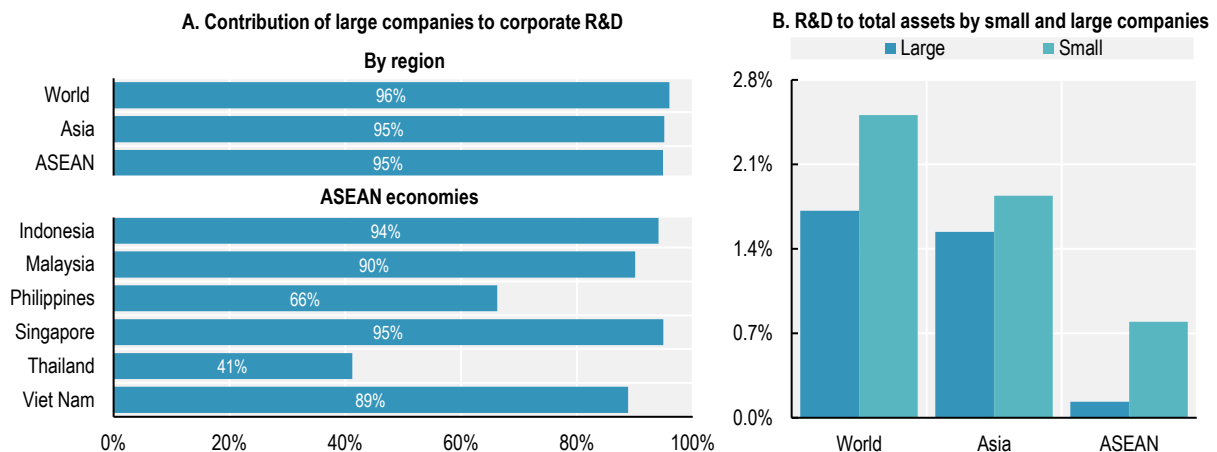
Notes: Panel B shows the median value of R&D to assets for each region. Companies with assets larger than the median asset size of each group are categorised as large companies. In Panel B, only companies with reported R&D are included.
Source: OECD Capital Market Series dataset, LSEG, see Annex for details.

1.5. ASEAN companies' use of public markets

ASEAN economies have seen an increased activity in recent years in both corporate bond and public equity markets. By the end of 2023, market-based financing in the region represented 54% of GDP, a much lower share than that of bank financing (81%).[6] The use of capital markets by non-financial ASEAN companies remains somewhat limited. The ratio of market capitalisation of listed companies to GDP and the amount of outstanding corporate bonds to GDP in 2023 was lower in ASEAN region than in Asia and the world. In particular, in 2023, market capitalisation of ASEAN listed companies reached USD 1.8 trillion representing 47% of region's GDP while non-financial companies had USD 264 billion in outstanding corporate bonds, equivalent to 7% of the region's GDP (Figure 1.13).

At the country level, significant differences exist in the development and the use of capital markets. At the more developed end, Thailand ranks first in terms of market capitalisation of non-financial listed companies and the outstanding amount of corporate bonds, even surpassing global figures as share of GDP. Indonesia follows with the second highest outstanding amount of corporate bonds and market capitalisation. However, as share of GDP, market-based financing is among the lowest in the region suggesting that capital markets are not contributing enough to the intermediation of financing in the economy. In Malaysia, the stock market is more developed with market capitalisation representing 67% of GDP while the outstanding amount of corporate bonds to GDP remains low, at 4%. On the other end, Cambodia and Lao PDR have the least developed capital markets in the region.

Figure 1.13. Overview of non-financial companies' use of market-based financing and bank credit

	Outstanding corporate bonds (end-2023)		Listed companies (end-2023)		Bank credit (end-2022)	
	Amount (USD billions)	% of GDP	Market cap. (USD billions)	% of GDP	Amount (USD billions)	% of GDP
By region						
Global	15 459	15%	83 814	80%	86 790	87%
Asia	3 965	12%	25 994	78%	49 744	152%
ASEAN	264	7%	1 789	47%	2 886	81%
ASEAN economies						
Thailand	113	22%	417	81%	649	131%
Singapore	43	9%	254	51%	603	129%
Philippines	28	6%	188	43%	197	49%
Indonesia	59	4%	518	37%	403	31%
Malaysia	16	4%	289	67%	462	114%
Viet Nam	3	0.6%	118	27%	514	126%
Cambodia	1	1.8%	5	17%	51	178%
Lao PDR	2	12%	0.3	2%	7	44%

Notes: Bank credit refers to bank credit to non-financial corporations, except for Lao PDR, where credit to non-financial corporations was not available and credit to the private sector was used instead. The GDP values used to compute the size of the corporate bond and equity markets corresponds to 2023 forecast values. Market capitalisation for Cambodia was collected from the Securities Commission of Cambodia. Non-financial corporate bond data excludes convertible bonds, deals that were registered but not consummated, preferred shares, sukuk bonds, bonds with an original maturity less than or equal to one year or an issue size less than USD 1 million. Non-financial listed companies' data excludes units, trusts, secondary listings, firms trading on over-the-counter markets and those listed on SME/growth markets, special purpose acquisition companies, investment funds and real estate investment trusts.

Source: OECD Capital Market Series dataset, Bank for International Settlements, Securities Commission of Cambodia, October 2023/April 2024 World Economic Outlook dataset, LSEG, see Annex for details.

1.5.1. Trends in the use of public equity markets

The use of public equity markets by ASEAN companies has grown over the last two decades. Between 2000 and 2023, the annual average share of the capital raised via public equity offerings to GDP was 0.9% in ASEAN economies in line with the figure for Asia (0.9%) and slightly above the global average of 0.8% (Figure 1.14). Despite smaller initial public offerings (IPOs) in the ASEAN region, since 2000, almost one in every 10 IPOs in the world correspond to an ASEAN company. The total amount of capital raised via secondary public offerings (SPOs) in ASEAN economies almost double that of initial offerings.

The use of public equity market shows significant differences across ASEAN economies over the 2000-23 period (Figure 1.14). The most active markets over the last two decades were Malaysia, Singapore and Thailand, where the total capital raised represented between 1.1-1.8% as share of GDP. Viet Nam, Philippines and Indonesia show lower levels of capital raised. Conversely, Cambodia and Lao PDR exhibited a more limited use of public equity financing, with total equity capital raised representing less than 0.2% of their respective GDP.

In the Philippines, Lao PDR and Cambodia the IPO activity is led by fewer and larger companies. Notably, Malaysia stands out as the jurisdiction with the highest overall IPO activity between 2000 and 2023 in terms of both the number of IPOs and total proceeds raised. With respect to secondary equity offerings, Singapore ranks first in the region with USD 95 billion raised (Figure 1.14).

The median size of IPOs in the majority of ASEAN economies remains small compared to Asia ranging between USD 8 billion and USD 33 billion. While Malaysia has the smallest IPOs among ASEAN peers, Philippines recorded the largest ones, mainly as a result of fewer but larger IPOs.

Figure 1.14. Equity capital raised by non-financial companies, 2000-23

	Number of IPOs	Size of IPOs (USD millions)	Total IPO raised (USD billions)	Total SPO raised (USD billions)	Total equity raised (% of GDP)
By region					
World	30 338	29	4 578	11 344	0.8%
Asia	16 040	30	1 883	3 774	0.9%
ASEAN	2 945	11	189	370	0.9%
ASEAN economies					
Cambodia	7	27	0.28	0.5	0.2%
Indonesia	546	12	36	73	0.5%
Lao PDR	3	16	0.18	n.a.	0.1%
Malaysia	663	8	48	72	1.5%
Philippines	78	33	11	33	0.6%
Singapore	574	12	27	95	1.8%
Thailand	557	16	42	84	1.1%
Viet Nam	517	9	24	12	0.8%

Notes: The size of IPOs is calculated by taking the median value of IPOs. The GDP values used in the calculations correspond to forecast values for 2023. Total equity raised as share of GDP is the annual average of the ratio between 2000 and 2023.
Source: OECD Capital Market Series dataset, October 2023 World Economic Outlook dataset, see Annex for details.

Over time, the trends in the amount of equity capital raised via initial and secondary public offerings, and the number of accessing equity markets have changed. From 2000 to 2010, the capital raised by ASEAN corporations joining public equity markets showed an upward trend with an annual average of USD 8.4 billion, reaching its peak in 2010 at USD 22 billion. In the following years, there was a decline in the IPO activity with an annual amount raised between 2011 and 2019 averaging USD 7.3 billion. Since Between 2020 and 2022, the annual capital raised by non-financial companies stood at around USD 8.5 billion. However, in 2023, the equity raised through IPOs decreased to USD 5.7 billion. The number of IPOs has declined since 2010, from 1 575 IPOs between 2000 and 2011 to 1 370 IPOs between 2012 and 2023 (Figure 1.15, Panel A).

Following global trends, the amount raised through secondary public offerings (SPOs) in the ASEAN region exceeded that of IPOs. However, between 2013 and 2018, the amount of capital raised via secondary offerings followed a downward trend. On average, since 2012, 326 companies issued USD 18.9 billion in new equity annually. These figures indicate a 58% increase in average proceeds and a 57% rise in the number of companies compared to the preceding period (from 2000 to 2011). The secondary public offerings activity increased particularly during the crisis, when non-financial companies extensively use the equity market to raise funds. Indeed, in 2021, amid the notable challenges posed by the COVID-19 pandemic, 443 already listed companies from the ASEAN region collectively raised USD 30 billion (Figure 1.15, Panel B). Nonetheless, in the subsequent years, both the number and amount raised via SPO declined substantially. In 2023 the equity capital raised in the ASEAN region only totalled USD 5 billion.

Figure 1.15. Initial and secondary public equity offerings by non-financial ASEAN companies

A. IPOs

B. SPOs
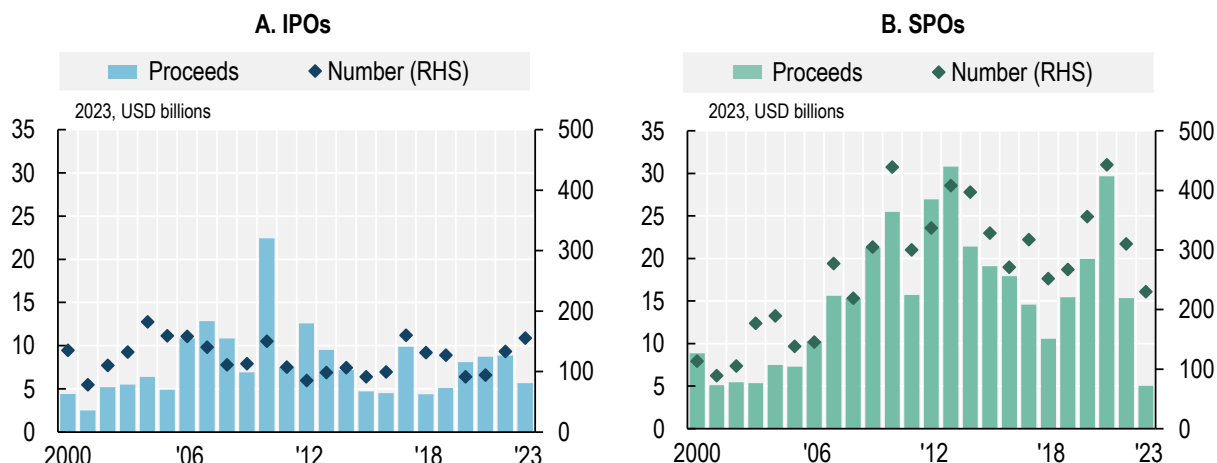
Source: OECD Capital Market Series dataset; see Annex for details.

In terms of the industry breakdown of equity public offerings, industrials emerge as the most active industry for both IPOs and SPOs globally, as well as in Asia and in the ASEAN region (Figure 1.16). Globally consumer cyclicals ranks second, while in Asia and the ASEAN region technology and consumer non-cyclicals rank second, respectively. Technology companies, despite using equity markets to access financing in Asia and globally, they are not important users of public equity in ASEAN economies. This coincides with the low investment in R&D observed by listed companies in the region (Figure 1.11).

Figure 1.16. IPO and SPO proceeds of non-financial companies by industry, 2000-23
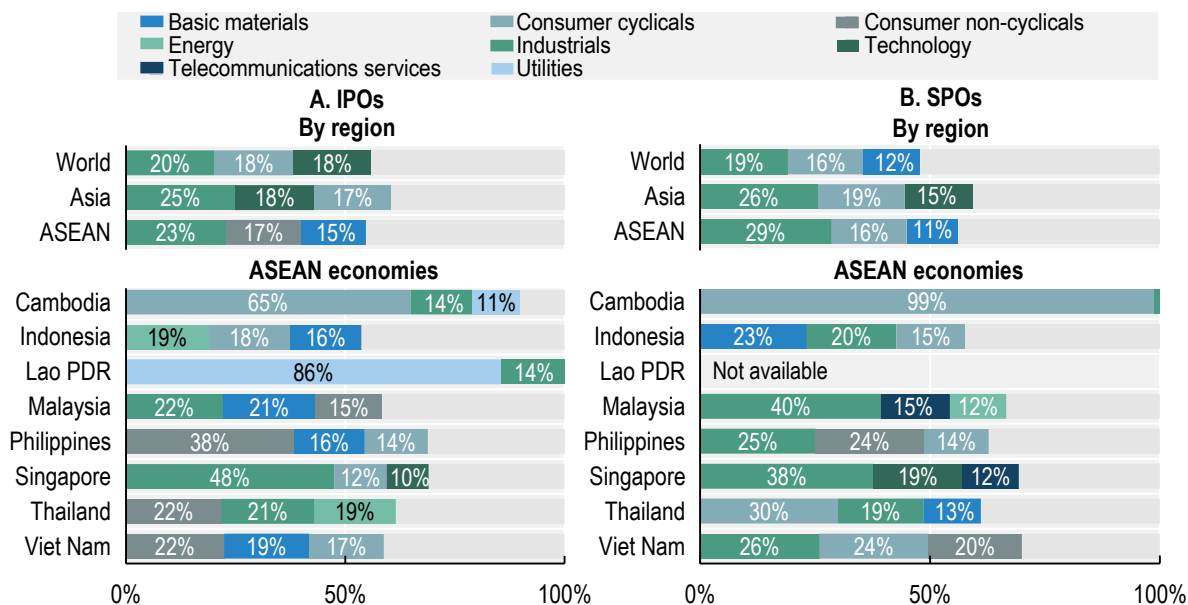
Note: This figure shows only the top three industries among non-financial listed companies by share of proceeds.
Source: OECD Capital Market Series dataset, see Annex for details.

The most active industries in raising public equity vary across ASEAN economies. In terms of funds raised through IPOs, industrials is the leading industry in Singapore and Malaysia, representing 48% and 22% of the total, respectively. In the Philippines, Viet Nam and Thailand, the consumer non-cyclicals industry

stands out as the most active, representing 38%, 22.4% and 21.8% of the equity raised, respectively. On the other hand, Cambodia and Lao PDR, due to the limited use of capital markets, exhibit a less diverse industry composition. For example, in Cambodia, consumer cyclicals companies concentrate 65% of the equity raised while in Lao PDR the utilities industry constitutes 86% [7] (Figure 1.16, Panel A).

Regarding SPOs, the industrials sector dominates in the majority of ASEAN markets. However, in Malaysia and Singapore, this industry's importance is notably high at 40% and 38%, respectively. In Thailand, the consumer cyclicals industry takes the lead, constituting 30% of the total equity capital raised through SPO, while in Indonesia, 23% or the capital was raised by companies in the basic materials industry. Cambodia's SPO issuance mostly corresponds to consumer cyclicals companies, while Lao PDR did not recorded SPO over the analysed period (Figure 1.16, Panel B).

1.5.2. Trends in the use of corporate bonds

Over the last two decades, the use of corporate bonds by ASEAN companies have steadily grown both by non-financial and financial companies. Capital raised through corporate bonds reached USD 122 billion in 2020, before declining to USD 81 billion in 2023. Over the period 2000-23, issuance by non-financial companies represented 47% of the total. In line with increasing issuance, the amount of outstanding corporate bonds in the region reached USD 551 billion in 2023 and non-financial companies represented 48% of the total.

However, despite the observed growth, the outstanding amount of non-financial corporate bonds represented only 7% of the region's GDP, below the 12% observed in Asia and 15% globally. Moreover, the capital raised via corporate bonds by ASEAN non-financial corporations during the last decade only accounted for 5% of the total capital raised in Asia, much lower than the ASEAN contribution to Asian GDP (11%) over the same period.[8]

Capital raised through corporate bonds by ASEAN non-financial companies increased from an annual average of USD 19 billion during 2000-11 to USD 44.1 billion in 2012-23 (Figure 1.17, Panel A). During the latter period, more than 3 000 non-financial ASEAN companies accessed market financing by issuing corporate bonds. They raised a record high of USD 57.8 billion in 2021, largely driven by increased borrowing needs due to the COVID-19 pandemic. However, 2022 and 2023 saw a decline in the use of corporate bonds in line with global trends as a response to tightening monetary policy. The overall growth in the use of corporate bonds by non-financial companies is also reflected in the growing outstanding amounts in the region reaching its peak in 2021 at USD 284 billion (Figure 1.17, Panel B).

Figure 1.17. Corporate bond trends in ASEAN economies
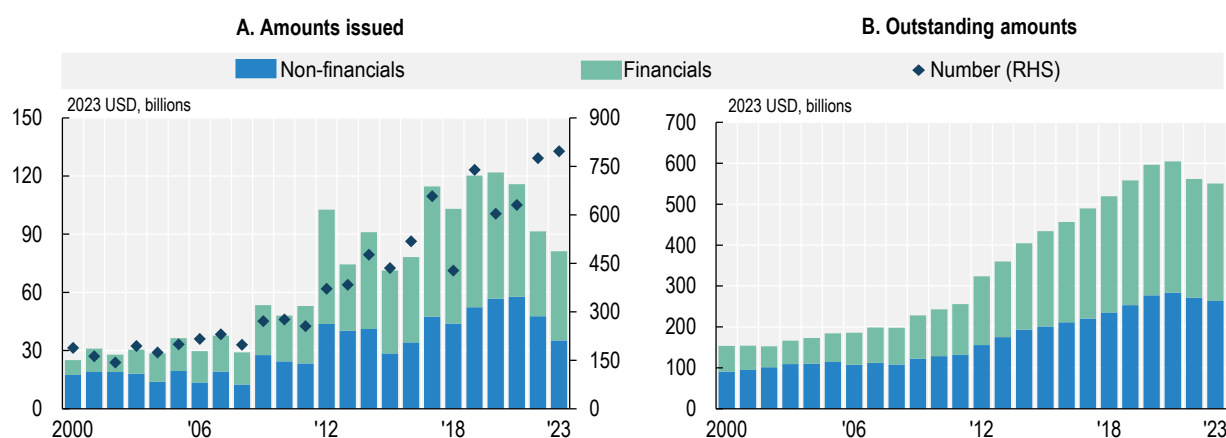
Source: OECD Capital Market Series dataset, LSEG, see Annex for details.

The use of corporate bond markets by non-financial companies shows significant differences across ASEAN economies (Figure 1.18.). Companies from Thailand, Indonesia and Philippines increased their use of corporate bonds over time, in line with global and regional trends. However, Malaysia experienced a decline in corporate bond issuance from USD 32.2 billion during the 2000-07 period to USD 18 billion in the 2016-23 period. Additionally, Singapore also experienced a decrease in issuance over the last seven years. While the use of corporate bonds in Cambodia, Lao PDR and Viet Nam have in improved over time, it is important to note that these markets remain small and are still at an early stage of development.

Figure 1.18. Corporate bond issuances by non-financial companies in ASEAN economies
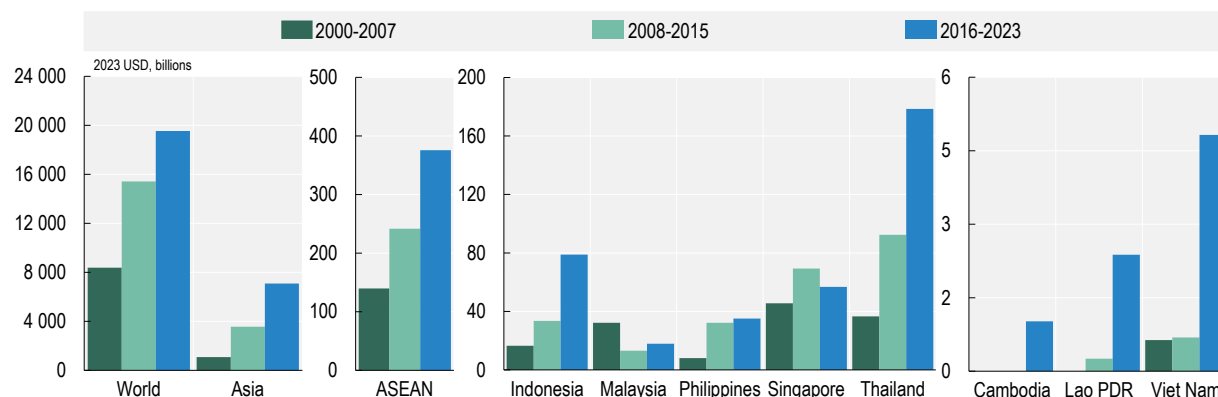
Source: OECD Capital Market Series dataset, LSEG, see Annex for details.

Similar to the use of equity markets, industrial companies dominate the corporate bond issuance globally, as well as in Asia and in the ASEAN region (Figure 1.19). Utilities followed in the ASEAN region. Energy companies are also important issuers of corporate bonds occupying the third place in ASEAN markets, while consumer cyclicals represent a larger share of the issuance globally and in Asia.

Figure 1.19. Industry distribution of non-financial corporate bonds, 2000-23
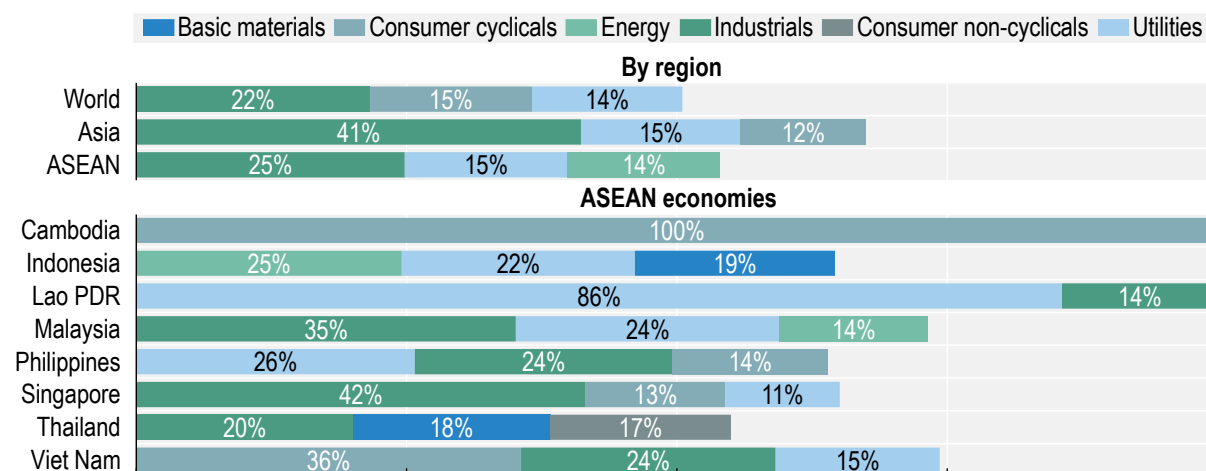
Note: The figure only shows the top three non-financial industries of corporate bond issuers.
Source: OECD Capital Market Series dataset, LSEG, see Annex for details.

The most active industries using corporate bonds differ at the country level (Figure 1.19). Similar to ASEAN trends, industrial companies are the largest bond issuers in Singapore (42%), Malaysia (35%) and Thailand (20%) accounting for a significant share of the total capital raised over the last two decades. Utility companies rank within the top three in Indonesia, Lao PDR, Malaysia, Philippines, Singapore and Viet Nam contributing to the regional dominance of that industry. Energy companies account for 14% of ASEAN corporate bond issuance while they are responsible for 25% in Indonesia and 14% in Malaysia. Notably, in Cambodia, all corporate bonds were issued by companies from the consumer cyclical industry, which also represents a significant share (36%) of the issuance of corporate bonds in Viet Nam.

The maturity of corporate bonds has fluctuated over time showing an overall decreasing trend in Asia and in ASEAN economies while it has remained at around the same level globally (Figure 1.20, Panel A). During the past three years there have been a substantial decline in the maturity of corporate bonds across regions. Tighter financing conditions and investors' concerns about economic prospects are behind the decline observed decline in maturities. Notably, average maturity in ASEAN economies dropped from 8.5 years in 2020 to 5.7 years in 2023.

When analysing average corporate bond maturities between the 2000-11 and 2012-23 periods, the picture changes for ASEAN economies. Globally, the average maturity of non-financial corporate bonds was 9.5 years, and in the ASEAN region it went up from 7 to 7.3 years (Figure 1.20, Panel B). The exception has been Asia where maturities dropped, driven by the high volume of short-term Chinese corporate bonds.

At the country level, most ASEAN issuers have lengthened the tenor of their corporate bonds, except those from Malaysia and Viet Nam. However, the average maturity of corporate bond issuances for Cambodia and Lao PDR should be interpreted with cautious since in these two young markets there are few issuances.

Figure 1.20. Value-weighted average maturity of non-financial corporate bonds

	2000-2011	2012-2023
By region		
World	9.5	9.5
Asia	6.7	5.6
ASEAN	7.0	7.3
ASEAN economies		
Cambodia	n.a.	5.0
Indonesia	6.8	10.5
Lao PDR	n.a.	6.2
Malaysia	7.3	7.6
Philippines	6.9	7.1
Singapore	6.6	6.9
Thailand	5.9	6.0
Viet Nam	5.8	4.0
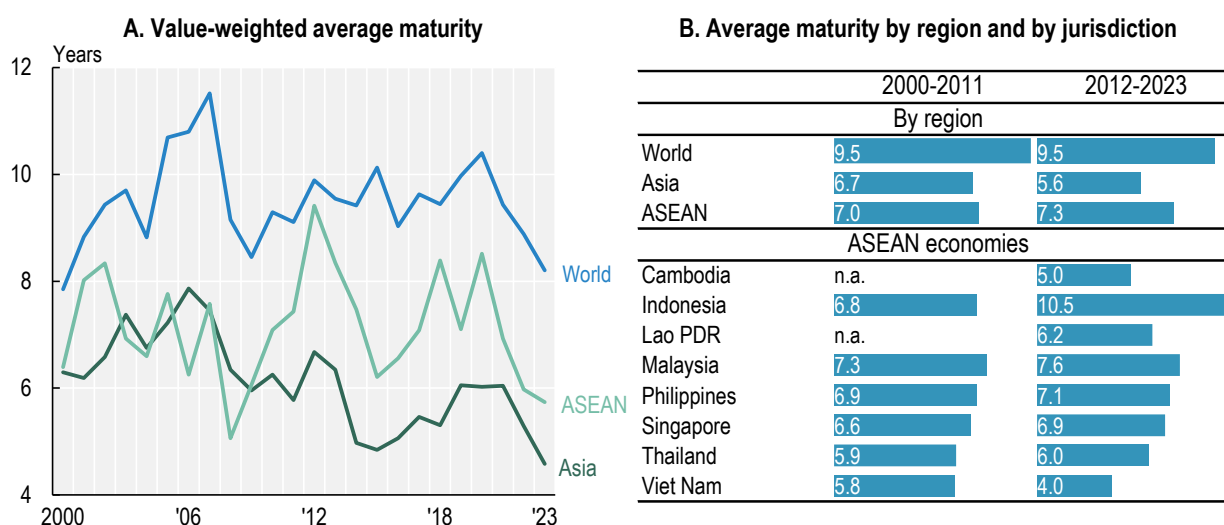
Note: Maturity used in the figure and in the analysis refers to maturity of the corporate bonds at issuance.
Source: OECD Capital Market Series dataset, LSEG, see Annex for details.

1.6. Selected issues in the public equity and corporate bond markets

This section discusses selected issues related to the public equity and corporate bond markets that may deserve the attention of policy makers such as: secondary stock market liquidity, index inclusion of ASEAN companies, credit and quality assessment in the corporate bond markets, and barriers to the development

of corporate bond markets. It also discusses the listing requirements and fees in the public equity and corporate bond markets.

1.6.1. Secondary stock market liquidity

A liquid market ensures an efficient price formation process, improves investor confidence and contributes to the overall functioning of capital markets. Overall, lack of liquidity undermines the attractiveness of capital markets for certain investors and discourages companies to use marketplaces in the first place. To have meaningful trading in the secondary market, a certain size of activity in the primary markets is essential. Moreover, capital markets' liquidity is linked to various factors, including the functioning of stock exchanges, the investors base, derivative markets, as well as the engagement of market makers, among others. The affordability and the existence of research on companies, the accessibility of trading information, cost of trading and fiscal arrangements could also have implications on the liquidity levels.

Most public equity markets in ASEAN economies are characterised by low levels of liquidity. The fact that ASEAN markets remain small and underrepresented in investable indices (see Section 1.6.2) does not help attracting foreign investors. In addition, the national investor bases are not broad enough. In 2023 stock market liquidity, measured by the turnover ratio, decreased even further in all the jurisdictions (Figure 1.21, Panel A). Stock markets in the Philippines, Cambodia and Lao PDR offer negligible liquidity (Panel B). In the Philippines, turnover ratio was 8% in 2023, lower than the levels recorded in previous years. Cambodia witnessed a slight increase in the turnover ratio in 2022, reaching 7.3%. However, in 2023 it decreased to 1.6%. Lao PDR has exhibited the lowest stock market liquidity among ASEAN economies over the last three years, with 2023 marking the lowest level at 0.18%. Equity markets in Singapore, Malaysia and Indonesia showed comparatively higher levels of liquidity with turnover ratios 32%, 31% and 22% respectively in 2023.

Equity markets in Thailand and Viet Nam show relatively higher liquidity. In particular, Thailand's turnover ratio was 73% in 2023, although it decreased compared to the previous years. Viet Nam's public equity market, despite being one of the smallest in the region, showed the highest level of liquidity in 2023 among ASEAN markets. However, liquidity significantly decreased in Viet Nam when compared to that in 2022.

Figure 1.21. Liquidity in the public equity market in ASEAN economies

A. Stock market turnover ratio

B. Traded value, 2023

USD, billions

Country	Value
Thailand	378.0
Singapore	196.1
Viet Nam	176.5
Indonesia	166.8
Malaysia	121.8
Philippines	24.9
Cambodia	0.051
Lao PDR	0.0012

Notes: The data used in the figures was retrieved from the respective stock exchange websites. The turnover ratio is calculated as the total value traded in a given year divided by the market capitalisation at the end of that year. For Lao PDR, the turnover ratios for 2021 and 2022 were directly extracted from the figures disclosed by the Lao Securities Exchange.
Source: Bursa Malaysia, Cambodia Securities Exchange, Lao Securities Exchange, The Philippine Stock Exchange, Bangko Sentral ng Pilipinas, Indonesia Stock Exchange, Hanoi Stock Exchange, HCM Stock Exchange, The Stock Exchange of Thailand, World Federation of Exchanges.

1.6.2. Index inclusion of companies from ASEAN region

In recent years, institutional investors have widely adopted the use of investable indices in their asset allocation process, primarily due to the benefits of index investing such as portfolio diversification and lower management fees. Most indices adopt a market capitalisation-weighted approach when assigning index weights to companies, leading to an inherent bias towards larger companies. Moreover, in the selection of markets to be included in the indices, certain liquidity requirements have to be met. Therefore, investors' portfolios mirroring these indices are often heavily concentrated in markets with certain level of liquidity and in fewer and larger corporations, leaving smaller companies and less liquid markets out of the radar of institutional investors.

An increasing number of ASEAN corporations have been included into major investable indices. Index inclusion improves the visibility of companies and markets, thus attracting more foreign investors, in particular institutional investors. However, there are notable differences in the inclusion of ASEAN companies in different indices.

In terms of regional representation, ASEAN companies are underrepresented in the *MSCI Emerging Market index.* The index allocates a weight of only 6% to ASAEN companies, lower than the ASEAN economies' share in the GDP of emerging markets and developing economies (8.4%) (Figure 1.22, Panel A). Moreover, companies from only five ASEAN economies are included in global and regional indices. (Panel B). Notably, companies from Cambodia, Lao PDR and Viet Nam are currently not included in any of the indices shown here. Additionally, compared to their share in total ASEAN market capitalisation, companies from Thailand are underrepresented in the *AC Asia Pacific* index, while companies from the Philippines are underrepresented in the *MSCI Emerging*, *AC Asia Pacific* and *MSCI Emerging Asia* indices when compared to their market capitalisation share in the ASEAN region.

Figure 1.22. Share of ASEAN companies in major global and Asian indices, end of 2022
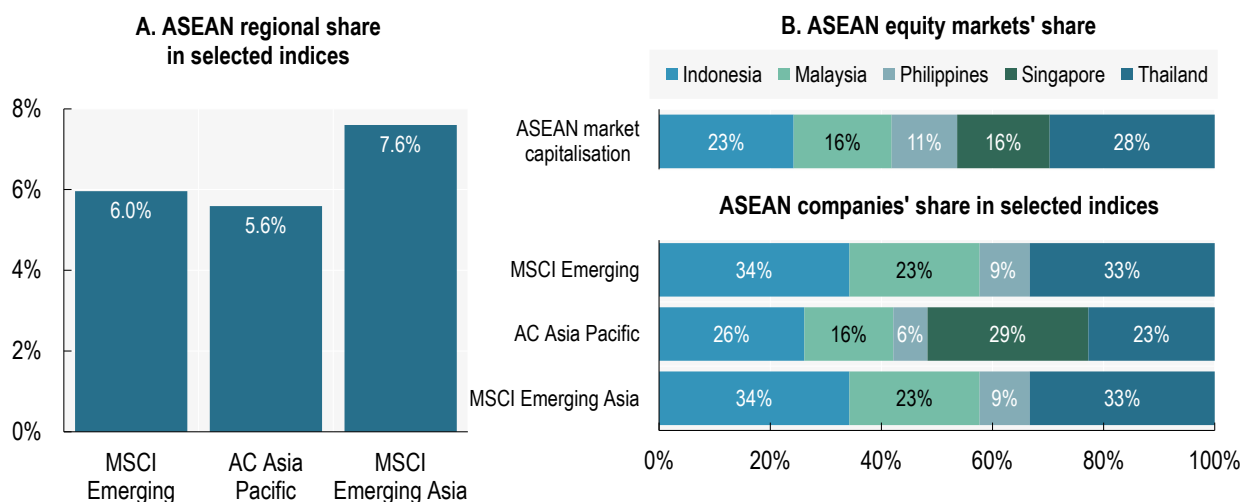
Note: The information on MSCI constituents is as of September 2023, REITS and investment funds are excluded from the indices.
Source: OECD Capital Market Series dataset, LSEG, MSCI, see Annex for details.

Major Asian and ASEAN indices do not fully reflect the industry composition of the markets they track (Figure 1.23). While in Asia, the indices feature a higher proportion of companies from the technology sector, the index including ASEAN companies has a predominant presence of companies from the financial sector. Major Asian indices, such as the *AC Asia Pacific Index* and the *MSCI Emerging Asia* overweight the technology sector. In contrast, the *AC ASEAN index* is heavily weighted towards the financial sector,

constituting 41% of the market capitalisation covered by the index, a significantly higher share than the financial sector's share in ASEAN markets as well as that of other indices.

Figure 1.23. Industry composition of major global, Asian and ASEAN indices, end of 2022
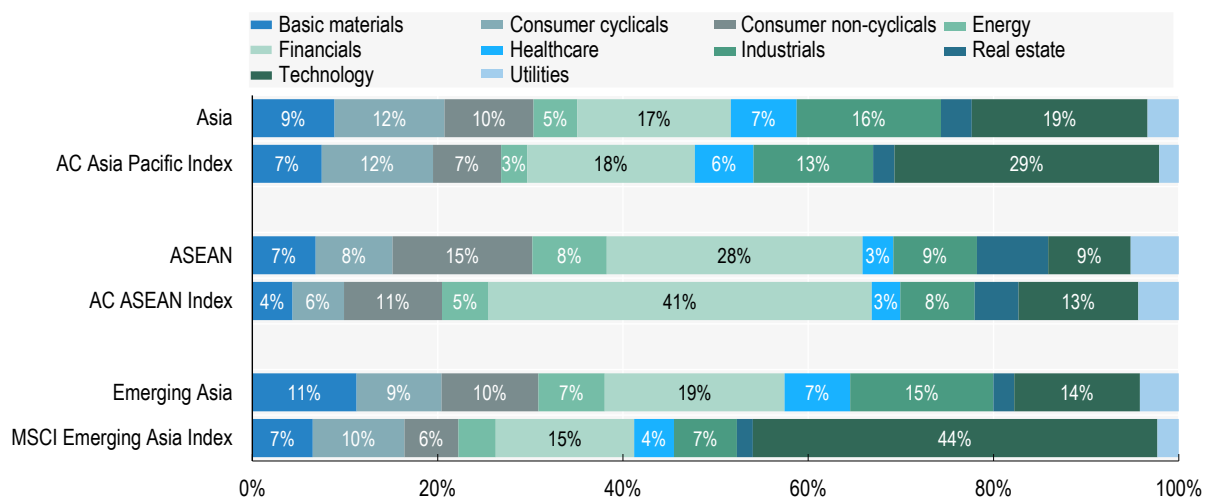
Notes: The information on MSCI constituents is as of September 2023, REITS and investment funds are excluded from the indices. Apart from the industry composition of major indices, the figure also shows the actual industry composition for the listed companies in Asia, ASEAN and Emerging Asia.
Source: OECD Capital Market Series dataset, LSEG, MSCI, see Annex for details.

The lack of inclusion of ASEAN companies in investable indices is also visible in the participation of foreign institutional investors in ASEAN markets (Figure 1.24). While 10% of the Asian listed equity in 2023 was in the hands of foreign institutional investors, this number is only 8% in ASEAN markets. Moreover, there are significant differences in foreign ownership across ASEAN markets. Singapore stands out with foreign institutional investors holding 12% of the listed equity. This does not come as surprise since Singapore is the only ASEAN markets included in the MSCI World Index (covering developed markets) and also represents a high share of the AC Asia Pacific index (see Figure 1.22). Markets such as Indonesia, Malaysia and Thailand are also represented in investable indices and show a significant share of foreign institutional ownership.

