AMRO
ASEAN +3 MACROECONOMIC RESEARCH OFFICE

Analytical Note

Climate Change: How Far along the Green Path are ASEAN+3 Banks?[1]

October 26, 2022

"The struggle to save the global environment is in one way much more difficult than the struggle to vanquish Hitler, for this time the war is with ourselves. We are the enemy, just as we have only ourselves as allies."

~ Al Gore
45th Vice President of the United States, 1993–2001
Academy Award, Nobel Prize, and Grammy winner for documentary, *An Inconvenient Truth*

I. Introduction

1. **Climate change has become a well-recognized threat to financial stability.** The establishment and growth of the Network for Greening the Financial System (NGFS) and the Sustainable Banking and Finance Network (SBFN) demonstrate the importance of climate risk issues requiring commitment to mitigation by authorities—and, eventually, banks—to advance sustainable finance.[2] Indeed, an Ernst & Young/Institute of International Finance survey found that 91 percent of banks' credit risk officers and 96 percent of their board of directors identified climate change as the most important risk over the next five years (Sutcliffe 2021).

2. **There are two obvious transmission channels through which climate risk can contribute to prudential risk.** Institutions that have insured or lent to individuals and corporations that are affected by changes in the environment, or the climate strategies and policies put in place by governments, will likely see higher levels of claims and losses in their portfolios, as set out below:

- ***Physical risks*** arise from heavy-pollution fossil fuel industries and forest burning that impact people's health. The associated increase in global temperatures contributes

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[2] The NGFS was created by eight founding central banks and supervisors, including several from among the ASEAN+3 (People's Bank of China (PBC), Hong Kong Monetary Authority (HKMA), and the Monetary Authority of Singapore (MAS)) in 2017, and has since grown to 116 members and 19 observers (of which AMRO is one). The SBFN was established earlier, in 2013, and currently has 72 members from 62 countries.

to shifting weather patterns and more frequent occurrences of typhoons, heatwaves, fires, floods, hurricanes, and storms. The resulting destruction, displacement, and death, along with the disruption of manufacturing capabilities, trade flows, and supply chains, affect borrowers' income streams, growth potential, and even their debt servicing abilities.

- ***Transition risks*** arise as society moves towards low-carbon alternatives. Traditional industries that are heavily reliant on fossil fuels are increasingly being shunned or facing greater scrutiny and regulatory burden. Credit ratings for coal companies have already been cut,[3] and could spread to oil and gas companies that do not effectively adapt in time (albeit the supply-chain disruption mitigating this for the time being), and eventually affect downstream companies and industries. The changes in asset values and elevated costs of doing business for corporates that have obtained loans from banks portend to rising risks to financial stability.

3. **Banks in the ASEAN+3 region are among the most susceptible to climate change risks.** In particular:

- Economies in the region face higher physical risks, brought about by a larger number of occurrences of more extreme natural disasters, such as earthquake, tsunami, flood, tropical cyclone and drought, according to the Index for Risk Management.[4] Longer-term risks, such as coastal floods and the rising sea-level that follow global warming are also disproportionally concentrated in tropical regions, especially in Asia, as gleaned from analyses conducted using satellite LiDAR data (Hooijer and Vernimmen 2021).

- These economies have greater dependence on fossil fuels, from which 79 percent of the energy consumption are derived—higher than the world average of 67 percent in 2015, according to the World Bank. The result is that more intensive transitioning efforts will be necessary in the region, given that petroleum accounts for a majority of its carbon dioxide (CO_2) emissions.

4. **This note provides a stocktake of the greening efforts by the region's banks.**[5] A multi-pronged analysis incorporating both qualitative and quantitative methods is undertaken, namely:

- Gauging the resilience of banks to physical and transition risks over the longer term—an area often overlooked in conventional financial analyses—using

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[3] As an example, Moody's downgraded Indonesia's coal producer, Bumi Resources Tbk, from Caa1 to Caa3, in 2021, with exposure to thermal coal price volatility cited as one of the reasons cited (Moody's 2021a). In June 2022, Standard and Poor's (S&P) downgraded the rating of Australian mining company, BHP Group, following its merger with Woodside Petroleum, citing its risk profile as being highly concentrated in the fossil fuel business (S&P 2022).

[4] Index for Risk Management is an open-source risk assessment data portal for humanitarian crises and disasters, covering the disaster risk profiles of 191 countries. The index ranges from 0–10, where 10 represents the highest level of risks. In 2021, the simple average index for ASEAN+3 countries was 6.0, higher than the average 4.1 for other countries.

[5] Unless otherwise indicated, the analyses are based on the latest information available as of August 2022. For brevity, Brunei Darussalam and Hong Kong, China are henceforth referred to as "Brunei" and "Hong Kong," respectively.

Environmental, Social and Governance (ESG) ratings, which take into account the management and mitigation of both risks.

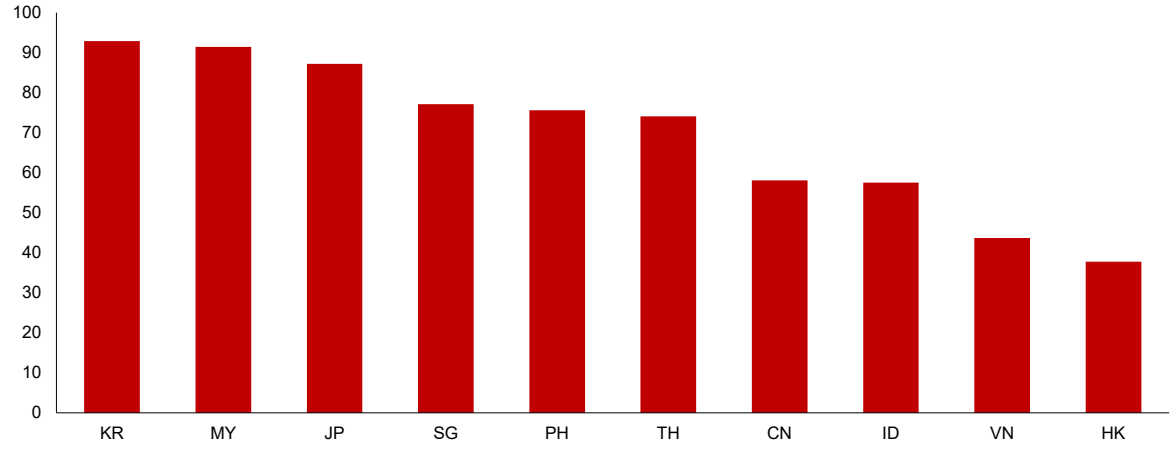
- Measuring banks' exposures to companies emitting greenhouse gasses to gain some insight into the magnitude of transition risks of the former, which comprises assessing the degree of "greening" undertaken by banks in the region, and estimating the amount of loans most exposed to climate change risks.

- Compiling the actions taken by the region's banks to date, and offering recommendations, based on best-practice international principles that could close some of the identified gaps, and be factored into the surveillance of and regulation by relevant supervisory authorities.

II. Banks' ESG Efforts

5. **In the absence of an internationally accepted ESG rating benchmark, this note uses the Moody's CreditView database to assess banks' efforts to contribute to mitigating climate change.** Moody's ratings could diverge substantially from those of other rating agencies (ESG Investor 2022), but the methodology is selected based on its relatively transparent approach and the comprehensive coverage (Environmental Finance 2022).[6] Although the dataset only captures 111 banks in the ASEAN+3 region, constituting 38 percent of the total number of banks in the Moody's CreditView database,[7] the larger and more systemically important banks are included and more than 60 percent of loans made by banks in the region are captured (Figure 1).