Figure 1.24. Institutional investor ownership in ASEAN markets, end of 2023
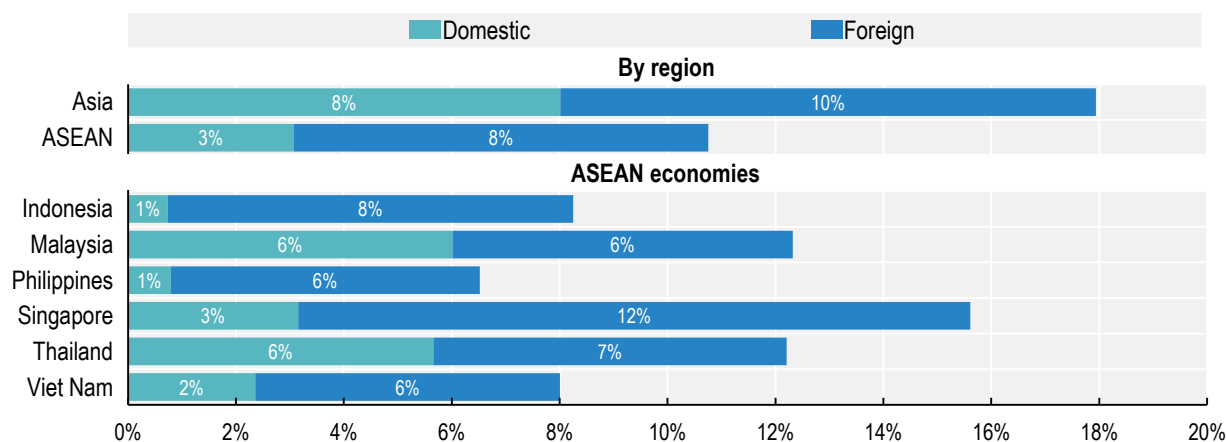
Source: OECD Capital Market Series dataset, FactSet, LSEG, Bloomberg, see Annex for details.

1.6.3. Credit assessment and quality in the corporate bond markets

Easy and affordable access to credit ratings and familiarity with the rating process significantly increases companies' ability to use long-term debt securities. Assessment of the creditworthiness of companies is perceived as the second most significant barrier to the development of corporate bond markets in the ASEAN region (OECD, 2024[1]). Despite the expansion of corporate bond markets globally over the last two decades, credit quality has deteriorated. The same has been observed in Asia and in ASEAN economies. This has been mainly the result of the surge in lower-grade corporate bonds.

All ASEAN markets have registered at least one or several credit rating agencies (CRAs). Domestic CRAs operate in the majority of them, while international and regional CRAs operate only in a few. Recent OECD research shows that all ASEAN markets, except Singapore and Lao PDR, have at least one registered domestic CRA (Figure 1.25, Panel A). Differently, one regional CRA operates in Lao PDR and one international CRA in Singapore. International CRAs also operate in Thailand and Viet Nam, and Thailand also hosts a regional CRA. In Malaysia, international CRAs have a stake in the domestic ones.

Obtaining a credit rating from a CRA for a corporate bond typically demands technical expertise to understand and navigate the involved processes, which smaller companies may lack. Additionally, considering the costs associated, it can also be unaffordable for smaller issuers to obtain a credit rating which may ultimately impede access to corporate bond financing. To address this issue and support market-based financing for growth companies, Malaysia introduced an alternative credit system where SME Corporation of Malaysia provides rating services.

The rating scales and process could vary across markets, posing challenges in objectivity, transparency and the quality of the analysis regionally. In order to improve rating quality through mutual cooperation Cambodia, Indonesia, Malaysia, Philippines, Thailand and Viet Nam joined to the Association of Credit Rating Agencies in Asia (ACRAA).

Figure 1.25. Number of domestic CRAs and requirements to have a credit rating

A. Domestic CRAs

Name of the jurisdiction	Number
Cambodia	1
Indonesia	1
Lao PDR	n.a.
Malaysia	2
Philippines	1
Singapore	n.a.
Thailand	1
Viet Nam	1

B. Requirement to have a credit rating to issue corporate bonds
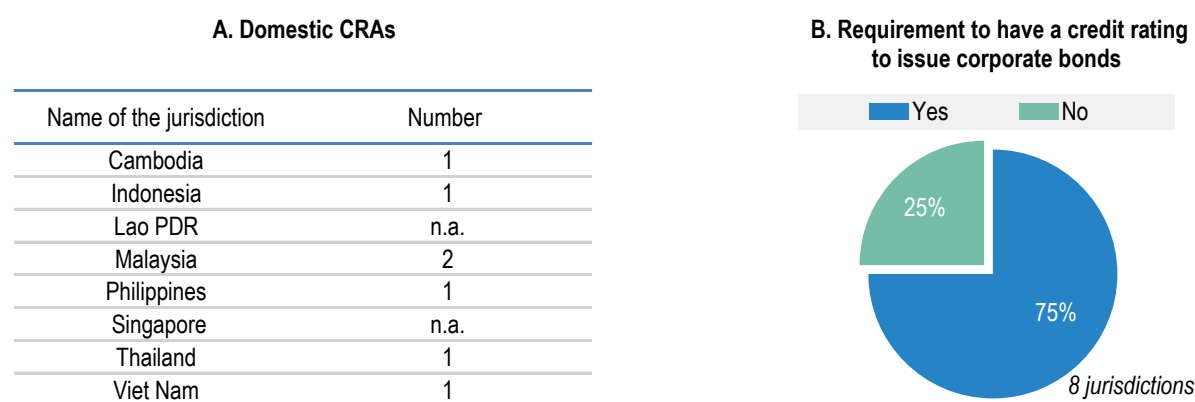
Notes: Lao PDR recognises a regional CRA, while Singapore an international CRA. The number of domestic Credit Rating Agencies (CRAs) in Panel A is based on the information about ACRAA (Association of Credit Rating Agencies in Asia) membership. For Cambodia the information was collected from the Securities and Exchange Regulator of Cambodia.
Source: OECD (2024[1]), Corporate Bond Markets in Asia: Challenges and Opportunities for Growth Companies, https://doi.org/10.1787/96192f4a-en; Japan Credit Rating Agency, (2023[2]), Association of Credit Rating Agencies in Asia (ACRAA), https://www.jcr.co.jp/en/service/international/acraa/; Securities and Exchange regulator Cambodia (2024[3]), Credit Rating Agency, https://www.serc.gov.kh/english/m69.php?pn=6.

Credit ratings also play an increasingly important role by influencing the investment decisions and asset allocation of financial and non-financial institutions in different ways such as quantitative limits by regulation, self-defined investment policies, rating-based indexes and investment mandates. All ASEAN markets, but Singapore and Viet Nam, require corporate bonds to be rated and have a minimum credit rating (Figure 1.25, Panel B). For example, companies wanting to list their bonds on the Lao's Exchange need to obtain a minimum "BB" credit rating. Even though Singapore does not set out any rules regarding the credit rating level of issued corporate bonds, the exchange requires them to be investment grade. Indonesia requires in its legal framework that corporate bonds require at least an investment grade rating.

The aggregate credit quality of non-financial corporate bonds has seen a decline over time globally, as well as in Asia and in the ASEAN region. The OECD corporate bond credit quality index,[9] shows this decrease in the credit quality of newly issued corporate bonds (Figure 1.26). In 2022, the average rating of corporate bonds issued by ASEAN companies was slightly higher than the investment grade threshold "BBB-". Importantly, over the period 2000-22, the quality of bonds issued by ASEAN companies has been mostly lower than in Asia. In 2023, corporate bonds issuance in Asia and ASEAN experienced a decline and therefore restricting access for lower-rated companies. Consequently, only highly rated companies were able to issue corporate bonds in 2023. As a result, the corporate bond credit quality index significantly improved in Asia and in the ASEAN region. On average, in 2023 corporate bonds issued in these regions carried an average "A" rating.

Figure 1.26. Corporate bond credit quality index
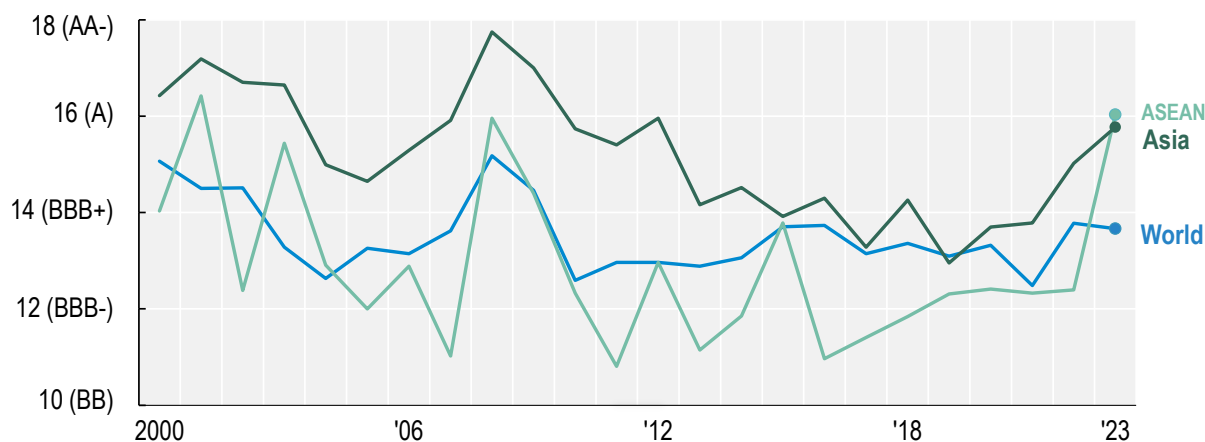
Source: OECD Capital Market Series dataset, LSEG, see Annex for details.

A closer look at issuer credit rating composition shows that the decrease in credit quality is partly an effect of increasing issuances in BBB rated bonds and an expansion of the non-investment grade market. Figure 1.27 in Panel A provides a breakdown of corporate bond issuance among ASEAN non-financial companies over the 2009-22 period. In general, the issuance of investment grade (IG) bonds dominated that of non-investment grade (non-IG) bonds.

A breakdown of corporate bond credit quality in Panel B shows a significant surge in lower-rated bonds. Within the investment grade category, BBB rated bonds' share in issuance increased from 40.5% during the 2000-11 period to 87.6% in the 2012-23 period. This is the opposite for non-investment grade bonds, where the share of the bonds with the highest rating (BB) increased from 62.1% to 68.1%.

Figure 1.27. Credit quality of non-financial corporate bonds in ASEAN economies

A. Composition of issuance

B. Composition of issuance by rating category

		2000-2011	2012-2023
IG	AAA	10.3%	3.4%
	AA	30.8%	6.3%
	A	18.4%	2.9%
	BBB	40.5%	87.6%
Non-IG	BB	62.1%	68.1%
	B+ or lower	37.9%	31.9%
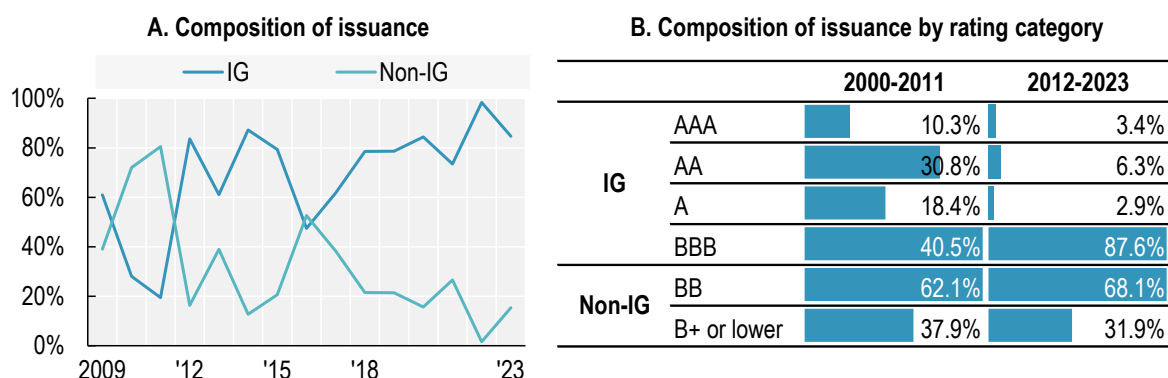
Source: OECD Capital Market Series dataset, LSEG, see Annex for details.

1.6.4. Barriers to the development of corporate bond markets

Despite the observed growth in ASEAN corporate bond markets, companies still have limited access to these markets. Some of the potential barriers to the further development of corporate bond markets include: weak regulatory frameworks (i.e. tax treatment and bankruptcy laws), lack of market infrastructure and the presence of intermediaries, a small and unsustainable investor base, high costs and complexity of issuance of bonds compared to bank credit, legal and investor protection issues, corporate governance issues, undeveloped government bond markets, a small number of mature firms and weak disclosure standards (IOSCO, 2015[4]).

Figure 1.28. Barriers to the development of bond markets in ASEAN and Asia

A. ASEAN

8 jurisdictions

B. Rest of Asia

11 jurisdictions
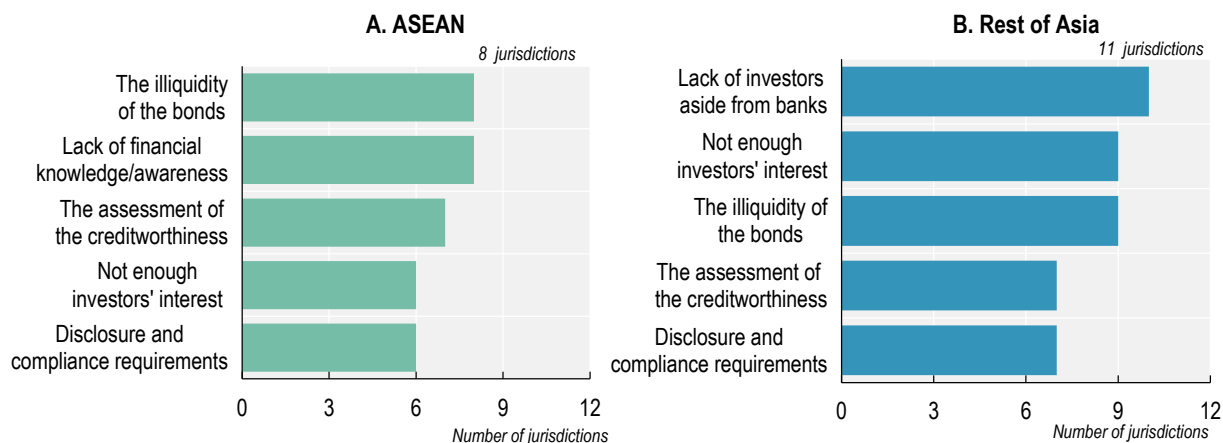
Notes: The figure shows the number of countries that identified the different factors as a barrier to the development of a corporate bond market. Panel B includes: Australia, Bangladesh, People's Republic of China, Hong Kong (China), India, Japan, Korea, Mongolia, Pakistan, Sri Lanka and Chinese Taipei.
Source: OECD (2024[1]), Corporate Bond Markets in Asia: Challenges and Opportunities for Growth Companies, https://doi.org/10.1787/96192f4a-en/

According to recent OECD research one of the most important barriers to the development of corporate bond markets in ASEAN economies is the lack of market liquidity (Figure 1.28, Panel A). Importantly, this has been pointed out as more significant barrier in ASEAN economies compared to the rest of Asia, where lack of liquidity ranks second (Figure 1.28, Panel B). Available data on trading volumes for corporate bonds

shows that the corporate bond market in Indonesia has the highest turnover ratio[10] in 2022, while Thailand and Malaysia have comparatively low levels of liquidity at 27% and 11.4%, respectively (OECD, 2024[1]).

Lack of financial knowledge and awareness was identified as other significant barrier by all ASEAN regulators. The issue is more relevant for ASEAN economies than for the rest of Asia, where this was not cited among the top five perceived barriers. Lack of financial knowledge could undermine investors' ability to assess the benefits and risks of corporate bond investments, which in turn could limit their participation in this market. The level of investors' financial literacy in the majority of ASEAN economies is lower than in Asia. The median value of the share of adults that are financially literate in ASEAN economies was 27%, six percentage point lower than in Asia (33%). Among ASEAN economies, only Singapore and Malaysia show higher values than in Asia (Figure 1.29, Panel A).

The lack of interest from investors and the assessment of creditworthiness, were identified within the five most important impediment for issuing corporate bonds both in ASEAN and in the rest of Asia (Figure 1.28). These two issues are interrelated and tend to self-reinforce each other, as challenges in evaluating credit worthiness undermine the investors' ability to evaluate risks and willingness to invest.

Cambodia, Indonesia, Malaysia and Philippines have in place at least one measure in place aiming to promote access to corporate bond markets (Figure 1.29, Panel B).

Figure 1.29. Financial literacy and measures to support access to corporate bond markets
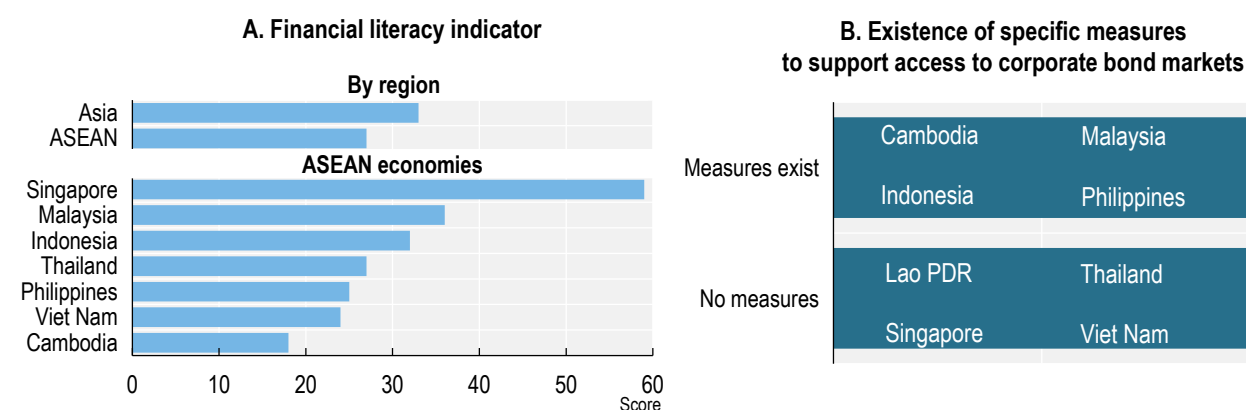
Notes: Panel A shows the share of adults who were financially literate in 2014. Data are not available for India and Lao PDR. In the S&P Global FinLit Survey, the literacy questions measure the four fundamental concepts for financial decision-making that include basic numeracy, interest compounding, inflation and risk diversification. The median values are shown for Asia and for the ASEAN region.
Source: OECD (2024[1]), Corporate Bond Markets in Asia: Challenges and Opportunities for Growth Companies, https://doi.org/10.1787/96192f4a-en, Klapper, Lusardi and Van Oudheusden (2014[5]), Financial Literacy Around the World: Insights from the S&P Ratings services global financial literacy survey, https://gflec.org/wp-content/uploads/2015/11/3313-Finlit_Report_FINAL-5.11.16.pdf.

1.7. Policy considerations

The growth of market-based financing in ASEAN economies is a reason for optimism. However, the fact that corporations in the region continue heavily relying on bank financing provides enough ground for further improvements in the functioning of capital markets in the region to allow companies to diversify their funding sources while increasing corporate sustainability. The fact that investment in the region is mostly concentrated on fixed capital, and little is invested in research and development, raises questions if corporations are provided with the appropriate financing sources. The need of well-functioning capital markets able to channel enough resources to enable the green and digital transitions in the region should be at the top of the policy agenda. With this in mind, the following policy considerations should be explored by policy makers in ASEAN economies:

- *Continue developing market-based financing*: Local authorities should consider designing policies to encourage the development and use of market-based financing. Corporations heavily rely on bank-based financing in the majority of ASEAN economies (e.g. Malaysia, Singapore, Thailand and Viet Nam) and market-based sources play a secondary role. While Indonesia and Philippines show a higher dependence on market-based financing, the penetration of both bank- and market-based financing remains low suggesting that the existence of many financially constraint businesses.

- *Promote the listing of non-financial corporations:* Financial companies represent 28% of the market capitalisation in ASEAN markets, almost twice the figure in Asia and globally. Most of these companies are banks that raise financing from public markets to later intermediate credit to the real sector. Indeed, the banking sector in ASEAN economies has a prominent position as provider of financing to the corporate sector.

- *Inclusion of companies in investable indices:* The lack of inclusion of ASEAN companies in investable indices has a visible impact on the participation of foreign institutional investors in ASEAN markets. While 10% of the listed equity is owned by foreign institutional investors in Asia, this number is 8% in ASEAN markets. Moreover, there are significant differences in foreign ownership across ASEAN markets. The fact that indices usually select markets with a certain level of liquidity and within those markets they adjust market capitalisation by free-float ratios, raises the need for ASEAN markets to increase the size of their local markets by bringing more and larger companies, but also by encouraging already listed companies to increase their free-float levels through increased new equity issuance or reduced shares in the hands of controlling shareholders.

- *Promote the access to long-term financing via corporate bonds*: Corporate bonds have increasingly become a source of long-term financing for non-financial companies. Despite the observed growth of this market in ASEAN economies, the capital raised by ASEAN corporations during the last decade only accounted for 5% of the total capital raised in Asia, much lower than the ASEAN contribution to Asian GDP (11%). Overall, more than half of the capital raised in the ASEAN region is issued by financial companies and in some markets financial companies are the largest users of corporate bonds. Importantly, corporate bond markets in the region are at differences stages of development which should require the implementation of different set of policies to continue developing each market (for a full set of recommendations to develop see (OECD, 2024[1])). One of the main barriers to access bond markets is easy and affordable access to get a credit rating.

- *Enhancing secondary market liquidity and broadening the investor base:* Secondary market liquidity plays a pivotal role in facilitating an efficient price discovery mechanism, bolstering investor confidence, and fostering the overall functioning of capital markets. The lack of liquidity reduces the appeal of capital markets for certain investors and dissuades companies from using public markets. Across ASEAN economies, most public equity markets grapple with low liquidity levels. Similarly, the inadequate liquidity in corporate bond markets within ASEAN nations remains a concern. Low liquidity levels have been identified as a key impediment to corporate bond market development. Today, institutional investors' participation in ASEAN equity markets remains low compared to Asia and globally. In many markets around the globe, the involvement of domestic institutional investors has played a pivotal role in nurturing local capital markets. Therefore, further developing domestic institutional investors and allowing them to participate in local capital markets should be a priority in the region.

- *Foster investment and boost productivity:* The ability to generate sales of ASEAN corporations has been on a declining trend since 2011, despite the continued growth of listed companies' assets. This is a sign of a reduced capacity of corporations in the region to generate better products or to use more efficient and better technologies in their production processes to enhance margins. One important factor is investment. ASEAN corporations despite showing similar levels of investment

in physical capital (capex) to those observed in Asia and globally, they underinvest in research and development. Investment in R&D is a key driver of economic growth and enhances the competitiveness of economies and corporations in the global market. It fuels the development of new industries, improves productivity and creates high-quality jobs. However, the success of R&D investment is highly uncertain and, therefore, well-functioning capital markets, in particular equity markets, play a key role in allowing corporations to invest in R&D enabling economies to exploit the benefits of innovation in terms of productivity and growth.

- ***Foster innovation and digital transformation:*** Better access to market-based financing could support the development of innovative ventures and at the same time, digital technologies could be used to ease access to financing. Contrary to what it is observed in Asia, technology companies are not important users of public equity capital. Companies from industrials, consumer cyclical and consumer non-cyclicals are instead the most important users of public equity. Policy makers in the region should consider taking actions to draw the benefits from the new opportunities presented by digital technologies and to explore the potential capacities in the region.

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[2]

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[5]

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[1]

Securities and Exchange Regulator of Cambodia (2024), *Credit Rating Agency*, https://www.serc.gov.kh/english/m69.php?pn=6.
[3]

Notes

[1] In Indonesia the first stock exchange was put in place by the Dutch East Indies government as a branch of the Amsterdam Stock Exchange, while in the Philippines the Manila Stock Exchange was merged with the Market Stock Exchange to form the Philippine Stock Exchange.

[2] The Cambodia Securities Exchange, the national stock exchange, is 55% owned by the Ministry of Economy and Finance; and Lao's stock exchange (Lao Securities Exchange) is 51% owned by the Bank of Lao PDR. The Stock Exchange of Thailand (SET) is a fully owned subsidiary of the Stock Exchange of Thailand Group which is a government agency operating under the legal framework laid down in the

Securities and Exchange Act. Both the Ho Chi Minh Stock Exchange and the Hanoi Stock Exchange are 100% state-owned.

[3] The calculation for Cambodia is based on the maximum threshold of both the main market and the growth market. In the main market, the initial listing fee follows a regressive structure, capped at KHR 10 million for a market capitalisation of KHR 12 billion. Conversely, in the growth market, the maximum fee is KHR 4 million.

[4] In the Philippines, the annual listing fee in the main market has a minimum of PHP 250 000, whereas this amount represents the maximum annual fee in the SME market.

[5] Measured by the turnover asset ratio that is defined as sales over assets.

[6] Bank financing information refers to 2022, the latest available.

[7] This corresponds to a single IPO occurring in 2011.

[8] The calculation is based on the IMF World Economic Outlook Database.

[9] The OECD corporate bond credit quality index is calculated as a weighted average of individual corporate bond credit ratings. Each credit rating is translated into a scale from 1 to 21. The lowest credit rating is assigned a value of 1 and the highest quality rating is assigned a value of 21.

[10] The corporate bond turnover ratio shows the trading volume relative to the outstanding amount of corporate bonds.

2 Corporate governance in ASEAN economies

This chapter describes corporate governance policies and practices in ASEAN jurisdictions to mobilise their capital markets, in alignment with the G20/OECD Principles of Corporate Governance. The first section discusses ownership structures in the region, and also describes regional initiatives to develop an integrated regional capital market, including the ASEAN Corporate Governance Scorecard. The second section discusses corporate governance policies and practices in ASEAN economies and their relevance for promoting corporate access to capital market financing, including with respect to company groups, institutional investors and stewardship, corporate sustainability, general shareholder meetings, and the responsibilities of the board. The final section discusses policy considerations.

2.1. Introduction

The corporate governance framework in the ASEAN economies should be facilitated in a way that takes into consideration the reality of its corporate ownership structures and other recent evolutions impacting capital markets, such as climate change and digitalisation. This section provides an overview of ownership structures and describes regional initiatives to develop an integrated regional capital market, including the ASEAN Corporate Governance Scorecard.

2.1.1. Ownership structure of ASEAN listed companies

By the end of 2023, the ownership structure of listed companies worldwide has two main characteristics: a wide variety of ownership structures across countries, and the prevalence of concentrated ownership in listed companies.

In terms of the relative importance of each category of investors, there are significant differences across regions and jurisdictions. Institutional investors constitute the largest category of investors globally, making up 45% of total equity holdings (Figure 2.1). However, this percentage is notably lower in Asia at 18% and even lower in ASEAN economies at 10%. Conversely, corporations are the predominant owners of public equity in ASEAN economies reflecting the prominent existence of company group structures. Particularly, their holdings account for 31% of the total, while globally, corporations only own 10% of public equity. Moreover, shareholders that are not required to disclose their ownership, contribute significantly to equity holdings, representing a total share of 27% globally, 33% in Asia, and 28% in ASEAN economies. The ownership share of the public sector, as well as that of strategic individuals, is also slightly higher in Asia and ASEAN economies compared to the global level.

Figure 2.1. Investors' holdings, end of 2023
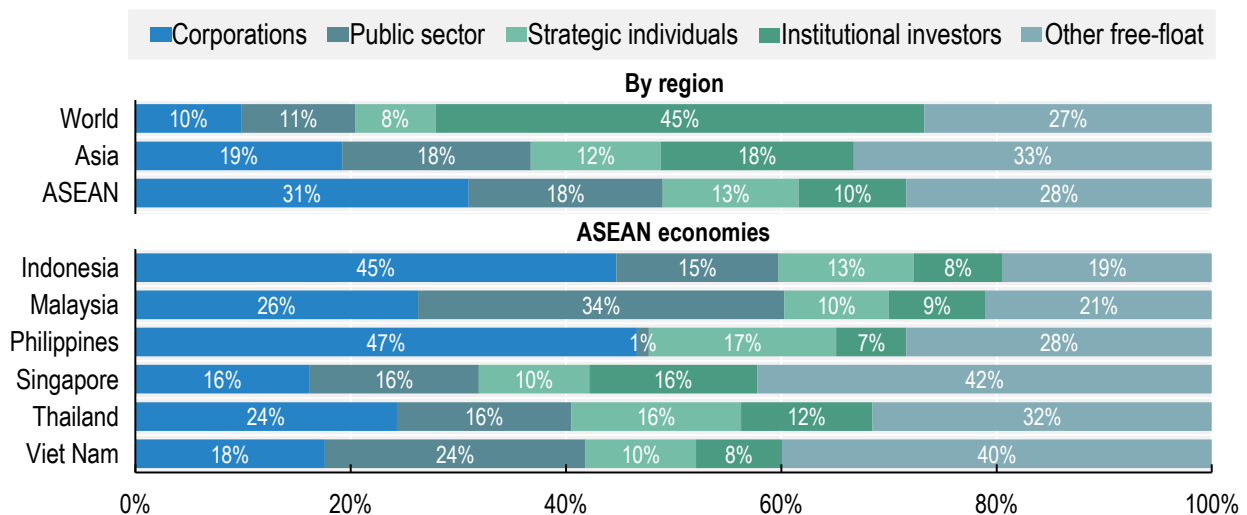
Note: Investors are classified following De La Cruz, Medina and Tang (2019[1]) "Owners of the world's listed companies".
Source: OECD Capital Market Series dataset, FactSet, LSEG, Bloomberg, see Annex for details.

Within ASEAN countries, corporate participation in listed equity is particularly high in Indonesia and Philippines, where they holdings account for 45% and 47% of the total listed equity, respectively. In the other markets, the ownership share of corporations ranges from 16% to 26%. Disparities are also evident across other investor categories. For instance, the public sector plays a crucial role in Malaysia and Viet Nam, owning 34% and 24% of total equity, respectively, while its share is slightly above 1% in the

Philippines. Furthermore, in Singapore, institutional investors own 16% of listed equity, a proportion that is comparatively higher than in any other jurisdictions and the ASEAN average.

ASEAN as a region has higher ownership concentration at the company level compared to both global and Asian levels. Figure 2.2 shows the share of companies with different levels of combined ownership for the three largest shareholders. Notably, in 66% of the ASEAN listed companies, the three largest shareholders together hold more than 50% of the listed equity. Additionally, in 12% and 23% of the ASEAN listed companies the three largest shareholders own between 10% and 29%, and between 30% and 49% of the public equity, respectively. However, differences exist across countries. For instance, Indonesia, Philippines and Singapore exhibit the highest levels of ownership concentration as in over 70% of listed firms the three largest shareholders hold more than 50% of the listed equity. In Malaysia, Viet Nam and Thailand, although this share decreases to around 50% of total firms, is still higher than the global average (40%).

Figure 2.2. Ownership concentration by the largest three shareholders, end of 2023
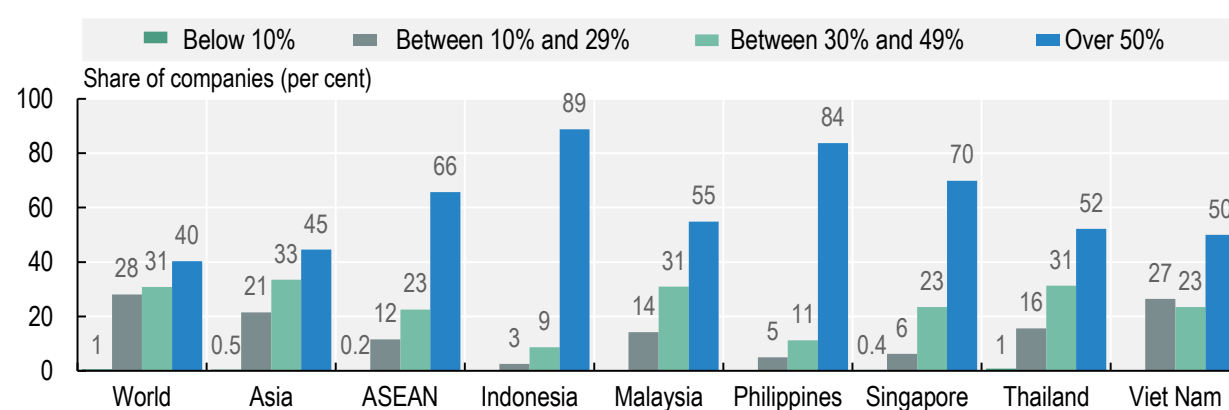
Note: Figure shows the share of companies with different levels of combined ownership for the three largest shareholders.
Source: OECD Capital Market Series dataset, FactSet, LSEG, Bloomberg, see Annex for details.

In ASEAN economies, corporations are the primary owners of listed firms (Table 2.1). In most cases, listed companies are part of a group either as the parent company or as a subsidiary. When the listed company is a subsidiary of the group, it is usually directly owned by the parent or at most by a company two layers away from the parent. This situation can originate agency-related issues, including the potential extraction of private benefits of control at the expense of other shareholders, opaque related party transactions among group members, and conflicts of interest between different group members with overlapping activities. (Medina, De la Cruz and Tang, 2022[2]).

As for the origin, with the exception of Singapore, domestic corporations hold a greater share of market capitalisation compared to non-domestic ones in all of the countries (Table 2.1). This is particularly notable in the Philippines, where domestic corporations own 43% of the nearly 47% share of the listed equity held by corporations. Furthermore, in the Philippines, Singapore and Thailand, the predominant equity owners are other listed corporations, whose market capitalisation accounts for 31%, 10% and 17% of the total, respectively. In contrast, in the remaining countries, non-publicly listed corporations are the most relevant owners.

Over the past two decades, the public sector has emerged as a significant owner of listed equity primarily due to the listing of minority shares of state-owned enterprises (SOEs) due to partial privatisation processes. In addition, the public sector has also increased its presence in the stock market through the establishment of sovereign wealth funds and public pension funds, among others. This increasing ownership could have some implications on companies' management. For instance, when the state is a

controlling shareholder in a company, it has the potential to use its political influence in a manner that may not align with the interests of minority shareholders. Moreover, even if the state doesn't own a significant portion of the company's shares, it can still exercise significant operating control and influence both internal and external governance mechanisms (Medina, De la Cruz and Tang, 2022[2]).

By the end of 2023, the public sector owned 12% of listed equity globally, and this figure was even higher in both Asian and ASEAN economies, standing at 25% and 29% respectively (Figure 2.1). Specifically, the public sector had controlling holdings in 2 039 listed companies worldwide (Table 2.2). Moreover, 76% of these companies were listed in Asia. There were 196 listed companies on ASEAN exchanges under state control, and their combined market capitalisation amounted to USD 706 billion, which represents almost one-third of the total market capitalisation in the region, a percentage more than twice the global value. State-controlled companies tend to be larger than other companies, especially in ASEAN economies where they account for 29% of total market capitalisation and only represent 8% of the total number of listed companies.

Table 2.1. Corporations as owners by location and listed status, end of 2023

	Share of market capitalisation owned by:					
	Corporations	Non-domestic corporations	Domestic corporations	Publicly listed corporations	Non-domestic public listed corporations	Domestic public listed corporations
Indonesia	44.6%	12.2%	32.4%	21.9%	8.3%	13.6%
Malaysia	26.1%	7.0%	19.2%	11.7%	5.1%	6.6%
Philippines	46.6%	3.2%	43.3%	30.7%	2.4%	28.4%
Singapore	16.2%	8.9%	7.2%	10.3%	7.1%	3.1%
Thailand	24.3%	9.0%	15.3%	17.1%	8.0%	9.1%
Viet Nam	17.5%	6.7%	10.8%	8.4%	3.9%	4.5%

Source: OECD Capital Market Series dataset, FactSet, LSEG, Bloomberg, see Annex for details.

Table 2.2. Public sector holdings, end of 2023

	Market cap. of state-controlled companies (USD million)	No. of listed companies under state control	Average state holdings[1]	State-controlled listed companies (share of total market capitalisation)	State-controlled listed companies (share of total number of companies)
By region					
World	12 829 204	2 039	54%	12%	7%
Asia	7 657 701	1 558	54%	25%	9%
ASEAN	706 282	196	58%	29%	8%
ASEAN economies					
Indonesia	167 333	49	67%	22%	9%
Malaysia	185 905	57	55%	51%	10%
Philippines	188	1	38%	0.1%	1%
Singapore	162 294	15	43%	39%	6%
Thailand	113 846	20	53%	23%	4%
Viet Nam	76 714	54	59%	41%	20%

Notes: State control is defined as any state holding of at least 25% of the listed equity. Control is not restricted to the state where the company is listed: a company listed in Viet Nam can be controlled by a state different from the Vietnamese state. The definition of state used here may differ from that is used in individual jurisdictions, see the Annex for details.
1. The state holdings correspond to the average within the companies identified as being under state control.
Source: OECD Capital Market Series dataset, FactSet, LSEG, Bloomberg, see Annex for details.

In ASEAN economies, the ownership of listed companies is dominated by domestic investors, with Singapore and Viet Nam to a lesser degree. In Philippines and Malaysia, 62% of the total equity is held by domestic investors, the highest share among the markets considered. In contrast, Singapore has the lowest domestic ownership rate, accounting for 32% of the total equity. For Indonesia this figure raises to 55%, while Thailand shows domestic ownership of 52% (Figure 2.3, Panel A).

Figure 2.3. Ownership of public equity by origin and category of investors, end of 2023
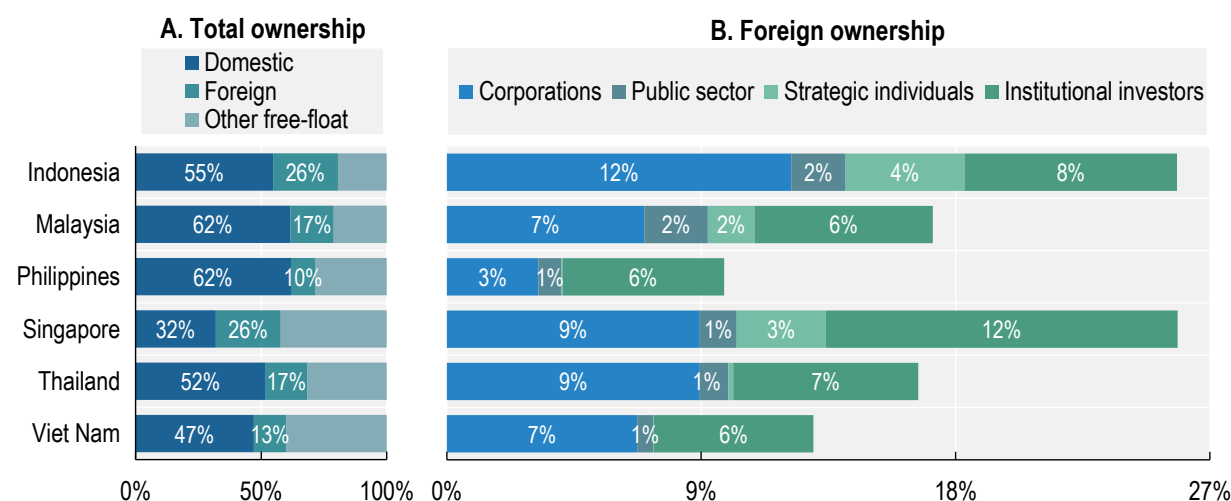
Note: The category other-free float in Panel A represents shares in the hands of investors that are not required to disclose their holdings and therefore no information is available.
Source: OECD Capital Market Series dataset, FactSet, LSEG, Bloomberg, see Annex for details.

Among foreign investors, corporations and institutional investors are the two predominant categories. Indonesia stands out as the jurisdiction with the highest foreign corporate participation, constituting 12% of the total listed equity. In the Philippines, corporations represent the lowest share. The foreign public sector holds between 1-2% of the listed equity while foreign strategic individuals hold less than 4% of the listed equity across ASEAN markets. Foreign institutional investors hold 6-7% of the listed equity in Malaysia, Philippines, Thailand and Viet Nam. The participation of foreign institutional investors is higher in Indonesia and Singapore.