Figure 1. Selected ASEAN+3: Share of Banking Sector Loans with Moody's ESG Ratings, as of August 2022
(Percent)



Sources: Moody's CreditView; national authorities via Haver Analytics; and AMRO staff calculations.
Note: The numerator represents loans of banks with Moody's ESG ratings. The denominator refers to total amount of loans in the country's banking sector in 2021. CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

6. **There are three main components to banks' ESG scores.** The ratings are derived from both quantitative information and qualitative judgment (Moody's 2021b, 2022) (Appendix I). "Better" ESG ratings are represented by lower scores (lowest score = 1) and

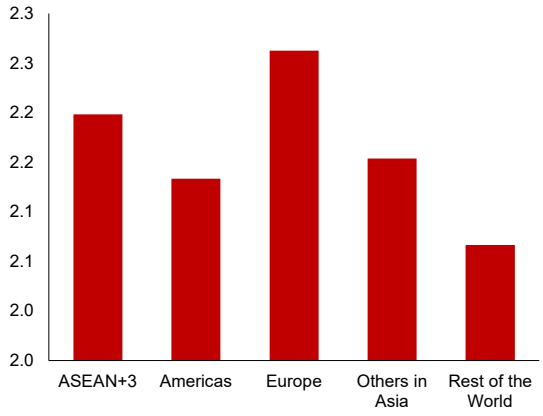
[6] The release of guidance by the Basel Committee on Banking Supervision (BCBS) is pending (BCBS 2022a).

[7] Moody's CreditView has information on 291 commercial banks in ASEAN+3. The data used in the analyses are reported as of August 2022.

"Worse" ESG ratings are represented by higher scores (highest score = 5). "Better" ESG rating implies relatively well managed ESG risks in the bank as compared to its peers.

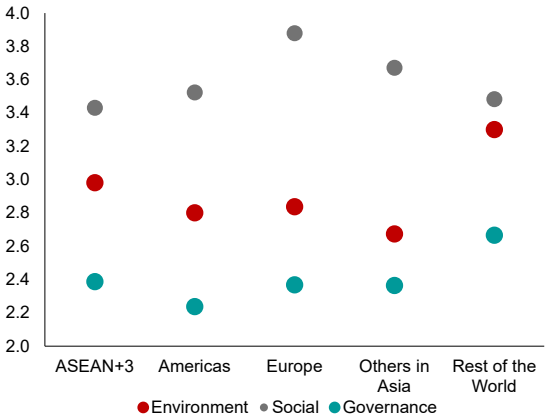
7. **Globally, ASEAN+3 banks rank relatively poorly for their overall ESG efforts.** On average, banks in this region have achieved more on the road to sustainability compared to those in Europe, but less so than those in the Americas, the rest of Asia, and the rest of the world (Figure 2). Out of the three ESG categories, ASEAN+3 strength appears to lie in the "G" category, which outscores both "E" and "S" (Figure 3), likely the long-term result of concerted reforms undertaken in the wake of Asian financial crisis. These banks have also issued sustainability reports and integrated climate change risks and control into their decision-making processes (see Section IV), which underpin their stronger "G" ratings. However, "E" appears to be an area of weakness, likely attributable to the region's more adverse exposures to the effects of severe natural and human-caused disasters, and continued general support for higher concentrations of fossil fuel-related companies and projects by governments and banks.[8]

Figure 2. World: Average ESG Scores of Banks by Region, as of August 2022
(Score)



Sources: Moody's CreditView; and AMRO staff calculations.
Note: The dataset covers about 472 banks with ESG scores, mostly the larger, publicly listed ones. Simple averages are calculated for the respective regions. The lower the score, the more sustainable the banking sector practices.

Figure 3. World: Average Individual ESG Scores of Banks by Region, as of August 2022
(Score)

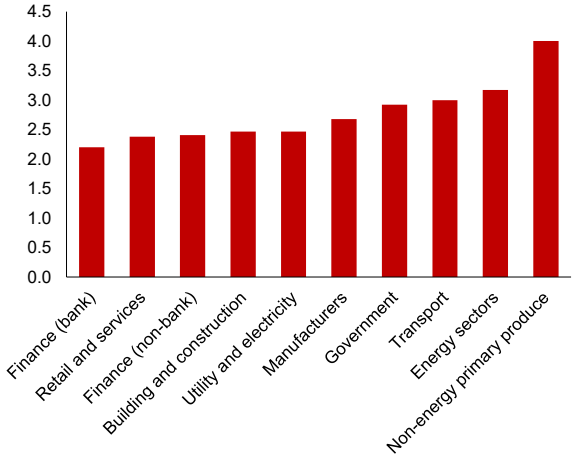


Sources: Moody's CreditView; and AMRO staff calculations.
Note: The dataset covers about 472 banks with ESG scores, mostly the larger, publicly listed ones. Simple averages are calculated for the respective regions.

8. **Nonetheless, banks' efforts have surpassed those of other economic sectors in the region.** The low scores are underpinned by the outperforming "G" ratings (Figure 4), which suggests that the financial industry is taking the lead in managing the changing needs in the region, including designing effective policies to mitigate carbon emissions and energy consumption. Also, the "E" ratings of banks, as well as firms in other service-related sectors—such as those offering retail and services, and other financial companies—fare relatively better than those of manufacturing firms (Figure 5), given that they have fewer supply-chain-induced carbon footprints.

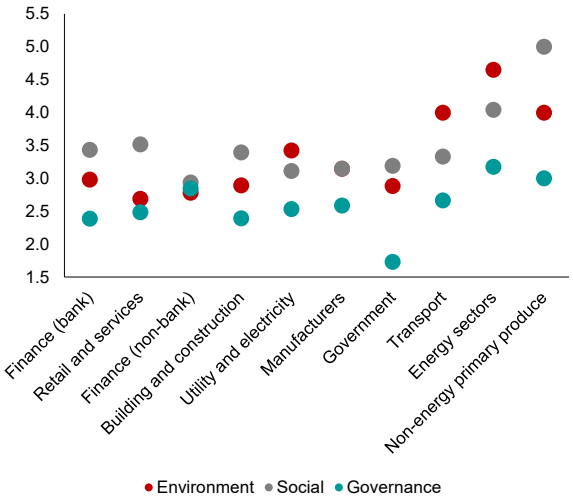
[8] For example, an estimated 80 percent of the world's new coal-fired power plants are located in five Asian countries, including China, Indonesia, Japan and Vietnam (Kuykendall 2021), contravening the international call to end new fossil fuel investments and deploy funds to renewable energy.

Figure 4. ASEAN+3: Average ESG Scores by Sector, as of August 2022
(Score)



Sources: Moody's CreditView; and AMRO staff calculations.
Note: The dataset covers about 377 entities. Simple averages are calculated for the respective industries.

Figure 5. ASEAN+3: Average Individual ESG Scores by Sector, as of August 2022
(Score)



Sources: Moody's CreditView; and AMRO staff calculations.
Note: The dataset covers about 377 entities. Simple averages are calculated for the respective industries.

9. **Stronger commitment to climate change efforts appears to be associated with the more resilient banks in the ASEAN+3.** For example:

- Banks with "Better" ESG ratings—with the exception of Vietnam—have, on average, total capital adequacy ratios (CARs) and Tier 1 CARs that are 1–5 percentage points and 0.4–4.8 percentage points higher than the banks with "Worse" ESG scores, respectively (Figures 6 and 7).[9] In fact, banks with higher-than-average CARs are observed to perform slightly better in all ESG aspects (Figure 8).