2.1.2. Regional initiatives

The ASEAN financial markets are heavily dependent on bank financing and policy makers should consider designing policies to encourage the development and use of market-based financing. To mobilise the capital markets as a region, the ASEAN Capital Markets Forum, a high-level grouping of capital market regulators from all 10 ASEAN member states, has worked to achieve greater integration of the region's capital markets, and one of its mandates is to raise corporate governance standards and practices of ASEAN listed companies.

One of these initiatives is the ASEAN Corporate Governance Scorecard (ACMF, 2024[3]). The Scorecard consists of a set of questions asked to listed companies to assess corporate governance practices in six participating countries, which are Indonesia, Malaysia, Singapore, Philippines, Thailand and Viet Nam. Based on companies' responses, the ASEAN Corporate Governance Initiative publishes bi-annual country assessment reports that analyse the evolution of corporate governance practices in each jurisdiction as well as areas for further improvement. The Scorecard was developed with the G20/OECD Principles of

Corporate Governance (hereafter "the Principles") as a main reference. The Scorecard was revised in October 2023 in response to the revision of the Principles.

2.2. Corporate governance policies and practices in ASEAN economies

This section discusses relevant corporate governance issues in ASEAN economies, including Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, and Viet Nam. The discussion covers issues on company groups, the role of institutional investors and stewardship, corporate sustainability, general shareholder meetings, and the board of directors.

2.2.1. Company groups

Good corporate governance frameworks should reflect the reality of the ownership structure of listed companies in respective jurisdictions. As illustrated in Figure 2.1, corporations are the largest owners of ASEAN listed companies, reflecting the prominent existence of company group structures.

Group structures can have advantages, including scale economies, efficiencies in resource allocation, reduced dependence on external finance, fewer information asymmetries, lower transaction costs and less reliance on contract enforcement. Additional common rationales for group structures are to facilitate the protection of intellectual property rights and cross-border activity (OECD, 2020[4]). Meanwhile, they may also be associated with risks of inequitable treatment of shareholders. The Principles therefore state that it is important for regulatory frameworks to ensure the effective oversight of publicly traded companies within company groups (I.H).

Furthermore, family businesses are often observed in companies in the ASEAN region. When founders and their family members own a controlling equity stake in a company while they are also involved in important business decisions of the company and the group, it can reduce the agency problem through higher incentives to monitor the management closely. Still, corporate governance frameworks should ensure that minority shareholders and bondholders are protected from abusive actions. On the other hand, when founders and their family members hold smaller or even no shares of the company, they may influence the company's decision-making disproportionate to their shareholding (OECD, 2022[5]) and the accountability becomes opaque. These relationships may not be captured by quantitative thresholds or definitions of substantial shareholders that may determine disclosure of related party transactions, and may require additional policy considerations.

Reflecting those practices and issues, it is important for the corporate governance framework to ensure the monitoring of group-wide risk management, related party transactions, and disclosure.

Group-wide risk management

Company groups need to manage group-wide risks while enabling timely and flexible decision-making of individual companies. Risks company groups face are becoming diverse, including on environmental impacts and human rights. For example, if a company's subsidiary overseas fails to do proper due diligence for their suppliers or squeezes them, it could affect their brand name and cause compliance and reputational risks. The Principles emphasise the importance of group-wide risk management and oversight of controls (V.D.8). To properly assess the group-wide risk, it is essential that board members of the parent company obtain accurate, relevant and timely information for the group.

The Principles state that the regulatory framework should ensure board members' access to key information about the activities of its subsidiaries to manage group-wide risks and implement group-wide objectives (V.F). ASEAN jurisdictions commonly have provisions that enable the board or management of a parent company to examine the books and records of their subsidiaries (OECD, 2022[5]). Board members'

access to information about activities of group companies beyond these issues is ensured in several jurisdictions e.g. Thailand[1] and Viet Nam.[2]

Related party transactions

Company groups are often involved in related party transactions. This is natural, as facilitating cooperation and exploration of synergies is considered one of the benefits of company groups. There is a potential abuse of related party transactions, as complicated group structures may increase the opaqueness of transactions and the possibility of circumventing disclosure requirements. Regulatory frameworks address related party transactions through a combination of measures, such as mandatory disclosure, board approval, and shareholder approval (OECD, 2023[6]).

The Principles, as in the Chapter on Disclosure and transparency, highlight the importance of identification of all related parties in jurisdictions with complex group structures involving listed companies (IV.A.7). In addition to periodic disclosure of related party transactions in financial statements based on the International Accounting Standards (IAS 24) or local standard similar to IAS 24, many jurisdictions have requirements for additional disclosure. Globally, the jurisdictions which have adopted the "German model" for the treatment of company groups require companies to disclose the negative impact of any influence by the parent company (OECD, 2023[6]).

Some ASEAN jurisdictions mandate immediate disclosure for specific related party transactions. In Malaysia, under the Listing Requirements (LR), listed issuers must disclose particulars of the material contracts and loans involving the interests of the directors, chief executive or major shareholders in their annual report. Further, a listed issuer must file an immediate announcement of non-recurrent related party transactions as soon as possible after the terms of the transaction have been agreed, if any of the percentage ratios defined in paragraph 10.02 of the LR is 0.25% or more. This does not apply to transactions below RM 500 000 or recurrent related party transactions. In Singapore, an issuer must make an immediate announcement of any interested person transaction of a value equal to, or more than, 3% of the group's latest audited net tangible assets. They are also required to disclose all transactions (regardless of transaction value) if the cumulative transaction with that interested person and its associates is above a 3% threshold. Interested person transactions exceeding the 5% materiality threshold must be subject to independent shareholders' approval. However, this does not apply to any transaction below SGD 100 000, or to certain types of transactions (OECD, 2023[6]). The ASEAN Corporate Governance Scorecard also shows that it is good practice to conduct related party transactions in such a way to ensure that they are fair and at arms' length (A.9.1), while in practice it is pointed out that further improvement in disclosing this item is needed (ADB, 2021[7]).

Board approval for certain transactions is widely used as a safeguard against abusive related party transactions, and independent board members often play a prominent role. Many jurisdictions, including Malaysia, require or recommend as good practice for interested board members to abstain from board decisions. Furthermore, even in that case, if regulatory frameworks do not set qualifications for independent directors in terms of company groups, the effectiveness of involving independent directors might be undermined. The Principles, while recognising a variety of approaches to defining independence, describe a range of criteria, including the absence of a relationship with not only the company, but also its group (V.E). For example, management and directors of the parent company are not qualified as an independent board member in Indonesia, Malaysia, and Thailand. In these jurisdictions, management and directors of the subsidiary are not considered independent either.

Disclosure concerning company groups

Considering the complexity of group structures and the opaqueness that could occur in terms of accountability, transparency of share ownership and corporate control allow shareholders, debtholders and potential investors to make better informed decisions. The Principles IV.A.3 and IV.A.4 state that disclosure

should include material information on capital structures, group structures and their control arrangements, as well as major share ownership, including beneficial owners, and voting rights.

In most jurisdictions, listed companies are required to prepare financial statements on a consolidated basis under the International Financial Reporting Standards, and disclose in their annual reports their major shareholders and the company's material shareholdings. However, specific disclosure items vary across jurisdictions. Globally, the majority of jurisdictions require disclosure of important company group structures and intra-group activities for listed companies, such as major share ownership, special voting rights, corporate group structures and shareholdings of directors, while such disclosure is less widespread in the case of beneficial ownership, and cross-shareholdings (OECD, 2023[6]). In the ASEAN region, all eight jurisdictions require or recommend disclosure of major share ownership and disclosure provisions on beneficial owners and shareholdings of directors are also common (Table 2.3).

It is also regarded as good practice to disclose shareholding of family members of directors and/or key executives (OECD, 2022[5]). Meanwhile, in practice, one assessment has found that disclosure of direct and indirect shareholdings of (deemed) shareholdings of senior management was not sufficient in several ASEAN jurisdictions (ADB, 2021[7]).

Table 2.3. Disclosure provisions on company groups

	Major share ownership (threshold)	Beneficial owners	Corporate group structures	Special voting rights	Cross shareholdings	Shareholdings of directors
Cambodia	● (10%)	-	-	-	-	-
Indonesia	● (5%)	●	●	●[1]	-[2]	●
Lao PDR	◆ (5%)	-	-	-	-	◆
Malaysia	● (5%)[3]	■[4]	●	●	-	●
Philippines	● (5%, 10% and 20 and 100 largest shareholders)	●	●	●	-	●
Singapore	● (5%)	●[5]	-	●	●	●
Thailand	● (10 largest shareholders)	●	●	●	●	●
Viet Nam	● (5%)	●	●	-	-	●

Key: ●= mandatory disclosure to public; ◆ = voluntary disclosure to public; ■ = mandatory reporting to the regulator/authorities; "-"No explicit requirement/recommendation

Note:

1. In **Indonesia**, it is mandatory for the specific regulated issuers that are allowed to have multiple voting rights which have innovation and high growth rates that conduct public offerings in the form of shares. In addition, issuers regulated in this provision should meet certain criteria such as utilising the technology to innovate products that increase productivity and economic growth, having shareholders who have significant contributions in the utilisation of technology, having minimum total assets of at least 2 trillion rupiah (or about USD 132 million), and others as promulgated by article Art. 3 OJK Regulation No 22/POJK.04/2021.

2. In **Indonesia**, cross-shareholding is prohibited.

3. In **Malaysia**, the requirement to disclose is for substantial shareholders holding at least 5% of voting shares. The definition of a major shareholder differs from a substantial shareholder. A major shareholder refers to a person who has an interest or interests in one or more voting shares in a corporation and the number or aggregate number of those shares, is (a) 10% or more of the total number of voting shares in the corporation, or (b) 5% or more of the total number of voting shares in the corporation where such person is the largest shareholder of the corporation.

4. In **Malaysia**, under Section 56 of Companies Act 2016, any company may require its shareholders to indicate the persons for whom the shareholder holds the voting share by names and other particulars if the shareholder holds the voting shares as trustee.

5. In **Singapore**, the disclosure to the public is mandatory only to the extent of deemed interests held by directors, CEO and substantial shareholders.

Source: OECD Survey; OECD (2022[5]), Good Policies and Practices for Corporate Governance of Company Groups in Asia, https://www.oecd.org/corporate/good-policies-practices-for-corporate-governance-company-groups-in-asia.htm.

2.2.2. The role of institutional investors and stewardship

One of the measures to make ASEAN capital markets more vibrant and to develop market-based financing could be to attract more investment from institutional investors. While the presence of institutional investors is relatively small in ASEAN markets, they are the largest owners in stock markets globally, and the participation of institutional investors in ASEAN capital markets could lead to diverse ownership and increased volume of market-based financing.

Table 2.4. Roles and responsibilities of institutional investors and regulated intermediaries

Jurisdiction	National framework (Public / private / mixed initiative)	Target institutions	Exercise of voting rights		Management of conflicts of interest	
			Disclosure of voting policy	Disclosure of actual voting records	Setting of policy	Disclosure of policy
Indonesia	Public: Code of Conduct for Investment Managers (OJK Regulation 17/POJK.04/2022)	Fund Managers	-	-	L	(L: Disclosure of conflicts of interest)
	Public: The Application of Corporate Governance of Investment Manager (OJK Regulation 10/POJK.04/2018)	Investment managers	L[1]	L[1]	L	L
	Public: Good Corporate Governance for Insurance Companies (OJK Regulation 73/POJK.05/2016)	Insurance companies	-	-	L	L
	Public: Good Corporate Governance for Insurance Companies (OJK Regulation 73/POJK.05/2016)	Pension funds	-	-	L	L
Malaysia	Private: Malaysian Code for Institutional Investors (MCII)	Asset owners, asset managers and service providers (including proxy advisors)	CE[2]	CE	CE	CE
Singapore	Private: Singapore Stewardship Principles IMAS Guidelines on Corporate Governance	Institutional investors, including asset owners and asset managers IMAS members: Investment funds and asset managers	I	I	I	C
Thailand	Public: Investment Governance Code for Institutional Investors (I Code)	Institutional investors	CE	CE	CE	CE

Key: **L** = requirement by the law or regulations; **I** = self-regulatory requirement by industry association without comply or explain disclosure requirement; **C** = recommendation by codes or principles without comply or explain disclosure requirement; **CE** = recommendation including comply or explain disclosure requirement overseen by either a regulator or by the industry association; "**-**" = absence of a specific requirement or recommendation.

Industry, association or institutional investor stewardship codes are included only if they have official status and their use is endorsed or promoted by the relevant regulator.

1. In **Indonesia,** in OJK Regulation No 10/POJK.04/2018 (Section 53) provides that Investment Managers are encouraged to disclose voting policy and actual voting records.

2. In **Malaysia**, the Malaysian Code for Institutional Investors (MCII) adopts the "apply and explain" approach where signatories are encouraged to explain how they have applied the principles of the MCII, and where there are departures, to highlight the same, along with the measures to address the departures, and the time frame required to apply the relevant principles.

Source: OECD (2023[6]), OECD Corporate Governance Factbook 2023, https://doi.org/10.1787/6d912314-en.

Recognising the importance of institutional investors' willingness and ability to make informed use of their shareholder rights and to effectively exercise their ownership functions in companies, the Principles have a number of recommendations. They include recommendations for institutions to disclose their policies for corporate governance and voting with respect to their investments (III.A) and to disclose how they manage material conflicts of interest that may affect the exercise of key ownership rights regarding their investments (III.D). Principle II.D also states that shareholders, including institutional shareholders, should be allowed

to consult with each other on issues concerning their basic shareholder rights as defined in the Principles, subject to exceptions to prevent abuse.

The Principles state that stewardship codes may offer a complementary mechanism to encourage institutional investors' engagement (III.A). It is observed that Asian jurisdictions have widely adopted stewardship codes (Fukami, Blume and Magnusson, 2022[8]). Out of the eight jurisdictions, four (Indonesia, Malaysia, Singapore and Thailand) have adopted stewardship codes as frameworks for engagement by institutional investors (Table 2.4).

2.2.3. Corporate sustainability

To mobilise ASEAN capital markets, it is essential to attract investors both domestic and global. Investors have increasingly expanded their focus on companies' performance to include the financial risks and opportunities posed by broader environmental and social challenges, and companies' resilience to manage those risks. As one of their three core objectives, the Principles state that a sound framework for corporate governance with respect to sustainability matters can help companies recognise and respond to the interests of shareholders and different stakeholders, as well as contribute to their own long term success.

Climate-related risks have particularly drawn investors' attention, while there are many other risks that companies in ASEAN economies are facing. By the end of 2022, companies that account for 62% of the market capitalisation in Asia were considered to be facing financially material climate change-related risks, which was similar to the global trend with 64% of the global market capitalisation (OECD, 2023[9]). Other sustainability issues that ASEAN companies are exposed to include human capital, data security and customer privacy, water and wastewater management, and supply chain management (OECD, 2023[9]).

This section focuses on policies and practices of sustainability-related disclosure and board responsibilities for sustainability matters in the ASEAN region.

Sustainability-related disclosure

Disclosure of material sustainability-related information is key for investors' well-informed decision making. The revised Principles clarify that disclosure should include material sustainability-related information (IV.A.2). They support adherence to internationally recognised standards that facilitate the comparability of sustainability-related disclosure across companies and markets (VI.A.2). The Principles also aim to ensure that verifiable metrics are disclosed if a company publicly sets a sustainability-related goal or target (VI.A.4), and recommend the phasing in of external assurance to provide an objective assessment of a company's sustainability-related disclosure (VI.A.5).

Regulators in Asia and around the world have increasingly adopted mandatory or voluntary sustainability-related disclosure provisions. ASEAN economies have been a part of this trend. At the regional level, the ASEAN Corporate Governance Scorecard, as revised in 2023, added new questions in alignment with the revised Principles. It includes questions about whether the company identifies environmental, social, and governance (ESG) topics that are material to its strategy (B.1.1), and whether the company discloses quantitative sustainability targets (B.1.4). A question on whether the company adopts an internationally recognised reporting standard for sustainability was upgraded from an optional question to a core question (B.1.3). The revised Scorecard also added an optional question on whether a company discloses the fact that its sustainability reporting is externally assured ((B).B.1.2). More broadly, The ASEAN taxonomy for sustainable finance is also being developed and regulators are expected to use it as a reference when setting rules for market participants concerning sustainability reporting disclosures at the portfolio and product levels (ASEAN Taxonomy Board, 2024[10]).

Corporate sustainability disclosure requirements and recommendations

Among ASEAN jurisdictions, five (Indonesia, Malaysia, Singapore, Thailand and Viet Nam) have mandatory requirements for corporate sustainability disclosure while three (Cambodia, Lao PDR and Philippines) have recommendations. This is similar to the global landscape, in which a requirement in the law, regulations or listing rules was established in more than 70% of the jurisdictions in 2022, while sustainability-related disclosure was a recommendation provided by codes or principles in 24% of the jurisdictions (OECD, 2023[6]).

In Indonesia, the Financial Services Authority (OJK), as part of the efforts to create a financial system that applies sustainable principles, introduced a new regulation in 2017 that requires financial services providers, issuers and public companies to implement sustainable finance in their business activities (OJK, 2017[11]). Financial institutions, issuers, and public companies[3] are required to prepare and disclose a sustainability report that contains information on the sustainability strategy, governance, and performance among others. The effective implementation dates of the new regulation differ by size and business classification of the entities (the earliest being 2019 for commercial banks and the latest by 2025 for pension funds), while the regulator calls for the earlier implementation by financial services institutions that are also issuers and public companies.[4]

In Malaysia, the LR require listed companies to disclose a sustainability statement in their annual reports. For listed companies on the Main Market, the sustainability statement must include information on the governance structure in place for the oversight of sustainability, the scope and basis for the sustainability statement, and how the company's material sustainability matters are identified and managed. Companies listed on the Main Market are required to disclose some additional information (such as data and performance targets) for annual reports issued with the financial year ending on or after 31 December 2023 and other items (such as climate-related disclosure aligned with the Task Force on Climate-Related Financial Disclosure (TCFD) recommendations) for annual reports issued with the financial year ending on or after 31 December 2025, while the ACE Market listed companies[5] are allowed to take more time, i.e. for annual reports issued for the financial year ending on or after 31 December 2025 and 31 December 2026, respectively (Bursa Malaysia, 2022[12]).

In the Philippines, the Securities and Exchange Commission of Philippines (SECP) in 2016 updated the Code of Corporate Governance for Publicly Listed Companies (CG Code for PLCs), which follows a comply or explain disclosure requirement, and recommended that listed companies start disclosing their ESG performance. In 2019, the SECP also published the sustainability reporting guidelines that are built upon international standards, which include the Global Reporting Initiative (GRI) sustainability reporting framework, the International Integrated Reporting Council framework, the Sustainability Accounting Standards Board (SASB) standards, and the TCFD's recommendations. The guidelines also required the PLCs to start issuing their Sustainability Reports in 2020 (SECP, 2019[13])

In Singapore, the Singapore Exchange (SGX) introduced a mandatory sustainability-related disclosure regime in 2016. SGX extended the sustainability-related disclosure regime to include disclosure of climate-related risks among other ESG issues (SGX, 2021[14]). The primary components of the sustainability report include: material ESG factors; climate-related disclosure consistent with the TCFD's recommendations; policies and targets to each material ESG factor identified; sustainability reporting framework; and board statement and associated governance structure for sustainability practices. The climate-related reporting rules mandated by the SGX require issuers to follow a phased approach in accordance with the industries identified by the TCFD as most affected by climate change and the transition to a lower-carbon economy. In 2022, all issuers were required to implement measures on a "comply or explain" basis. In 2023, it became mandatory for issuers in the (i) financial, (ii) agriculture, food, and forest products, and (iii) energy industries; in 2024, for issuers in the (i) materials and buildings, and (ii) transportation industries (SGX, 2021[14]).

In Thailand, in 2020, the Securities and Exchange Commission of Thailand (SECT) announced the mandatory use of a new reporting standard, named One Report, which is a consolidated form of an annual

registration statement and annual report, in order to enhance the ESG disclosure standards which went into effect in 2022 (SECT, 2021[15]). The new form includes requirements to disclose environmental and social policies and guidelines as well as some specific indicators, including Greenhouse Gases (GHG) emissions.

In Viet Nam, in 2020, the Ministry of Finance issued a guidance on public disclosure requiring listed companies to report their corporate objectives on environmental and social issues, as well as impacts on the environment and society, including GHG emissions (SSC, 2020[16]). This took effect in 2021.

Among the eight jurisdictions, some require or recommend sustainability-related disclosures to be consistent with internationally accepted core standards, while the standards vary. In Malaysia and Singapore, climate-related disclosures should be consistent with the TCFD's recommendations. In Viet Nam, in 2016, the State Securities Commission (SSC) in collaboration with the IFC published a guide for listed companies to adopt and better implement the disclosure of environmental and social information, building on the GRI reporting framework (SSC, 2016[17]), which implies calling for information on the company's impact on the environment. Globally, the usage of GRI standards, TCFD's recommendations or SASB standards was common and used in sustainability-related disclosure in 2022 by companies representing 60%, 54%, and 37% of global market capitalisation respectively (OECD, 2024[18]).

Consideration for flexibility for smaller listed companies

With relatively fixed costs for sustainability-related disclosure regardless of companies' size (OECD, 2024[18]), corporate governance frameworks in ASEAN jurisdictions could consider a flexible approach for smaller listed companies. The Principles state that sustainability-related disclosure frameworks need to be flexible and that policy makers may need to devise sustainability-related disclosure requirements that take into account the size of the company and its stage of development (VI.A).

Figure 2.4 shows a gap in sustainability-related disclosure between larger and smaller listed companies. In the ASEAN region, companies representing 80% of the regional market capitalisation disclosed sustainability-related information in 2022 or later, and these companies account for 18% of all listed companies in the region. Each ASEAN country has a similar disparity between the market value and absolute number of companies disclosing sustainability-related information, which shows the challenges for small listed companies in disclosing sustainability information.

Figure 2.4. Disclosure of sustainability information by listed companies in 2022
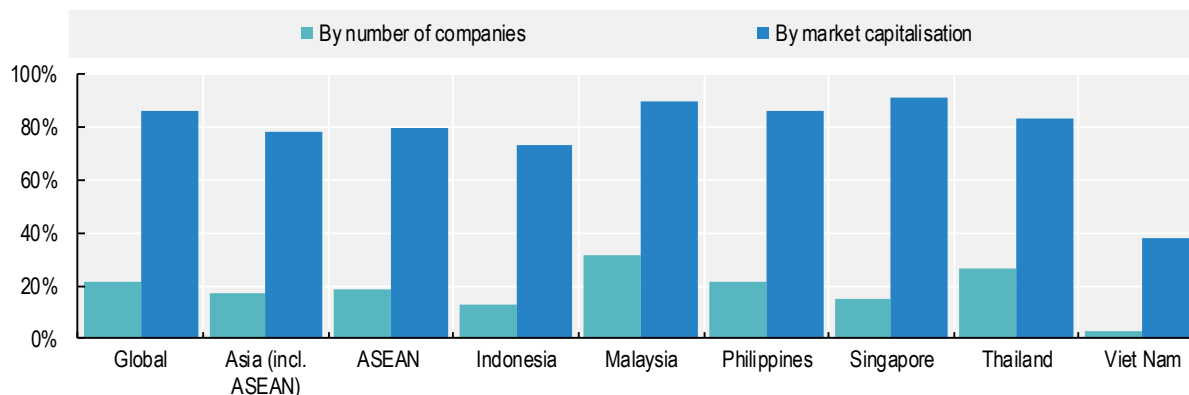
Source: OECD Corporate Sustainability dataset, LSEG, Bloomberg. For more information on the methodology, see the OECD (2024[18]), Global Corporate Sustainability Report, https://doi.org/10.1787/8416b635-en.

Several ASEAN jurisdictions have introduced some flexibility. For example, in Malaysia, the ACE Market listed companies (mainly smaller growth companies) are required to disclose a smaller number of

disclosure items. In Indonesia, the effective implementation dates of the new regulation differ by the size of the companies.

Phasing in of assurance of sustainability information

Sustainability-related disclosures reviewed by an independent, competent and qualified assurance service provider may enhance investors' confidence in the information disclosed and the possibility of comparing sustainability-related information between companies. ASEAN region regulators could consider encouraging external assurance by large listed companies in the longer term.

Practices and policies in the region show that the jurisdictions need time to adopt assurance. In ASEAN economies, companies accounting for 52% of market capitalisation disclosed sustainability-related information with assurance, while it represented 20% of the listed companies in 2022 (Figure 2.5). All ASEAN jurisdictions had a similar trend except for the Philippines, where there was a smaller gap between the two and companies representing 26% of the market capitalisation and 18% of the listed companies disclosed sustainability reports with assurance. The regulatory frameworks in the ASEAN jurisdictions have started including provisions on the external assurance, keeping them voluntary (in Indonesia, Malaysia, and Singapore[6]).

Figure 2.5. Assurance of a sustainability report by an independent third party in 2022
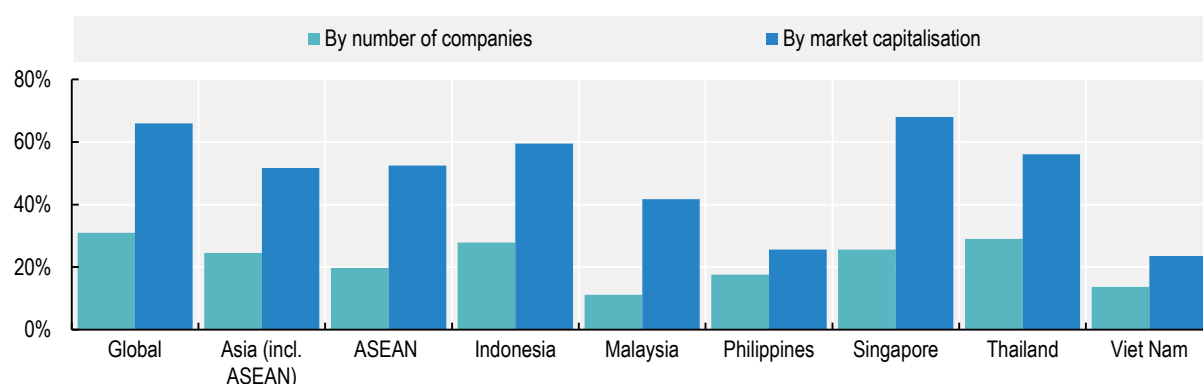
Source: OECD Corporate Sustainability dataset, LSEG, Bloomberg. For more information on the methodology, see the OECD (2024[18]), Global Corporate Sustainability Report, https://doi.org/10.1787/8416b635-en.

Board responsibilities

Boards are increasingly ensuring that material sustainability matters are also considered. As the revised Principles recommend, when fulfilling their key functions, boards should ensure that they also consider material sustainability matters (VI.C). The revised ASEAN Corporate Governance Scorecard also reflects it by adding a question on whether the company discloses board of directors/commissioner's oversight of sustainability-related risks and opportunities ((B).B.1.5).

Reflecting the growing importance of these issues for companies, all of the eight jurisdictions have at least some provisions that clearly articulate the responsibilities of the board to ensure that governance practices, disclosure, strategy, risk management and internal control systems adequately consider material sustainability risks and opportunities.

In Indonesia, financial services institutions are required to prepare a sustainable finance action plan which should be arranged by the board of directors and approved by the Board of Commissioners.[7] More generally, financial services providers, issuers, and public companies are required to implement sustainable finance in their business activities by using principles of responsible investment, sustainable

business strategies and practice, and social and environmental risk management among others.[8] It could be argued that the board is expected to take a lead role in drafting and implementing these principles.

In Malaysia, the Malaysian Code on Corporate Governance sets out best practices and guidance to strengthen board oversight and the integration of sustainability considerations in the strategy and operations of companies (SCM, 2021[19]). Particularly, the Code recommends that the board together with management takes responsibility for the governance of sustainability in the company including setting the company's sustainability strategies, priorities and targets.[9] The board is also recommended to take appropriate actions to ensure that it stays abreast of and understands the sustainability issues relevant to the company and its business, including climate-related risks and opportunities.[10]

In several jurisdictions, the board responsibilities are approached from the point of view of disclosure requirements and recommendations. In Lao PDR, the board should ensure that the company discloses the material economic, environmental and social impacts in line with internationally accepted standards in the company's annual report.[11] In the Philippines, listed companies are recommended to disclose the board's oversight of climate-related risks and opportunities; the risks and opportunities that the organisation has identified over the short, medium, and long-term; the processes for identifying and assessing the related risks; and the metrics used in assessing in line with the companies' strategy and risk management processes (SECP, 2019[13]). In Singapore, the mandatory sustainability report should include "a statement of the Board that it has considered sustainability issues in the issuer's business and strategy, determined the material ESG factors and overseen the management and monitoring of the material ESG factors." Companies are also required to "describe the roles of the Board and the management in the governance of sustainability issues" (SGX, 2021[14]). In Viet Nam, companies are required to disclose the assessments by the board of directors of the company's operations, including the assessment related to environmental and social responsibilities, while specifying the risks probably affecting the production and business operations or the realisation of the company's objectives, including environmental risks.[12]

In Thailand, the Corporate Governance Code refers to the board responsibilities for environmental and social issues mainly from the perspectives of innovation and responsible business. For example, Principle 5.1 of the Code states "[t]he board should prioritise and promote innovation that creates value for the company and its shareholders together with benefits for its customers, other stakeholders, society, and the environment, in support of sustainable growth of the company." Here, the Code recommends the board to consider not only financial profits for shareholders, but also benefits for its stakeholders, the society and environment.

2.2.4. General shareholder meetings

General shareholder meetings are the main platform for shareholders to exercise their rights. Typically, a number of parties are involved in the voting process and share responsibilities, including proxy representatives, custodians, and service providers (Norges Bank, 2020[20]) and voting chains often involve foreign investors. Furthermore, the COVID-19 pandemic triggered a major shift of company practices and legal frameworks to virtual meetings (where all shareholders attend the meeting virtually) as well as hybrid meetings (where some shareholders attend the meeting physically and others virtually). The revised Principles added a new recommendation that remote shareholder participation in virtual and hybrid shareholder meetings be conducted in a way that ensures equal access to information and engagement opportunities (II.C.3).

Reflecting such evolutions, the corporate governance framework needs to be facilitated so that shareholders can participate and exercise their voting rights with sufficient information in the meetings (Principle II.C). The details about the conduct of shareholder meetings are often delegated to each company's bylaw, constitution or article of association. Still, it is important that the corporate governance framework (i) gives shareholders sufficient time and information to prepare meetings; (ii) provides proper identification of shareholders eligible for voting; (iii) ensures that shareholders' voting is counted properly

and accurately; (iv) encourages companies to properly handle questions from shareholders; and (v) encourages the disclosure of voting and meeting results.

Giving shareholders sufficient time and information to prepare meetings

Sub-principle II.C.1 of the Principles states "[s]hareholders should be furnished with sufficient and timely information concerning the date, format, location and agenda of general meetings, as well as fully detailed and timely information regarding the issues to be decided at the meeting."

Shareholder meetings should be noticed well in advance to allow shareholders to have sufficient time to prepare for their participation and voting through the voting chain. When there is a long chain of voting process, parties need time to communicate among them, such as a voting instruction from shareholders to the proxy representative and registration as a proxy representative to a company. The shorter the notice period, the less time is left for each party to take for the examination and processes. The Principles highlight the importance of a reasonable notice period in the context of cross border voting (II.C.7).

All the eight ASEAN jurisdictions set the minimum notice period for holding general shareholder meetings but with significant differences (Table 2.5). Twenty-one days is the most common period required or recommended in Lao PDR, Malaysia, Philippines, Singapore for special resolutions, and Viet Nam, which shows a similar trend to the global landscape, where 51% of the jurisdictions established a minimum notice period ranging between 15 and 21 days (OECD, 2023[6]). The ASEAN Corporate Governance Scorecard also has a question on whether a jurisdiction's companies provided at least 21-day notices for annual shareholder meetings (A.2.13). Malaysia and Thailand recommend a longer 28-day notice in their corporate governance codes.[13] Cambodia requires a 20-day notice with a maximum period of 50 days.

The eight jurisdictions commonly have requirements or recommendations on providing meeting materials at the same time as the notice of the meeting. In the Philippines, the Code of Corporate Governance for Public Companies and Registered Issuers states that "sufficient and relevant information" should be sent with the notice of meetings to encourage active shareholder participation.[14] In Indonesia, when the agenda of the meeting concerns the appointment of members of the board of directors and/or commissioners, companies are required to make the curriculum vitae of candidates available on the company's website.[15] In Thailand, companies are specifically required to send the balance sheet to shareholders at least three days before the general meeting.[16]

Providing proper identification of shareholders eligible for voting

Corporate governance frameworks need to balance between ensuring the voting rights for shareholders who hold shares on the date of shareholder meetings, and considering companies' burden for identifying and registering shareholders eligible for voting. If the record date, by when shareholders should be registered and identified, is too far from the shareholder meeting date, this weakens the shareholders' right to vote. In cases where there is a long voting chain, the cut-off date could be even earlier than legal requirements due to deadlines set by service providers and custodians.

In the ASEAN region, several set record dates in company laws and regulations. In Indonesia, the regulation states that shareholders who are entitled to attend the meeting are those who are registered one business day before the invitation to the meeting.[17] In Viet Nam, the list of shareholders entitled to participate in the meeting shall be compiled not more than 10 days before the invitation date.[18] In Singapore, companies are not allowed, in their constitution, to require submitting documents to appoint a proxy more than 72 hours before a meeting.[19]

Ensuring that shareholders' voting is counted properly and accurately

The Principles highlight the importance of shareholders being informed of the rules for general shareholder meetings, including voting procedures (II.C). The eight ASEAN jurisdictions commonly require or

recommend the formal procedure for vote counting. In the Philippines, disclosure and clear explanation of voting procedures are recommended and poll voting is highly recommended as opposed to the show of hands.[20] In Thailand, designating an independent party to count or audit the voting results is recommended for each resolution in the meeting.[21]

Electronic voting helps to ensure quick, accurate and efficient vote counting and facilitates equitable treatment of all shareholders. The Principles recommend secure electronic voting for both remote and in-person meetings (II.C.6). They also emphasise the importance of facilitating electronic voting in absentia (II.C.2), considering voting by proxies.

Several ASEAN jurisdictions refer to electronic voting processes, either as requirements, recommendations or making them optional. In Indonesia, listed companies are required to provide electronic voting systems for proxies.[22] In Malaysia and Thailand, companies are recommended to leverage technology to facilitate voting.[23] In Singapore, companies are allowed to facilitate real-time remote electronic voting,[24] while in the Philippines votes through remote communication are allowed when authorised in the bylaws.[25]

Table 2.5. Voting process concerning the annual general meeting

	Minimum notice period in advance	Deadline for making meeting materials available	Record dates of ownership	Formal procedure for vote counting	Electronic voting process (Required / Recommended / Optional / Not allowed)	Disclosure deadline of voting results after AGMs	Disclosure of number of percentage of votes for, against, and abstentions for each resolution
Cambodia	20-50 days	-	20-50 days	Required	-	-	-
Indonesia	22 days	22 days	1 business day before the invitation	Required	Required	2 business days	Required
Lao PDR	5 days (21 days)	5 day (21 days)	-	Recommended	-	(Immediately)	Recommended
Malaysia	21 days (28 days)	21 days (28 days)	-	Required	Recommended	Immediately	Required
Philippines	21 days	(21 days)	-	Recommended	Allowed if authorised in bylaws	(Next working day)	Recommended
Singapore	14 days [21 days for special resolutions]	14 days	Cut-off date 72 hours before the meeting for appointing a proxy	Required	Optional	Immediately	Required
Thailand	7 days (28 days)	7 days [3 days for balance sheets]	21 days with prior notice (optional)	Recommended	Recommended	(Next business day)	Recommended
Viet Nam	21 days	21 days	10 days before the invitation	Recommended	Optional	(1 day)	Requested

Key: **( )** = recommendation by the codes or principles; **Immediately** = within 24 hours. "**-**" = absence of a specific requirement or recommendation.

Encouraging companies to properly handle questions from shareholders

The Principles state that shareholders should have the opportunity to ask questions and describe that many jurisdictions have improved the ability of shareholders to submit questions in advance of the meeting and to obtain appropriate replies from management and board members in a manner that ensures their transparency (II.C.4). They also state that due care is required to ensure that remote meetings do not decrease the possibility for shareholders to engage with and ask questions to boards and management in comparison to when shareholders attend in person (II.C.3).

In Singapore, companies are recommended to allow shareholders at least seven calendar days after the publication of the notice to submit their written questions.[26] In Malaysia, shareholders also can submit their questions prior to the meeting with a deadline and through a manner set by the company. Companies are advised to share those questions during the shareholder meeting.[27] Also, it is recommended that all directors attend general meetings and all questions posed during the meeting should receive a meaningful response.[28]

Encouraging the disclosure of voting and meeting results

Seven out of eight ASEAN jurisdictions require or recommend disclosure of voting results soon after the general shareholder meetings, complemented by detailed minutes of the meeting. Companies are recommended to disclose questions asked and answers provided during the meeting in Lao PDR, Malaysia, Singapore, and Thailand. Disclosure of board members who attended the meeting is required or recommended in Indonesia, Lao PDR, Philippines, Thailand, and Viet Nam. In the Philippines, when a substantial number of votes were cast against a proposal made by the company, the disclosed voting results may make an analysis of the reasons. Disclosure of minutes of the meeting and board attendance are also considered good practice in the ASEAN Corporate Governance Scorecard (A.2.7).

2.2.5. The corporate board of directors

Corporate government frameworks include various mechanisms to ensure that the board fulfils its functions. Board independence is essential for the board to exercise objective judgement. Board committees might support the board for a deeper focus on specific areas. To have sufficient capacity to supervise and oversee the company's management, board members with appropriate qualifications and diverse views should be appointed through a transparent nomination and election process.

Board independence

To ensure proper monitoring of managerial performance while balancing demands on the corporation with wider scope and complexity, it is essential that the board is able to exercise objective independent judgement. While recognising a variety of approaches to defining independence, the Principles describe a range of criteria, including the absence of relationships with the company, its group and its management, the external auditor of the company and substantial shareholders, as well as the absence of remuneration, directly or indirectly, from the company or its group other than directorship fees (V.E).

The Principles also refer to ensuring the board's independence from controlling shareholders. This is particularly important in ASEAN jurisdictions, due to high levels of concentrated ownership and the strong presence of company group structures. The role of independent directors in controlled companies is different than in companies with dispersed ownership structures, since the nature of the agency problem is different (i.e. in controlled companies the vertical agency problem between ownership and management is less common and the horizontal agency problem involving controlling and minority shareholders greater) (OECD, 2023[6]).

In jurisdictions with one-tier board systems, the objectivity of the board and its independence from management may be strengthened by the separation of the role of the chief executive officer (CEO) and the board chair. The Principles refer to the separation as good practice, because "it can help to achieve an appropriate balance of power, increase accountability and improve the board's capacity for decision making independent of management" (V.E). In the ASEAN region, the separation between the CEO and the board chair is required in Viet Nam and recommended in Lao PDR, Malaysia, Philippines, Singapore and Thailand (Table 2.6). Singapore encourages the separation of the two functions through an incentive mechanism by triggering the application of a recommendation for a company to appoint a majority of independent directors when the chair is not independent. On the other hand, when the chair is independent of management, the required number of independent directors is reduced to one-third. In Indonesia, this separation occurs due to its use of a two-tier board system that does not allow for management to serve on the supervisory board.