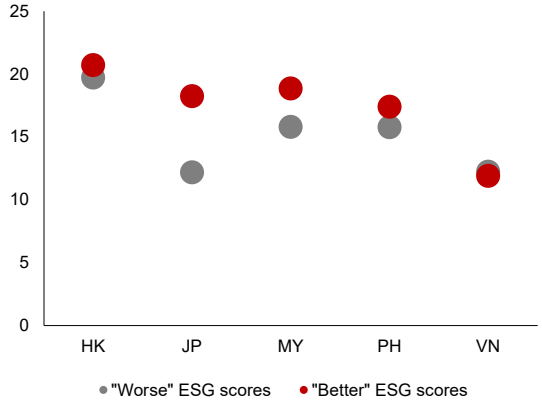
- Banks with better-than-average ESG scores, by and large, have lower credit risks, with non-performing loan ratios 0.2–4.6 percentage points lower than those with worse-than-average scores (Figure 9).

- Banks with better ESG scores, excluding the ones in Japan, are generally more profitable, with the 10-year annual average return on assets (ROAs) and return on equities (ROEs) up to 0.3 percentage points and 4.8 percentage points higher than those with worse-off ESG scores (Figures 10 and 11).

10. **The positive correlation between bank soundness and higher ESG scores could be reflective of banks' overall risk management strategies.** The more prudent banks are likely treating physical and transition risks more seriously, alongside the more traditional risk areas. As such, these banks may be more sustainable in the longer term, having better ability to address and withstand different types of shocks, including those related to climate change.

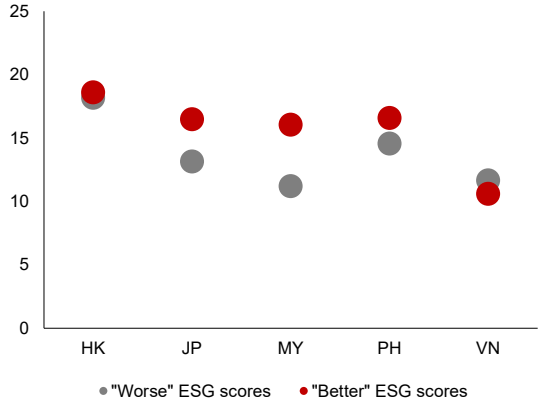
[9] Simple averages of ESG scores (as of August 2022) covering banks in Singapore, China, Indonesia, Korea, Thailand, Hong Kong, Malaysia, the Philippines, Japan, and Vietnam are calculated. However, analysis is not conducted for a few countries in the absence of variations in ESG scores, precluding the separation of banks into two groups.

Figure 6. Selected ASEAN+3: Bank Total CARs, 2021
(Percent)



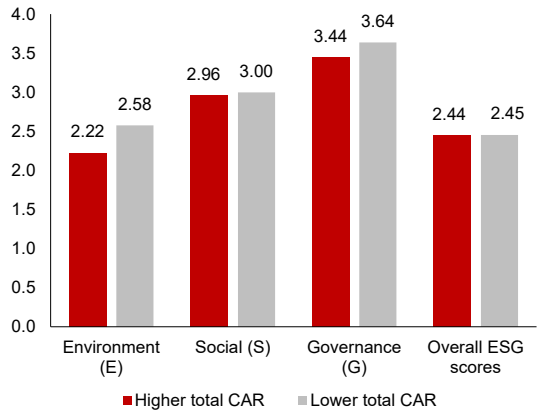
Sources: Moody's CreditView; and AMRO staff calculations.
Note: Simple averages are calculated for the respective countries. For banks without CAR information in 2021, the reported CARs in 2020 are used instead. HK = Hong Kong; JP = Japan; MY = Malaysia; PH = Philippines; VN = Vietnam.

Figure 7. Selected ASEAN+3: Bank Tier 1 CARs, 2021
(Percent)



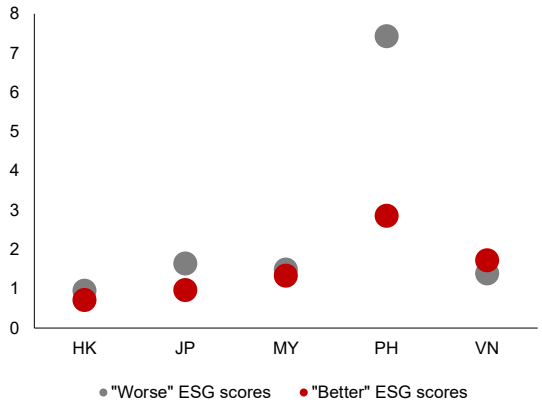
Sources: Moody's CreditView; and AMRO staff calculations.
Note: Simple averages are calculated for the respective countries. For banks without Tier 1 CAR information in 2021, the reported Tier 1 CARs in 2020 are used instead. HK = Hong Kong; JP = Japan; MY = Malaysia; PH = Philippines; VN = Vietnam.

Figure 8. Selected ASEAN+3: ESG Scores of Banks with Higher vs Lower Total CARs, 2021
(Percent)



Sources: Moody's CreditView; and AMRO staff calculations.
Note: Simple averages covering banks in Hong Kong, Japan, Malaysia, the Philippines, and Vietnam are calculated for the respective categories. The classification into banks with higher and lower than average total CARs is based on 2021 total CAR information. If the data are not available, the reported total CARs in 2020 are used instead.

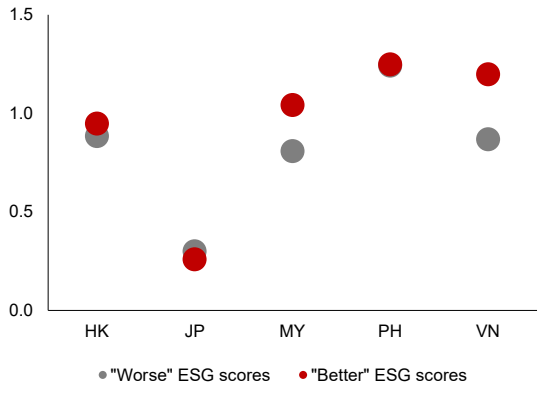
Figure 9. Selected ASEAN+3: Bank NPL Ratios, 2021
(Percent)



Sources: Moody's CreditView; and AMRO staff calculations.
Note: Simple averages are calculated for the respective countries. For banks without NPL ratio information in 2021, the reported NPL ratios in 2020 are used instead. HK = Hong Kong; JP = Japan; MY = Malaysia; PH = Philippines; VN = Vietnam.

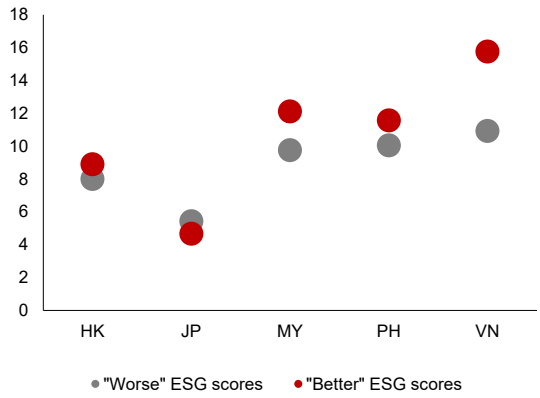
11. **Separately, there is no obvious correlation between bank size and overall ESG ratings.** Indeed, the marginally better ratings of the larger banks are predominantly driven by their stronger "G" scores (Figures 12 and 13). The large banks' "E" and "S" scores tend to be weaker, likely due to higher amounts of loan exposures to fossil fuel companies, as highlighted in the Global Coal Exit List (Urgewald 2022). The better "G" scores for these banks could be attributable to stricter regulatory requirements and supervisory scrutiny of their risk management and governance practices, given that most of them are classified as systemically important banks globally and/or domestically. Further, large banks tend to have more available resources than the smaller-to medium sized banks to devote to ESG reports for engagement with stakeholders and in alignment with broad international practices.

Figure 10. Selected ASEAN+3: Bank ROAs, 2012–21
(Percent, annual average)



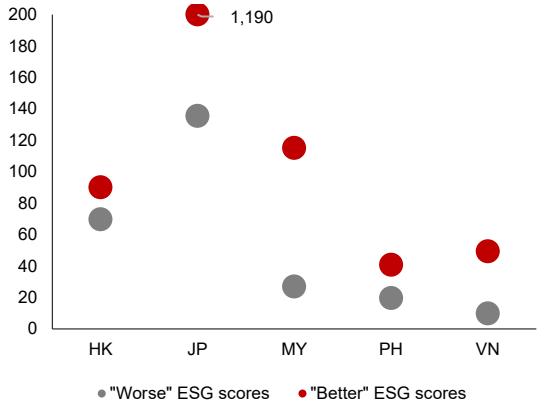
Sources: Moody's CreditView; and AMRO staff calculations.
Note: Simple averages are calculated for the respective countries. For banks without ROA information in 2021, the reported ROAs from 2012–21 are used instead. HK = Hong Kong; JP = Japan; MY = Malaysia; PH = Philippines; VN = Vietnam.

Figure 11. Selected ASEAN+3: Bank ROEs, 2012–21
(Percent, annual average)



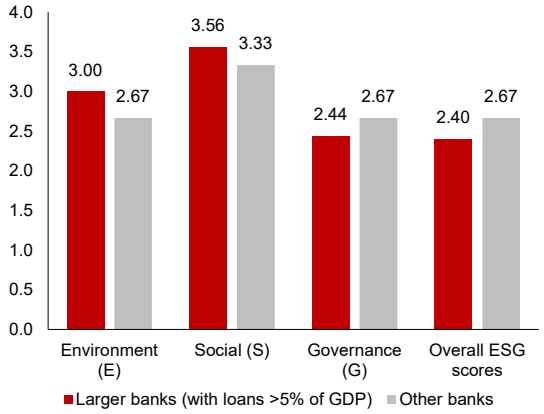
Sources: Moody's CreditView; and AMRO staff calculations.
Note: Simple averages are calculated for the respective countries. For banks without ROE information in 2021, the reported ROEs from 2012 to 2020 are used instead. HK = Hong Kong; JP = Japan; MY = Malaysia; PH = Philippines; VN = Vietnam.

Figure 12. Selected ASEAN+3: Bank Total Assets, 2021
(Billions of US dollars)



Sources: Moody's CreditView; and AMRO staff calculations.
Note: Simple averages are calculated for the respective countries. For banks without total assets information in 2021, the reported total assets in 2020 are used instead. HK = Hong Kong; JP = Japan; MY = Malaysia; PH = Philippines; VN = Vietnam.

Figure 13. Selected ASEAN+3: ESG Scores of Large vs Other Banks, as of August 2022
(Percent)



Sources: Moody's CreditView; and AMRO staff calculations.
Note: Simple averages covering banks in Hong Kong, Japan, Malaysia, the Philippines, and Vietnam are calculated for the respective categories. The classification into larger and other banks is based on 2021 loans and GDP information. If the data are not available, the loans and GDP information reported in 2020 is used instead.

12. **Ultimately, the extent of the efforts made by the banking industry toward limiting global warming is difficult to estimate.** Hence, this exercise is conducted on a best-effort basis to better understand the greening measures adopted by the region's financial sector. The caveats are that:

- Data points are more extensive for some countries (for example, Korea and Malaysia) but less so for others (for example, Vietnam and Hong Kong).
- The worst-performing banks are more likely to not collect and/or not provide climate risk data, which would introduce a positive bias to the sample set.

- Interpretation of the data should take into account the possibility of "greenwashing"—although banks with more positive ESG scores may be reporting and putting in place climate risk-related policies and governance practices, their comprehensiveness and accuracy may be questionable.[10]

III. Banks' Exposures to Transition Risks

13. **This section identifies the types of banking sector loans that could be more exposed to transition risks, in an effort to measure the latter in a less subjective manner.** The Emissions Database for Global Atmospheric Research (EDGAR) identifies five sectors that could be more affected by climate change: (1) agriculture, forestry, and other land use (AFOLU); (2) buildings; (3) energy systems; (4) industry; and (5) transport, where borrowers may face greater challenges in shifting toward a low-carbon future. Assumptions are necessarily applied to standardize and map the information across these sectors, given the lack of consistency in reporting across countries (Appendix II).[11] Also, in the absence of any granular sectoral breakdown, the estimation of approach to identifying climate-change-related loans may capture those that do not result in significant carbon emissions (for example, administrative offices, product and delivery quality control services of companies involved in goods production value chain).

14. **ASEAN+3 banks have significant exposures to climate change-related sectors, mostly in the form of property-related loans.** On average, 45 percent of the region's bank loans are exposed to climate change risks (Figure 14), led by Indonesia, Japan, and Korea, with 28 percent of total loans related to the property sector (Figure 15). They comprise construction and mortgage loans, followed by industry (8.2 percent), AFOLU (7.2 percent), transport (1.0 percent), and energy systems (0.5 percent). Although it would ideally be useful to analyze this breakdown at the entity level, this particular analysis is necessarily conducted at the aggregate level in the absence of more specific sectoral disclosures by individual banks.

15. **However, larger transition risks are attached to other types of loans, as measured by their carbon intensity.**[12] In this context, transition risks are highest for loans to the energy system sector (with an estimated emission per loan level at 62.4 tCO_2 per billion US dollars). Loans to the transport sector (8.8 tCO_2 per billion US dollars) are next, followed by the industry sector (4.1 tCO_2 per billion US dollars) (Figure 16). Banks in some countries (for example, Brunei, Indonesia, and Lao PDR) may be required to expend more in adjustment costs to go green, given their greater susceptibility to impairments from climate change policies and developments (Figure 17).

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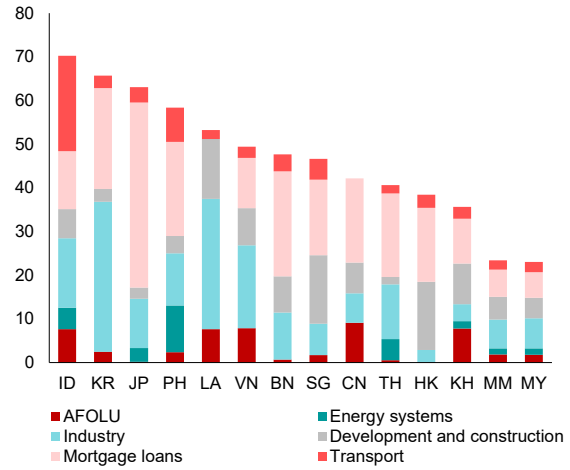
[10] A number of global banks have been criticized on this issue. For example, HSBC pledged to go carbon neutral but continues to provide significant financing to the global coal industry, particularly across Asia (Williams 2021). A survey in March 2022 by Asia Research and Engagement (ARE) finds that none of the region's banks has taken sufficient action to meet the Paris Agreement objectives and most banks are not aligned with their country's national policies on decarbonization (ARE 2022). The survey also concludes that Asia's banks may have mispriced their exposures to carbon-intensive assets.