Independence from substantial shareholders is also a key factor in the definition of independence of the board member, but national approaches vary considerably. Globally, while the large majority of the 49 jurisdictions covered in the Corporate Governance Factbook (2023[6]) include in the definitions of independent directors requirements or recommendations that they be independent of substantial shareholders (86%), the threshold for substantial shareholding ranges from 2% to 50%, with 10-15% the most common share (in 14 jurisdictions). Shareholding thresholds of "substantial" for assessing independence also vary across the ASEAN jurisdictions, from 1% in Cambodia, Thailand and Viet Nam to 20% in Indonesia (Table 2.6). Regulations in several jurisdictions also include the absence of a family relationship with the current board members, executives, or major shareholders (e.g. Singapore[29]).

Setting minimum numbers or ratios of independent directors is common across jurisdictions. In Indonesia's two-tier board system, there are requirements on the minimum number and ratio of independent members of the Board of Commissioners that serve as the supervisory board. The independent criteria include the absence of business relationships with the company and not holding the company's share either directly or indirectly. In cases where the supervisory board members are two persons, one of them should be an independent member. In the event that the Board of Commissioners has more than two members, at least 30% of them should be independent.[30] Viet Nam also differentiates the minimum number of independent board members depending on the board size: a company should have at least one independent director if the board consists of one to five members, and at least two and three for the board size of six to eight and nine to eleven members respectively.

At the regional level, in the ASEAN Corporate Governance Scorecard, it is regarded as good practice that companies have a term limit of nine years or less or two terms of five years to be considered independent. In addition to serving as a criterion for the Scorecard's assessment, the maximum tenure for a director to still be considered independent and the effect at the expiration of the term is also considered in many ASEAN jurisdictions' definitions for board independence. The maximum term of office allowing for independence ranges from 9 to 12 years in all seven ASEAN jurisdictions. In Viet Nam, the maximum tenure of 10 years is set by governmental regulation while the code recommends nine years.[31] In Thailand and Philippines, the maximum term of nine years is recommended by the codes while in Lao PDR the term is eight years.[32] The ASEAN approach gives greater prominence to such criteria compared to the global situation, where only 57% (28 out of 49) of jurisdictions have such requirements or recommendations, ranging from 5 to 15 years (OECD, 2023[6]).

The details of the maximum tenure for a director and whether, at the expiration of tenure, the director is still regarded as independent, vary across the ASEAN countries. In Indonesia, the maximum term of office for independent supervisory board members, called commissioners, is two periods of the board term (maximum of five years for each period). Independent commissioners can be appointed for more than two periods as long as they explain why they consider themselves independent at the general shareholder meeting.[33]

Table 2.6. Board independence requirements for listed companies

	Tiers	Board independence requirements		Key factors in the definition of independence			
		Separation of the CEO and chair of the board (as applicable to 1-tier boards)	Minimum number or ratio of independent directors	Maximum term of office and effect at the expiration of term[1]		Independence from "substantial shareholders"	
						Requirement	Shareholding threshold of "substantial" for assessing independence
Cambodia	1	-	1/5	9	-	Yes	1%
Indonesia	2	-	[30%]	10[2]	[Explain]	[Yes]	[20%]
Lao PDR	1	Recommended	(1/3)	(8)	(No independence)	No	-
Malaysia	1	Recommended	1/3 or 2	[12][3] (9)[4]	No independence Explain – re-designate as a non-independent director or adopt two-tier voting process	Yes (major shareholder)	10% or more of total number of voting shares in the corp.; or 5% or more of number of voting shares where such person is largest sh of corp.
Philippines	1	Recommended	20% (1/3)	(9)	Explain	Yes	2%[5]
Singapore[6]	1	Recommended	(Majority) [1/3]	[9]	[No independence]	(Yes)	5%
Thailand	1	Recommended	1/3 or 3	(9)	Explain	Yes	1%[7]
Viet Nam	1+2	Required	1 if board size is 1-5 members; 2 if board size is 6-8; 3 if board size is 9-11. (1/3)	10[8] (9)	Explain	Yes	1%

Key: **[ ]** = requirement by the listing rule; **( )** = recommendation by the codes or principles; "**-**" = absence of a specific requirement or recommendation. For 2-tier boards, separation of the chair from the CEO is assumed to be required as part of the usual supervisory board/management board structure unless stated otherwise.

Note:

1. Maximum term of office and effect at the expiration of term refers to the maximum tenure for a director to still be considered independent and if, at the expiration of tenure, the director is still regarded as independent, or needs an explanation regarding her/his independence.

2. In **Indonesia**, the maximum term of office for independent supervisory board members (called commissioners in Indonesia) is two periods of the board term (with maximum of five years per period). Independent commissioners can be appointed for more than two periods as long as they explain why they consider themselves independent at the General Shareholder Meeting.

3. In **Malaysia**, the 12-year tenure limit took effect from June 2023 onwards. Notwithstanding the effective implementation of said requirement, listed companies with independent directors of more than 20 years ("affected long-serving IDs") were strongly encouraged to expedite the replacement or re-designation of such directors as soon as possible before 1 June 2023. Should a company appoint a person who had before cumulatively served as an independent director of the listed issuer or any one or more of its related corporations for more than 12 years and observed the requisite 3-year cooling-off period, the company shall make an announcement to the exchange and provide a statement justifying the appointment of the person as an independent director and explaining why there is no other eligible candidate.

4. In **Malaysia**, Practice 5.3 of the Malaysian Code on Corporate Governance recommends that the tenure of an independent director should not exceed a cumulative term of nine years. Upon completion of the nine years, an independent director may continue to serve on the board as a non-independent director. If the board continues to retain the independent director after the ninth year, the board should seek annual shareholders' approval through a two-tier voting process. Under the two-tier voting process, shareholders' votes at a general meeting will be cast to - Tier 1: only the Large Shareholder(s) of the company votes; and Tier 2: shareholders other than Large Shareholders votes. The decision for the above resolution is determined based on the vote of Tier 1 and a simple majority of Tier 2. The resolution is deemed successful if both Tier 1 and Tier 2 votes support the resolution. However, the resolution is deemed to be defeated where the vote between the two tiers differs or where Tier 1 voter(s) abstained from voting.

5. In **the Philippines**, the Code of Corporate Governance for Publicly Listed Companies (Explanation d. of the Recommendation 5.3) states that an independent director refers to a person who is not an owner of more than 2% of the outstanding shares of the covered company, its subsidiaries, associates, affiliates, or related companies.

6. In **Singapore**, a majority of independent directors is recommended for companies if the chair is not independent. The SGX Listing Rules previously required the appointment of independent directors who have served beyond nine years to be subject to a two-tier vote requiring approval by the majority of (i) all shareholders; and (ii) all shareholders excluding shareholders who also serve as directors or the CEO and their associates. These rules were amended on 11 January 2023. Under the new regime, the SGX Listing Rules require independent directors to be subject to a nine-year tenure limit. Independent directors who have served beyond such limit must be redesignated as non-independent at the next annual general meeting of the issuer, with effect from the annual general meeting held for the financial year ending on or after 31 December 2023.

7. In **Thailand**, a board member is considered independent if the person holds shares not exceeding one per cent of the total number of shares with voting rights of the applicant, its parent company, subsidiary company, associate company, major shareholder or controlling person, including shares held by related persons of such independent director.

8. In **Viet Nam**, the maximum term of office for independent board members is two periods of the five-year board member term, or 10 years.
Source: OECD (2023[21]), Corporate finance and corporate governance in ASEAN economies, https://www.oecd.org/corporate/background-note-corporate-finance-and-corporate-governance-ASEAN-economies.htm.

A number of jurisdictions have strengthened requirements and recommendations for maximum term limits. The framework in Malaysia could be characterised as having two layers, consisting of the listing rule and the recommendation by the Malaysian Code on Corporate Governance. Under the listing rules, a director shall not serve as an independent director in a listed company or its related corporations for a cumulative period of more than 12 years. In addition, a company should disclose in the notice of the annual general meeting a statement justifying the nomination of an individual as an independent director, and explaining why there is no other eligible candidate, if such an individual had cumulatively served as an independent director of the company or any one or more of its related corporations for more than 12 years before and observed the requisite 3-year cooling off period (Bursa Malaysia, 2022[22]). Furthermore, the Malaysian Code on Corporate Governance recommends that the tenure of an independent director should not exceed a cumulative term of nine years.[34] Upon completion of the nine years, an independent director may continue to serve on the board as a non-independent director. If the board continues to retain the independent director after the ninth year, the board should seek annual shareholders' approval through a two-tier voting process.

Singapore is another jurisdiction which has revised the regulation on this issue recently. Under the new regime effective from 2023, the SGX Listing Rules require independent directors to be subject to a nine-year tenure limit. Independent directors who have served beyond such limit must be redesignated as non-independent at the next annual general meeting of the issuer (SGX, 2022[23]).

Board-level committees

Setting up board committees may help and support the work of the board of directors. The Principles reflect the growing use of board committees while emphasising flexibility in their establishment (V.E.2). Among the traditional committees, including audit, nomination, and remuneration, audit committees are considered to be particularly important, reflecting their role in overseeing the relationship with the external auditor as well as the effectiveness and integrity of the internal control system.

All eight ASEAN jurisdictions have requirements or recommendations to set up the three committees with an independent chair and with a specific minimum number or ratio of independent members (Table 2.7). In Malaysia, financial institutions are required to have an independent chair for the audit, nomination and remuneration committees. In Viet Nam, when a company has a one-tier board, setting up the audit committee is mandatory. In this case, the company should have (i) at least one-fifth of the board being independent members, (ii) the chair of the audit committee being an independent member and (iii) all other members of the audit committee being non-executive members. In the two-tier board system, where the supervisory board is overseeing the board of directors, there is no requirement to have an independent member in the supervisory board.

The Principles do not provide specific recommendations on how often boards and committees should meet, because companies of different sizes, complexity and stages of development may have differing needs. Prescriptive requirements may also discourage companies from listing and benefiting from equity market finance. Establishing proportionate and flexible regulatory frameworks is a broad approach that the Principles take.

Several ASEAN jurisdictions have provisions about the minimum frequency of the meeting of the board as well as of audit, nomination and remuneration committees. In Cambodia, the board is recommended to hold a regulator meeting at least once every quarter.[35] In Indonesia, the required frequency of the meeting is at least once per month for the board of directors (management board) and at least once in two months for the Board of Commissioners. The regulation requires the audit committee to meet more frequently (at least once in three months) than the nomination and remuneration committees (at least once in four months). Thailand is another jurisdiction with a recommended minimum frequency of meetings, six times per year for the board of directors, four times per year for the audit committees, and twice per year for the nomination and remuneration committees.[36]

Table 2.7. Board-level committees

	Audit committee			Nomination committee			Remuneration committee		
	Establi-shment	Chair indepe-ndence	Minimum number or ratio of independent members	Establi-shment	Chair indepe-ndence	Minimum number or ratio of independent members	Establi-shment	Chair indepe-ndence	Minimum number or ratio of independent members
Cambodia[1]	L	L	Chair	L	-	-	L	-	-
Indonesia[2]	L	L	100%	L	L	(33%)	L	L	(33%)
Lao PDR	C	C	(>50%)	C	C	(>50%)	C	C	(>50%)
Malaysia	R; L (financial institutions)	R; L (financial institutions)	>50%	R; L (financial institutions)	C;L (financial institutions)	>50%	C;L (financial institutions)	L (financial institutions)	>50%
Philippines	C and L	C	(>50%)	C and L	C	(>50%)	C	C	(>50%)
Singapore[3]	L R	R	>50% (50%)	R	R	(>50%)	R	R	(>50%)
Thailand	L	L	(100%)	C	C	(>50%)	C	C	(>50%)
Viet Nam[4]	L	L	Chair (>50%)	C	C	(>50%)	C	C	(>50%)

Key: **L** = requirement by law or regulations; **R** = requirement by the listing rule; **C** = recommendation by the codes or principles; **( )** = recommended by the codes or principles; "**-**" = absence of a specific requirement or recommendation.

Note:

1. In **Cambodia**, the remuneration and nomination committees shall be chaired by the non-executive director.

2. In **Indonesia**, the audit committee should be chaired by an independent supervisory board member (called a commissioner).

3. In **Singapore**, where a listed company adopts a dual class share structure, the majority of each of the committees, including the respective chairmen, must be independent.

4. In **Viet Nam**, when a company has a one-tier board, setting up the audit committee is mandatory. In this case, the company should have (i) at least one-fifth of the board being independent members, (ii) the chair of the audit committee being an independent member and (iii) all other members of the audit committee being non-executive members. In the two-tier board system, where the supervisory board is overseeing the board of directors, there is no requirement to have an independent member in the supervisory board.

Source: OECD (2023[21]), Corporate finance and corporate governance in ASEAN economies, https://www.oecd.org/corporate/background-note-corporate-finance-and-corporate-governance-ASEAN-economies.htm.

Other jurisdictions aim at ensuring the commitment of the members of the board as well as the committees by setting up minimum attendance ratios and requiring disclosure of their attendance records. In Singapore, although there are no specific mandated requirements about the minimum frequency of the meeting of the

board, there are provisions requiring directors to attend and actively participate in the board and board committee meetings.[37]

Other committees may be established to advise the board on additional issues. To support the board in its oversight of risk management, some companies have established a risk committee or expanded the role of the audit committee, following regulatory requirements or recommendations on risk management and the evolution of the nature of risks. Other committees include, for example, a sustainability committee to advise the board on environmental and social risks and opportunities, as well as a technology committee on the management of digital security risks and the company's digital transformation. Ad hoc or special committees can also be temporarily set up to respond to specific needs or corporate transactions.

Some ASEAN jurisdictions have provisions on a separate risk committee (Lao PDR,[38] Malaysia[39] and Viet Nam[40]), while sometimes taking proportionate and flexible approaches into consideration (in Indonesia[41] and Philippines[42]). In Singapore[43] and Thailand,[44] the listing rule allows the board to delegate responsibility for risk governance either to the audit committee or a separate board risk committee. In Cambodia, the audit committee is required to review risk management in case there is no risk management committee.[45] Indonesia has mandatory provisions for setting up the Information Technology steering committee for all commercial banks and non-bank financial institutions with total assets of more than one trillion rupiah.[46] In the Philippines, the board is recommended to establish the corporate governance committee and its function includes overseeing the implementation of the corporate governance framework and the board evaluation.[47]

Board nomination and election

Electing and removing members of the board is a basic shareholder right (Principle II.A). Shareholders can generally nominate board members or propose candidates. Some jurisdictions set a minimum shareholding requirement for a shareholder to nominate, usually at the same level as the shareholders' right to place items on the agenda of general meetings (OECD, 2023[6]).

In the ASEAN region, setting majority voting requirements for board elections is common similarly to the global trend. Cumulative voting is mandatory in Viet Nam, unless the company's charter can prescribe otherwise.[48] In the Philippines, the removal of a director requires a vote of at least two-thirds of the outstanding shares.[49]

Regarding the qualifications of candidates, setting a requirement or recommendation for qualifications for all board members is common, while some jurisdictions set more specific requirements or recommendations for the qualifications of at least some board appointees (e.g. independent directors, audit committee members). While most jurisdictions have established general requirements or recommendations for the qualifications of all board candidates, some jurisdictions give more emphasis to the balance of skills, experience and knowledge of the board, rather than to the qualifications of individual board members (OECD, 2023[6]). For example, in the Philippines, the board is recommended to have an appropriate mix of competence and expertise and the board members should remain qualified for their positions individually and collectively, to fulfil their roles in responding to the needs of the organisation on the evolving business environment and strategic direction.[50] Also, Singapore's Code of Corporate Governance states "[t]he Board and board committees are of an appropriate size, and comprise directors who as a group provide the appropriate balance and mix of skills, knowledge, experience, and other aspects of diversity such as gender and age, so as to avoid groupthink and foster constructive debate" (2.4).

Table 2.8. Governance of board nomination

Jurisdiction	Information provided to shareholders regarding the candidates for board membership			Requirement or recommendation for board nomination	
	Name of candidate	Qualifications of candidates	Candidate's relationship with the firm	Qualification of candidates [e.g. only for non-executive directors (NED) or members of audit committee (AC)]	Formal screening process (e.g. approval by the nomination committee)
Cambodia[1]	-	-	-	L, C	C
Indonesia	L	L	L[2]	L: NED, AC	L
Lao PDR	C	C	-	C	C
Malaysia	R	R	R	R	R; C
Philippines[3]	-	-	-	C	C
Singapore[4]	R	R	R	R, C	C
Thailand	C	C	-	L	C
Viet Nam	C	C	-	L, C	C

Key: **L** = requirement by law or regulations; **R** = requirement by the listing rules; **C** = recommendation by the codes or principles; "**-**" = absence of a specific requirement or recommendation.

Note:

1. In **Cambodia**, Article 6 of the Parakas on Corporate Governance for the Listed Companies states that shareholders should have the right to receive information related to directors and senior officials as well as information related to shareholder meetings.

2. In **Indonesia**, the information on the relationship of the candidate with the firm is required to oversee the independence of the commissioner.

3. In the **Philippines**, when the shareholder meeting is for the election of directors or trustees, the notice of shareholder meetings should include information on the requirements and procedure for nomination and election (Section 50 of the Revised Corporation Code of the Philippines).

4. In **Singapore**, the SGX Listing Manual provides that any appointment of a director must be announced by the issuer, providing information including the director's name, working experience, relationship with the issuer, shareholding interest in the issuer and other specified information. The Listing Manual requires directors to have appropriate experience and expertise to manage the group's business. A director without prior experience as a director of an issuer must undergo training as prescribed by the Exchange. If the nominating committee is of the view that training is not required as the director has other relevant experience, the basis of their assessment must be disclosed.

Source: OECD (2023[6]), OECD Corporate Governance Factbook 2023, https://doi.org/10.1787/6d912314-en.

Globally, requiring or recommending that some of the candidates go through a formal screening process, such as approval by the nomination committee, is common. In most cases, such screening processes are recommended as good practice in national codes (OECD (2023[6]), Table 2.8). In Thailand, the nomination committee should set the nomination criteria and process consistent with the skills matrix approved by the board and ensure that the candidate's profile meets the requirements set out in the skills matrix and nomination criteria. Upon proposal to and approval by the board of a candidate, the candidate is presented to the shareholders' meeting for election and appointment as a director.[51] In Viet Nam, the code states that the nomination committee should assist the board in selecting and recommending candidates for election by shareholders and oversee the development and implementation of the formal board nomination process.[52] The code also has recommendations on the establishment of the corporate governance, nomination and remuneration (CGNR) committee and its responsibilities could include identifying individuals qualified to become board members and recommending such individuals to the board for nomination for election.[53]

2.3. Policy considerations

To mobilise ASEAN capital markets further for sustainable growth of their companies, the corporate governance framework in the ASEAN economies should be facilitated in a way that reflects the reality of the ownership structure and other recent evolutions of capital markets, such as climate change and digitalisation. In particular:

- Publicly traded companies within **company groups** should be under the effective oversight, considering that corporations are the largest owner of ASEAN listed companies and there may be risks associated with equitable treatment of shareholders and stakeholders. It is important for the corporate governance framework to ensure the monitoring of group-wide risk management, related party transactions and the disclosure of ownership and company group structures.

- To attract investments from **institutional investors**, the corporate governance framework could include a framework to facilitate their effective engagement with companies. To enable investors to adopt flexibly, a soft law approach, including the establishment of stewardship codes, could be considered.

- Considering investors' increased attention to **sustainability issues** and companies' exposure to sustainability risks, sustainability-related disclosure should be encouraged, while taking flexibility for smaller listed companies into consideration. To ensure the quality of disclosed information, the regulatory frameworks in the ASEAN region could consider encouraging external assurance by large, listed companies in the long-term.

- To enable shareholders to exercise their rights effectively, policies and practices should ensure proper conduct of **general shareholder meetings**. It is important that the corporate governance framework (i) gives shareholders sufficient time and information to prepare meetings; (ii) provides proper identification of shareholders eligible for voting; (iii) ensures that shareholders' voting is counted properly and accurately; (iv) encourages companies to properly handle questions from shareholders; and (v) encourages the disclosure of voting and meeting results.

- In terms of the **board responsibilities**, corporate governance frameworks should have effective provisions on board independence, in both the board of directors and board committees, in the context of ownership concentration on company groups. To have sufficient capacity for the supervision and oversight of company management, board members with appropriate qualifications and diverse views should be appointed through a transparent nomination and election process.

- In terms of the **overall corporate governance framework** and in line with objectives to encourage corporate access to equity markets, ASEAN jurisdictions should consider opportunities to provide greater flexibility for boards to establish board committee structures that best serve their needs. Minimum requirements may be justified in particular to support minority shareholder protections, such as in the case of board independence and election requirements and ensuring the effective exercise of audit committee functions, but greater flexibility may be justified with respect to frequency of meetings or other specific board subcommittee requirements.

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Notes

[1] In Thailand, "a listed holding company (whose primary business is to hold a controlling interest of other companies) is required to have in place sufficient measures to supervise the course of business of their subsidiaries and affiliated companies and oversee the accuracy and completeness of the disclosure for such subsidiaries and affiliated companies"(Clause 23(4) of Tor Jor. 39/2559)(OECD, (2022[5]).

[2] In Viet Nam, whenever requested by the parent company's legal representative, the subsidiary company's legal representative shall provide reports, documents and information that are necessary for preparation of the consolidated financial statements and other consolidated reports of the parent company and subsidiary companies.

[3] A public company is defined as a company whose shares have been owned by at least 300 shareholders and has a paid-up capital of at least three billion rupiah or a number of shareholders and paid-up capital determined by government regulation.

[4] Article 3(2) of OJK Regulation 51/POJK.03/2017.

[5] Quantitative criteria of listing requirements for the Main Market includes uninterrupted profit of three to five full financial years with aggregate after-tax profit of at least 20 million Malaysian Ringgit (RM), a total market capitalisation of at least RM 500 million, and minimum of 1 000 public shareholders holding not less than 100 share each. The ACE Market, designed for companies with growth prospects, does not have requirements on profit and market capitalisation, while the companies should have at least 200 public shareholders holding note less than 100 shares each.

[6] For Indonesia, Appendix II, I.2 of OJK Regulation 51/POJK.03/2017. For Malaysia, paragraph 6.2(e) of Practice Note 9 of Bursa Securities Listing Requirements. For Singapore, Rule 711B of Singapore Exchange Rulebooks.

[7] Articles 4(1) and 4(4) of OJK Regulation 51/POJK.03/2017.

[8] Articles 2(1) and 2(2) of OJK Regulation 51/POJK.03/2017.

[9] Practice 4.1 of the Malaysian Code on Corporate Governance [as at 28 April 2021].

[10] Practice 4.3 of the Malaysian Code on Corporate Governance [as at 28 April 2021].

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[13] For Malaysia, Practice 13.1 of the Malaysian Code on Corporate Governance [as at 28 April 2021]. For Thailand, 8.1.4 of the Corporate Governance Code for listed companies 2017.

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[15] Article 18(4) of OJK Regulation 15/POJK.04/2020.

[16] Article 101 of Civil and Commercial Code.

[17] Article 18 (2) of OJK Regulation 15/POJK.04/2020.

[18] Article 141(1) of Law or Enterprises.

[19] Article 178(1)(c) of Companies Act 1967.

[20] Explanation of Recommendation 13.1 of the Code of Corporate Governance for Public Companies and Registered Issuers.

[21] 8.2.9 of the Corporate Governance Code 2017.

[22] Article 27 of OJK Regulation 15/POJK.04/2020.

[23] For Malaysia, Practice 13.3 of the Malaysian Code on Corporate Governance 2021. For Thailand, 8.2.3 of the Corporate Governance Code 2017.

[24] 5.2 of SGX Practice Note 7.5 General Meetings.

[25] Sec 49 of the Revised Corporation Code of the Philippines.

[26] 4.2 of SGX Practice Note 7.5.

[27] 2.7 of Malaysia Guidance Note and FAQs on Conduct of General Meetings.

[28] 13.2 of the Malaysian Code on Corporate Governance [as of 28 April 2021].

[29] Mainboard Rule 210(5)(d)(ii) and Catalist Rule 406(3)(d)(ii).

[30] Article 20(2) and (3) of OJK Regulation 33/POJK.04/2014.

[31] 154(2) of Enterprise Law 2020 and Principle 3.4 of Viet Nam Corporate Governance Code of Best Practices.

[32] For Thailand, Principle 3.2.5 of the Corporate Governance Code 2017. For the Philippines, Recommendation 5.3, Code of Corporate Governance for Publicly Listed Companies (CG Code for PLCs, 2016). For Lao PDR, 4.2.2 of Guidelines on Corporate Governance for Listed Companies.

[33] Article 25 of OJK Regulation 33/POJK.04/2014.

[34] Practice 5.3 of the Malaysian Code on Corporate Governance [as of 28 April 2021].

[35] Article 14 of the Parakas on Corporate Governance for the Listed Companies.

[36] Guideline 3.9.2 of Corporate Governance Code for listed companies 2017, and 2.1 of the Principles of Good Corporate Governance for Listed Companies 2012.

[37] 1.5 of the Code of Corporate Governance 2018.

[38] 6.2 of Guidelines on Corporate Governance for Listed Companies.

[39] Step Up Practice 10.3 of the Malaysian Code on Corporate Governance 2021 recommends that the board establishes a Risk Management Committee, which comprises a majority of independent directors, to oversee the company's risk management framework and policies.

[40] Principle 4.2 of Viet Nam Corporate Governance Code of Best Practices.

[41] All commercial banks are required to establish the risk management committee (under the Board of Directors), while financing companies with total assets of more than 200 billion rupiah are required to establish the risk monitoring committee (under the Board of Commissioners) (Article 16 of OJK Regulation 18/POJK.03/2016 and Article 28(1)b of OJK Regulation 29/POJK.05/2020).

[42] Recommendation 3.4 of the Code of Corporate Governance for Public Companies and Registered Issuers.

[43] Practice Guidelines 9: Risk Management and Internal Controls in SGX Listing Rules.

[44] Principle 6.1.5 of the Corporate Governance Code for listed companies 2017.

[45] Article 25 of Parakas on Corporate Governance for the Listed Companies.

[46] Article 8(1) of OJK Regulation 4/POJK.05/2021.

[47] Recommendation 3.3 of the Code of Corporate Governance for Public Companies and Registered Issuers.

[48] Article 148 (3) of Law on Enterprises.

[49] Section 27 of the Revised Corporation Code of the Philippines.

[50] Recommendation 1.1 of the Code of Corporate Governance for Public Companies and Registered Issuers.

[51] 3.3.2 of the Corporate Governance Code 2017.

[52] 2.1.5 of Viet Nam Corporate Governance Code of Best Practices.

[53] Principle 4.3 of Viet Nam Corporate Governance Code of Best Practices.

3 Artificial intelligence (AI) and finance in ASEAN economies

Advances in artificial intelligence (AI) models, including the advent of models offering content generative capabilities and user-friendly interfaces, have increased interest around AI innovation by the general public in Asia and globally. Although the deployment of fully automated generative AI tools in finance is slow-paced, the wider deployment of AI in finance could amplify risks already present in financial markets and give rise to new challenges. This chapter provides a sentiment analysis of interest in AI innovations in finance in major Asian economies using Machine Learning (ML) techniques; presents recent developments in AI in finance and the potential use cases and associated benefits of such tools for ASEAN member states, analyses potential risks from a wider use of such tools in ASEAN financial markets; examines policy developments and discusses associated policy implications.

3.1. Introduction

Advances in artificial intelligence (AI), including the advent of models with content generating abilities, have sparked public interest and increased direct usage of AI tools by non-technical users. For example, generative AI models have the ability to produce 'original' content that closely resembles human-generated output. In addition to their advanced computational capabilities, such tools have a user-friendly, accessible conversational interface that has been one of the main drivers of rapid public adoption of such models, particularly given the availability of some free-of-charge. Such developments have marked a breakthrough in the ability of non-technical users to engage with complex technologies in a way that aligns with human thinking.

This chapter discusses potential benefits and risks of the use of AI in finance and presents trends in AI in finance in ASEAN economies, in terms of the sentiment and deployment trends, use cases, and implications for financial market participants and policy makers. It includes original analysis based on a machine learning (ML) model that uses natural language processing techniques provides evidence of important and increasing interest around AI in finance in major Asian economies, such as Japan and Korea. Finally, it examines national AI strategies that have been developed in seven ASEAN member states and provides policy considerations and recommendations for ASEAN economies.

3.2. AI in finance: Asian trends

3.2.1. Using AI models to examine interest in AI in finance in major Asian economies

Asian economies have emerged as key hubs for the development of AI, particularly given the role of some Asian economies in the semiconductor markets (e.g. China, Chinese Taipei), while the region has been at the forefront of AI adoption. The central role of the Asian region's AI activity contributes to economic growth and the digital transformation of the regions' economies.

OECD analysis based on a ML-based model that uses Natural Language Processing (NLP) techniques[1] provides evidence of important and increasing interest around AI in finance in major Asian economies such as Japan and Korea (Figure 3.1). AI-related topics were covered in almost 2.5% of articles examined in the period January 2021 – October 2023 in the respective samples examined for each of the countries' financial press.[2] A graphic representation of the frequency of words in the abovementioned samples, in the form of WordClouds, demonstrates the importance of 'Generative AI' or 'GenAI', 'investment', and 'technology' in the discussion and reporting around AI in finance (Figure 3.2). In the case of Japan, 'risk' is also a prominent word appearing in financial press, and this could be related to the G7 policy discussions, the Hiroshima Process International Guiding Principles for Organizations Developing Advanced AI Systems and the Hiroshima Process International Code of Conduct for Organizations Developing Advanced AI Systems (G7, 2023[1]; 2023[2]; 2023[3]). The Korean financial press has concentration of interest on the investment perspective of AI (Figure 3.2), which can also be explained by the increasing investment of Gen AI applications (Table 3.1), and other FinTech companies in Korea (Table 3.2).

Figure 3.1. Increasing interest in AI in finance in Japan and Korea (January 2021-October 2023)

A. AI frequency in Japanese financial press

B. AI frequency in Korean financial press
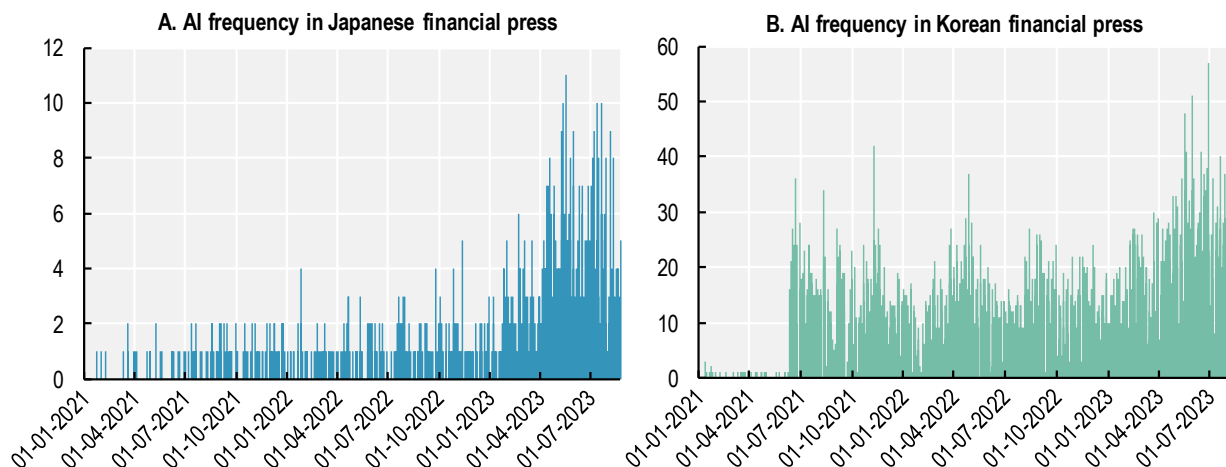
Note: Based on a machine learning (ML)-based model that uses Natural Language Processing (NLP) techniques to analyse 44 222 press articles from the Japanese financial press, which included 1 027 AI-related articles; and 436 509 articles from the Korean financial press, which included 9 730 AI-related articles. Covering the period January 2021 – October 2023.

Figure 3.2. AI in finance in Japan and Korea (January 2021-October 2023)

A. Most common terms used to discuss AI in Japanese news

B. Most common terms used to discuss AI in Korean news
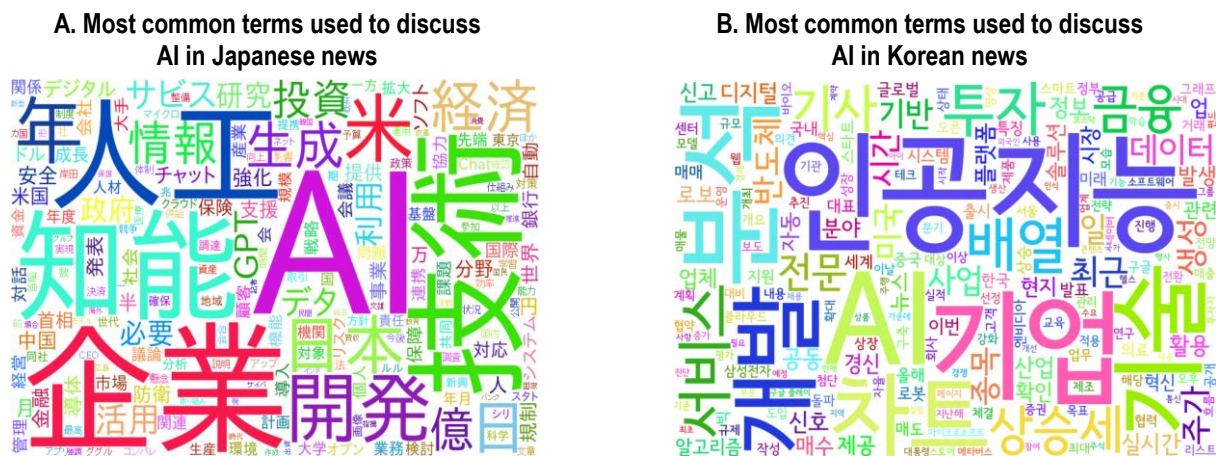
Note: *Wordclouds* demonstrating a graphic representation of the most frequently used words in the same of financial press articles studied. Terms prevailing in Japanese news articles include '*risk', 'information', 'United States', 'China, ', and 'requirement*'. Terms prevailing in Korean financial press include '*investment', 'increase', 'chart', 'array', 'analysis'''* and '*stock prices*'.
Source: OECD. Based on a ML-based model that uses NLP techniques to analyse 44 222 press articles from the Japanese financial press, which included 1 027 AI-related articles; and 436 509 articles from the Korean financial press, which included 9 730 AI-related articles. Covering the period January 2021 – October 2023.

3.2.2. Evolution of sentiment on AI in Finance in Japan and Korea

Sentiment analysis performed on the basis of the abovementioned sample of financial press in Japan and Korea provides some evidence of the sentiment towards AI in finance in the countries examined, and indicates the temporal evolution of such sentiment and its direction (Figure 3.3 for Japan and Figure 3.4 for Korea).

The labelling of the articles focusing on AI in the sample examined was based on three sentiments, positive, neutral, and negative, and the probabilities of each sentiment was generated with the pretrained

NLP model, BERT. The indices on sentiment and polarity were generated based on a daily basis frequency by integrating those probabilities (see more in the Annex). The sentiment in Japan seems to be mostly neutral in the period January 2021 – October 2023. Over time, the sample exhibits some peaks of negative sentiment which could be attributed to the increase in the discussions around AI and generative AI challenges and risks, inter alia during the G7 meetings in Japan throughout 2023. The same peaks in negative sentiment are reflected in the negative peaks of the polarity index for the sample discussed, although there is great volatility in the sentiment observed. Such large volatility could be explained by periods of increased reporting around AI regulation or policy discussions more broadly in the financial press, as well as by discussions on investment opportunities on AI in Japan[3].

Figure 3.3. Sentiment analysis on AI in finance in Japan (January 2021-October 2023)
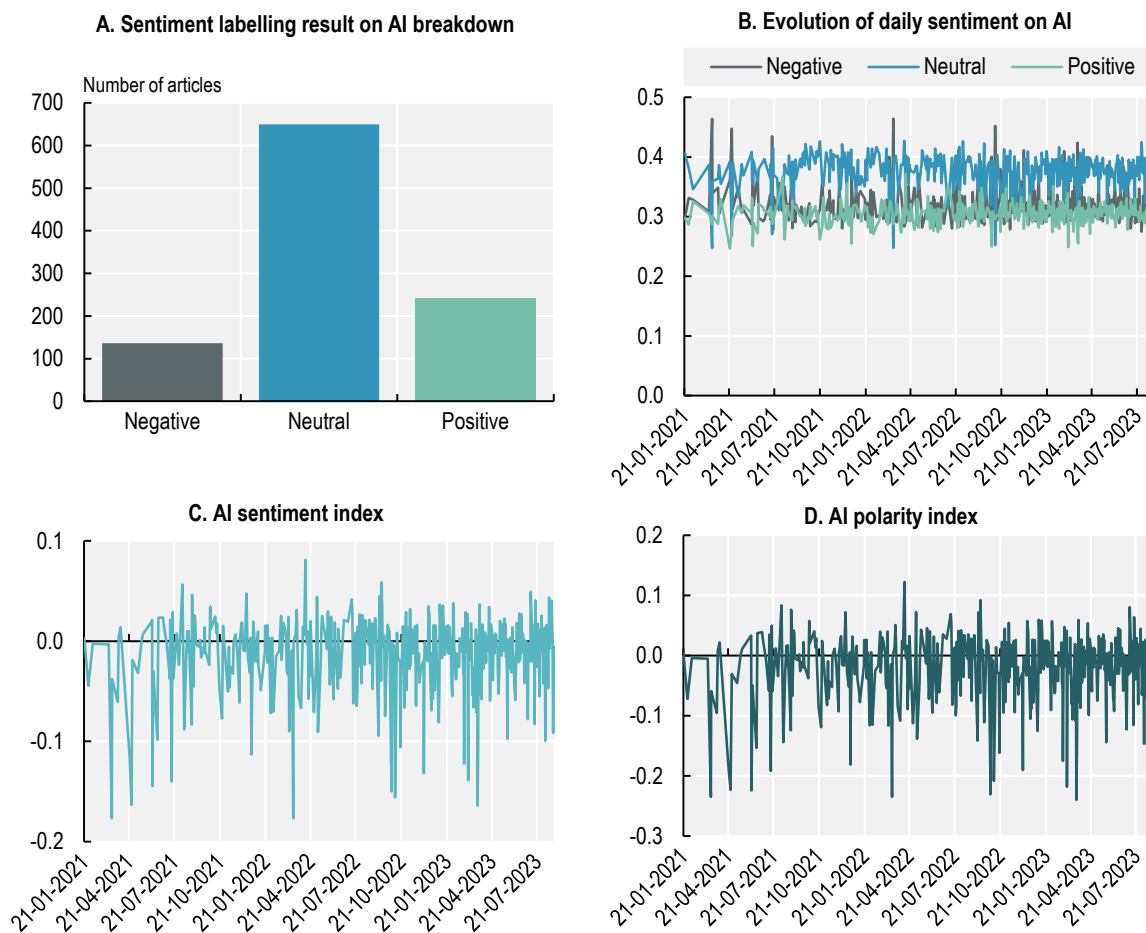
A. Sentiment labelling result on AI breakdown

B. Evolution of daily sentiment on AI

C. AI sentiment index

D. AI polarity index

Note: Based on a ML-based model that uses NLP techniques to analyse 44 222 press articles from the Japanese financial press, which included 1 027 AI-related articles. Polarity and sentiment indices follow similar trends because the equation between the sentiment index and the AI polarity index has the same numerator. The exact equations are denoted in the Annex.