[11] As an example, "manufacturing" loans in Singapore and "production" loans in Thailand are both listed as "industry" loans in this exercise.

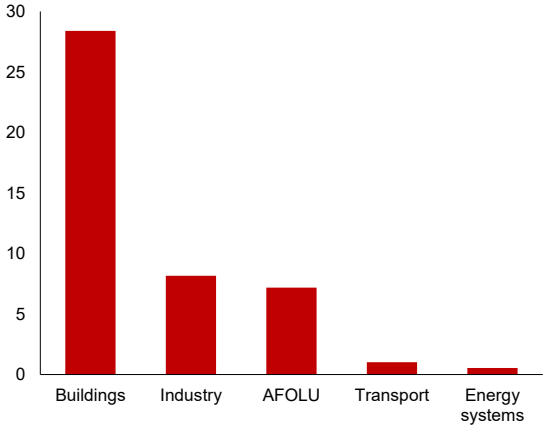
[12] This measure is proposed by Faiella and Lavecchia (2020), given that CO_2 is the primary GHG emitted through human activities (United States Environmental Protection Agency 2022).

Figure 14. ASEAN+3: Share of Climate Change Related Loans by Country, 2021
(Percent)



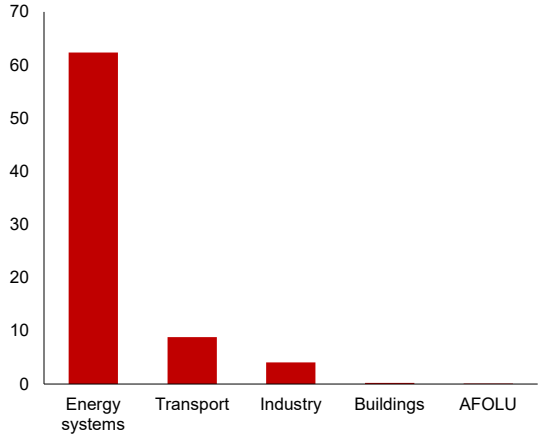
Sources: National authorities via Haver Analytics; and AMRO staff calculations.
Note: Myanmar's loans are based on information reported in 2020. BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MM = Myanmar; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Figure 15. ASEAN+3: Share of Climate Change Related Loans by Sector, 2021
(Percent)



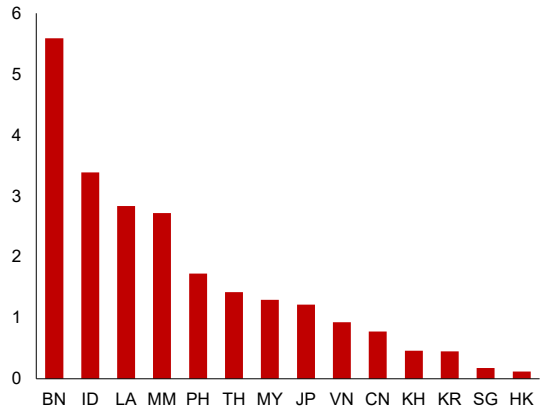
Sources: National authorities via Haver Analytics; and AMRO staff calculations.
Note: The computed shares are weighted, based on the loan amounts in each country and sector. The computations of shares include Myanmar's loans that depend on information reported in 2020.

Figure 16. ASEAN+3: Emissions per Loan by Sector, 2021
(tCO_2 per billion of US dollars)



Sources: National authorities; and AMRO staff calculations.
Note: The computed shares are weighted, based on loan amount in each country and sector. Emissions are based on information reported in 2020, and the computations of shares include Myanmar's loans that depend on information reported in 2020.

Figure 17. ASEAN+3: Emissions per Loan by Country, 2021
(tCO_2 per billion of US dollars)



Sources: National authorities; and AMRO staff calculations.
Note: The computed shares are weighted, derived using the loan amount in each country and sector. Emissions are based on information reported in 2020. Myanmar's loans are also dependent on information reported in 2020. BN = Brunei; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MM = Myanmar; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

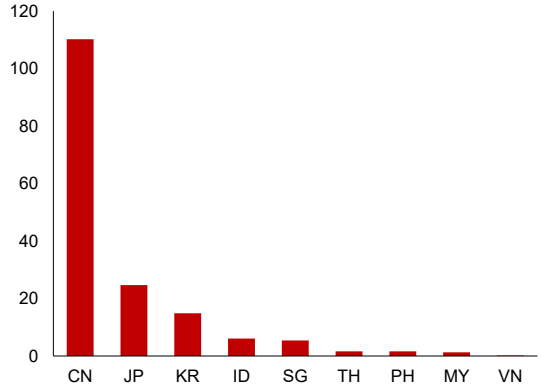
IV. Banks' Ongoing ESG Efforts

16. **Based on broad country-level observations, the ASEAN+3 region appears committed to developing green sectors, through even the COVID-19 pandemic.** For example, ASEAN+3 governments, central banks, and regulatory authorities linked fiscal stimulus projects to increasing levels of financing for low carbon and renewable sectors (for example, China, Japan, and Korea) and encouraged green research and innovation (for example, Singapore) during the pandemic. Also, government agencies have issued green

bonds and rolled out measures—such as the standardization of green standards and introduction of green bond platforms—to promote debt securities markets (for example, Hong Kong and Malaysia). Several other similar responses and actions have been undertaken across the region (Appendix III).

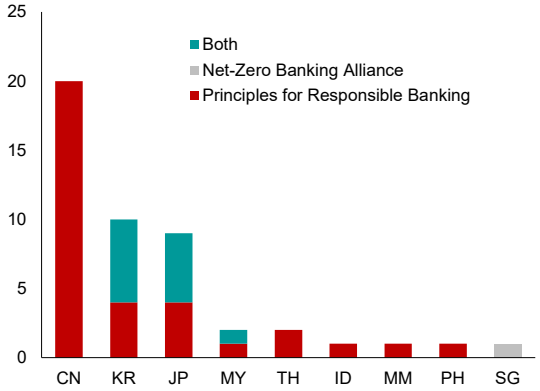
17. **A number of banks in the region have ventured into green financing.** They have been involved in the underwriting or issuance of green bonds, that is, bonds identified by the Climate Bonds Initiative (CBI), where 95 percent of proceeds go to environmental uses (Figure 18).[13] A number of banks in the region are also pledging to work toward a greener environment. To date, 47 ASEAN+3 banks have either become members of the UN Principles for Responsible Banking (PRB) or Net-Zero Banking Alliance (NZBA) (Figure 19).[14]

Figure 18. ASEAN+3 Green Bond Issuances, 2021
(Billions of US dollars)



Source: IMF via Haver Analytics.
Note: CN = China; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Figure 19. Banks with Pledges, as of August 2022
(Number)



Sources: Moody's CreditView; and AMRO staff calculations.
Note: CN = China; ID = Indonesia; JP = Japan; KR = Korea; MM = Myanmar; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand.

18. **Banks within the ASEAN+3 are expected to increase near-term greening efforts, with many central banks and supervisors in the region participating in climate change initiatives.** At the entity-level, banks in the ASEAN+3 region have put several ESG initiatives in place to facilitate sustainable lending (Appendix IV). At the country-level, 10 out of 14 economies in the region are now in the NGFS which is facilitating moves towards a

[13] As an illustration, the Bank of China was involved in underwriting green bonds for a municipal government in 2021 (Leung 2022); Agricultural Bank of China issued a USD 1 billion renminbi-denominated green bond in 2015 (Feng 2015), and Indonesia's Bank Mandiri set out a sustainability bond framework and raised USD 300 million to finance environmentally and socially focused projects in 2021 (Bank Mandiri 2021). In addition, banks in the region have also extended green loans to corporates on sustainable projects or business models, and individuals on mortgages associated with "green buildings." For instance, Standard Chartered Singapore currently offers lower interest rates on mortgage properties with a valid Building and Construction Authority (BCA) Green Mark rating in Singapore (Standard Chartered Bank (Singapore) Limited 2022) and DBS Hong Kong offers a cash rebate to mortgage borrowers for designated residential properties that have received the BEAM Plus Platinum or Gold Rating issued by the Hong Kong Green Building Council (DBS Hong Kong 2022).

[14] The PRB is a framework for ensuring signatory banks' strategies and practices align with the vision that the society has set out in the Sustainable Development Goals and the Paris Climate Agreement. The NZBA is a banking element of Glasgow Financial Alliance for Net Zero (GFANZ) and Race to Zero, working toward an internationally coherent framework and guidelines to decarbonization.

greener path for the financial sector.[15] The authorities' determination to strengthen the resilience of the financial system to climate-related financial risks should see them provide more support to the banks, ensuring an orderly economy wide transition to net zero emissions, through the adoption of effective climate disclosure and putting in place a more coordinated approach to climate change. The commitment to climate change mitigation by banks will bring the countries a step closer to their net zero targets, where a majority have pledged themselves to a 2030 timeline.

V. Strengthening Capacity to Address ESG Risks

19. **Central Banks and supervisors in the region should have a role in ensuring that banks' balance sheets evolve in a sustainable and orderly manner.** ESG has become an increasing concern for policymakers that feed into the conduct of micro- and macro-prudential supervision, but formalized frameworks for information reporting are still at an early stage (Irving Fisher Committee 2021). In the first instance, supervisors should consider integrating their mandates and policy frameworks to include climate risk, beyond meeting regulatory best practices for other more traditional risk areas (Elderson 2021). Some top-down principles, guidance, and long-term policy support from the authorities incorporating views from the financial institutions will lay a solid foundation to facilitate banks' climate change efforts and ensure a level playing field (BCBS 2022b).

20. **Continuous capacity building in the ESG area is necessary for the authorities, such as through the stepping up of relevant manpower and tapping on international resources.**[16] Supervisors need the right skillsets to adequately review banks governance and risk management frameworks to ensure the resilience of business models against climate risks and shocks, which may require some reskilling of manpower to plug the demand-supply gap in green jobs (World Economic Forum 2020). Separately, the principles on effective management and prudential supervision of climate-related financial risks by global standard setters such as the BCBS should provide practical references and guidance for central banks and supervisors in ASEAN+3 in setting their green supervisory plans and agenda for the financial institutions they regulate.

21. **Bottom-up efforts from the banks are also critical, starting with the individual banks putting in place strong climate risk-focused governance frameworks.** This step is fundamental to banks being able to consider the impact of climate-related risks over various time horizons, and then incorporate such risks into their overall business strategies and risk management frameworks (BCBS 2022b). The board and senior management should then clearly assign climate-related responsibilities to members/committees and identify those responsible for managing climate-related risks across the organizational structure. Such efforts would go a long way toward improving the "G" score when assessed by any rating agency, in particular, for the smaller-to medium-sized banks in the region that are lagging.

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[15] The members are Japan, Korea, China, Hong Kong, Indonesia, Malaysia, Thailand, Philippines, Singapore, and Cambodia.

[16] As an example, AMRO is currently working with a variety of partners (including the NGFS, the World Bank and The Public and Third Sector Academy for Sustainable Finance ('P3S Academy') at the University of Oxford) to roll out more comprehensive training and technical assistance on climate risk focused areas for its ASEAN+3 members.

22. **Any re-balancing of banks' balance sheets to focus on green financing would be important in reducing transition risks.** The preliminary findings of this note suggest that a significant share of ASEAN+3 bank loans could face transition risks, largely consistent with Urgewald (2022), which shows that Chinese and Japanese banks are among the top financiers behind coal companies, including the ones on the "Global Coal Exit List" (GCEL). Hence, a priority area for banks in the region is the reduction of loans to fossil fuel and related industries and channeling of funds to sustainable business models, in adherence to standards agreed internationally and by their national governments to achieve a low carbon economy. Currently, funding for projects on affordable clean energy transitions is largely provided by the public sector, with any increase in financing from the private sector likely to be welcomed (International Energy Agency 2021).

23. **Forward-looking assessments would help to measure the impact of climate risks on banks.** Stress tests can help to inform business decisions, especially as the economies transition to low carbon in the near future (Baudino and Svoronos 2021). Establishing comprehensive and detailed climate stress testing capabilities would allow banks to adequately identify and prepare for the range of tail risk scenarios related to climate risk (for example, those from Intergovernmental Panel on Climate Change). While such quantitative assessments are not currently used for regulatory requirements, the findings can be used by ASEAN+3 authorities to engage institutions that have higher concentrations of fossil fuel-related assets and/or liabilities on the books.

24. **Finally, collaboration across banks to align data disclosures, and breakdown by products and loan types can improve the identification of climate change risks:**

- Consistent measurement of ESG loans is critical for establishing a common understanding across banks/countries. Although the ASEAN region has published guidance on a common climate risk-related taxonomy (ASEAN Taxonomy Board 2021), there is still a long way to go in agreeing on common standards and definitions, given that banks are incentivized to negotiate for lower standards for key fossil fuel-related industries that play a major role in their individual economies.

- More detailed classification of sectoral loans enhances transparency on physical and transition risks, and facilitates more comprehensive risk assessments and business planning. This step is particularly important given the disparity in climate change efforts among financial institutions, reducing the scope for "climate arbitrage" and greenwashing. Only about a third of global banks (including those in the Asia-Pacific) are able to quantitatively assess physical and transition risks (Sutcliffe 2021), due in part to the less than granular breakdown of loans by sectors.

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Appendix I. Scoring Banks' ESG Efforts

There are 3 channels through which each of the ESG components affect borrowers' credit worthiness. They are briefly described below:

- **Environmental ("E").** Both carbon transition and physical climate risks with implications on borrowers' balance sheets are considered. Clean-up costs in relation to waste and pollution are also included. Bank vulnerabilities could be mitigated by country-specific policy initiatives that reduce environmental hazards and/or improve climate change infrastructures and technologies.

- **Social ("S").** Customer relations, health and safety, and supply-chain considerations could affect borrowers' production lines. Government expenditure and investments in education would play a role in reducing social risks.

- **Governance ("G").** Accounts for financial strategy and risk management, organizational structure, compliance and board structure of the bank. Poor governance exacerbates the other two types of risks (that is, environmental and social), whereas good governance improves a bank's resilience to the various shocks.