On the other hand, the analysis of the Korean financial press shows a similar absolute prevalence of neutral sentiment in financial press. However, the discussion in the financial press seems to be focusing more on the opportunities of AI, rather than the challenges, and the overall sentiment expressed is always positive in the period examined, as evidenced by the positive values of the polarity index throughout this period. The low volatility of the sentiment indices also stands for consistent positive tone of AI articles in the Korean financial press, and it also demonstrates the Korean news articles contain more positive tones, compared to the Japanese.

Figure 3.4. Sentiment analysis on AI in finance in Korea (January 2021-October 2023)

A. Sentiment labelling result on AI breakdown

B. Evolution of daily sentiment on AI

C. AI sentiment index

D. AI polarity index
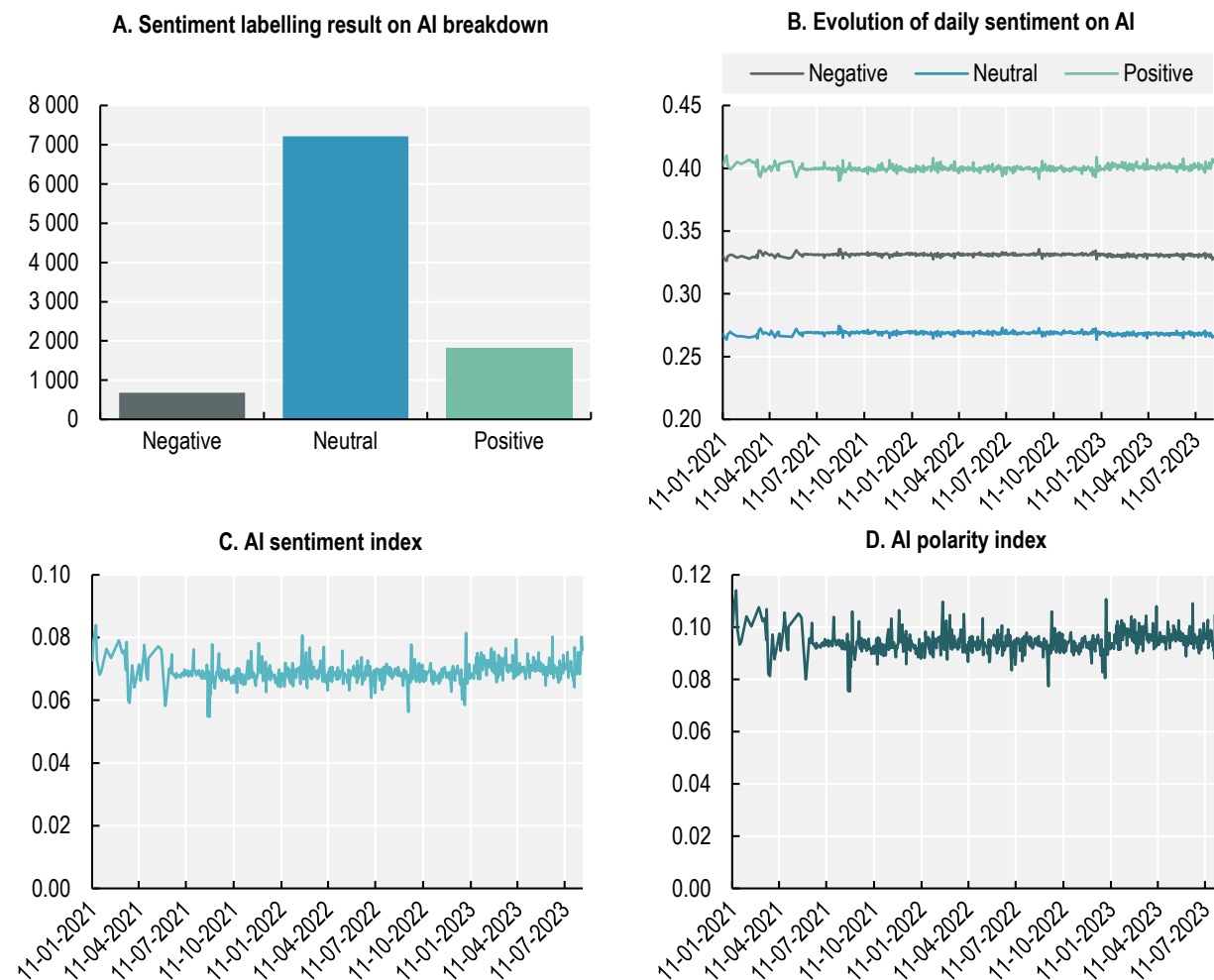
Note: Based on a ML-based model that uses NLP techniques to analyse 436 509 articles from the Korean financial press, which included 9 730 AI-related articles.

Overall, the results of the sentiment analysis for Japan and Korea may indicate a different tone in the discussion around AI in finance, that may be driven by the multilateral policy discussions that took place in Japan over 2023 during the G7 Presidency. A more negative sentiment may be related to the risk implications from the use of AI and the policy discussions on mitigating such risks. On the other hand, Korean News articles tend to focus on more neutral to positive implications of AI, focusing on investment opportunities and AI applications in finance and beyond.

3.2.3. Investment into AI and financial sector acquisitions of AI companies in Asia

Analysis of mergers and acquisitions (M&A) of AI-related companies by financial service providers shows activity in Asia as well as in ASEAN member states over the year 2023 (Figure 3.5). Given the enormous amounts of compute power and data required to develop and train AI models, banks and financial institutions tend to acquire companies developing AI-based models, particularly those with a first mover advantage or with the resources available to undertake design, training and maintenance of models. Although the number of M&A deals in both Asian and ASEAN markets fluctuated during the year, activity is recorded right after the announcement of ChatGPT in November 2022 and following the ChatGPT model

updates, announced in February and July 2023. Activity in ASEAN is concentrated on three member states: Malaysia, Singapore, and Thailand.

Looking at the latest trends, the volume of generative AI M&A deals involving financial entities in Japan, Korea, and China gradually increased between December 2022 and March 2023. In ASEAN, a peak is observed in February 2023 when a Thai firm acquired a holding company of semiconductor manufacturing services in Singapore, representing the largest transaction in this sector in the region (The Business Times, 2023[4]). Activity in Asia is concentrated in three countries, Japan, Korea, and China, which together account for almost 87% of total deal volume. Singapore has also recorded important activity, which amounted to 11.6% of the transaction volume.

Figure 3.5. M&A deals related to generative AI in finance in selected Asian jurisdictions
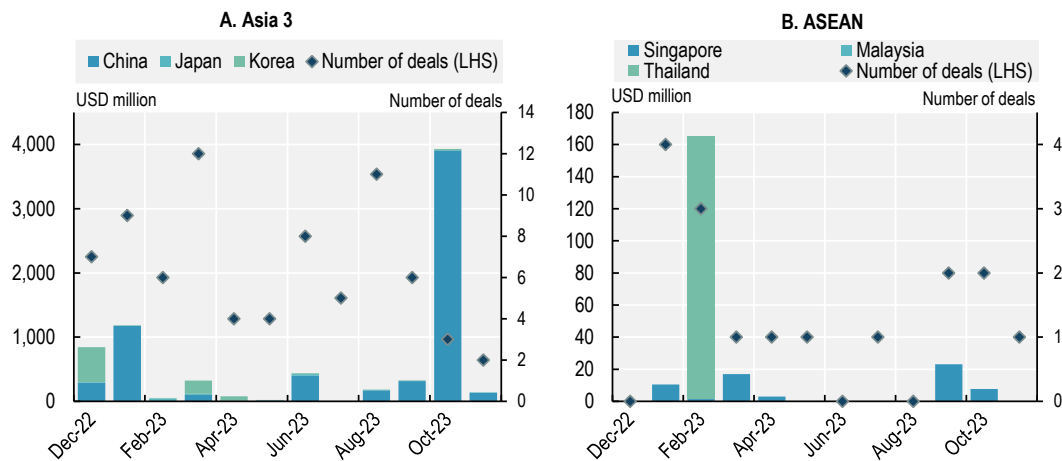
Note: The three Asian countries are Japan, Korea and China.
Source: LSEG and OECD staff compilation.

Figure 3.6. M&A deals related to advanced semiconductors in selected Asian jurisdictions
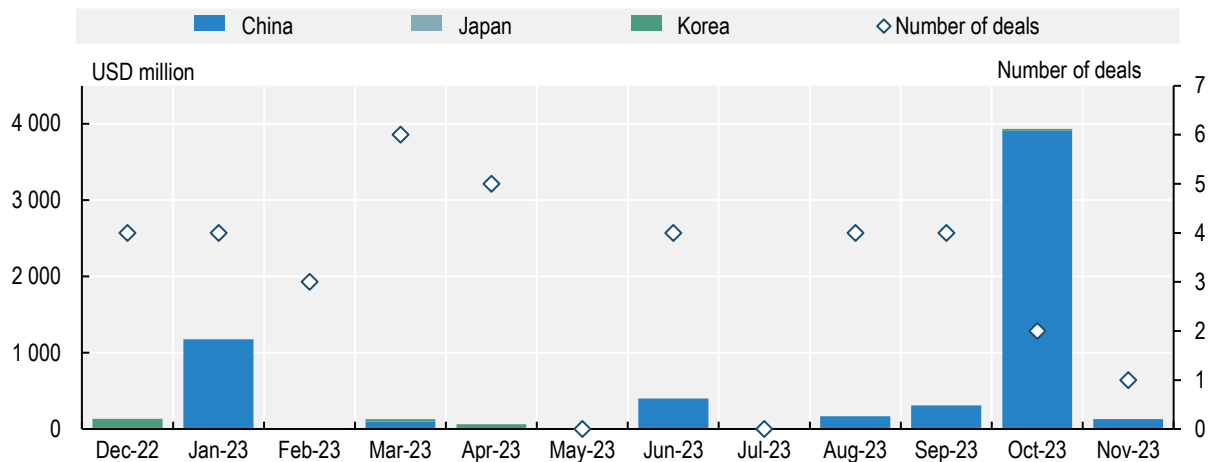
Note: The 3 Asian countries are Japan, Korea and China.
Source: LSEG and OECD staff compilation.

Large Asian countries also recorded semiconductor-related deals, with chips being a critical component of the AI model development (Section 3.3.1). Since the chip production is mostly led by the three Asian countries, Japan, Korea, and China (World Population Review, 2023[5]), an important number of semiconductor M&A transactions were recorded in these countries over the past year. In particular, 97% of semiconductor deals in Asia involved Japanese, Korean or Chinese entities (Figure 3.6).

3.3. Recent developments in AI: the advent of Generative Artificial Intelligence

Generative Artificial Intelligence (GenAI) is a subset of AI comprising models that generate new content in response to user-based inputs or prompts by using neural networks and deep learning (OECD, 2023[6]) (Figure 3.7). Examples of output include text (produced from LLMs like ChatGPT), visual outputs (Sunthesia), audio (Speechify), and code (GitHub CoPilot). These outputs are informed by models built on neural networks such as Generative Adversarial Networks (GANs), [4] which process and transform input data based on pre-processed data collected from massive, unstructured datasets.[5]

Figure 3.7. Generative AI
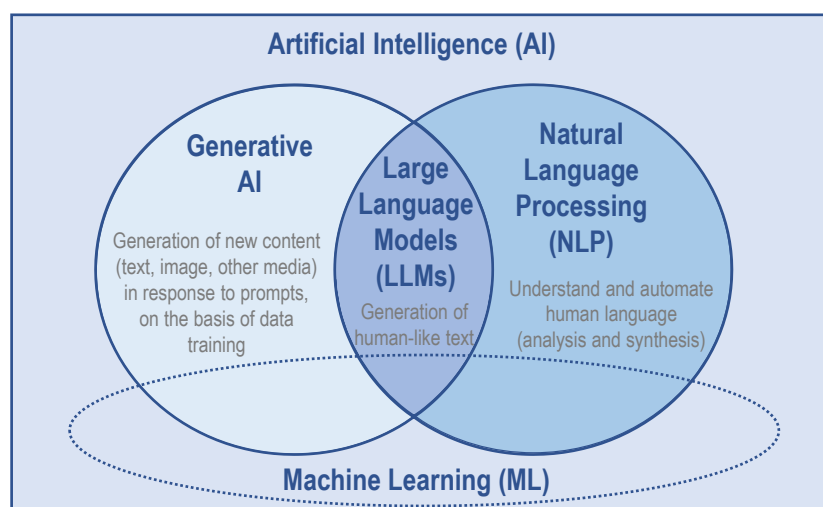
Note: indicative, non-exhaustive representation of AI domains.
Source: OECD (2023[7]), Generative artificial intelligence in finance, https://doi.org/10.1787/ac7149cc-en.

GenAI has garnered widespread popularity as a result of their wide array of potential use cases and their ease of use, particularly when it comes to LLMs that have caught particular attention as a subset of the wider AI advances and tools. These include models such as ChatGPT (OpenAI), Bard (Google), Bing Chat (Microsoft), Claude (Anthropic), Ernie Bot (Baidu). The conversational character of such models, that bring them closer to human cognition than any other previous AI model, coupled with their computational power, have driven to a large extent their notoriety with the general public since the release of ChatGPT in November 2022.

3.3.1. Drivers of fast AI adoption in non-finance applications

AI has developed quickly over the last decade; indicatively, more advances in deep learning have been made in the last ten years alone compared to the last forty years (Kotu and Deshpande, 2019[8]). Such advances are due to three key drivers: significant progress in computational power (GPU and TPU), the rapid growth of available online data, and improved cost efficiency for underlying data processing capacity

(Ahmed et al., 2017[9]; OECD, 2021[10]). The exponential growth of datasets is a result of both increasing reliance on internet and online data as well as progress in synthetic data generation, which makes it simpler to produce the volume of data needed to train AI models. Another driver is increased private funding for GenAI, with USD 2.6 billion raised across 110 deals in 2022 (OECD, 2023[7]).

Private and public investment flows into projects involving the development of AI tools have been growing over the past years in Asia, including across ASEAN member states. In 2023, government funding to the generative AI projects in Asia Pacific supported almost two-thirds of the regional organisations looking into the potential use cases of Generative AI (IDC, 2023[11]). On the private investment side, the total value of private equity funding for GenAI projects in Asia stood at USD 428.2 million as of 30 November 2023, recording a significant increase relative to previous years (Figure 3.8). A similar increase is observed in the corresponding number of transactions underlying this funding. In terms of the number of venture capital (VC) investments, AI accounted for a very small percentage (3%) of total venture capital investments in Asia in 2012, reaching 23% of all VC investments by H1 2023 (Monetary Authority of Singapore, 2023[12]). Important investments are also flowing in the semiconductor industry of the Asian region, with Japan, Korea, China and Chinese Taipei accounting for around 41% of global market share in 2021 and 36 % of the global R&D expenditure (as a percent of sales), respectively (SIA, 2023[13]). Those investments are related to semiconductor subproduct sectors such as chips are to a large extent driven by demand and urgency in sourcing logic chips used to build large AI models (Section 3.2.3).

Figure 3.8. Private funding flows to generative AI and generative AI unicorns in Asia
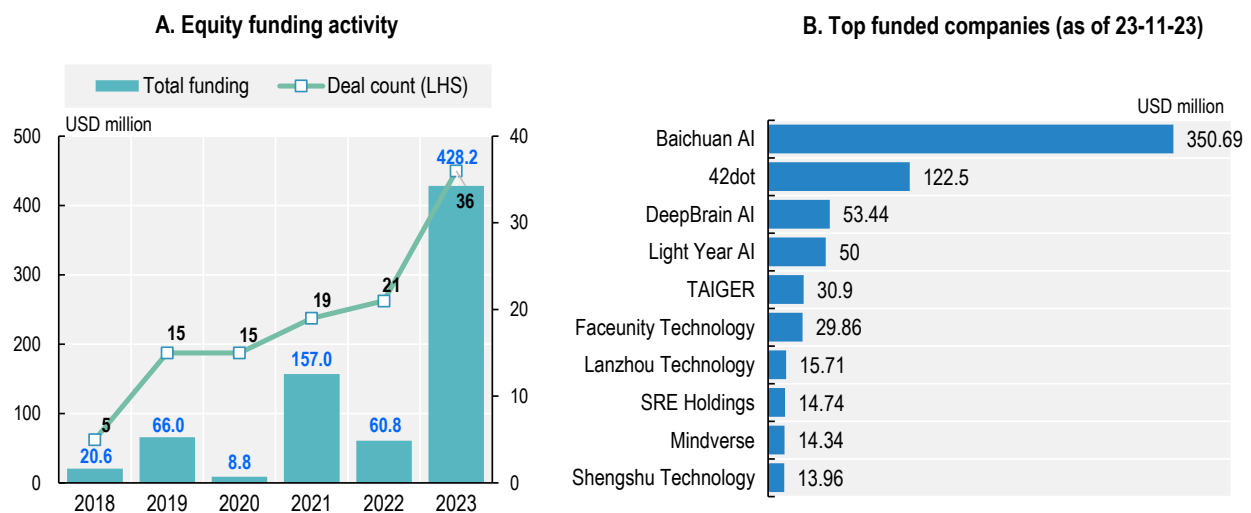
Source: CB Insights and OECD staff compilation.

AI and LLMs have gained increased popularity and demand from the public given they are designed to be user friendly, accessible, and intuitive, while also having significant technical capabilities. Unlike other types of AI, like deep neural or ML models, GenAI models product outputs that are easy to grasp by the average user without any specific technical knowledge and resonate with human cognition, thereby driving fast adoption (Figure 3.9). The cost-free availability of online LLM models such as ChatGPT and their conversational abilities contribute to such a demand trend.

Figure 3.9. Speed of adoption of some generative AI applications

A. Speed of adoption of ChatGPT relative to other online apps
■ Time to reach 1 million users (days)

B. Speed of adoption of ChatGPT relative to other innovations
■ Time to reach 100 million users (years)
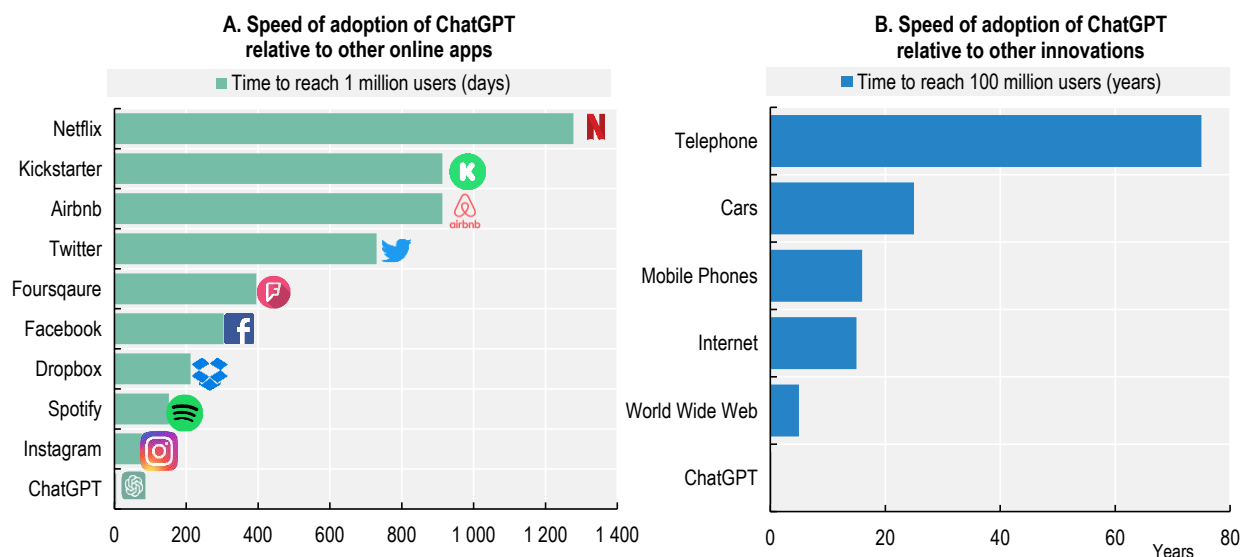
Source: OECD (2023[7]), Generative artificial intelligence in finance, https://doi.org/10.1787/ac7149cc-en; based on Statista and OECD calculations.

3.3.2. Slow-paced deployment of advanced AI models in finance

Despite the popularity of AI, implementing advanced AI solutions such as generative AI models that involve full end-to-end automation in financial markets continues to be in the testing and development phase (OECD, 2023[7]). So far, such tools are mostly deployed in process automation, which is designed to enhance productivity at both the back-office (operations) and middle-office (compliance and risk management) of financial service providers. These tasks include content generation, summarisation of documents used by financial advisors, and human resource processes. As AI advances, its use in front-end use cases and the increased use in the back-end is expected to accelerate.

Part of the reason why advanced AI tools such as generative AI models have slow uptake in finance is that financial market activity is highly regulated. Risk management and model governance rules and regulations are already in place, and the technology neutral approach of regulation renders them applicable irrespective of the type of technology used (OECD, 2023[7]). As such, the more advanced AI techniques may not be fully compatible with regulatory frameworks that try to ensure market integrity, consumer protection, financial stability and require risk management, model governance, transparency, and other obligations.

Given the important costs of developing and training large AI models such as LLMs, in most cases the use of such models by financial market participants will involve the outsourcing of a model that is then tailored to the specific needs of the user firm. Such model will then be trained with private proprietary data in 'offline' environments, for example within the private cloud of the firm.

Furthermore, due to the high risks of security and data breaches, the use of *public* AI tools is most likely incompatible with data protection frameworks in place. The use of open-source or off-the-shelf reusable models (e.g. foundation models[6]) can pose a significant risk of data breaches of financial market participants' sensitive and confidential client data. Additionally, some AI models such as LLMs, are known for lack of transparency behind their decision-making processes. This can be problematic for financial markets where transparency is crucial for regulatory compliance and trust (Section 3.5.4). As such, financial market participants that use AI typically deploy restricted and bespoke LLM models that operate within the firewalls or at the private cloud of the firm in order to ensure data sovereignty and security.[7]

Also, given the legal responsibility and fiduciary duty of financial service providers to act in the best interests of the clients, financial service providers must work to protect clients from the risks of misleading outputs, misinformation, and other risks posed by advanced AI tools (e.g. deceptive model outcomes, deepfakes etc. Section 3.5.4). Risks related to the use of advanced AI models discussed in this chapter may be an additional impediment to the wider use of such tools by the financial sector at this stage. Incompatibilities with applicable rules and requirements, such as the ones posed by the lack of explainability of model outputs, may further impede their widespread usage in finance.

Smaller financial service providers will likely face greater challenges in the implementation of AI tools, including advanced AI models such as LLMs, related to their capacity. Although large financial institutions may have challenges related to their existing governance structures and legacy infrastructure, smaller players may not have the financial resources and capacity of managing datasets in order to be able to implement large AI models. For instance, successful deployment of AI depends on both the availability and quality of data. Smaller financial institutions may not have sufficient data management structures in place to support the vast amounts of unstructured data they own for the purpose of AI use. While the above risks regarding training data are salient for supervised ML models in finance, AI models such as LLMs that are fully autonomous and self-supervising do not need to label training data. This is because such models can identify complex relationships and learn from unstructured data. Furthermore, effectively using AI tools to keep up with modern work trends will require AI skills across the board. Accordingly, AI skills should be present at all levels and functions that use AI for service provision and may require additional organisational manoeuvring.

One example of the phased introduction of AI in finance is the use of AI in trading: instead of completely automating the entire trading process, the use of AI is limited to specific tasks, mostly to analyse the large, noisy and complex datasets at hand to identify insights for trading decisions. It is possible that AI-based algorithms may eventually be fully automated and equipped to adjust their own decisions without requiring human intervention. However, the use of AI in trading can nevertheless exacerbate the risk of prohibited or illegal trading strategies such as spoofing and front-running (OECD, 2021[10]).

Financial market participants are currently experimenting with customized, offline or private versions of LLMs and other advanced AI tools (OECD, 2023[7]). Presently, these models use public data to primarily act as sources of information and as tools for internal processes and operations. As AI continues to advance, it can be anticipated that financial market participants may implement new use cases of these models emerging from experimentation or third-party provision. The wider adoption of AI mechanisms may expose financial service providers, users and the markets to important risks, warranting policy discussion and possible action.

3.3.3. Direct vs. indirect scope of use of AI in finance

Different types of AI models interact with financial service providers and/or the end customer in different ways, and each level of interaction comes with a different level of associated risks. These different levels may also underpin the slow-paced and phased deployment of AI in finance, which is currently used primarily to assist operations as opposed to full automation and direct interaction of the model with the financial consumer.

AI models, particularly those with generative capabilities, can be employed to assist customers without directly interacting with them. For instance, they can be used to generate portfolio allocation recommendations that are customised to their financial profile. Such output can be used as input to inform the financial service provider in the delivery of his recommendation. But they can also be used more directly, to provide direct personalised recommendations to the customers and/or to execute suggested recommendations without any human involvement. The latter case has increased risks and anecdotal evidence by the financial services industry indicates limited full end-to-end deployment of AI tools at their current stage of development.

Risks related to the use of AI in finance increase given that users (whether financial service providers or end-customer) may not be fully aware of the limitations of the AI models. These risks are even more pronounced if and when the model interacts directly with the customers and executes its own recommendations in a fully automated manner without any 'human-in-the-loop' and therefore such direct scope of use poses significant risks to both the customers and the service provider. It could be anticipated, however, that the use of AI in finance will in the future evolve to include such direct interaction of financial consumers with the model, and to that end trust and safety of such applications will be of paramount importance.

3.4. Use cases of AI in finance and associated benefits for ASEAN countries

AI tools are used across a vast array of use cases in financial markets, including multiple parts of the value chain and multiple verticals, such as asset management (e.g. stock picking; risk management and operations); algorithmic and high-frequency trading (e.g. liquidity management and execution with minimal impact); retail and corporate banking (e.g. onboarding, creditworthiness analysis, customer support) and payment institutions (e.g. AML/CFT, fraud detection) (OECD, 2021[10]). The performance of such AI-based services is expected to be improved through the use of AI tools, particularly for areas such as sales and marketing, customer support and operations, including data/information management, as well as translation, coding and software development.

Operations and back-office functions is one of the most widely reported use cases of AI in finance today (Figure 3.10), with the potential to increase both efficiency and accuracy of operational workflows and enhance performance and overall productivity. This can be an important benefit for financial market participants in ASEAN countries, as it can allow for cost reduction given that these AI tools can replace manually intensive and repetitive P&L and other reconciliations with less expensive and more efficient automated ones. To the extent that such cost savings are passed on to the end customer, these can alleviate any potential cost burden associate with formal financial services.

Figure 3.10. Generative AI use cases in finance, 2023

In % of industry survey respondents
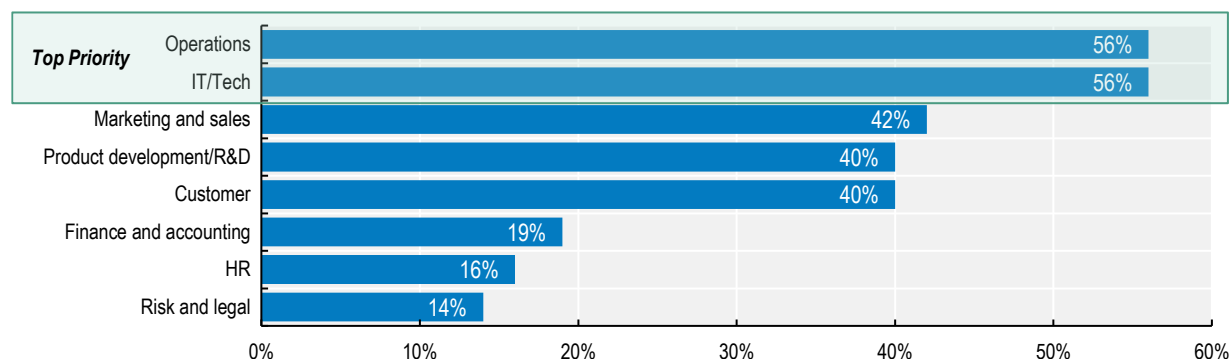
Source: KPMG (2023[14]), Generative AI: From buzz to business value.

AI, and generative forms of AI in particular, can also be used to make data analysis and reporting firm data more human-like for both internal and external purposes, facilitating regulatory reporting and compliance by small financial services firms in particular. External purposes include customer service analytics, human resource tasks (e.g. generation of summaries of management reviews), translation or summarisation of contracts, or other reporting. AI models with generative capabilities can also enhance individualised

communication for customer-facing purposes, including tasks related to product creation, marketing and sales, and improved customer support.

AI-based anomaly detection tools can also improve both AML/CFT processes fraud detection across various types of financial market participants, especially in the area of payments, with important potential contribution to improving trust and confidence in the formal economy for ASEAN consumers. This, in turn, can increase customer trust and satisfaction from the formal financial system and their willingness to participate in the formal economy. These models can automatically identify outliers that deviate from expected data points and behaviour within given datasets (Kotu and Deshpande, 2019[15]), thereby potentially implying fraudulent activity. It can also be beneficial for automating client onboarding, making KYC checks for banking clients more efficient, and improving compliance functions for financial market participants. The performance of such tasks can be further augmented by generative forms of AI, which can use company data to generate reporting and other necessary outputs needed to facilitate compliance.

AI is also used to enhance risk management for asset managers and institutional investors. AI-based risk models have the capacity to quickly assess portfolio performance under various market and economic scenarios by considering a range of consistently monitored risk factors. Investment strategies, such as quantitative strategies or fundamental analysis of systematic trading, have always relied heavily on structured data. However, AI-based models use raw or unstructured/semi-structured data to give investors an informational advantage. This data-driven approach enhances sentiment analysis and provides additional insights using pattern recognition (OECD, 2021[10]).

ML models in particular inform decision-making for portfolio allocation and/or stock selection by using pattern recognition, NLP[8] to make predictions (Table 3.1). Such models have recently gained significant attention due to the ability of models like neural networks to capture non-linear relationships between stock characteristics and future returns by learning from data. This has opened up the potential for including ML-based stock-selection strategies in informing portfolio construction. Academic studies examine whether or not such ML-based strategies can generate "alpha", a measure of investment performance, with mixed results (Freyberger et al., 2020[16]; Moritz and Zimmermann, 2016[17]). Interestingly, ML-based strategies with longer time horizons tend to focus on slower signals and rely more on traditional asset pricing factors, which can lead to poorer performances compared to short-term strategies (Blitz et al., 2023[18]).

AI models in lending could reduce the cost of credit underwriting and facilitate the extension of credit to 'thin file' clients, potentially promoting financial inclusion (OECD, 2021[10]). The use of AI can create efficiencies in information management and data processing for the assessment of creditworthiness of prospective borrowers, enhance the underwriting decision-making process and improve the lending portfolio management. It can also allow for the provision of credit ratings to 'unscored' clients with limited credit history, supporting the financing of the real economy (e.g. SMEs) and potentially promoting financial inclusion of underbanked populations. As with any AI application in finance, the potential benefits come also with important risks, such as possible discrimination and bias; and with challenges, such as the difficulty in interpreting the model's output (explainability) (Section 3.5.1).

The most significant opportunities for Gen AI are expected to lie in customer-facing financial services and in the delivery of new, highly customised products. 'Traditional' AI classes were used to power chatbots and automated call centres for customer support (Weizenbaum, 1966[19]). In comparison, GenAI introduces a conversational element that closely resembles human interaction. GenAI is also expected to support the production and delivery of new products, from investment advice to robo-advisors, by using product-feature optimisation, and improving targeted sales and marketing (Table 3.2). GenAI can also help brokerage firms and other investment advisors tailor their recommendations at an individual level, delivered in a human-like and conversational manner, through improved customer segmentation at the individual level in an efficient manner.

Table 3.1. Select types of AI applications by Asian financial services firms

Name	Segment	Service	Description
TROVATA	FinTech	Treasury tool	Generative AI Finance & Treasury Tool
Kakaobank	FinTech	R&D center	With the basis for judgment on the results made by AI, explaining the decision-making process and results from the user's perspective
Shinhan Bank	Commercial Bank	Financial assistant	Recognition of AI customer answer, real-time AI consultation analysis, tablet handwriting verification, and full text subtitle implementation
Kookmin Bank	Commercial Bank	Financial assistant	The AI model automatically generates the overall financial status and analysis, and system judgment results, which is for the corporate goddess in charge
Hana Bank	Commercial Bank	Financial advisor assistant	Building AI chatbot and callbot services for banks and cards based on NLP engines, enabling AI to quickly determine customer requests and suggest ways to respond directly or process them on their own
Nonghyup Bank	Commercial Bank	Sales and marketing, information management	The 12 different AI channels, including customer service, consultation support, quality control, and big data analysis
MUFG Bank	Commercial Bank	Financial assistant	Using AI chatbots to increase productivity responding the customers' inquiries for their satisfaction
SMBC Bank	Commercial Bank	Financial assistant	Using the chatbot as a personal teller service where customers can make inquiries via a messaging style interface
MIZUHO Bank	Commercial Bank	Financial assistant	With Fujitsu's generative AI technology, using the streamline of the maintenance and development of its systems
Daiwa Securities	Corporate and Investment Banking	Financial assistant, information management	Free use of ChatGPT to the employees to identify financial products and collecting information and drafting
VietABank	Commercial Bank	Financial assistant, information management	Using AI for foreign currency transactions, personal credit, and digital banking by transaction monitoring to detect fraud and risk through VPDirect
Vietcombank	Commercial Bank	Financial assistant, information management	Collaborated with FPT Smart Cloud Company to develop VCB Digibot, a customer care chatbot platform

Note: Non-exhaustive and based on reported information by financial market participants.
Source: OECD based on web research.

However, the greatest short-term impact of AI for finance could come in the areas of financial analysis assistance and communication, especially in light of the proliferation of platformisation and embedded finance. AI tools' ability to make predictions and produce information is critical for product support. Recommendation engines, a class of ML techniques, can predict user preference, especially when bolstered by methods like content-based filtering (Kotu and Deshpande, 2019[20]). AI's ability to generate content complements this by tailoring sales strategies and marketing campaigns to individual customers, thereby potentially promoting financial inclusion if the customisation aims at that objective.

Coding represents another highly impactful domain for generative AI, which can support software development for a wide array of financial services/products. It can serve as a dedicated coding assistant and generate new code, provide troubleshoot scripts, offer solutions to coding errors, and test code. Despite its significant potential and relatively low associated risks, this use case is more unexplored compared to others. Similar considerations are also applicable in the use case of translations supporting customisation and communication around financial services and products. Related, AI can produce custom, large-scale synthetic data that is customised for specific market scenarios. Synthetic data is artificial data created from an original dataset and a model that is trained to mimic its characteristics and structure. It offers potential advantages in terms of privacy, cost and fairness (EDPS, 2021[21]). In the financial sector, the most pertinent use case is generating simulated financial market data for scenario analysis and creating datasets to test, validate and calibrate AI-based models.

Finally, AI can support sustainable financing and ESG investing, particularly through NLP for real-time ESG assessments based on firms' communications, like corporate social responsibility reports (ESMA, 2023[22]). In investment strategies, AI tools are mainly deployed to process unstructured and complex ESG-related data that typically require more sophisticated analysis (Papenbrock, GmbH and Ashley, 2022[23]). As ESG continues to gain prominence, asset managers are also advocating for ethical AI use by companies they invest in. For example, the world's largest sovereign wealth fund, located in Norway, is introducing AI use standards for its portfolio companies to align with its responsible investment framework and ESG commitments (FT, 2013[24]).

Table 3.2. Select AI companies offering AI and generative AI applications for finance in Asia

Name	Service	Description
Active.Ai	Customer support	Using AI to provide conversational finance and banking services and help financial companies integrate virtual intelligence assistants into their services
Boltzbit	Synthetic data generation and analysis	Offers database linking, portfolio optimization and enhanced prospect profiling through the generation of synthetic financial data.
KryptoGO	Financial analysis	Fast identity verification, risk assessment, blockchain address analysis, and periodic reviews, ensuring your business remains highly compliant and secure
QRAFT	Synthetic data generation and analysis	Easy access to the translated and summarized overseas disclosures with its pioneer AI-driven investment solutions
INNOFIN	Financial analysis	Data collection, refinement, and preprocessing the scattered financial data with AI and big data technologies
ALCHEMI LAB	Synthetic data generation and analysis	AI-Guided trading solution that visually displays the risks associated with each trade, empowering traders with insight, based on asset allocation
AI ZEN	Financial Advisory	AI-based banking services for financial institutions easy access to data by securing more customers with better automatic financial decision-making
Syfe	Financial Advisory	With its Robo-Advisor by accessing diversified, institutional-grade funds and optimizing the portfolio's equity component to outperform the markets over time
bambu	Financial Advisory	SaaS-based Robo-advisor with full transactional capabilities, customizable to your products, portfolios, personalized branding
KRISTAL	Financial Advisory	Building a customized financial plan tailored to the investment needs and managing the funds across various asset classes, investment styles, and geographies
AUTOWEALTH	Financial Advisory	Institutional grade Robo-advisory available to retail users and the WealthTech automating the investment plans by offering professionally managed portfolios to cater to the investment needs
WEINVEST	Wealth Management	Quant strategies augmented with AI/ML capabilities of digital wealth management and asset management
StashAway	Wealth Management	Easy investment on autopilot managed by experts or customizing the portfolio by earning returns with fair and transparent fees and unlimited transfers and withdrawals
WINKSTONE	Wealth management	By existing financial institutions to AI/ML-based models, public and actual transaction data other than credit data used for financial benefits
ADVANCE.AI	Direct Lending / Credit Scoring	Managing risk efficiently across the industry by preventing fraud and automating workflow to reduce the cost
credolab	Direct Lending / Credit Scoring	Scoring Risk, detecting fraud, improving marketing for better decisions with advanced behavioral analytics
LenddoEFL	Direct Lending / Credit Scoring	Offering alternative credit scores based on the consumer's digital footprint, from social media posts to geotagged photos, and behavioral data derived from psychometric tests
TurnKey Lender	Direct Lending / Credit Scoring	Providing a B2B AI-powered lending automation platform, and decision management solutions and services
VALIDUS	Direct Lending / Credit Scoring	Supervised and unsupervised machine learning can predict potentially fraudulent and anomalous transactions, and protect customer databases to provide SME working capital loan services

Name	Service	Description
CrediLinq.Ai	Direct Lending / Credit Scoring	Disrupting credit underwriting for businesses using embedded finance and Credit-as-a-Service
funding societies	Direct Lending / Credit Scoring	Pairing AI processes with a reliable funding option to allow businesses to focus on expanding their roots
aspire SYSTEMS	Direct Lending / Credit Scoring	Businesses assessments for the effectiveness of different service approaches, optimize resource allocation, by simulating real-world scenarios to identify potential challenges and opportunities, which ultimately leads to more informed and robust service strategies
SILOT	Direct Lending / Credit Scoring	AI platform for intelligent financial decisions by enabling banking software suite and merchant banking solutions
cynopsis.co	Regulatory and Compliance	Offering the RegTech solutions designed to automate KYC/AML processes
Handshakes	Regulatory and Compliance	Performing entity search and gain useful insights to support your due diligence with data analytics solutions
SILENT EIGHT	Regulatory and Compliance	Leveraging AI to create custom compliance models for the world's leading financial institutions to combat money laundering and terrorist financing
SHIELD	Anti-Fraud	Provides software security solutions which is related to the online fraud management solutions enabling enterprises to manage risk from fraudulent payments and accounts
URBANZOOM	Quantitative & Asset Management	AI-enabled research tool for homeowners, buyers, sellers, landlords and tenants
value 3	Quantitative & Asset Management	B2B FinTech offering Capital Markets AI-platform for independent, predictive, and automated credit ratings, research and analytics

Note: Non exhaustive list.
Source: OECD compilation based on public sources.