Appendix II. Loans to Climate Change-Related Sectors

Appendix Table 1. Mapping of Sectoral Loans to Climate Change Related Sectors

Sector		Member				
		Brunei	Cambodia	China	Hong Kong	Indonesia
AFOLU		• Agricultural	• Agriculture, forestry and fishing	• Agricultural loans • Loans to farmers		• Agriculture, forestry and fishery
Buildings	**Development and construction**	• Commercial property development • Infrastructure	• Construction	• Housing development, land development, and others (proxied used housing development loans and land development loans)	• Building and construction	• Construction
	Mortgage loans	• Land purchases and constructions • Housing purchase • Interior home improvement • Structural home improvement	• Real estate activities • Rental and operational leasing activities	• Individual housing loans	• Purchase of flats in home ownership • Purchase of other residential	• Real estate • Housing • Flat and apartment • Shophouse and officehouse
Energy systems			• Mining and quarrying • Utilities			• Mining and quarrying • Electricity and gas supply
Industry		• Manufacturing	• Manufacturing	• Medium and long term industrial loans	• Manufacturing	• Manufacturing industry • Water supply, sewerage, waste management and remediation activities
Transport		• Transportation • Automobile loans	• Transport and Storage		• Transport/ transport equipment	• Transport and storage • Vehicles • Wholesale and retail trade; repair of motor vehicles and motorcycles
Other loans (non-ESG)		• Credit card • Consumer durables • General consumption loans • Financial • Traders • Services • Tourism • Telecommunication and information technology • Foreign lending	• Wholesale trade • Retail trade • Hotels and restaurants • Information media and telecommunication • Other nonfinancial services • Personal essentials • Other sectors • Financial institutions	• Others • Medium and long term service sector loans	• Telecommunication • Information technology • Information technology – others • Wholesale and retail trade • Hotels and accommodation • Financial concerns • Stockbrokers • Other individual loans • Other loans • Foreign loans (estimated)	• Accommodation and food service activities • Information and communication • Financial and insurance activities • Business services • Public administration and defence; compulsory social security • Education • Health and social work activities • Other services activities • Other household loans
Source		Brunei Darussalam Central Bank (BDCB)	National Bank of Cambodia (NBC)	People's Bank of China (PBC)	Hong Kong Monetary Authority (HKMA)	Bank Indonesia (BI)

Sectors		Member				
		Japan	Korea	Lao PDR	Malaysia	Myanmar
AFOLU		• Agriculture and forestry • Fishery	• Agriculture, forestry and fishing	• Agriculture and forestry	• Primary agriculture	• Agriculture loans
Buildings	**Development and construction**	• Construction	• Construction	• Construction	• Construction loans	• Construction
	Mortgage loans	• Real estate • Loans for housing funds and consumer credit		• Real estate	• Housing loans	• Real estate activities • Business facilities management and business support services, rental and leasing activities
Energy systems		• Mining and quarrying of stone and gravel • Electricity, gas, heat supply, and water	• Mining and quarrying		• Mining and quarrying • Electricity, gas, and water	
Industry		• Manufacturing	• Manufacturing • Electricity, gas, steam, and conditioning supply • Water supply, sewerage, waste management, and materials recovery	• Industry • Materials and supplies	• Manufacturing	• Production loans
Transport		• Transport and postal activities	• Transportation and storage	• Transport	• Transport, storage, and communications	• Transportation loans
Other loans (non-ESG)		• Information and communications • Wholesale trade • Retail trade • Finance and insurance • Goods rental and leasing • Scientific research, and professional and technical services • Hotels • Eating and drinking services • Personal and amusement services • Education and learning support • Medical, healthcare, and welfare services • Other services • Local governments • Card loans • Other personal loans (estimated) • Overseas yen loans and domestic loans transferred overseas	• Accommodation and food service • Information and communications • Financial and insurance • Professional, scientific and technical activities • Education • Human health and social work • Public administration and other activities • Wholesale and retail trade	• Commerce • Services • Handicrafts • Others	• Finance, insurance and business activities • Education, health, and others • Household sector • Other sectors • Wholesale and retail trade, hotels and restaurants	• Trading loans • Services loans • General loans • Hire purchase loans • Small and Medium Enterprise (SME) loans
Source		Bank of Japan (BOJ)	Bank of Korea (BOK)	Bank of the Lao PDR (BOL)	Bank Negara Malaysia (BNM)	Central Bank of Myanmar (CBM)

Sectors		Member			
		Philippines	**Singapore**	**Thailand**	**Vietnam**
AFOLU		• Agriculture, forestry, and fishing	• Agriculture, mining, and quarrying	• Agriculture, forestry, and fishing	• Agriculture, forestry, and fishery
Buildings	**Development and construction**	• Construction	• Building and construction	• Construction	• Construction
	Mortgage loans	• Real estate activities	• Housing and bridging loans	• Real estate activities • Personal consumption: land • Personal consumption: housing • Personal consumption: land and housing for other purposes	• Mortgage and loans (estimated)
Energy systems		• Mining and quarrying • Electricity, gas, stream, and air conditioned supply		• Mining and quarrying • Electricity, gas, steam, and air conditioning supply • Water supply, sewer, waste management, and remediation activities	
Industry		• Manufacturing • Water supply, sewerage, and waste management	• Manufacturing	• Production	• Industry
Transport		• Transportation and storage • Motor vehicle loans	• Transport and storage • Car loans	• Transportation and storage	• Transportation/ telecommunication
Other loans (non-ESG)		• Wholesale, retail trade, and repair of vehicles • Accommodation and food service activities • Information and communication • Financial and insurance activities • Professional, scientific, and technical activities • Administrative and support service activities • Public administration and defence • Education • Health and social work • Arts, entertainment, and recreation • Other service activities • Activities of households as employers • Credit cards • Salary loans • Others	• Wholesale trade • Retail trade • Accommodation and food services activities • Information and communication • Financial institution • Business services • Professional and private Individuals • Other commercial loans • Credit cards • Share financing • Other personal loans	• Hotels and restaurants • Information and communication • Financial and insurance activities • Wholesale, retail trade, and repair of vehicles • Admin and support service activities • Other loans • Personal consumption: hire purchase • Personal consumption: education • Personal consumption: travelling - overseas employment • Other personal consumption	• Trade • Other activities (deducted mortgage)
Source		Bangko Sentral ng Pilipinas (BSP)	Monetary Authority of Singapore (MAS)	Bank of Thailand (BOT)	State Bank of Vietnam (SBV)

Appendix III. The Region's Transitioning Efforts to a Low-Carbon Economy

Appendix Table 2. Selected ASEAN+3: Actions Taken to Transition to Low-Carbon Economy during the COVID-19 Pandemic

Economies	Actions
China	• President Xi, in his United Nations' speech in September 2020, pledged that China will achieve carbon neutrality before 2060, and announced that the country will pursue green recovery in the post-COVID era (United Nations 2020). • In July 2020, China through its Ministry of Finance, Ministry of Ecology and Environment and Shanghai city government, launched the National Green Development Fund, which seeks to assist the green transformation of the Chinese economy and reinforce the market's role in combating pollution (State Council of the People's Republic of China 2019). In its first phase, the environmental fund raised CNY 88 billion, which was used to invest in green projects such as environmental protection and pollution prevention, green transportation and clean energy (Reuters Staff 2020). • To develop the green bond market in China, the People's Bank of China (PBC), in conjunction with the National Development and Reform Commission (NDRC) and China Securities Regulatory Commission (CSRC), jointly issued a consultation paper on "Green Bond Endorsed Project Catalogue (2021 Edition)" (PBC 2021). The paper removed the controversial option to have "clean" coal projects financed within green bond proceeds, which will increase investors' confidence and willingness to buy China's green bonds. Domestic green bond standards are also harmonized—previously, green corporate bonds had to comply with the standards in the Guidelines on Green Bond Issuance issued by NDRC and/or the standard in the Green Bond Endorsed Project Catalogue issued by the PBC.
Hong Kong	• In Hong Kong, the Government, along with the HKMA and Securities and Futures Commission (SFC), established the Green and Sustainable Finance Cross-Agency Steering Group in May 2020 (HKMA 2020). The Steering Group coordinates the management of climate and environmental risks to the financial sector, accelerating the growth of green and sustainable finance in Hong Kong and supporting the climate strategies of the government. • To encourage the participation of bond market players in enhancing the green finance ecosystem in the region, the Hong Kong Exchanges and Clearing Limited (HKEX) launched the Sustainable and Green Exchange (STAGE) in December 2020 (HKEX 2020). It was a first-of-its kind sustainable finance platform in the Asia region, which serves as a central hub for data and information on sustainable and green-finance investments. A few financial institutions and corporations in Hong Kong have also issued green bonds. For instance, the MTR Corporation that runs Hong Kong's Mass Transit Railway, announced in August 2020 that it had issued a USD 1.2 billion green bond, widely perceived as a move to alleviate the financial damage faced by the company due to the COVID-19 outbreak (Yau 2020). • The Hong Kong Quality Assurance Agency (HKQAA), the government agency that had initiated the Green Finance Certification Scheme to promote green finance in Hong Kong, launched the COVID-19 Resilience Finance Certification Scheme in 2020 (HKQAA 2022). The scheme aimed to bring in additional bodies to invest in projects related to COVID-19 prevention, control, and recovery, and strengthen resilience against the pandemic.
Japan	• In December 2020, the then Prime Minister Suga announced the government's launch of a JPY 2 trillion innovation fund in order to support ambitious green projects for the next 10 years (Prime Minister of Japan 2020). To achieve the goal of carbon neutrality by 2050, the fund will position hydrogen as a new source of power and create large-scale and low-cost hydrogen production equipment.
Korea	• In July 2020, the Korean government announced a Green New Deal worth approximately KRW 73.4 trillion to prepare the Korean economy for economic growth after the COVID-19 induced downturn (Korean Ministry of Economy and Finance 2020). The COVID-19 stimulus package will be used to rebuild the country's economy in a cleaner and greener way, focusing on three main areas: (1) green transition of infrastructures; (2) a low-carbon and decentralized economy; and (3) innovation in the green industry. The deal includes substantial investment in renewable energy, the introduction of a carbon tax, and the phasing out of domestic and overseas coal financing by public sector institutions. • In April 2020, Kookmin Bank issued a COVID-19 Response Sustainability Bond for USD 500 million (Hwang 2020). It was the first corporate bond issued in the country, which was intended to support government efforts to mitigate the economic slowdown due to the pandemic. A part of the proceeds will be used to extend loans to COVID-19-hit small and medium-sized enterprises (SMEs), home businesses and small offices. The remaining proceeds will be used to finance and/or refinance new and existing ESG-related projects in accordance with the bank's sustainable financing framework.

Economies	Actions
Malaysia	• Even before COVID-19, Malaysia had issued both Green Bonds and Green Sustainable and Responsible Investment (SRI) sukuks. Green SRI sukuks are Shariah-compliant sustainable and responsible certificates for renewable energy and other environmental sustainability projects. • Early in 2020, the Malaysian Government issued an innovative first-of-its-kind MYR 500 million Sukuk Prihatin (Mohd Yunus 2020), which was open to retail and corporate investors. The bond is part of the National Economic Recovery Plan launched on 5 June 2020, to finance micro SMEs, especially female entrepreneurs, to support grants for research into infectious diseases, and improve connectivity for rural schools. A framework for those issuances had been established in 2020 to further spur the issuance of social bonds related to COVID-19 (The Bond and Sukuk Information Exchange 2020). • The country's budget for 2021 also had a sustainability focus and set out to further support the Sustainability Development Goals (WWF Malaysia 2020). Following the strong interest in the Sukuk Prihatin, the government decided to issue its first Sustainability Bond. In addition, the income tax exemption for Sustainable and Responsible Investment (SRI) Green Sukuk grant that includes all types of sukuks and bonds has been extended up to 2025. An allocation of MYR 2 billion for two years up to 2022 for the Green Technology Financing Scheme has also been approved.
Singapore	• In a speech during the opening of Singapore's 14th Parliament in 2020, President Halimah remarked that the Government would make a major push for sustainable growth, which included a push for green financing and sustainable infrastructure development across the region, to ride on Asia's growth while protecting the environment (Chew 2020). The remark was followed by an announcement from the Minister for Sustainability and the Environment that there would be a push for "green recovery" from COVID-19 and support for a competitive transition to a low-carbon and climate-resilient future (Mohan 2020). • The MAS has been taking active measures to promote green and sustainable financing in the financial sector. In June 2020, the MAS launched a SGD 1.75 million MAS Global FinTech Innovation Challenge to seek innovative solutions to assist financial institutions in building their resilience against the COVID-19 pandemic and climate change (MAS 2020a). • In collaboration with research institutes and universities, the MAS has also launched the first research institute in Singapore dedicated to green finance research and talent development (MAS 2020b). The Singapore Green Finance Centre (SGFC) aims to cultivate a strong pipeline of talent in green finance for financial institutions and service providers. • To develop more green and sustainable finance products and markets, the MAS launched the Green and Sustainability-Linked Loan Grant Scheme (GSLS), which became effective from 1 January 2021 (MAS 2020c). The objectives of the grant were twofold: (1) support corporates' green and sustainable financing by defraying the expenses incurred from engaging with independent advisors to validate green and sustainability-linked loans; and (2) encourage banks to develop frameworks for green and sustainability-linked loans that enhance the availability of funding to corporates (including SMEs).
Thailand	• In August 2020, the government issued its first sustainability bond for THB 30 billion (Bangkok Post 2021). The first THB 10 billion tranche was used to finance green infrastructure for the Mass Rail Transit Orange Line (East) project. The remaining THB 20 billion was used to finance economic and social impact projects to support the country's recovery from the COVID-19 pandemic, including job creation for SMEs and local public infrastructure development with social and environmental benefits.

Sources: National authorities; national exchanges; United Nations; various media; WWF Malaysia; and AMRO staff compilation.

Appendix IV. ASEAN+3: Examples of Banks' ESG Efforts

Banks in the ASEAN+3 region have put several ESG initiatives in place. Some of these actions have been promoted or led by the respective authorities, such as the Bangko Sentral Ng Pilipinas (BSP) that set out expectations of banks embedding sustainability principles in their corporate governance framework (BSP 2020), and the HKMA's collaboration with the relevant international bodies to provide technical support to banks to better understand the green methodology and principles (HKMA 2022). The more commonly observed ones led by the banks themselves are illustrated below:

- **Establishing board/council**—establishing climate steering committees to oversee and promote overall sustainability initiatives. As an example, Maybank of Malaysia has set up a Board Sustainability Committee that is responsible for ESG actions across the organization, including the review of ESG-related governance, principles and priorities (Maybank 2022).

- **Reporting**—publishing sustainability strategy, initiatives and performance across the key business units and operations. As an example, Kasikornbank Public Company Limited of Thailand has prepared sustainability reports annually since 2012, covering the bank's activities that have significant impact on the environment (Kasikornbank 2022).

- **Carbon accounting and climate-related scenario analysis**—measuring portfolio GHG emissions and conducting scenario analyses to assess the bank's resilience to physical and transition risks. As an example, Shinhan Financial Group of Korea uses the methodology developed by the Partnership for Carbon Accounting Financials to measure carbon emissions of financial assets and uses a Paris Agreement-based scientific tool presented by the Science Based Target initiative (SBTi) to establish the bank's goal of reducing emissions (Shinhan Financial Group 2021).

- **Improving disclosure and client engagement**—disclosing ESG practices, business activities, financial situation, tax contribution and performance, in accordance with applicable regulations and industry practices. As an example, at the "One Plant Summit" held in Paris in 2017, the Sumitomo Mitsui Banking Corporation (SMBC) Group of Japan announced its support for the Task Force on Climate-Related Financial Disclosures (TCFD) that was established by the Financial Stability Board (SMBC 2021).

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