3.5. Risks and challenges of AI applications in finance

The use of AI tools in finance has the potential to amplify risks identified in the use of more 'traditional' AI mechanisms in financial markets, while it also gives rise to novel risks (e.g. related to the authenticity of outputs of LLMs) (OECD, 2023[7]). This section identifies such risks, focusing on the most pertinent for ASEAN economies idiosyncrasies.

3.5.1. Lack of explainability

Lack of explainability, which can be described as the capacity to understand or clarify how AI-based models arrive at decisions, can increase risks and incompatibilities for financial applications. While such risks already existed for ML models and other AI techniques, they are significantly amplified when AI models are used. Recent advances in generative forms of AI demonstrate its ability to generate highly complex, non-linear, and multidimensional outputs, which, while providing potential benefits, makes it harder for humans to understand or interpret their decision-making processes. This is made more difficult by the dynamic nature of AI models, which adapt based on feedback on a dynamic, autonomous manner[9].

The significant lack of explainability for AI decisions makes it harder to mitigate risks associated with their use. Limited interpretability of AI models makes it harder to identify instances where inappropriate or unsuitable data is being used for AI-based applications in finance. This magnifies the risks of bias and discrimination in the provision of financial services, which is particularly pertinent in countries with ethnic minority groups, as is the case in some ASEAN countries (UN, 2012[25]). This also creates challenges when it comes to adjusting investment or trading strategies due to the nonlinear nature of the model or lack of clarity around the parameters that influenced the model's outcome. Overall, lack of explainability of AI-based models can also lead to low levels of trust in AI-assisted financial service provision for both customers and particularly market participants, limiting its potential beneficial impact.

3.5.2. Risk of bias and discrimination

Risk of bias and discrimination in the outcomes of algorithms has been well-known since machine learning first began being used in finance given the quantity of data required to train AI-based models. For example, if data containing gender-based variables or information on protected categories, like race or gender, is used as input for the AI-based model, it can lead to biased outputs. These results are not necessarily intentional because algorithms may analyse seemingly neutral data points but can nevertheless use such data points as proxies for protected characteristics like race or gender or infer these from the datasets. This can lead to biased decisions that may circumvent existing laws against discrimination. Bias can also be intentional when datasets used to train the model are manipulated to intentionally exclude certain groups of consumers.

A pertinent example of risk of bias and discrimination that could be relevant for ASEAN countries lies in credit allocation and discriminatory lending practices when creditworthiness is assessed using AI-based models and alternative data (OECD, 2021[10]). When such models are exclusively used for credit allocation decisions, this can risk disparate impact in credit outcomes, i.e., different outcomes for different groups of people, and can make it more challenging to identify instances of discrimination due to the machine's lack of transparency and the limited explainability of AI models, exacerbated in case of generative forms of AI. Such lack of explainability also makes it impossible to justify the outcomes to declined prospective borrowers, a legal requirement in certain jurisdictions. Consumers are also limited in their ability to identify and contest unfair credit decisions. Even when the decision is fair, it is difficult for prospective borrowers to understand how their credit outcomes can be improved in a future request for credit.

Advanced AI models can be trained on any data source available online, intensifying the risk of discrimination as the model can learn from possibly already biased data, such as data that includes hate or toxic speech. Furthermore, imbalanced datasets, where some data is underrepresented or excluded while other data is more dominant, can negatively impact the model's accuracy and thereby distort results. Such was the case with the Gender Shades project for facial recognition (Buolamwini, 2018[26]). Since advanced AI models have the opportunity to learn from user feedback, including through user prompts, this risk is accentuated as the model outputs could reflect prejudices demonstrated by the individual users post-training of the model.

3.5.3. Data-related risks

Data plays a critical role for both financial systems and AI, which is why quality data is central to quality output of any AI model, and even more so of advanced AI models, such as the ones with generative capabilities, given the massive amount of data required for their training, as well as the dynamic self-learning capabilities and the feedback loops with user input (OECD, 2023[7]). The quality of outputs is also impacted by the level of representativeness of data, which must cover a comprehensive and balanced representation of a population of interest in order to minimise risk of bias or discrimination and promote the accuracy of the model outputs.

Risks to data privacy and confidentiality would increase with the possible integration of plug-ins in private AI models, allowing for access to a wide array of content. Accordingly, this can increase the volume of data flowing into AI systems, which will further amplify the risk of data breaches by making it more challenging to protect such vast swathes of information. User inputs (e.g. prompts) can also contain private or proprietary information that would heighten the risks involved with data leaks. While specificity of user inputs can improve the quality of output, this may come at the cost of potential data privacy breaches.

In addition to quality and privacy, authenticity of data and intellectual property risks are also significant concerns for AI models built on large amounts of unstructured, public data. Given the vastness and diversity of this data, there are risks that training datasets may contain information protected by intellectual property rights, potentially without proper authorisation or copyright permissions. Consequentially, there is

also an inherent doubt about the authenticity of such outputs due to the uncertainty around origin and permission status of the data used for training. Data provenance, or the origin and complete history of data, and data location, or the physical location of data, are also important considerations. AI-model related data management and data sharing frameworks, which allow third parties to access customer data, must consider the implications of data provenance and location when exploring challenges around intellectual property and data ownership. Financial market participants should also consider who holds the ownership of the data used to train their private AI models. This involves examining the intellectual property rights of the models used and their outputs.

3.5.4. Cyber-security risks

Similar to other digitally enabled financial products, the use of AI techniques exposes markets and their participants to increased cyber-security risks. AI models exacerbate such risks as they could be used by bad actors to tailor individualised fraud attacks on a large scale and with fewer resources required. For example, AI tools could be used for social engineering, email phishing, and attacks that compromise access to firms' systems, emails, databases, and technology services (Federal Reserve Board, 2023[27]). Integrating external models, such as third-party software or open-source systems, amplifies the risk of cyber-security breaches by introducing vulnerabilities to a firm's security infrastructure. Such vulnerabilities can stem from the inherent risks associated with using externally sourced software, and such risks are further exacerbated when dealing with open-source systems due to their broader accessibility and potential for security gaps to be identified by bad actors.

The misuse AI techniques can easily cause market financial disruption, which in some cases also involves difficulties in market participants understanding of whether the information they receive is true or constructed. For instance, Deepfake pictures or other content generated by AI may be used to manipulate the market. For example, a fake viral image of an explosion at the Pentagon in 22th of May, 2023, which is possibly generated by AI, induced the market fluctuation to the US stock market (NPR, 2023[28]). Another example in the Asian region involved a false essay entitled "Warning Article on Major Risks in iFLYTEK"[10] that was widely circulated in the market, which was eventually confirmed as having been written by generative AI.

Cyber-security risks could also include state-sponsored cyber-attacks leveraging on advanced AI tools, such as generative AI, to disrupt financial markets by disseminating sophisticated disinformation. State-sponsored cyber-attacks are linked to or sponsored by states and aiming at both financial profit and/or geopolitical goals (e.g. hacks by North-Korean-affiliated Lazarus Group).[11] Hackers in these cases are trained as national projects, with systematic and sophisticated attack methods. AI could magnify the risk of financial market manipulation by state-sponsored hackers or other malicious actors given the significant capabilities of such tools that could be used for massive manipulation of markets and their participants. For example, deepfakes (e.g. voice spoofing or fake images generated by AI) could be used to spread disinformation that is difficult to detect and identify as false and misleading given the capabilities of AI (e.g. rumours or disinformation that could cause market instability or panic). Furthermore, with the development of quantum mechanics-based computational power, there are risks of increased cyber-security risks involved, including with geopolitical motives (The Institute of World Politics, 2019[29]; NATO, 2022[30]).

Bad actors can therefore utilise AI to conduct market manipulation at a large scale. This could involve dissemination of false information about stocks and other investments or provision of deceptive advice to potential investors and other financial consumers. Regular, real-time input of web information, such as social media data, into AI-driven financial models can increase such risk of market manipulation.

To address the various risks highlighted above, large financial institutions currently report the use of private, restricted versions of AI models that operate offline within the firm's firewalls or private cloud. This setup promotes greater security over the operation of the AI-based application, thereby allowing financial institutions to better protect client data and proprietary information. It also allows them to better oversee

and ensure compliance of AI use with regulatory standards. A future scenario in which use of plug-ins enable input of real time internet data for these proprietary models may see an increase in market manipulation risk as it can enable bad actors to spread rumours through social media, thereby impact financial markets.

3.5.5. Model robustness and resilience, reliability of outputs and risk of market manipulation

According to the OECD AI Principles, it is essential that AI systems consistently function in a robust, secure and safe way while continuously managing related risks (OECD, 2019[31]). If AI-driven models lack reliability and accuracy, there's a heightened risk of poor outcomes, particularly for financial applications like inadequate investment advice. Models that lack robustness and resilience may not function as intended, posing potential harm in unforeseen scenarios or environments. In essence, these models are unable to handle unexpected events or changes effectively, impacting end users negatively (NIST, 2023[32]). Concerns regarding data quality, discussed above, as well as model drifts and overfitting pose risks to the accuracy and reliability of machine learning models use in finance (OECD, 2021[10]). When unexpected events cause disruptions in the data used for model training, for example, this can cause model drifts that negatively impact the models' predictive capability, especially during market turbulence or periods of stress.

Lack of resilience of AI models and their potentially limited reliability can impact trust among retail investors and financial consumers, which could be even more concerning in economies with important part of the population being unbanked - as is the case in several ASEAN member states. In advanced AI models, such as generative AI, user interactions and the feedback loops used for self-learning models can reduce the model's accuracy: recent empirical analyses demonstrate that there can be significant change in the behaviour of the same LLM model over a short time, thereby requiring ongoing monitoring of LLMs (Chen, Zaharia and Zou, 2023[33]). It is challenging to discern whether changes in the model's accuracy stems from model updates or from interactions with users, where poor quality inputs may affect the model's autonomous learning process. AI also introduces risks related to a model output's quality and reliability, potentially leading to the risk of 'hallucinations'[12] or other kinds of deception or misinformation.[13] False information or advice provided by AI-driven financial models can damage the credibility of financial market practitioners responsible for this service provision among financial consumers. AI models have the potential for deception that be either unintentional, such as when AI generates content that does not have any real-world basis, or intentional, such as in fraudulent use cases like identity theft. Such kinds of deception can be subtle, like encouraging use of opaque methods for discretionary pricing based on client attributes such as purchasing power among financial advisors. Differentiating between accurate information and inaccurate or deceptive information is crucial in mitigating such intentional or unintentional risks. The potentially limited awareness of limitations of AI-models by both users and recipients of such financial services can exacerbate concerns about the trustworthiness of the models as well as the services in question.

3.5.6. Governance-related risks, accountability and transparency

Financial institutions that use AI-based models adhere to their established model governance frameworks, model risk management and oversight arrangements. This involves defining clear lines of responsibility for the development and supervision of AI-based systems across their entire lifecycle, from creation to implementation, and assignment of accountability for any negative outcomes that result from the model's operation. However, accountability hinges on transparency (NIST, 2023[32]), which can only be advanced in AI models by disclosing a comprehensive amount of information about the model and its data. This includes information on data sources, copyrighted data, compute- and performance-related information,

model limitations, foreseeable risks and steps to mitigate risks (such as evaluation) and the environmental impact of these models.

The environmental aspect of advanced AI model usage is particularly important for financial market participants who aim to harmonise AI applications with ESG practices they may follow. Achieving high levels of transparency for AI models might face challenges based on their specific characteristics. For instance, disclosing copyright status of training data sourced from unstructured internet information may prove difficult (Bommasani R. et al., 2023[34]). Similar to the case of DLTs (OECD, 2023[6]), accurately measuring energy usage and emissions may prove challenging. Furthermore, given their influence on downstream use, it may prove difficult to establish accountability for a model's downstream[14] applications.

The lack of awareness regarding the associated risks might heighten the risk profile for both AI tools and for the end users. As use of AI solutions continue to become more widespread, the AI-driven tools and applications are also likely to proliferate in the financial industry. As such, non-qualified practitioners may also unknowingly begin to use these tools and therefore, governance frameworks for financial market practitioners may need to consider human capacity requirements (e.g. awareness and skills).

Governance issues are amplified in the case of outsourcing AI models and third-party provision of AI-related services and infrastructure (such as cloud providers), which is particularly important in the case of smaller financial institutions active in ASEAN member states given possible limits in their in-house capacity to develop/maintain large models. Governance hurdles may be associated to the assignment of accountability for adverse outcomes to third parties involved in model creation and training. Questions about intellectual property also emerge as financial providers, even if they purchase "off-the-shelf" AI models, may not necessarily own the intellectual property rights. Simultaneously, these providers do input valuable proprietary data to these models, which the third-party service provider can access. The distinction between the roles of model provider and model deployer may also need to be considered for matters related to oversight and enforcement.

3.5.7. Systemic risks: Herding and volatility, interconnectedness, concentration and competition

The use of AI-based models in finance, including GenAI, could pose potential systemic risks with regards to one-way markets, market liquidity and volatility, interconnectedness and market concentration (OECD, 2021[10]). The widespread use of the same AI model among numerous finance practitioners may induce herding behaviour and one-way markets, affecting liquidity and system stability, especially during stressful periods (OECD, 2021[10]). For example, AI in trading could potentially exacerbate market volatility by initiating large and simultaneous sales or purchases, thereby introducing new means for vulnerabilities (FSB, 2017[35]). When trading strategies converge, they risk creating self-reinforcing feedback loops that lead to significant price shifts and pro-cyclicality. In addition, investor herding behaviour can cause liquidity issues and flash crashes during times of stress, as seen recently in algo-high frequency trading.[15] Such convergence also heightens cyber-attack risks, allowing bad actors to influence agents that act similarly. These risks are prevalent in all algorithmic trading and are accentuated in AI models that autonomously learn and adapt, notably unsupervised learning-based AI models.

The use of AI in financial market activity, such as trading, may cause financial markets and institutions to further connect financial markets and institutions to each other in unforeseen ways, including interconnections between previously unrelated variables (FSB, 2017[35]). It can also result in higher network effects, potentially causing unexpected changes in the magnitude and direction of market movement. This may be further increased by the advent of AI-as-a-Service providers, especially those that provide bespoke models (Gensler and Bailey, 2020[36]).

AI models amplify concerns about market concentration and dominance by a few model providers, potentially risking market concentration and a range of systemic implications (OECD, 2023[7]). These risks

are compounded by the concentration of data (Gensler and Bailey, 2020[36]) while they could also be associated with infrastructure providers enabling the use of AI models (e.g. cloud services). The risk of operational failures by dominant players can have systemic effects for the markets based on the level of dependence of financial market participants on such providers and models. With regards to outsourcing, the reliance on third-party model providers adds an extra layer of vulnerability in addition to existing infrastructure dependence on these third-party providers, such as cloud services.

Related to these systemic implications for financial stability, AI models can also raise competition-related challenges. Indicatively, a possible refusal of access to models or data and barriers to switching by dominant providers could have important implications for financial market participants in a market with distorted competition conditions. Since AI models require a significant level of resources and computing power to be developed and trained, there is indeed a risk of market concentration amongst a small group of players, especially those with first mover advantage or with the number of resources needed to design, train and maintain models. Financial institutions that deploy models from dominant third parties may face the burden of reduced competition, which can also impact their customers (such as associated costs).

The current stage of AI development also poses challenges for countries that lack the economic resources to develop, train and maintain their own models, as could be the case in some ASEAN member States. With regards to users, large-scale AI models may primarily benefit those equipped to invest in such technologies, such as larger financial market participants. Data concentration is another risk related to dominance of incumbents with cheaper or easier access to datasets (e.g. social platforms). Access to data is crucial for the success of AI models such as LLMs, and data concentration by BigTech or other platforms could exacerbate the risk of dominance of few large companies with excess power and systemic relevance. Furthermore, AI models could be exploited to bolster monopolies or oligopolies and stifle competition, thereby undermining market dynamics. For instance, AI models can be used to influence investor preferences based on their specific role.

3.5.8. Other risks: employment and skills, environmental impact

While the current and future impact of AI in the labor market remains uncertain, there is currently little evidence of significant negative employment effects due to AI to date according to OECD analysis (OECD, 2023[37]). This could be due to low AI adoption rates and firms opting for voluntary workforce adjustments, possibly delaying the materialization of any negative employment effects from AI (OECD, 2023[37]).

In the long-term, new employment challenges and opportunities could arise through a wider adoption of AI tools by financial institutions, with implications also in terms of capacity and skills development. Widespread usage of such tools in finance may help increase available resources needed for higher-value tasks while also posing risks to the job market. AI in particular has the potential to automate a wide array of back-office and middle-office functions in finance (Section 3.4). AI's impact on employment is also anticipated to cause pressure for industries to consider how skillsets may need to evolve (OECD, 2023[37]). Insufficient skills for using AI can pose risks from both an industry and regulatory perspective, thereby potentially leading to employment issues for financial institutions. Using AI for finance will demand skillsets currently possessed by only a small segment of financial practitioners, and inadequate capacity or awareness of the risks associated with models, especially with easily accessible AI models, can have adverse effects for financial market participants and their clients.

The increasing computational needs of AI systems may also raise sustainability concerns (OECD, 2023[38]). GenAI and LLMs, for example, necessitate extensive computational resources for training, consuming significant energy for development, training and inference processes, with potential environmental impact that requires deeper examination. This also pertains to data centres, considering their pivotal role in model training. Like other innovative financial technologies, there is not enough reliable information on AI's impact on the environment that can inform policy discussions around is environmental risks (OECD, 2023[37]; 2022[39]).

3.6. Policy considerations on AI in finance

The use of AI in finance has the potential to deliver important benefits to financial consumers and market participants in ASEAN member states and beyond, by promoting efficiencies and enhancing productivity, but comes with important risks and challenges. Rapid developments in AI and its increasing relevance to financial markets calls for policy discussion and potential action to ensure the safe and responsible use of such tools in finance. Financial regulators and supervisors must ensure that the use of AI in finance remains consistent with the policy objectives of securing financial stability, protecting financial consumers, promoting market integrity [and fair competition].

The OECD Principles on AI, adopted in 2019, which constitute the first international standard agreed by governments for the responsible stewardship of trustworthy AI, remain highly relevant for the application of AI, including GenAI, tools in finance (OECD, 2019[31]). At the G20 level, the financial stability implications of artificial intelligence and machine learning in financial services have been discussed by the Financial Stability Board in 2017 (FSB, 2017[35]), while the G7 in 2020 has analysed the cyber risks posed by artificial intelligence in the financial sector. Most recently, the G7 Leaders welcomed the Hiroshima Process International Guiding Principles for Organizations Developing Advanced AI Systems and the Hiroshima Process International Code of Conduct for Organizations Developing Advanced AI Systems (G7, 2023[1]; G7, 2023[2]; G7, 2023[3]).

A number of national or regional initiatives have also been launched with the aim of providing guidance or promoting guard rails for the safe and trustworthy development of AI across sectors globally, including in ASEAN member states.

3.6.1. Policy developments on AI in finance in ASEAN countries

National AI strategies have been developed in seven ASEAN member states, namely Indonesia, Malaysia, Myanmar, Singapore, Thailand, Philippines and Viet Nam. Furthermore, at the ASEAN-level, ongoing discussions are currently taking place concerning the preparation of a Guide to AI Ethics and Governance, which is anticipated to be released in 2024 (Reuters, 2023[40]). Although such framework can be influential in providing guidance to the national legislators, its application would remain voluntary. Unlike the EU AI Act (European Commission, 2021[41]) the ASEAN document will not include a strict risk categorisation and will take a more business-oriented approach, allowing for flexibility related to cultural differences across member countries. In particular, when it comes to national AI strategies:

- The **Indonesian** AI strategy has been implemented in 2020, with an end date of 2045. The end goal of this strategy involves the transformation of the country in line with an innovation-based approach, including through the encouraging of AI research, and the amelioration of data infrastructure (Nasional Kecerdasan Artifisial Indonesia, 2020[42]). In addition, the AI Ethical Guidelines incorporate setting up a data ethics board and suggesting AI innovation regulation, which is to be expected in the nearby future (Arkyasa, 2023[43]). Certain aspects of Fintech, digital banking and capital markets fall under the AI regulation in Indonesia.

- **Malaysia** has developed its National AI Roadmap for the years 2021-2025, which includes establishing AI governance, as well as advancing R&D, digital infrastructure and a national AI innovation system (Ministry of Science, 2021[44]). Focus is also placed on ethics by incorporating seven principles of responsible AI into the roadmap. Furthermore, the Responsible AI Framework Guidelines, published in 2023, formulate further guidance related to the ethical dimension of AI use by the Malaysian organisations more broadly (Ariffin et al., 2023[45]).

- **Singapore's** National AI Strategy dates back to 2019 and aims to promote Singapore as an AI leader by 2030. This framework is developed with the focus placed on specific national projects, such as improving efficiency of municipal services and of border clearance operations, for instance (Smart Nation Singapore, 2019[46]). Singapore has also developed a Model Governance AI

Framework in 2020, which incorporates the principles of inter alia fairness, accountability and explainability into the AI governance models across sectors of activity (Info-communications Media Development Authority, 2020[47]).

- **Thailand's** AI Strategy and Action Plan was launched in 2022 and has 2027 as its end date. The strategy includes regulatory readiness, national infrastructure development, education, innovation development and promotion of AI use (AI Thailand, 2022[48]). Currently, the second phase of the Action Plan is being implemented, with the focus placed on the expansion of research and development of AI applications to enhance competitiveness of industries (AI Thailand, 2022[48]). The Royal Decree on AI System Service Business of 2022 introduces a risk-based approach to AI, with differentiation of certain AI systems as high risk and including some prohibitions (His Majesty King Maha Vajiralongkorn Phra Vajiraklaochaoyuhua, 2022[49]). At the same time, the Draft Act on the Promotion and Support of AI Innovations in Thailand of 2023 seeks to enhance the innovation within the AI ecosystem by granting businesses with access to an AI sandbox, AI clinic and training AI database (The Electronic Transactions Development Agency, 2023[50]).

- The National AI Strategy Roadmap of the **Philippines** was issued in 2021. The overall objective of the roadmap is ensuring AI readiness through the dimensions of development of infrastructure, research and development, workforce development and regulation (The Department of Trade and Industry, 2021[51]).

- **Viet Nam**'s National Strategy on R&D and Application of AI was launched in 2021 and has an end date of 2030 (Prime Minister of Vietnam, 2021[52]). The framework sets out the strategic directions to be taken, which include building of AI-related regulations, computing infrastructure, promotion of AI application and international cooperation. The draft National Standard on AI and Big Data, released in 2023 is focused on the AI quality standards in the realms of safety, privacy and ethics, as well as risk assessments and addressing unintentional biases (The Ministry of Information and Communication, 2023[53]).

- **Cambodia** and **Lao PDR** have not developed any national AI strategies. However, the Cambodian Ministry of Industry, Science, Technology & Innovation has issued its first AI-specific report in May of 2023 (The Ministry of Industry, 2023[54]). The AI Landscape in Cambodia Report discusses the importance of imminent development of national AI regulation and guidelines that would harmonise the existing laws. Such policies are to be in line with principles of human-centricity and sustainable development, while taking into consideration the issues of ethics and privacy.

Almost all ASEAN countries have provided some form of guidance around the use of AI in finance, in most cases as part of their broader policy action on AI across sectors.[16] Specific policies related to the use of AI in the field of finance can be found in Indonesia, Malaysia, Myanmar, Singapore, Thailand, Philippines, Viet Nam and Cambodia. In particular:

- The **Indonesian** AI strategy explicitly distinguishes finance as one of the key sectors relevant to long-term development of AI (Nasional Kecerdasan Artifisial Indonesia, 2020[42]). It underlines the importance of the use of financial data for the development of AI applications, and it refers to financial use cases such as credit scoring or financial forecasting. This policy is focused on pursuing four strategic targets, namely of service improvement, cost optimization, improved products, and a reliable risk management. The framework is set forth to include stages of exploration of AI in finance, optimization (implementation of the findings) and transformation (practical support of the finance sector). The framework relevant to financial data may be further amended in the near future, as the upcoming Presidential Regulation implementing the Personal Data Protection Law will regulate the protection of data for artificial intelligence uses (Rochman and Adji, 2023[55]).

- **Malaysian** policies on digital economy, articulated within the National 4IR Policy and the Digital Economy Blueprint of 2021, enlist finance as one of the key sectors for the digital transformation

of Malaysia (MyDIGITAL Malaysia, 2021[56]). The National 4IR Policy introduces strategies such as adoption of an anticipatory regulatory approach that allows for the innovation acceleration, as well as promotion of uniform data protection standards for the finance industry (Ministry of Science, 2021[57]). Actors within the finance industry are encouraged to ensure that their workforce possesses the skills and knowledge necessary to the digital economy. Furthermore, financial service providers are to adopt an anticipatory regulatory approach, that includes both the necessary risks management policies and innovative initiatives (Ministry of Science, 2021[57]). Furthermore, MDEB established concrete strategies aiming at fostering innovation in the sector. Namely, the policy created a Fintech Innovation Accelerator Programme, to support the local fintech development (MyDIGITAL Malaysia, 2021[56]). On the regulatory side, a special task force has been formed in July 2023 to review current laws in the realm of investment and business in Malaysia, inter alia in light of the AI developments (New Straits Times, 2023[58]).

- In **Singapore**, the Monetary Authority of Singapore (MAS) published in 2018 broad Principles to promote Fairness, Ethics, Accountability and Transparency (FEAT) in the use of AI in Singapore's financial services sector (MAS, 2018[59]). In 2022, MAS conducted a thematic review on selected financial institutions' implementation of the Fairness Principles in their use of AI, reviewing policies and governance frameworks against the FEAT Principles, and their implementation effectiveness in actual AI/ML use cases (MAS, 2022[60]). In 2022, MAS also released five whitepapers, setting forth guidelines applicable to financial service providers, aimed at the use promotion of responsible use of AI (MAS, 2022[61]). The white papers detail assessment methodologies for the FEAT principles and include a comprehensive FEAT checklist for financial institutions to adopt during their AI and data analytics software development lifecycles; an enhanced fairness assessment methodology, which enables financial institutions to define fairness objectives, as well as identifying personal attributes of individuals and any unintentional bias; a new ethics and accountability assessment methodology, which provides a framework to carry out quantifiable measurements of ethical practices, in addition to the qualitative practices currently adopted; and a new transparency assessment methodology, which helps determine the extent of internal and external transparency needed to interpret the predictions of ML models. The white papers were advanced on the basis of a public-private collaborative model, promoting risk management and sustainable good governance principles in the use of AI in finance. Currently, MAS is working on GenAI and plans to publish a risk framework for the use of such models by the financial sector. In 2022, MAS has launched Project NovA! – a tool helping financial institutions to predict financial risks relevant to their organisations (Monetary Authority of Singapore, 2023[12]). MAS has also launched Project MindForge – a Generative AI risk management framework, developed in a collaborative manner with the finance industry players (MindForge Consortium, 2023[62]). During the first phase of the Project, completed in November 2023, the main risks areas were identified, *inter alia* in the areas of accountability, monitoring, transparency and data security. Next, the Project is to include insurance and asset management financial entities in its scope and to expand the use of GenAI in areas of compliance with anti-money laundering, sustainability, and cyber-security policies.

- The AI and ICT Roadmap of the **Philippines** details the application of AI in the banking and finance sector (Department of Science and Technology, 2020[63]). The central role is given to the Bangko Sentral ng Pilipinas to develop strategies in the fields of anti-money laundering and fraud risks mitigation. The scope of application of such AI solutions is then planned to be extended to commercial banks. BSP is also tasked with the development of other innovative policies in the finance sector, such as the creation of an open finance framework, which has been adopted in the Bank's roadmap for 2021-2024 (Bangko Sentral Ng Pilipinas[64]). Furthermore, there are plans to enact a new Artificial Intelligence Development Authority, which will be developing a national AI framework, focused on the practical use of new technologies by the businesses (Republic of the Philippines House of Representatives, 2023[65]).

- **Thailand's** AI Strategy and Action Plan details the use of AI in the financial sector (AI Thailand, 2022[48]). It specifies the application of the Strategy and Action Plan in banking (credit checks, risk analysis, customer base expansion), trade (analysis of product offerings, sales boosting) and investment (stock analysis, investment advice and strategies). A proposal of guidelines for the use of AI in financial sector is currently reported to be prepared by the Bank of Thailand (Suchit, 2023[66]). Financial actors may also anticipate new rules regarding data sharing, especially in relation to AI development, as the Electronic Transactions Development Agency (ETDA) has announced draft changes in personal data protection laws (Mungkarndee and Nantananate, 2023[67]). These amendments are to establish a closer collaboration between the regulator and businesses, that fosters the spirit of AI innovation, inter alia via the use of an AI Sandbox.

- **Viet Nam's** National Strategy on R&D and Application of Artificial Intelligence includes provisions on promotion of the AI in finance (Prime Minister of Vietnam, 2021[52]). The task of the Ministry of Finance is to allocate the necessary funds for the implementation of strategies promoting the development and application of AI in the financial sector. Similarly, the State Bank of Viet Nam is to engage in the AI development in the banking field. This includes application of AI to the use for loan predictions and analysis, fraud detection and amelioration of the customer service. In the insurance sector, newly enacted Law on Insurance Business encourages the application of AI technologies in the insurance field to improve its products and services (National Assembly of Vietnam, 2022[68]).

- The AI Landscape in **Cambodia** report enlists finance industry as one of the key sectors of interest (The Ministry of Industry, 2023[54]). It focuses on the possible applications of AI to boost the efficiency of financial transactions and prevent fraud and money-laundering activities. Further attention is to be paid to the use of AI tools to ensure compliance, enhance customer support, execute smart contracts, and enhance the business ecosystems. The report also underlines the importance of data security, especially to financial institutions that process large data related to personal finance. Cambodia Digital Tech Roadmap of 2023 also features AI and ML as one of the most important technologies for the future development in Cambodia (The Ministry of Industry, 2023[69]). Specific strategies listed within the financial sector refer to the support of development of start-up programmes and decentralised financial systems.

Among ASEAN member states, policies explicitly targeting generative forms of AI can only be found in Singapore. Singapore has formulated a Model Governance AI Framework in 2020 that is to be amended by including GenAI risks (Info-communications Media Development Authority, 2020[47]). The Infocomm Media Development Authority (IMDA) has released a discussion paper on Gen AI, in which it includes suggestions on the incorporation of Gen AI within the business ecosystem (Info-comm Media Development Authority, 2023[70]). It proposes a risk-based approach that includes acknowledging of the risks related to privacy, disinformation, copyright infringement issues and embedded biases.[17] On the other hand, the paper focuses on enhancing trust within the AI ecosystem by addressing immediate rather than future risks. Thus, the proposed approach remains practical, business-oriented and leaves space for latter developments.

A number of ASEAN member states are planning or pursuing public-private cooperation projects or other initiatives with the AI industry with a view to advance safe GenAI development. Indicatively:

- Indonesia is collaborating with Open AI to stimulate the local development of ChatGPT (Nur, 2023[71]). In a few other countries (Thailand, Philippines, Viet Nam), there are works in progress related to the development of national LLM models, capable of using local languages in an efficient and accurate manner.

- Similarly, although Indonesia has not developed concrete generative AI policies as of now, it has established a partnership between its Artificial Intelligence Research and Innovation Collaboration (KORIKA) and Open AI, announced in June of 2023. The aim of this partnership is the development

of an AI system that takes into account Indonesian cultural values. Such collaboration is indicative of the considerations to experiment and support the use of GenAI within the country (Nur, 2023[71]).

- The Malaysian National 4IR Policy enlists Generative AI as one of the technologies of future that Malaysia should focus on developing at the national level (Ministry of Science, 2021[57]). An indication of further use of ChatGPT specifically within the government services has been given by the Ministry of Science, Technology & Innovation in August 2023 (Yeoh and Fam, 2023[72]). Also, there are considerations of enacting an AI Bill that would impose higher standards of transparency, data security and accountability. That would entail labelling any Gen AI-generated content in line with the transparency requirements (digwatch, 2023[73]).

- Thailand has not formulated GenAI specific policies, however, its National Electronics and Computer Technology Center has collaboratively developed OpenThaiGPT Project – a LLM capable of processing Thai language at a higher efficiency and speed than Chat GPT (Leesa-Nguansk, 2023[74]). This project is based on public data and remains an open source. A similar development can be observed in the Philippines, where the Department of Science and Technology has expressed its intention in September of 2023 to create a local language-focused Chat GPT (Quismorio, 2023[75]). However, GenAI specific policies are still in the announcement, rather than implementation stage in the Philippines. In Viet Nam, a LLM featuring Vietnamese language was announced by a private enterprise, VinBigdata, a part of the Vingroup conglomerate (Phuong, 2023[76]).

- Another category of private-public partnerships involves practices of private sector participants (e.g. Google and Microsoft) in the ASEAN region. Partnerships of national government entities with Google Cloud have been announced in Indonesia, Malaysia, Singapore, Thailand, Philippines, and Viet Nam. Google's partnerships involve granting access to Vertex AI – a Gen AI platform for businesses, GenAI-related skilling programmes and Google Cloud services (MAS, 2023[77]). Business-oriented GenAI products are also offered by Microsoft that has partnered with state-owned Telkomsel in Indonesia, UOB Bank of Singapore, Vietnamese AI Fintech Trusting Social, and also has announced a strategic cooperation with the Thai government (Tanner, 2023[78]; Viet Nam News, 2023[79]; Sullivan, 2023[80]; Ho Chi Minh, 2023[81]).

3.6.2. Policy considerations and recommendations for the use of AI in Finance in ASEAN

- The importance of the responsible use of AI within the financial sector when providing financial products and services cannot be underestimated. Risks that stem from use of AI tools in finance will need to be identified and mitigated to support and promote the use of responsible and safe AI, without stifling innovation. The use of advanced forms of AI models, such as GenAI, in finance exacerbates some of the 'generic' AI-related risks given its enhanced capabilities, although it also raises a number of additional novel challenges associated with its specificities (e.g. deepfakes).

- The application of existing guard rails applicable in AI models may need to be clarified and potentially adjusted to effectively address some of the novel challenges of advanced AI tools, if and where needed. Any perceived incompatibilities of existing arrangements with developments in AI may also need to be considered, such as the case of explainability in AI models.

- Policy consideration and potential action could be considered from a contextual and proportional framework, using a risk-based approach depending on the criticality of the application and the potential impact on the consumer involved (OECD, 2021[10]). Any guidance or policy will also need to be future proof to withstand the test of time given how rapidly AI technology advances.

- Policy makers may need to consider reinforcing policies and strengthening defences and guard rails against risks emerging from, or exacerbated by, the use of AI in finance, focusing on a number of overarching areas. In particular:

- **Strengthen data governance practices by model developers and deployers**: It is evident that data is critical to training AI models and their usage by financial market participants. Best practices for data management and governance practices may be considered to ensure data quality, data adequacy as needed, data privacy when financial consumer data is fed into the model, and data authenticity and appropriate source attribution/copyrighting when applicable. This could include increased transparency and reporting about the data used to train the model and any other data introduced into the model, including their location, origin and source attribution for copyrighted data used. Depending on the model, the feasibility of data deletion options or obligations from models after a certain period of time could also be considered (similar to the 'right to be forgotten' of GDPR). This would need to include any data inputted in the model through prompts or otherwise, and the output of the model itself, keeping in mind its integration of feedback loops for its self-training.

- When private data are being used, consumers should have the right to opt-out from the use of their data for the training of AI models. This becomes particularly important in case the model can scrape data off the internet if it has web browsing capabilities or it if can link to the web in any way. The same considerations around data governance apply on databases purchased by third party providers, and on synthetic data generation based on public and private data.

- **Safeguards should be in place to overcome risk of bias and discrimination**: Firms using such models should ensure that pre-existing fairness frameworks in financial services continue to apply. This could also involve proactive equity assessments of the models, impact assessment of model outputs, their sense checking against baseline datasets and other tests to ensure that protected classes cannot be inferred from other attributes in the data. The validation of the relevance of variables used by the model and of datasets used for training in terms of their representativeness are additional possible tools to reduce sources of potential biases. The latter applies in particular to LLMs, given potential current under-representation of minority languages in the training of language models (OECD, 2023[6]). Risks diagnosed should be followed by mitigating action, and reporting of all the above could be conducive to strengthening user trust.

- **Encourage efforts to improve levels of explainability**: Limited or outright lack of explainability, as likely the case in AI models, poses significant risks associated with the use of such models in finance (e.g. inability to adjust strategies in times of market stress). It may even be incompatible with existing laws and regulations, for example, the requirement to explain the basis for denial of credit extension to a prospective borrower in some jurisdictions. Progress made in the area of explainability of relatively simpler ML models will need to also be pursued in generative AI models, which have even greater complexity and lack of explainability. Improved explainability levels will be crucial for building trust around the deployment of such tools in finance (and beyond).

- **Foster transparency and consider disclosure requirements depending on the case**: Financial consumers should be informed about the use of AI techniques in the delivery of a product, when these have an impact on the customer outcome, as well as about machine-generated content and any potential interaction with an AI system instead of a human being. Financial consumers should also be informed about any collection and/or processing of their data for the purposes of the model and informed consent could be sought to that end. Customers should be offered the option to engage with a human if they so prefer. Active disclosure by financial market participants deploying such tools could be considered to ensure maximum awareness of the customer.

- Disclosure requirements could include clear information, in plain language, around the AI system's functionalities and performance, including capabilities and limitations, as well as mitigating action taken to address such limitations. Description of the datasets used to train the model, including any copyrights, could help address data governance risks. Description of the results of any internal testing and independent external evaluation of the model and any impact assessment made (e.g. for disparity testing) could be considered as part of reporting to users. Manuals could be provided

for downstream uses of models. Datapoints on the energy requirements for the model (for its training or use) could also be considered in light of limited data around their environmental footprint. The governance framework of the model's development and deployment could also be integrated into reporting. Transparency and disclosure will be even more critical for advanced forms of AI models as a way to partly compensate for their lack of explainability.

- **Strengthen model governance and promote accountability mechanisms**: Currently applicable frameworks for model governance in finance may need to be enhanced or adjusted to address incremental risks emerging from advances in AI. Solid governance arrangements and clear accountability mechanisms are fundamental in AI models deployed in high-value use-cases (e.g. in determining access to credit or investment advice). Parties involved in the development and deployment and such models should be held accountable for their proper functioning (OECD, 2019[31]). Explicit governance frameworks could include clear lines of responsibility and oversight throughout their lifecycle[18] and minimum standards or best practice guidelines to be followed. Documentation and audit trails for oversight and supervision should not be limited to the development process, and model behaviour and outcomes need to be monitored and tested throughout the model's lifetime.

- Governance arrangements may need to include explicit attribution of accountability to a human irrespective of the level of automation of the model, with a view to also help build trust in AI-driven systems. In other words, this involves explicit accountability of the actor deploying the model for any harm caused by the model they are deploying. Contingency and security planning may also need to be considered to ensure business continuity. This could include the introduction of kill switches or other automatic control mechanisms, and back-up plans, models and processes in place to ensure business continuity in case the models fails or acts in unexpected ways (OECD, 2021[10]). Additional guard rails could be considered for the accountability of third- party providers of (foundation) models that are being adapted for downstream use cases or in other cases of outsourcing. Questions around recourse and legal liability of developers of such models could be also examined.

- **Promote safety, robustness and resilience of AI models (including for cyber risk) and mitigate risks of deception and market manipulation**: Frameworks for appropriate training, retraining and rigorous testing of AI models, and their ongoing rigorous monitoring and validation could be the most effective ways to improve model resilience, prevent and address drifts, and ensure the model performs as intended. Monitoring and validation could include independent reviews and external audits both at the development and during deployment, and documentation of each such processes could facilitate supervision. Ongoing monitoring is particularly important for AI models that are based on autonomous unsupervised learning and where false or inaccurate information introduced in the model post deployment continues to inform model in future loops (e.g. user prompts). Also, datasets used for training, especially when synthetic, need to be large enough to capture non-linear relationships and tail events in the data to cover for unprecedented events. Stress testing for such scenarios could be performed.

- Testing for dangerous or harmful capabilities of a model before its deployment could be used to understand the ability of the model to act in adversarial ways (e.g. proliferation of misinformation) and to adjust the models' behaviour to account for the results of such tests. Depending on the capabilities of the model, and the results of such impact assessments prior to deployment, content filtering and other restrictions could be introduced upfront to the model based on safety thresholds (e.g. refusal of harmful requests by design). Alternative options to be considered could include positive permission forms of design (i.e. do not do unless it is permitted). AI-generated output needs to be explicitly disclosed as such in order to limit the risk of deepfakes and promote the truthfulness of the model's output. In case of large models above a certain level of capabilities that could be considered systemically important, adherence to commonly agreed sets of safety requirements could be envisaged.

- **Encourage a human-centric approach and place emphasis in human primacy in decision making, particularly for higher-value use cases (e.g. lending)**: An appropriate degree of human involvement in AI-assisted financial market activity may need to be ensured to minimise the risk of harm to individual customers, depending on the criticality of the use case. End customers need to be informed about the involvement of AI in the provision of their service and could have the right to object to its use, opt out of AI-assisted products or services and of the AI model's reach (e.g. for data usage). Customers may need to be given the right to request a human intervention or challenge the outcome of the model and seek redress. In addition to a mandatory human alternative option for the end customer, humans would also need to be ready to act as a human safety net in case of model disruption to ensure business continuity, avoiding over-reliance of firms in AI-based systems. Keeping the 'human in the loop' can also help build confidence and trust in the use of AI in finance.

- **Invest in R&D, skills and capacity to keep pace with advances in AI, raise awareness of the perils of AI and create tools to mitigate some of the associated emerging risks (e.g. hallucinations).** Both the public and the private sector will need to invest in research, build skills and raise awareness for financial market participants and policy makers around the risks of advanced AI models such as GenAI and LLMs. R&D investment could provide solutions and tools to mitigate issues of explainability and mitigate risks of AI models (e.g. identify and prevent deceptive outputs). Research is also important to ensure safety of future scenarios of fully autonomous models (e.g. AGI). Investment in education and skills in the industry could enable effective AI model governance, while also guiding practitioners and consumers towards safer deployment of such models. Policy makers would also need to keep pace with advancements in AI technology in order to be technically able and prepared to oversee such activity in finance and/or intervene as required. Importantly, the upskilling of policy makers will also allow them to benefit from RegTech/SupTech solutions for effective and efficient supervision of financial market activity more broadly.

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Notes

[1] Analysis using BERT deep learning architecture for NLP analysis which harnesses the notion of self-attention to weigh-in the context in the computation of word embedding. For more on the methodology used see Annex.

[2] Analysed 44 222 press articles from the Japanese financial press and 436 509 articles from the Korean financial press. The difference in the number of articles examined relate to the availability of non-subscription-based financial press and the related limitations.

[3] This is also because of the lower number of articles that were scraped in the Japanese financial press given accessibility constraints.

[4] Generative Adversarial Networks (GAN) emanate in the category of Machine Learning (ML) frameworks, and use deep neural networks to generate (after training) content that aims to preserve the likeness of the original data (Yang et al., 2020[82]).

[5] Deep neural network architectures are inspired by the brain structure and functionality and are designed for unsupervised Machine Learning in the fields such as computer vision, NLP and recommendation engines.

[6] Foundation models (e.g. LLM models such as ChatGPT), are models trained in an unsupervised way on a huge amount of unstructured data and which can be adapted to many applications or use cases. The term has been coined by the Center for Research on Foundation Models (CRFM) of the Stanford Institute for Human-Centered Artificial Intelligence (HAI) (HAI, 2023[83]). A foundation model can be used in infinite downstream AI systems.

[7] Still, in case of use of cloud services, the possibility of signals captured by the foundational model cannot be dismissed at this stage.

[8] Natural language processing (NLP) is an interdisciplinary AI domain aiming at understanding natural languages as well as using them to enable human–computer interaction. It differs from text mining in that it takes into consideration the surrounding information and is concerned with processing the interactions between source data, computers, and human beings (Stephanie Kay Ashenden, 2021[84]).

[9] Interpretability refers to the meaning of the model's output in the context of their designed functional purposes, while explainability refers to a representation of the mechanisms underlying the AI system's operation (NIST, 2023[32]).

[10] iFLYTEK is an AI company based in China.

[11] Latest example of hack by the Lazarus Group includes USD 1.7 billion crypto-assets stolen involving the North Korean Lazarus Group; the 2016 Bangladesh Bank FX reserves attack; and the 2018 Chilean bank attack.

[12] Artificial hallucination refers to the phenomenon of a machine, such as a chatbot, generating seemingly realistic sensory experiences that do not correspond to any real-world input. This can include visual, auditory, or other types of hallucinations. Artificial hallucination is not common in chatbots, as they are typically designed to respond based on pre-programmed rules and data sets rather than generating new information. However, there have been instances where advanced AI systems, such as generative models, have been found to produce hallucinations, particularly when trained on large amounts of unsupervised data (Ji et al., 2023[85]).

[13] Disinformation in AI LLMs defined as deliberate fabrication of untrue content designed to deceive (e.g. writing untrue texts and articles), while misinformation involves the false or misleading information that does not intend to harm (e.g. creating falsehoods for entertainment) that can damage public trust in democratic institutions (OECD, 2023[6]; Molly Lesher, Hanna Pawelec and Arpitha Desai, 2022[86]).

[14] Referred to as the impact of the output of the model on subsequent actions, for foundation models.

[15] Algorithmically driven high frequency trading strategies appear to have contributed to extreme market volatility, reduced liquidity and exacerbated flash crashes that have occurred with growing frequency over the past several years (OECD, 2021[10]). Spoofing and other illegal market manipulation strategies, as well as collusion of ML models are additional risks of AI use in high frequency trading (OECD, 2021[10]).

[16] With the exception of Lao PDR which features policies related to the digital economy without making explicit reference to AI (National Digital Economic Development Strategy for 2021-2030, and the National Digital Economic Development Plan for 2021-2025).

[17] Malaysia also features Gen AI in its national digital economy policies.

[18] Design, development, deployment of the model.

4 Sustainable bonds: Trends and practices in ASEAN economies

Forms of sustainable finance have grown rapidly in recent years in Asia. These practices encompass instruments for issuers, third-party ratings, principles and guidance, as well as index and portfolio products to help channel financing to transitioning entities, and also to better price the risks and benefits of the green transition. This chapter provides an overview of the trends in corporate sustainable bonds in Asia with a specific focus on ASEAN economies and outlines relevant standards that have been developed. Further, it describes how key performance indicators (KPIs) and metrics underpin such bonds and support a broader monitoring of sustainable finance activities across the financial sector. It also presents policy considerations to support authorities' efforts in the region.

4.1. Introduction

Forms of sustainable finance have grown rapidly in recent years, as a growing number of institutional investors and investment funds now incorporate various sustainability factors into their investment strategies. The growth of sustainable finance, including the increasing array of financial products, has attracted the attention of investors, policy makers and civil society stakeholders due to its potential to deliver long-term risk-adjusted returns, align with societal values, and contribute to sustainability and climate-related objectives. In addition, Article 2.1c of the Paris Agreement acknowledges the financial sector's importance in meeting international decarbonisation goals by "making financial flows consistent with a pathway towards low greenhouse gas (GHG) emission assets and climate-resilient development".

Sustainable finance encompasses instruments for issuers, third-party ratings, principles and guidance, as well as index and portfolio products to help channel financing to transitioning entities, and also to better price the risks and benefits of the transition. These products, practices and tools have been developed to support issuers and investors in activities in line with the climate transition and to achieve long-term risk-adjusted returns. If fit for purpose, they have the potential to improve information flow, price discovery, market efficiency, and liquidity in support of sustainability objectives and a low-carbon transition.

This chapter provides an overview of trends with respect to corporate sustainable bonds in Asia, with a focus on ASEAN countries, and outlines relevant standards that have been developed. Further, the chapter shows how key performance indicators (KPIs) and metrics underpin certain bonds within this category, namely "Sustainability-linked bonds" (SLBs), and support a broader monitoring of sustainable finance activities across the financial sector in Asia. It also presents policy considerations to support authorities' efforts in Asia and the ASEAN region.

4.2. Overview of sustainable bonds in Asia

Within the landscape of sustainable finance practices in Asia, this chapter will focus on the key characteristics and trends of sustainable bonds in Asian markets. Sustainable bonds can be classified into two major categories (ICMA, 2022[1]). "Use of proceeds bonds" are bonds whose proceeds should be used to either partially or fully finance or re-finance new or existing eligible green, social or sustainable projects. In the case of "use of proceeds bonds" that are issued by financial institutions, the proceeds are typically allocated to finance or refinance the provision of loans for the development of eligible projects. These bonds can be labelled as green, social or sustainability-labelled bonds. "Sustainability-linked bonds" (SLBs), on the other hand, are bonds for which the issuer's financing costs or other characteristics of the bond (e.g., its maturity) can vary depending on whether the issuer meets specific sustainability performance targets within a timeline, but whose proceeds do not need to be invested in projects with an expected positive environmental or social impact (OECD, 2024[2]).

The landscape of sustainable bonds encompasses various definitions and guidelines for such bonds and the use of capital raised. "Use of proceeds bonds" include green, social and sustainability bonds (GSS bonds). As their name suggests, the proceeds of green bonds must be applied to finance projects with expected environmental benefits, which may include, for instance, projects in renewable energy, clean transportation, biodiversity conservation, and wastewater management (ICMA, 2021[3]). In this classification, "blue bonds" and "climate bonds", which focus on environmental issues related to the sea and climate change, respectively, would be classified as "green bonds". The resources raised through social bonds must be invested in projects that aim to address or mitigate a specific social issue or seek to achieve positive social outcomes, including affordable housing, food security and the empowerment of minorities (ICMA, 2023[4]). Sustainability bonds are the bonds where proceeds are typically used to finance a combination of both green and social-eligible projects (OECD, 2024[2]).

The following sections analyse the key characteristics of both categories of sustainable bonds and their implications for companies and investors in Asia. However, one basic characteristic of sustainable bonds should be clear from the start. Sustainable bonds present the same rights and risks to their holders as with any other conventional bond, but they also create a commitment. In the case of the GSS bonds, the issuer ordinarily commits to having developed or to plan to invest in eligible sustainable projects with a value that is equal to or higher than the outstanding value of the GSS bonds it has issued. In the case of SLBs, the issuer commits to reaching sustainability performance targets, such as reducing its GHG emissions.

4.3. Trends in corporate sustainable bonds in Asia

This section provides an overview of the main trends in the sustainable bond market in Asia. Based on a sample of 4 457 corporate debt securities issued between 2016 and 2023, this section presents key figures and analyses relevant trends (see Annex A). Nonetheless, the section focuses on identified trends based on the issued bonds within the last five years (2019-2023) to ensure more representative data on the latest market developments.

In the last eight years, there has been significant growth in the issuance of sustainable corporate bonds as an alternative to meet financing needs. Asian market participants have issued around USD 793.1 billion of sustainable bonds since 2016 – representing almost 8% of all issued corporate bonds in the region. While the market has shown an overall positive growth trend, it became particularly evident in 2021 when Asian corporations issued a record amount of USD 181 billion in capital through sustainable corporate bonds. This represented an increase of 138% in comparison to 2020. While the total issuance has decreased since 2022, sustainable bonds remained a significant source of capital with a total issuance amounting to USD 154.3 billion in 2023 – equivalent to almost 8% of all issued corporate bonds in the region.
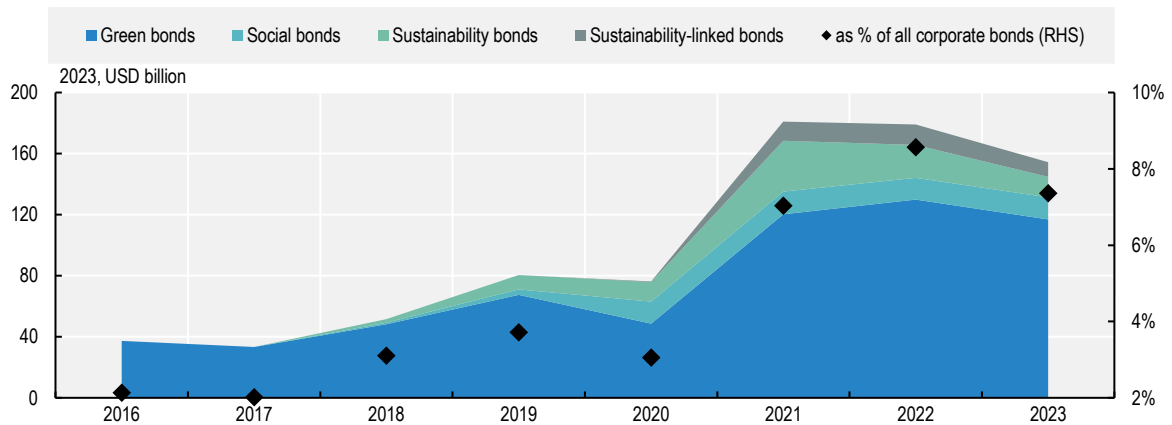
Figure 4.1. Issuance of sustainable bonds by domicile, 2016-23
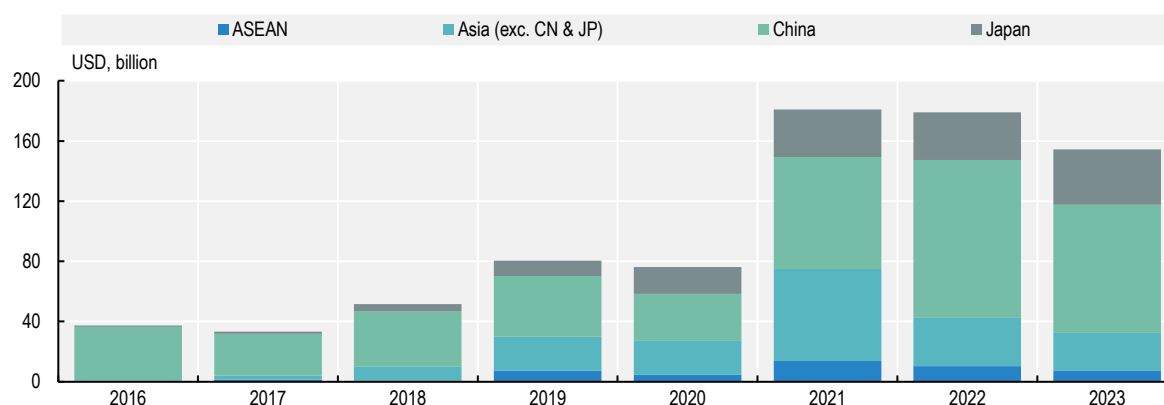
Source: OECD Corporate Sustainability dataset, LSEG.

Although corporations across Asia are increasingly issuing sustainable debt instruments to meet their financing needs, the market is highly concentrated in the People's Republic of China (China) and Japan. Corporations domiciled in China have issued around USD 436 billion since 2016. This represents almost 55% of the total issuance in Asia between 2016-23. Corporates domiciled in Japan accounted for 17% of total issuance, estimated at USD 135.5 billion. Similarly, corporations domiciled in countries in the ASEAN region are increasingly offering sustainable bonds, with a total issuance standing at USD 45.4 billion – around 6% of total issuance. The remaining 22% of the total issuance, calculated at USD 176.3 billion, came from other countries in Asia.

Figure 4.2. Issuance of sustainable bonds by instrument in Asia, 2016-23

Source: OECD Corporate Sustainability dataset, LSEG.

Green bonds remained the most important type of sustainable bonds despite a recent increase in the issuance of other types of sustainable bonds in Asia. Green bonds accounted for around 76% of the total issuance between 2016-2023, estimated at USD 601.7 billion (Figure 4.2). The second most common type of sustainable bond was sustainability bonds with almost 12% of total issuance worth USD 92.9 billion. Then, social bonds, equivalent to USD 62.6 billion, represent approximately 8% of the total issued amount. Finally, sustainability-linked bonds remained the least common sustainable financing alternative for regional corporations, calculated at USD 35.9 billion – around 5% of total issuance between 2016-2023.

Figure 4.3. Sustainable bonds' issuance by region and jurisdiction, 2019-23
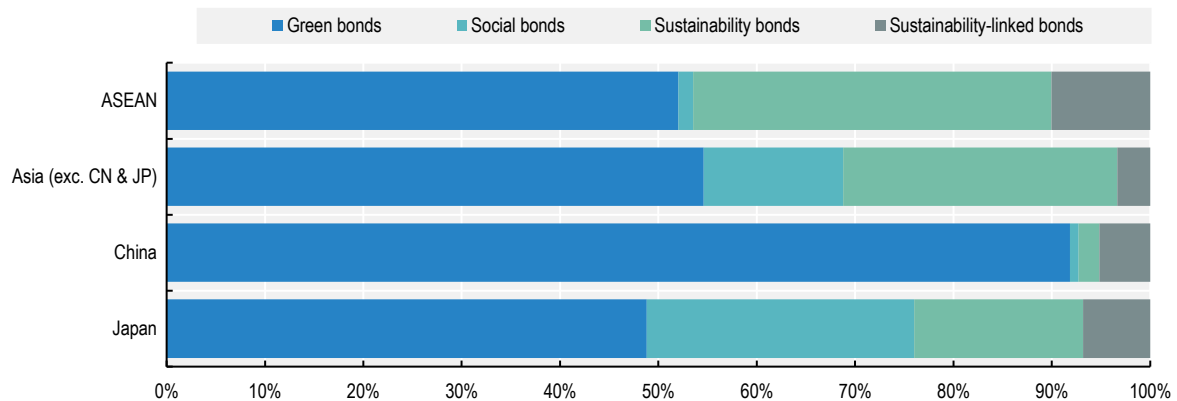
Source: OECD Corporate Sustainability dataset, LSEG.

Over the past five years, the prioritisation of issuance of other sustainable bonds (other than green bonds) has varied across different jurisdictions. Social bonds, for instance, were the second most common type of sustainable debt instrument for the Japanese corporate sector. These bonds represented around 27% of Japan's total issuance of sustainable corporate bonds within the period 2019-2023 (Figure 4.3). In fact, it is worth mentioning that Japanese corporations led the regional issuance of social bonds, offering around 57% of the total social bonds estimated at USD 61.6 billion. ASEAN countries prioritised the issuance of sustainability bonds, offering USD 15.8 billion (equivalent to 36% of their total offering of sustainable bonds). The data also indicates that ASEAN countries issued the highest number of sustainability-linked bonds relative to total issuance. Sustainability-linked bonds, valued at USD 4.3 billion, represented 10% of ASEAN's total issuance of sustainable bonds. Finally, Chinese corporations have issued sustainable

bonds other than green bonds to a very limited extent given that only 8% of the total Chinese issuance accounts for additional classes of bonds.

Around 56% of the total issuance between 2019 and 2023, estimated at USD 376.7 billion, was offered by non-financial corporates, mostly from the industrial sector (Figure 4.4). The industrial sector issued around 39% of the total amount offered by non-financial corporates. This is equivalent to USD 145.3 billion. Next, corporates in the utility industry offered approximately 29% of the non-financial corporates' total issuance equivalent to USD 108.4 billion. The remaining USD 123.1 billion offered by non-financial corporates was issued by corporates involved in additional industries including basic materials, real estate, consumers and other sectors.

While non-financial corporations are the leading issuers of sustainable bonds in absolute amounts, this is only the case in China and Japan where most of the issuance is concentrated. China and Japan-domiciled financial corporations' issuance constituted 40% and 28% of their respective total issuance (see Figure 4.4). Meanwhile, financial corporates in ASEAN and other Asian countries' share of total issuance amounted to 52% and 62% respectively. In total, financial corporates offered USD 294.2 billion between 2019 and 2023, issuing a record amount in 2023 equivalent to USD 84.9 billion. For the first time within the last five years, this value surpassed the amount issued by non-financial corporates in the region.

Figure 4.4. Issuance of sustainable bonds by sector for Asia, 2019-23
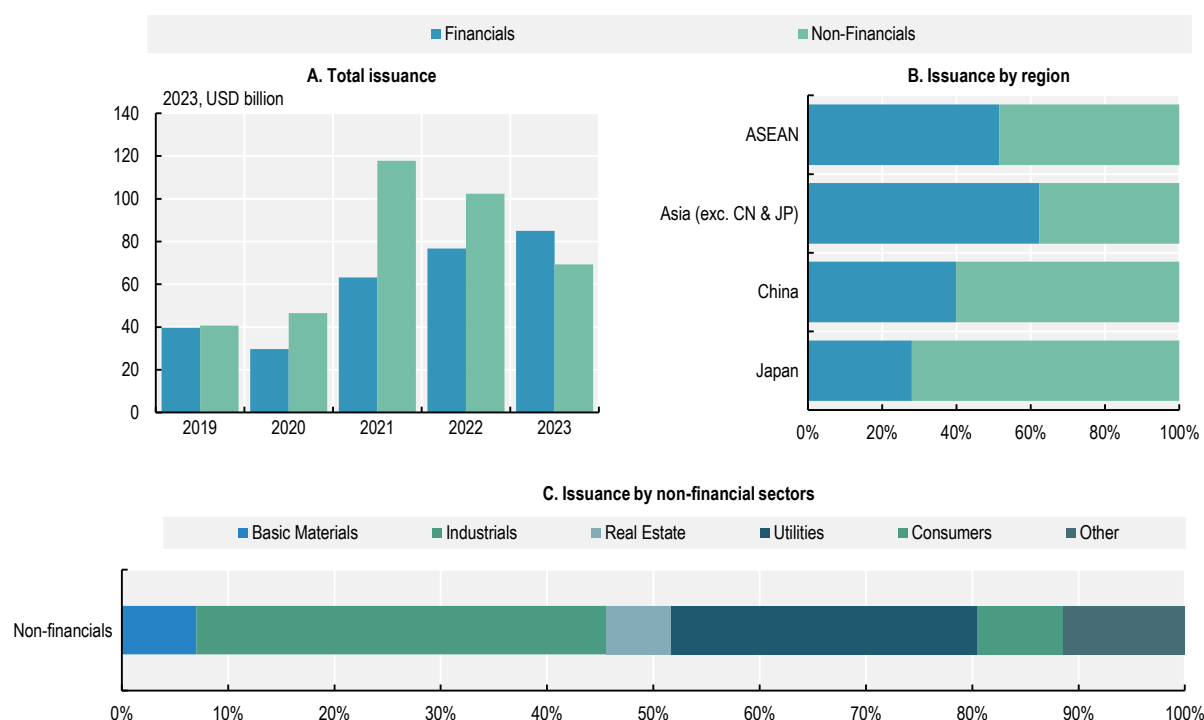
Source: OECD Corporate Sustainability dataset, LSEG.

Analysing the promised use of the proceeds of GSS Bonds, most of the issued bonds target "clean transport" and "energy efficiency" purposes – areas related to climate change. Conversely, activities related to "agriculture" and "waste management" benefited the least from the use-of-proceeds sustainable bonds. It is worth noting that both financial and non-financial corporates from all jurisdictions tend to follow a very similar trend while allocating the proceeds of GSS Bonds (Table 4.1).

Table 4.1. Percentage of GSS bond's allocated proceeds between 2019-23

	Asia (exc. China & Japan)		ASEAN		China		Japan	
	Non-financials	Financials	Non-financials	Financials	Non-financials	Financials	Non-financials	Financials
Clean transport	37%	35%	21%	44%	13%	45%	24%	33%
Energy efficiency	18%	5%	36%	7%	16%	10%	11%	38%
Renewable energy projects	11%	6%	7%	<1%	15%	8%	3%	1%
Eligible green projects	9%	5%	7%	0%	34%	12%	5%	0%
Climate change adaptation	8%	4%	9%	11%	5%	15%	12%	0%
Biodiversity conservation	7%	10%	1%	0%	<1%	<1%	<1%	2%
Green construction/buildings	3%	1%	3%	1%	7%	5%	5%	6%
Infrastructure	3%	19%	9%	30%	4%	<1%	35%	5%
Social expenditures	3%	14%	<1%	2%	1%	1%	2%	5%
General purpose	1%	1%	6%	4%	3%	2%	3%	9%
Other	<1%	<1%	<1%	0%	1%	1%	<1%	<1%

Source: OECD Corporate Sustainability dataset, LSEG.
Note: "Other" includes "waste management", "water or wastewater management", "agriculture", and "sustainable development projects".

Concerning SLBs' key performance indicators (KPIs), GHG emissions tend to be the priority for regional issuers. As observed in Table 4.2, regional SLBs tend to focus mostly on reducing GHG emissions, using KPIs mostly related to Scope 1, and 2 emissions, while seldom referring to Scope 3 emissions. This is a trend observed across all jurisdictions except for China, where corporates issued the least SLBs addressing GHG emissions.

Table 4.2. KPIs in sustainability-linked bonds (2019-23)

KPI	ASEAN	Asia (exc. China & Japan)	China	Japan
Carbon intensity	25%	19%	6%	<1%
Scope 1 and 2 GHG emissions	20%	31%	<1%	51%
Energy consumption and efficiency	19%	0%	44%	0%
Renewable energy	8%	14%	29%	13%
Emissions intensity	3%	0%	0%	0%
Increase in women board members	0%	0%	0%	2%
Scope 1, 2 and 3 GHG emissions	0%	0%	<1%	1%
Scope 3 GHG emissions	0%	0%	0%	9%
Other	26%	36%	21%	23%

Source: OECD Corporate Sustainability dataset, LSEG.

Corporate sustainable bonds in Asia have been issued mostly with a medium-term maturity (ranging from two to ten years). Since 2019, around 80% of bonds, with a total amount of USD 539 billion, have been offered with a medium-term maturity, as shown in Figure 4.5. Long-term maturity bonds (with a maturity in more than ten years after issuance) account for around 11% of total issuance, estimated at USD 74.1 billion. While bonds with a long-term maturity were the second most common form of issuance in the region, around 44% of these were offered by corporates domiciled in Japan. Concerning short-term bonds (with a maturity in less than two years after issuance), around USD 41.5 billion were issued, representing almost 6% of the sample. Yet 66% of short-term bonds were offered by corporates with a

domicile in China, which is the country with the most issuance of short-term bonds relative to its total issuance.

Figure 4.5. Maturity of sustainable bonds in Asia, 2019-23
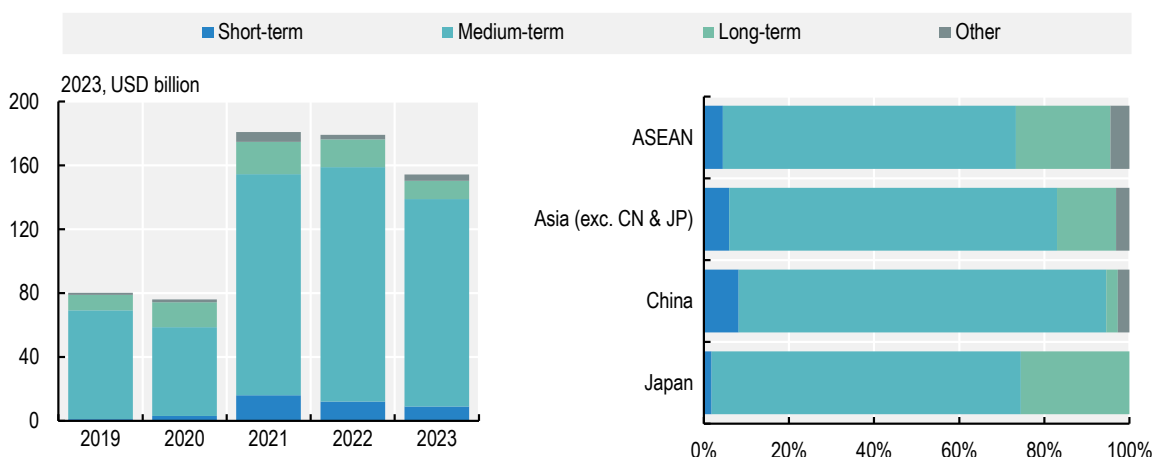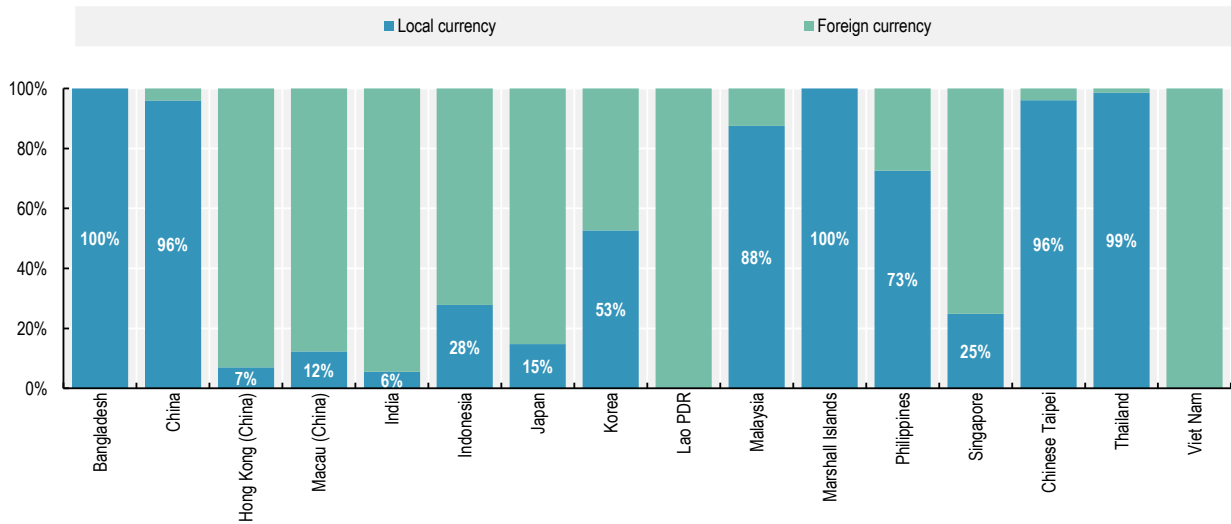

Source: OECD Corporate Sustainability dataset, LSEG.
Note: Bonds are classified as 'short-term' if their original maturity date is less than two years; "medium-term" if the maturity is between two and ten years; "long-term" if their maturity is in more than ten years; and 'other' if they are perpetual bonds or the maturity date is not specified.

Although the number of countries favouring local over foreign currency was equal, the largest share of sustainable bond issuance was issued in a foreign currency. As seen in Figure 4.6, there were eight countries where the issuance of sustainable bonds was mostly in local currency and eight countries where corporates issued in foreign currency between 2019-2023. Nevertheless, issuance in a foreign currency outweighed issuance in a local currency. Corporates offered sustainable bonds amounting to USD 436.7 billion (around 88% of the total issuance) in foreign currencies, whereas only USD 60.5 billion were issued in one local currency.

Over the last five years, the Chinese Yuan (CNY) has remained the most common currency for the issuance of sustainable bonds. Between 2019 and 2023, around 49% of the total issuance, equivalent to USD 328.33 billion, was offered in CNY. Nevertheless, around 98% of this amount is attributed to issuances of corporates domiciled in China, where most of the sustainable bond issuance was concentrated. Next, issuances in United States Dollars (USD) totalled USD 129.6 billion – 19% of the total issuance between 2019 and 2023. The Japanese Yen (JPY) was the third most common currency used, almost exclusively by Japanese corporates nonetheless, with an equivalent offering estimated at USD 99.2 billion – 15% of the total issuance. Next, USD 53.3 billion was issued in Korean Won (KRW) representing 8% of the total issuance. Finally, the remaining 9% of the issuance was issued in other currencies such as the Euro or other local currencies.

Figure 4.6. Currency composition of sustainable bonds issuance in Asia, 2019-23

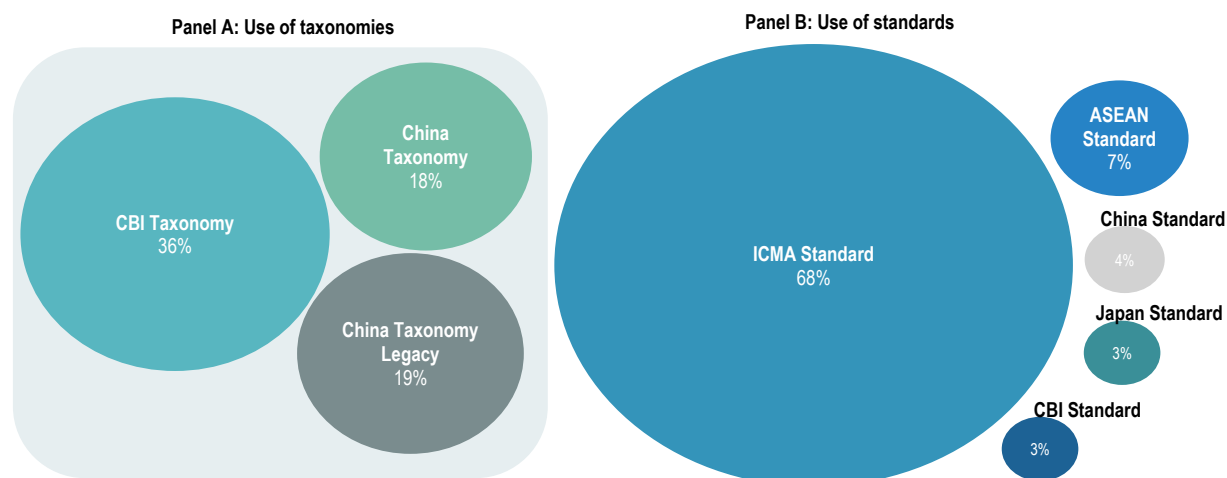Source: OECD Corporate Sustainability dataset, LSEG.

Figure 4.7. Currency composition of sustainable bonds issuance in Asia over time
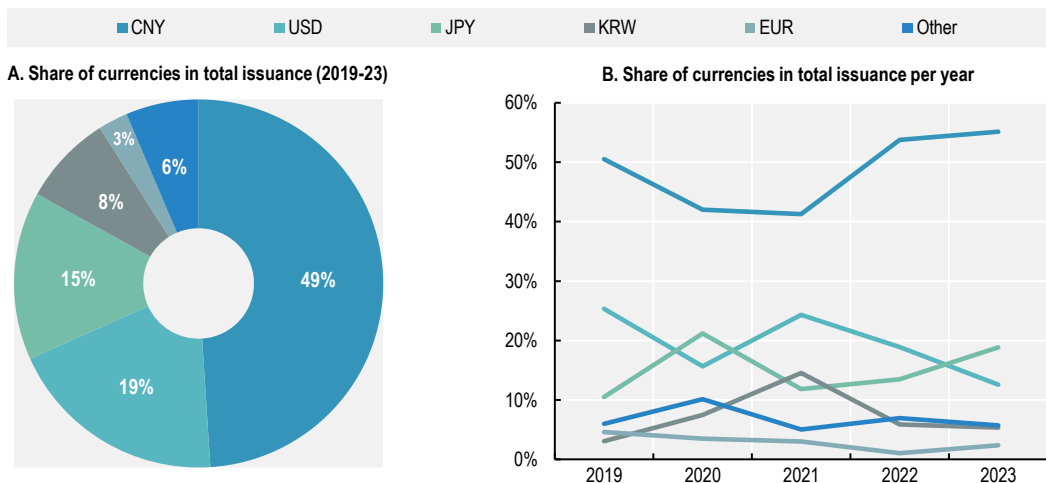
Source: OECD Corporate Sustainability dataset, LSEG.

Regional issuing corporates acknowledge the relevance of sustainable finance guidance since more than 91% of sustainable bond issuance followed at least one relevant framework. Regional market participants rely mostly on the International Capital Markets Association's (ICMA) Standard as 68% of the issued bonds cite such a document (Figure 4.8). In total, corporates domiciled in all analysed jurisdictions have issued bonds worth USD 428.5 billion referring to ICMA's standard. With regards to the ASEAN Standard, this was also used mostly exclusively by corporates domiciled in Southeast Asia. While only 7% of total bonds in the sample refer to the ASEAN Standard, around 52% of sustainable bonds issued by corporates domiciled in the ASEAN region follow this Standard. However, since the ASEAN standard follows ICMA's standard, issuers complying with the ASEAN Standard would also comply with the ICMA Standard.

Figure 4.8. Frameworks used in the issuance of sustainable bonds, 2019-23

Panel A: Use of taxonomies

Panel B: Use of standards

- China Taxonomy 18%
- CBI Taxonomy 36%
- China Taxonomy Legacy 19%
- ICMA Standard 68%
- ASEAN Standard 7%
- China Standard 4%
- Japan Standard 3%
- CBI Standard 3%

Source: OECD Corporate Sustainability dataset, LSEG.

## 4.4. Assessment of standards, KPIs and metrics underpinning sustainable bonds in Asia

Standards, KPIs and metrics play a pivotal role in the issuance and evaluation of sustainable bonds, providing investors with valuable insights into sustainability-related performance, as well as more targeted performance in line with climate-related risks and opportunities.

This section assesses standards, KPIs and metrics that feed into sustainable bonds in Asia, encompassing both international and region-specific frameworks. The aim is to shed light on the robustness and relevance of these standards, KPIs and metrics in supporting market integrity in the issuance of sustainability-linked bonds in Asia. Additionally, the section discusses the challenges and limitations inherent in the development and application of sustainability KPIs and metrics, addressing key issues such as data availability, materiality, and regulatory fragmentation.

4.4.1. Overview of the use of proceeds' stipulations and KPIs within sustainable bonds' contracts

This sub-section investigates Asian market practices underpinning sustainable bonds by analysing the requirements within 37 prospectuses of bonds issued in Asian jurisdictions. This analysis explores the regulation of GSS bonds through the use of proceeds stipulations and SLB bond-related Sustainability Performance Targets (SPTs). This sub-section also examines the reporting obligations for both types of bonds. The sample is composed of 20 of the largest issuances and 17 randomly selected issuances that have their prospectuses accessible in Bloomberg in English for Asian and ASEAN jurisdictions. All bonds in the sample were issued between 2018 and 2022. Figure 4.9 outlines the composition of the sample by country and sector.

Figure 4.9. Composition of the sample of sustainable bonds' contracts by country and issuer type
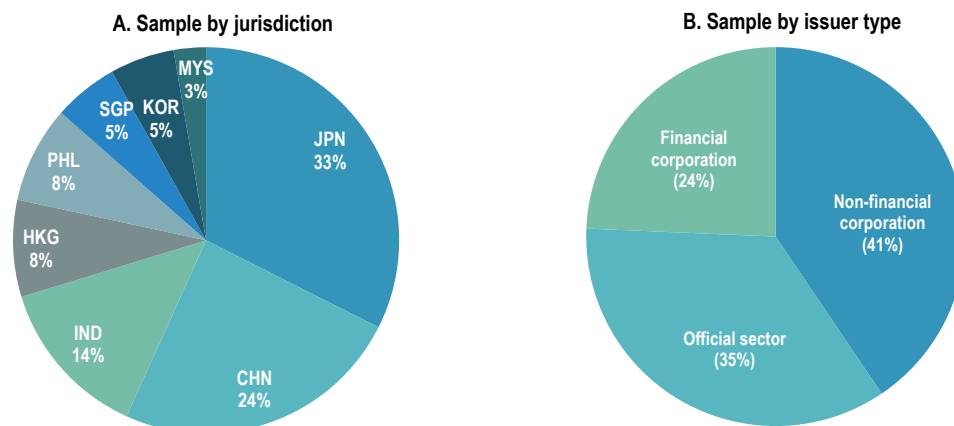
Source: OECD (2024[5]), OECD Global Debt Report dataset, https://doi.org/10.1787/91844ea2-en; LSEG.

Concerning the use of proceeds of GSS bonds, no prospectus explicitly forbids refinancing existing eligible projects as allowed by the ICMA Use-of-proceeds Principles. The ability to refinance a qualifying asset may prompt the issuer to retain it instead of selling it. However, this does not lead to new investments since the asset already exists. In certain cases, it may even be detrimental to society to encourage a company, with access to the sustainable bond market, to hold onto an asset rather than selling it to another company. A new company might be more adept at operating the asset in a more efficient approach, but it may lack easy access to public capital markets (for instance, if the former is a listed company and the latter is not) (OECD, 2024[5]).

In addition, no prospectus refers to contractual penalty or default in case of non-compliance with the use of proceeds. More than one-third (39%) of the GSS bonds' prospectuses mention that refinancing of existing eligible projects is allowed. In one case, when the funds raised are idle, they can be invested in money market instruments. In 32% of the issuances, the prospectus notes that non-compliance with the commitment to use proceeds for eligible projects would not be considered an event of default.

As for the reporting obligations of GSS bonds, there are different approaches in the sample. Almost half (54%) of the GSS bonds' prospectuses establish that the issuer will provide an annual assurance of the "use of proceeds", while one-third (32%) will provide an annual assurance of the impact of the projects financed. Issuers have opted for different approaches to disclose their progress. For instance, one issuer will publish a "periodic progress report". In another case, the issuer will provide a post-evaluation report from the completion of the financed project. Furthermore, the assurance of the impact of another issuer will be provided by a third party. Nevertheless, in no case, failure to comply with these obligations is stated as an event of default. As a matter of fact, in almost one-fifth of the cases (17%), failure to comply with reporting obligations is explicitly excluded from the events of default.

The annual disclosure of the performance is a requirement by the ICMA Sustainability-Linked Bond Principles. While accounting and reporting on the issuer's performance against relevant KPIs may be costly, in some cases the annual disclosure of this information – and not only when the target is supposed to be reached – may be material for investors. In Asia, the majority of SLB prospectuses in the sample have only one Sustainability Performance Target (SPT) and state that the issuer will provide an annual report on its performance against relevant KPIs. Only around one-third of the prospectuses have two SPTs. The SPT(s) is related to GHG emissions in two-thirds of the cases.

The penalty for not reaching the SPT(s) is an increase in costs either in the form of a higher coupon rate or a one-off payment. 55% of the issuers, will have to increase the annual coupon paid to investors by

between 15 and 37.5 basis points. In the remaining cases except one, the penalty is a one-off payment worth between 10 and 25 basis points to fund eligible entities, green projects, or to buy carbon credits.

4.4.2. Overview of international and Asia-specific frameworks proposing relevant requirements for sustainable bonds

The accelerating threat of climate change raises the urgency of the global commitment to climate transition, including the important role of financial markets in aligning investment with net-zero objectives. This has attracted the attention of investors, policy makers, and civil society stakeholders, and has been a factor in the growth of sustainable finance and tailored financial products. As a result, countries have started developing guidelines for debt instruments, following in certain cases the frameworks set out by ICMA.

Table 4.3. Frameworks for sustainable bonds in Asia

Country	Green framework	Social framework	Other guidelines
China	China Green Bond Principles		
Indonesia	The Green Bond and Sukuk Framework		SDGs Government Securities Report
Japan	Green Bond Guidelines	Social Bond Guidelines	Basic Guidelines on Climate Transition Finance
Korea	Green Bond Guideline		
Singapore	Singapore Green Bond Framework		
ASEAN	ASEAN Green Bond Standards	ASEAN Social Bond Standards	ASEAN Sustainability Bond Standards;

Source: Countries' websites, including securities regulators and ministries of finance.

Among the prominent international frameworks, the guidelines delineated by ICMA serve as a foundational reference point. The ICMA framework provides comprehensive guidance on structuring debt instruments to support sustainable initiatives and mitigate environmental risks.

In line with the global momentum towards sustainable finance, the Asia-Pacific region has witnessed the emergence of national and regional guidelines for classifying a bond as sustainable. Notably, countries within the region have advanced towards formulating frameworks that address both environmental and social dimensions of sustainability.

China has advanced efforts in sustainable finance with the establishment of the China Green Bond Principles, laying the groundwork for financing projects with significant environmental benefits. These principles underscore China's commitment to green finance and provide a framework for issuing green bonds aligned with international standards.

Japan has adopted a multifaceted approach to sustainable finance, as evidenced by the issuance of the Green Bond Guidelines; Social Bond Guidelines; Basic Guidelines on Climate Transition Finance. These guidelines reflect Japan's commitment to addressing climate change and promoting social inclusivity through innovative financial instruments.

Indonesia has delivered different sustainable finance tools including The Green Bond and Sukuk Framework to ensure the integrity of sustainable financial products. Aiming to hone its guidance, the government delivered the SDGs Government Securities Report. This Framework outlines areas of Sustainable Development Goals (SDGs) that can be financed or refinanced by Indonesia's thematic bonds. These areas include projects or sectors that contribute to climate change mitigation and adaptation (green focus), the advancement of the blue economy (blue focus), and the generation of positive social outcomes (social focus).

Korea has embraced the principles of sustainable finance through the formulation of the [Green Bond Guideline](#), signalling its intent to mobilise capital for environmentally beneficial projects. These guidelines underscore Korea's proactive stance towards addressing climate change and fostering green investments.

Singapore has emerged as a leading hub for sustainable finance in the Asia-Pacific region, bolstered by the implementation of the [Singapore Green Bond Framework](#). This framework provides issuers with clear guidelines for issuing green bonds, thereby facilitating capital flows towards environmentally sustainable projects.

The **Association of Southeast Asian Nations (ASEAN)** has taken collaborative action to promote sustainable finance through the adoption of the [ASEAN Green Bond Standards](#), the [ASEAN Social Bond Standards,](#) the [ASEAN Sustainability Bond Standards](#) and the [ASEAN Sustainability-Linked Bond Standards](#) (see Box 4.1). These standards provide a unified framework for promoting sustainable investment across the ASEAN region, thereby fostering economic resilience and environmental stewardship.

Box 4.1. ASEAN standards with respect to sustainable bonds

ASEAN Green Bond Standards

The ASEAN Green Bond Standards were introduced in November 2017, and have been developed in collaboration with the International Capital Market Association (ICMA) based on ICMA's Green Bond Principles. The ASEAN Green Bond Standards are aligned and guided by four core components: use of proceeds, the process for project evaluation and selection, management of proceeds, and reporting. Key features include:

- **Eligible Issuers**: to create a green asset class for the ASEAN region, the Issuer or issuance of the green bond must have a geographical or economic connection to the region.
- **Ineligible Projects**: fossil fuel power generation projects are excluded from the ASEAN Green Bond Standards, so as to provide further guidance to investors and Issuers as to what qualifies as green in order to mitigate greenwashing of projects and protect the ASEAN Green Bonds label.
- **Continuous Accessibility to Information**: the ASEAN Green Bond Standards further set out how investors are to be given access to information continuously by requiring the Issuers to disclose information on the use of proceeds, process for project evaluation and selection, and management of proceeds to investors in the issuance documentation, as well as ensuring such information is publicly accessible from a website designated by the Issuer throughout the tenure of the ASEAN Green Bonds.
- **Encourage More Frequent Reporting**: in addition to annual reporting, Issuers are encouraged to provide more frequent periodic reporting which would increase transparency on the allocation of proceeds and investor confidence in the ASEAN Green Bonds.
- **External Review**: the appointment of an external reviewer is voluntary under the ASEAN Green Bond Standards. However, considering the nascent stage of green bond market development in ASEAN, the ASEAN Green Bond Standards nonetheless require the external reviewers to have the relevant expertise and experience in the area that they are reviewing.

ASEAN Social Bond Standards

To support ASEAN's sustainable development needs, the ASEAN Social Bond Standards complement the ASEAN Green Bond Standards and are based on ICMA's Social Bond Principles. Key features include:

- **Eligible Issuers**: to create a social asset class for the ASEAN region, the Issuer or issuance of the social bond must have a geographical or economic connection to the region.

- **Ineligible Projects**: projects which involve activities that pose a negative social impact related to alcohol, gambling, tobacco, and weaponry are excluded from the ASEAN Social Bond Standards. Issuers are also encouraged to develop a list of additional ineligible projects for the issuance of their ASEAN Social Bonds, if applicable.

- **Continuous Accessibility to Information**: the ASEAN Social Bond Standards further set out how investors are to be given access to information continuously by requiring the Issuers to disclose information on the use of proceeds, process for project evaluation and selection, and management of proceeds to investors in the issuance documentation, as well as ensuring such information is publicly accessible from a website designated by the Issuer throughout the tenure of the ASEAN Social Bonds.

- **Encourage More Frequent Reporting**: in addition to annual reporting, Issuers are encouraged to provide more frequent periodic reporting which would increase transparency on the allocation of proceeds and investor confidence in the ASEAN Social Bonds.

- **External Review:** the appointment of an external reviewer is voluntary under the ASEAN Social Bonds. However, considering the nascent stage of green bond market development in ASEAN, the ASEAN Social Bonds nonetheless require the external reviewers to have the relevant expertise and experience in the area that they are reviewing. The external reviewers' credentials and the scope of the review conducted must be made publicly accessible from a website designated by the Issuer throughout the tenure of the ASEAN Social Bonds. Such disclosure will contribute towards awareness creation and increased investor confidence.

ASEAN Sustainability Bond Standards

The ASEAN Sustainability Bond Standards were developed based on the ICMA's Sustainability Bond Guidelines and intend to provide guidance on the issuance of ASEAN Sustainability Bonds. ASEAN Sustainability Bonds are bonds where the proceeds will be exclusively applied to finance or re-finance a combination of both Green and Social Projects that respectively offer environmental and social benefits.

The Issuer of an ASEAN Sustainability Bond must comply with both the ASEAN Green Bond Standards (ASEAN GBS) and the ASEAN Social Bond Standards (ASEAN SBS). The proceeds allocated for the Project must not be used for Ineligible Projects specified by the ASEAN GBS (i.e., fossil fuel power generation projects) as well as the ASEAN SBS (i.e., projects which involve activities that pose a negative social impact related to alcohol, gambling, tobacco, and weaponry).

ASEAN Sustainability-Linked Bond Standards

In October 2022, the ASEAN Sustainability-Linked Bond Standards were developed to facilitate the role sustainability-linked bonds can play in funding companies that contribute to sustainability. The ASEAN Sustainability-Linked Bond Standards intend to enhance transparency, consistency and uniformity of ASEAN Sustainability-Linked Bonds which will also contribute to the development of a new asset class, reduce due diligence cost, and help investors to make informed investment decisions. (ICMA) Sustainability-Linked Bond Principles, as they are internationally accepted and widely used. Key features include:

- **Eligible issuers**: to create a sustainable asset class for the ASEAN region, the Issuer or issuance of the sustainability-linked bond must have a geographical or economic connection to the region.

- **Continuous accessibility to information**: the ASEAN Sustainability-Linked Bond Standards further set out how investors are to be given access to information continuously by requiring the

Issuer to disclose information on the ASEAN Sustainability-Linked Bond's KPIs, SPTs, bond characteristics, reporting and verification in the relevant pre- and post-issuance documentation, as well as ensuring such information is publicly accessible from a website designated by the Issuer throughout the tenure of the ASEAN Sustainability-Linked Bonds.

- **Encourage more frequent reporting**: in addition to annual reporting, Issuers are encouraged to provide more frequent periodic reporting which would increase transparency and investor confidence in the ASEAN Sustainability-Linked Bonds.

- **Increased transparency on reporting timeline**: issuers are encouraged to indicate the timeline in which reporting on the ASEAN Sustainability-Linked Bonds will be made available.

- **External review**: issuers must appoint an external reviewer to review the Issuer's Sustainability-Linked Bond framework. Considering the nascent stage of sustainability-linked bond market development in ASEAN, external reviewers should have the relevant expertise and experience in the area which they are reviewing.

- **Encourage alignment of KPIs with sustainable development goals**: issuers are encouraged to align the KPIs of the ASEAN Sustainability-Linked Bonds with the Sustainable Development Goals (SDGs).

Source: ACMF (2018[6]) ASEAN Green Bond Standards, https://www.theacmf.org/images/downloads/pdf/AGBS2018.pdf; ACMF (2018[7]), ASEAN Social Bond Standards, https://www.theacmf.org/images/downloads/pdf/ASBS2018.pdf; ACMF (2018[8]), ASEAN Sustainability Bond Standards, https://www.theacmf.org/images/downloads/pdf/ASUS2018.pdf; ACMF (2022[9]) ASEAN Sustainability-Linked Bond Standards, https://www.theacmf.org/images/downloads/pdf/ASEAN%20Sustainability-linked%20Bond%20Standards.pdf

4.4.3. Analysis of metric methodologies and their robustness in tailoring products

Metrics serve as the cornerstone of sustainable bonds, providing investors with essential data to evaluate the environmental and social performance of investment projects. This section analyses the methodologies used to develop these metrics and assesses their robustness in tailoring financial products to meet sustainability objectives.

Quantitative metrics

Quantitative metrics are often derived from standardised reporting frameworks and publicly available data sources. These metrics provide investors with tangible data points to assess the environmental impact of investment projects. For example, the ASEAN Green Bond Standards recommends that Issuers use, where feasible, quantitative performance measures such as energy capacity, electricity generation, GHG emissions, and disclose the key underlying methodology and/or assumptions used in the quantitative determination.

Qualitative metrics

Qualitative metrics, including stakeholder engagement practices, corporate governance structures, and human rights policies, offer insights into the broader societal implications of investment activities. While these metrics may lack the precision of quantitative indicators, they provide valuable context for understanding the social and ethical dimensions of sustainable finance. Additionally, qualitative assessments can help capture nuances that quantitative metrics may overlook, enhancing the comprehensiveness of sustainability evaluations.

Methodologies to develop KPIs and metrics

The usefulness of metric methodologies for market participants lies in their robustness and transparency. The frameworks mentioned above highlight the importance of disclosing these elements. The Japanese

[Green Bond Guidelines,](#) for example, indicate that issuers are recommended to disclose information on underlying methodologies and/or assumptions with the indicators used.

4.4.4. *Challenges and limitations*

Although significant progress has been made in developing metrics for sustainable bonds in Asia, several challenges and limitations persist, such as data availability and quality issues, limited transparency of methodologies, and evolving regulatory frameworks.

One of the primary challenges facing sustainable bonds in Asia is the limited availability of reliable and consistent data. In many cases, issuers may lack the infrastructure or incentives to collect and disclose relevant sustainability information, making it difficult for investors to assess the environmental and social performance and impact of investment projects. In many cases, market participants do not have access to enough quality data to measure the impact of their investment strategies, relying almost exclusively on qualitative indicators. Improving data availability and quality is essential for enhancing the credibility and transparency of sustainable bonds and facilitating informed investment decision-making.

Another challenge is the limited transparency surrounding the methodologies used to develop sustainability metrics. In some cases, issuers may not fully disclose the criteria and processes used to evaluate sustainability performance, making it difficult for investors to assess the robustness and reliability of sustainable bonds. Enhancing transparency in metric methodologies is crucial for fostering trust and confidence among investors and ensuring the integrity of sustainable finance initiatives.

Additionally, the evolving nature of regulatory frameworks presents additional challenges for sustainable bonds in Asia. Emerging regulatory requirements and reporting standards across jurisdictions can create uncertainty for issuers and investors, leading to the need for markets to adapt. Common standards can help foster a conducive environment for sustainable finance and facilitate the issuance and uptake of sustainable bonds in Asia.

4.5. Policy considerations

The growth of the sustainable bond market in Asia is reason for optimism. It signals a growing interest in the incorporation of sustainability considerations into financial market activities. Additionally, if proceeds of such bonds are invested in projects that support environmental, social and government risk management, this could support to deliver long-term risk-adjusted returns. However, this chapter finds that the regulatory environment and relevant institutions need to further guarantee that sustainable bond markets function in a way that upholds market integrity and protects the interests of investors. With this in mind, the following considerations are of relevance for policy makers in supporting the robust growth of the sustainable bond market segment:

- Reinforcing how standards on green, social, and sustainability bonds could provide further transparency on the use of proceed stipulations to better understand financial obligations for not upholding outlined objectives.
- Increasing the liquidity of the sustainable bond market. For example, allowing central banks and others to consider the purchase of sustainable bonds for foreign reserve management.
- Exploring the extent to which GSS bonds' proceeds could be used to refinance existing projects, where there could be potential to re-allocate this capital to support sustainability-related objectives. ICMA's Use-of-proceeds Principles explicitly admit the use of proceeds to re-finance existing projects, and many GSS bonds do indeed allow such a practice.
- Considering the extent to which the adoption of contractual penalties could be encouraged in cases where GSS bond proceeds are not invested in eligible sustainability-related projects. Explicit

contractual penalties may provide a strong incentive for issuers not to deviate from their stated intent to invest in sustainable projects and reduce the risk of greenwashing.

- Introducing additional measures to increase the interoperability of Asian-specific standards for sustainable bonds with internationally recognised standards. Currently, ASEAN standards follow ICMA standards that have been updated since their development, therefore continual discussions on how these should be updated are relevant to ensure that investors continue to invest in bonds issued by Asian entities.

- Reflecting upon how reporting requirements on the performance against KPIs could be strengthened to ensure that metrics and methodologies are robust and decision-useful for SLBs.

- Identifying tools that could support greater transparency and quality of data on sustainable bond issuance. For example, integrated systems for data and information flow that foster collaboration among relevant stakeholders and relevant market participants.

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Annex A. Methodology for data collection and classification

In this report ASEAN, as a region, includes the following eight jurisdictions: Cambodia, Indonesia, Lao PDR, Malaysia, the Philippines, Singapore, Thailand and Viet Nam. Asia, as a region, includes the following 18 jurisdictions: Bangladesh, Cambodia, People's Republic of China, Hong Kong (China), India, Indonesia, Japan, Korea, Lao PDR, Malaysia, Mongolia, Pakistan, Philippines, Singapore, Sri Lanka, Chinese Taipei, Thailand and Viet Nam.

Balance sheet information for non-financial listed firms

The information presented in Chapter 1.1 is based on LSEG Datastream. The unbalanced global panel dataset contains financial statement information for non-financial listed companies between 2005 and 2022. The universe covers 52 320 companies registered in 135 countries.

Financial information cleaning

The raw financial dataset contains several firm-year observations when a company reports for different purposes. To construct a panel with a unique firm-year observation, the following steps are applied:

- Financial companies are excluded
- Firms listed on an over-the-counter (OTC) market are excluded
- Security types classified as "units" and "trust" are excluded
- Firms identified as delisted are excluded
- For firms with multiple observations but different countries of domicile, their true country of domicile is manually checked to remove the duplicates
- Financial statements covering a 12-month period are used
- Companies with at least one observation showing negative assets or negative fixed assets are excluded
- Financial information is adjusted by annual US Consumer Price Index changes and information is reported in 2022 USD

Industry classification

LSEG Datastream uses the Reference data Business Classification (TRBC).

Table A A.1. Economic sectors used in the balance sheet information data

TRBC Economic Sector	
Basic materials	Healthcare
Consumer cyclicals	Industrials
Consumer non-cyclicals	Real estate
Energy	Technology
Financials	Utilities

Listing information

The information presented in Figure 1.2 is based on LSEG Screener and the following criteria are used to clean the data:

- Security type classified as "units" and "trust" are excluded
- For firms with multiple listings, only primary listings are kept
- For firms with multiple observations but different countries of domicile, their true country of domicile is manually checked to remove the duplicates.
- Firms trading on over-the-counter (OTC) markets and those listed on multilateral trading facilities (MTFs) or SME/growth markets are excluded.
- Special Purpose Acquisition Companies (SPACs) are excluded.
- Investment funds are excluded.
- Real Estate Investment Trusts (REITs) are excluded.

Public equity data

The information on IPOs and SPOs or follow-on offerings presented in Section 1.5.1 is based on transaction and/or firm-level data gathered from several financial databases, such as LSEG (Screener, Datastream), FactSet and Bloomberg. Considerable resources have been committed to ensuring the consistency and quality of the dataset. Different data sources are checked against each other and, the information is also controlled against original sources, including regulator, stock exchange and company websites and financial statements.

Country coverage and classification

The dataset includes information about all IPOs and SPOs or follow-on offerings by financial and non-financial companies. All public equity listings following an IPO, including the first-time listings on an exchange other than the primary exchange, are classified as a SPO. If a company is listed on more than one exchange within 180 days, those transactions are consolidated under one IPO. The country breakdown is carried out based on the stock exchange location of the issuer. It is possible that a company becomes listed in more than one country when going public. The financial databases record a dual listing as multiple transactions for each country where the company is listed. However, there is also a significant number of cases where dual listings are reported as one transaction only based on the primary market of the listing. For this reason, the country breakdown based on the stock exchange is based on the primary market of the issuer. The IPO and SPO data are collected on a deal basis via commercial databases in current USD values. Issuance amounts initially collected in USD were adjusted by 2023 US Consumer Price Index (CPI).

Exclusion criteria

With the aim of excluding IPOs and SPOs by trusts, funds and special purpose acquisition companies the following exclusion criteria are used:

- Financial companies that conduct trust, fiduciary and custody activities
- Asset management companies such as health and welfare funds, pension funds and their third-party administration, as well as other financial vehicles
- Open-end investment funds
- Other financial vehicles

- Grant-making foundations
- Asset management companies that deal with trusts, estates and agency accounts
- Special Purpose Acquisition Companies (SPACs)
- Closed-end investment funds
- Trading on over-the-counter (OTC) markets
- Security types classified as "units" and "trust"
- Real Estate Investment Trusts (REITs)

Industry classification

LSEG uses the Reference data Business Classification (TRBC) Industry Description. The economic sectors used in the analysis are the following economic sectors:

Table A A.2. Economic sectors used in the public equity data

TRBC Economic Sector	
Basic materials	Industrials
Consumer cyclicals	Technology
Consumer non-cyclicals	Telecommunication services
Energy	Utilities
Healthcare	

Corporate bond data

Data presented on corporate bond issuances in Section 1.5.2 are based on OECD calculations using data obtained from London Stock Exchange Group (LSEG)that provides international deal-level data on new issues of corporate bonds that are underwritten by an investment bank. The database provides a detailed set of information for each corporate bond issue, including the identity, nationality and sector of the issuer; the type, interest rate structure, maturity date and rating category of the bond, the amount of and use of proceeds obtained from the issue. Convertible bonds, deals that were registered but not consummated, preferred shares, sukuk bonds, bonds with an original maturity less than or equal to one year or an issue size less than USD 1 million are excluded from the dataset. The analyses in the report are limited to bond issues by non-financial companies. The industry classification is carried out based on the TRBC Industry Description. The country breakdown is carried out based on the issuer's country of domicile. Yearly issuance amounts initially collected in USD were adjusted by 2023 US CPI.

Given that a significant portion of bonds are issued internationally, it is not possible to assign such issues to a certain country of issue. For this reason, the country breakdown is carried out based on the country of domicile of the issuer.

Early redemption data

When calculating the outstanding amount of corporate bonds in a given year, issues that are no longer outstanding due to being redeemed earlier than their maturity should also be deducted. The early redemption data are obtained from LSEG WS and cover bonds that have been redeemed early due to being repaid via final default distribution, called, liquidated, put or repurchased. The early redemption data are merged with the primary corporate bond market data via international securities identification numbers (i.e. ISINs).

Rating data

Rating information is based on OECD calculations using data obtained from LSEG that provides rating information from three leading rating agencies: S&P, Fitch and Moody's. For each bond that has rating information in the dataset, a value of 1 is assigned to the lowest credit quality rating (C) and 21 to the highest credit quality rating (AAA for S&P and Fitch and Aaa for Moody's). There are eleven non-IG categories: five from C (C to CCC+); and six from B (B- to BB+). There are ten IG categories: three from B (BBB- to BBB+); and seven from A (A- to AAA).

If ratings from multiple rating agencies are available for a given issue, their average is used. Some issues in the dataset, on the other hand, do not have rating information available. For such issues, the average rating of all bonds issued by the same issuer in the same year (t) is assigned. If the issuer has no rated bonds in year t, year t-1 and year t-2 are also considered, respectively. This procedure increases the number of rated bonds in the dataset and hence improves the representativeness of rating-based analyses. When differentiating between investment and non-IG bonds, the final rating is rounded to the closest integer and issues with a rounded rating less than or equal to 11 are classified as non-IG.

Industry classification

For industry classification, dataset on corporate bonds uses the Reference data Business Classification (TRBC) Industry Description. The economic sectors used in the analysis are the following economic sectors:

Table A A.3. Economic sectors used in the corporate bond data

TRBC Economic Sector	
Basic materials	Healthcare
Consumer cyclicals	Industrials
Consumer non-cyclicals	Technology
Energy	Utilities

MSCI data

The MSCI data used in the Section 1.6.2 has been retrieved from the equity index constituents disclosed by MSCI, and the data is as of September 1, 2023. The details are cross-referenced with the OECD dataset on listed companies. Industry classification and market capitalisation are extracted from this dataset built with the aforementioned process on "Listing Information". The information on listed companies was as of end 2022, REITS and investment funds are excluded from the analysis. The matched sample used in the analysis represents nearly 90% of the total weight for the MSCI Emerging Asia index and over 90% of the weight for the MSCI Emerging and AC Asia Pacific indices.

Ownership data

The main source of information is the FactSet Ownership database. This dataset covers companies with a market capitalisation of more than USD 50 million and accounts for all positions equal to or larger than 0.1% of the issued shares. Data are collected as of end of 2023 in current USD, thus no currency nor inflation adjustment is needed. The data are complemented and verified using LSEG and Bloomberg. Market information for each company is collected from LSEG. The dataset includes the records of owners for 31 342 companies listed on 115 markets covering 94% of the world market capitalisation. For each of

the countries/regions presented, the information corresponds to all listed companies in those countries/regions with available information.

The information for all the owners reported as of the end of 2023 is collected for each company. Some companies have up to 5 000 records in their list of owners. Each record contains the name of the institution, the percentage of outstanding shares owned, the investor type classification, the origin country of the investor, the ultimate parent name, among other things.

The table below presents the five categories of owners defined and used in this report following (De La Cruz, Medina and Tang, 2019[1]). Different types of investors are grouped into these five categories of owners. In many cases, when the ultimate owner is identified as a Government, a Province or a City and the direct owner was not identified as such, ownership records are reclassified as public sector. For example, public pension funds that are regulated under public sector law are classified as government, and sovereign wealth funds (SWFs) are also included in that same category.

For the information provided in Table 2.2, the control is not restricted to the state where the company is listed. It can be any state, e.g. a company listed in Viet Nam can be controlled by a state different from the Vietnamese state. Therefore, the definition of state used in the table may differ from that used in individual jurisdictions.

Table A A.4. Categories of owners defined and used in the report

Investor category	Categories of owners	
	Investor type	
Private corporations and holding companies	Business Association	Operating Division
	Employee Stock Ownership Plan	Private Company
	Holding Company	Public Company
	Joint Venture	Subsidiary
	Non-profit organisation	
Public sector	Government	Regional Governments
	Sovereign Wealth Manager	Public Pension Funds
Strategic individuals and family members	Individual (Strategic Owners)	Family Office
Institutional investors	Bank Investment Division	Mutual Fund Manager
	Broker	Other
	College/University	Pension Fund
	Foundation/Endowment Manager	Pension Fund Manager
	Fund of Funds Manager	Private Banking/Wealth Management
	Fund of Hedge Funds Manager	Private Equity Fund/Alternative Inv.
	Hedge Fund	Real Estate Manager
	Hedge Fund Manager	Research Firm
	Insurance Company	Stock Borrowing/Lending
	Investment Adviser	Trust/Trustee
	Market Maker	Umbrella Fund
	Mutual Fund-Closed End	Venture Capital/Private Equity
Other free-float including retail investors	Shares in the hands of investors that are not required to disclose their holdings. It includes the direct holdings of retail investors who are not required to disclose their ownership and institutional investors that did not exceed the required thresholds for public disclosure of their holdings.	

Industry classification

LSEG Datastream uses the LSEG TRBC. The economic sectors used in the analysis are the following:

Table A A.5. Economic sectors used in the ownership data

TRBC Economic Sector	
Basic materials	Healthcare
Consumer cyclicals	Industrials
Consumer non-cyclicals	Real estate
Energy	Technology
Financials	Utilities

Sentiment indices from the NLP work

Definition of AI sentiment and polarity indices

To create the sentiment indices with the AI articles, defining the Sentiment and Polarity indices with its tone of the news is mandatory to show the AI interest of each country (Alonso Robisco and Carbó Martinez, 2023[2]). According to the publication, the *Sentiment Index* and *Polarity Index* were generated by the probability scores from the BERT model, which is apart from the traditional machine learning, the dictionary-based model for sentiment analysis. By using the probability scores of the *positive* and *negative,* those indices demonstrate the AI sentiments of Japan and Korea.

$$AI\ Sentiment = Prob\ (daily\ positive) - Prob\ (daily\ negative)$$

$$AI\ Polarity = \frac{Prob(daily\ positive) - Prob(daily\ negative)}{Prob(daily\ positive) + Prob(daily\ negatvie)}$$

Choosing newspapers and webcrawling

Before scraping the browsers, choosing proper news platforms is very important which represent each nation's economic status and atmosphere. The *Nikkei Shimbun* (also known as the *Nihon Keizai Shimbun*; https://www.nikkei.com/) was used for Japanese sentiment analysis, and The Korea Economic Daily (nicknamed *Hankyung;* https://www.hankyung.com/) was chosen for that of Korea, since both news platforms well stand out for each country, based on the number first circulation for the economic news, respectively.

The main logical tools by *Python* to scrape the data could be adjusted to both since the platforms have a lot of similarities as the web was created by front-end developers with *HTML, CSS*, and *Javascript*. Besides, as they have the similar structures and categories, *International, Politics, Opinion, Financial,* and *Economy* sections were scraped to establish an identical data setup of both platforms. Therefore, each article's released date, headline, summary, and its url were scraped and contained to the *Dataframe*, which is a basic dataset framework of *Python* to use *Pandas*. Based on the customized web crawling codes, 436,509 Korean articles which include 9,730 AI articles and 44,222 Japanese ones which have 1,027 AI related ones were scraped from January 2021.

Figure A A.1. Nikkei Shimbun and Hankyung

Source: https://www.nikkei.com/ and https://www.hankyung.com/

Labelling and pre-processing

After scraping the articles for the certain period, extracting the articles whose contents are related to the AI and classifying them with its sentiments would be needed[1]. While tokenizing each headline and summary, the articles which mention *AI*, *Generative AI,* and *Chat GPT* were automatically taken out and labelled by the Python with "*AI: 1, non-AI: 0*"[2]. As for the sentiment labelling process, the articles related to the AI were labelled by "*negative: -1, neutral: 0,* and *positive: 1*" with their tones of the writing. This was also labelled by whether related to finance (1) or not (0).

Since the Japanese and Korean languages share considerable similarities[3], the API of *DeepL*, which is the deep learning-based AI translator, allows the Korean articles to be fully translated into Japanese, so that it enables us to understand the contexts and classify them with the three different sentiments. By using the API, the Large Languages Model (LLM) was saved into the Python *Dataframe* with its translated version, to make it easier to conduct the labelling. After classifying the articles with their contexts, the labelled data would be used to the sentiment analysis applied to the BERT, which is the recent deep learning model using Tensor Processing Unit (TPU).

Figure A A.2. The BERT Model and Chat GPT
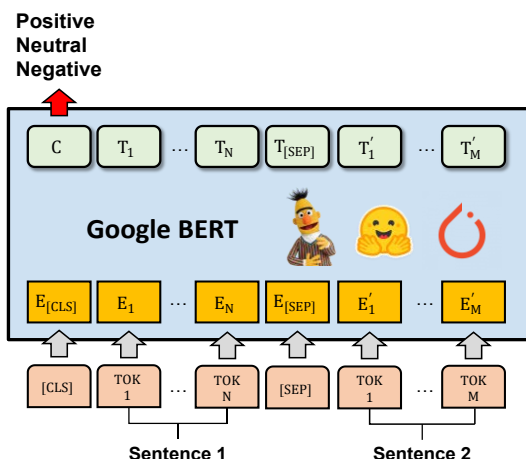
Source: https://wikidocs.net/book/2155

The BERT model and the sentiment scores

The BERT (Bidirectional Encoder Representations from Transformers) model is a recent deep learning model of machine learning and Natural Language processing (NLP), using embedded LLMs to classify the sentiment while being based on the labelled data. Since the BERT is a masked language model, it uses the hidden masked sentence bidirectionally to predict the next words, based on its originally embedded contexts and labelled data.

With the BERT, the data was able to be estimated to the three different sentiments scores. Compared to the previous machine learnings, since the BERT is a pretrained and fine-tuning model, it could improve the previous ones more efficient with general transfer learning methods. By predicting the next sentences, the model could lower the required number of the trained data and eliminates the overfitting issues which decreases the performance. The *Google Colab*, which is an open platform to use TPU, was used for the whole sentiment analysis procedures. Since the '`bert-base-multilingual-cased`' model offers 104 different languages with the analysis, the BERT could automatically recognise the language and produce the results. The Python code were generated and modified by ChatGPT.

The sentiment scores from the BERT are based on the daily articles' headline and summary and its sentimental labels. By calculating the average of daily scores with each article, the sentiment and polarity indices were finally obtained throughout those procedures.

Figure A A.3. Data frame of Japanese news: Sentiment scores, sentiment and polarity index

Figure A A.4. Data frame of Korean news: Sentiment scores, sentiment and polarity index

Sustainable bonds data and coverage

This dataset on sustainable bonds is mainly collected from LSEG and contains deal-level information of nearly 14 400 bonds issued by both the corporate and official sectors from 103 jurisdictions since 2013. This dataset provides a detailed set of information for each sustainable bond issue, including the identity,

nationality, and industry of the issuer; the type, interest rate structure, maturity date and rating category of the bond, the amount of and "use of proceeds" obtained from the issue. The issuance amounts were adjusted by 2023 US CPI.

For sustainable bonds, values for corporations correspond to the "gross proceeds" (i.e., the amount paid by investors to acquire the bonds) in most cases. Where the information on the gross proceeds could not be retrieved, the "original amount issued" (i.e., the face value of the bonds in their legal documentation) has been used as follows: 22% of the amount issued from 2013 to 2023 corresponds to the original amount issued, whereas the remaining 78% corresponds to the gross proceeds. For that 78% in which the gross proceeds are used, the original amount issued is 2.9% higher. However, the amount issued in "all corporate bonds", which includes conventional bonds, corresponds to the gross proceeds amounts in all cases.

Countries in the Asia region include Bangladesh, China, Hong Kong (China), Macau (China), India, Indonesia, Japan, Korea, Lao PDR, Malaysia, Marshall Islands, Philippines, Singapore, Chinese Taipei, Thailand, Viet Nam. Countries in the ASEAN region in the sample include Indonesia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, and Viet Nam. Countries in Asia (exc. CN and JP) include Bangladesh, Hong Kong (China), Macau (China), India, Korea, Marshall Islands, and Chinese Taipei.

LSEG data contains both Regulation S and Rule 144A sustainable bonds. Rule 144A presents a safe harbour from the registration requirements of the Securities Act for resales of securities not fungible with securities listed on a US securities exchange to qualified institutional buyers. Regulation S provides a safe harbour from the registration requirements of the Securities Act for offerings made outside the United States (Bruckhaus, 2017[3]). The calculations presented take account of this factor, and an exercise to eliminate the duplication when a single bond was issued both under Regulation S and Rule 144A was performed.

In Table 4.1, for the GSS bonds where more than one "use of proceeds" was disclosed by the issuer, the amount issued by the GSS bond was equally split for each of the use of proceeds. For example, if a GSS bonds amounting to USD 1 000 displayed *clean transport* and *energy efficiency* as promised use of proceeds, USD 500 was allocated into the category *clean transport* and USD 500 into *energy efficiency* one.

In Table 4.2, for the SLBs where more than one key performance indicator was disclosed by the issuer, the amount issued by the SLB was equally split for each of the key performance indicators. For example, if a SLB amounting to USD 1 000 displayed *renewable energy* and *sustainable forest management* as key performance indicators, half of that amount was allocated into the category *renewable energy* and half into the *sustainable and forest management* one.

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Notes

[1] When it comes to the current machine learning technology, classifying the articles by reading them one by one is inevitable to figure out whether it is related to the AI and to define the sentiments. If extracting the articles just by the bag of words without reading the context, this may cause errors and lower the model's functional performance.

[2] Within the Korean news, words for AI, 생성AI, 인공지능, Artificial Intelligence, ChatGPT, 챗GPT, Generative AI and its related words were used. On the other hand, AI, 生成AI, ジェネラティブAI, 人工知能, Artificial Intelligence, Chat GPT, チャットGPT, Generative AI, 対話型AI and related words were used for the Japanese News.

[3] Supported by computational linguistics and archaeological evidence, the historically adjacent Tungusic languages are the likeliest candidates to explain the similarities between Japanese and Korea, and the geographical proximity has also led to successive waves of cultural and linguistic contact, such as language borrowing. For example, with the geographically close between Japan and Korea, both languages share considerable similarity in typological features of their syntax and morphology. Besides, both has a common denominator for the presence of Chinese characters and historical influence between them.

Mobilising ASEAN Capital Markets for Sustainable Growth

The ASEAN region's economic expansion has created significant financing needs among corporations and investment opportunities for households. This report aims to support ASEAN policy makers harness opportunities and address barriers in mobilising capital markets for sustainable growth and development in the region. It focuses on the functioning of capital markets and the corporate sector's use of market-based financing. It also examines current corporate governance regulatory frameworks, emerging artificial intelligence trends in finance, and sustainable finance developments with a focus on corporate sustainable bonds.