

A close-up photograph of several ants crawling along a green plant stem. The background is a soft, out-of-focus green.

Nature at a tipping point

How investors in Asia Pacific can manage nature-related risks

Report | 14 minute read | May 28, 2024

PwC analysis reveals 58% of the combined market capitalisation of Asia Pacific stock exchanges (US\$17 trillion) includes companies with higher or moderate dependency on nature¹. So, how can investors and investee companies mitigate these risks and integrate them into their strategies?

Nature is defined as occurring in four realms – land, ocean, freshwater and the atmosphere. Within each realm, there are different types of natural ecosystem or ‘biome’, such as tropical forests, rivers and streams. Ecosystems are natural assets that provide ‘ecosystem services’ on which the world depends, such as fresh water for drinking and irrigation and pollination of crops by insects, birds and other animals².

Right now, nature is declining faster than at any point in human history. The Asia Pacific region alone is experiencing alarming levels of nature loss, posing serious challenges to both the environment and the economy. Nature loss threatens business operations, supply chains and productivity.

PwC analysis shows the undeniable and substantial risk inherent in the decline of nature associated with impact to business and 53% of Asia Pacific economic gross value added (GVA) are moderately or highly dependent on nature, amounting to US\$18 trillion³.

In collaboration with the Asia Investor Group on Climate Change (AIGCC), PwC has released “Nature at a Tipping Point”, a guide for investors in the Asia Pacific region on understanding and identifying nature-related risks to achieve a nature-positive future. Through the working relationship, AIGCC and PwC aim to build awareness and encourage action towards the protection and restoration of the region’s natural environment.

Asia Pacific is home to a diverse natural ecosystem that is essential for sustaining economic development and there’s a rising risk of nature loss in the region.

- The World Wide Fund for Nature (WWF) estimates that the region's ecosystem health has declined by 55% since 1970⁴
- 53% of the region’s industries GVA are highly or moderately dependent on nature⁵
- 58% of Asia Pacific stock exchanges’ market capitalisation is moderately or highly dependent on nature⁶

Globally, 55% of the industries’ gross domestic product (GDP) are highly or moderately dependent on nature and 51% of the listed companies’ market capitalisation on 19 of the world’s largest stock exchanges are highly or moderately dependent on nature.⁷



Increasing pressure to address nature loss

Inaction in preventing nature degradation could lead to significant direct and indirect material economic and financial risks. In recent years, the importance of addressing nature loss has become more apparent.

1. Target 15 of the Kunming-Montreal Global Biodiversity Framework⁸ requires governments to ensure large companies and financial institutions monitor, assess, and disclose biodiversity-related risks, dependencies, and impacts by 2030.
2. The Task Force for Nature-Related Disclosure (TNFD) recommendations, aligned to TCFD, provide a risk management and opportunities disclosure framework for the private sector to identify, assess, respond to and disclose nature-related issues.
3. Mandatory regulatory requirements are being introduced that address nature-related risks such as the EU Deforestation Regulation (EUDR), the UK Environmental Act on the due diligence on forest risk commodities and the US Forest Act of 2023.^{9 10}
4. Government policies that support nature-relevant activities are being introduced, such as Singapore's carbon tax, Indonesia's carbon trading scheme for forestry and land use sectors, and Malaysia's recently announced tax incentives for reforestation and conservation activities.

There is a growing expectation from regulators, shareholders, consumers, and civil society for investors in the Asia Pacific region to take responsibility and ensure that investments are not causing detrimental impacts on nature and to properly assess and manage nature-related risk.

Understanding nature-related risks can also help investors explore opportunities to support nature restoration and regeneration. The reversal of biodiversity loss presents more than US\$10 trillion of economic value that could potentially be generated through solutions with a positive impact on nature.¹¹



Sector dependency on nature in Asia Pacific

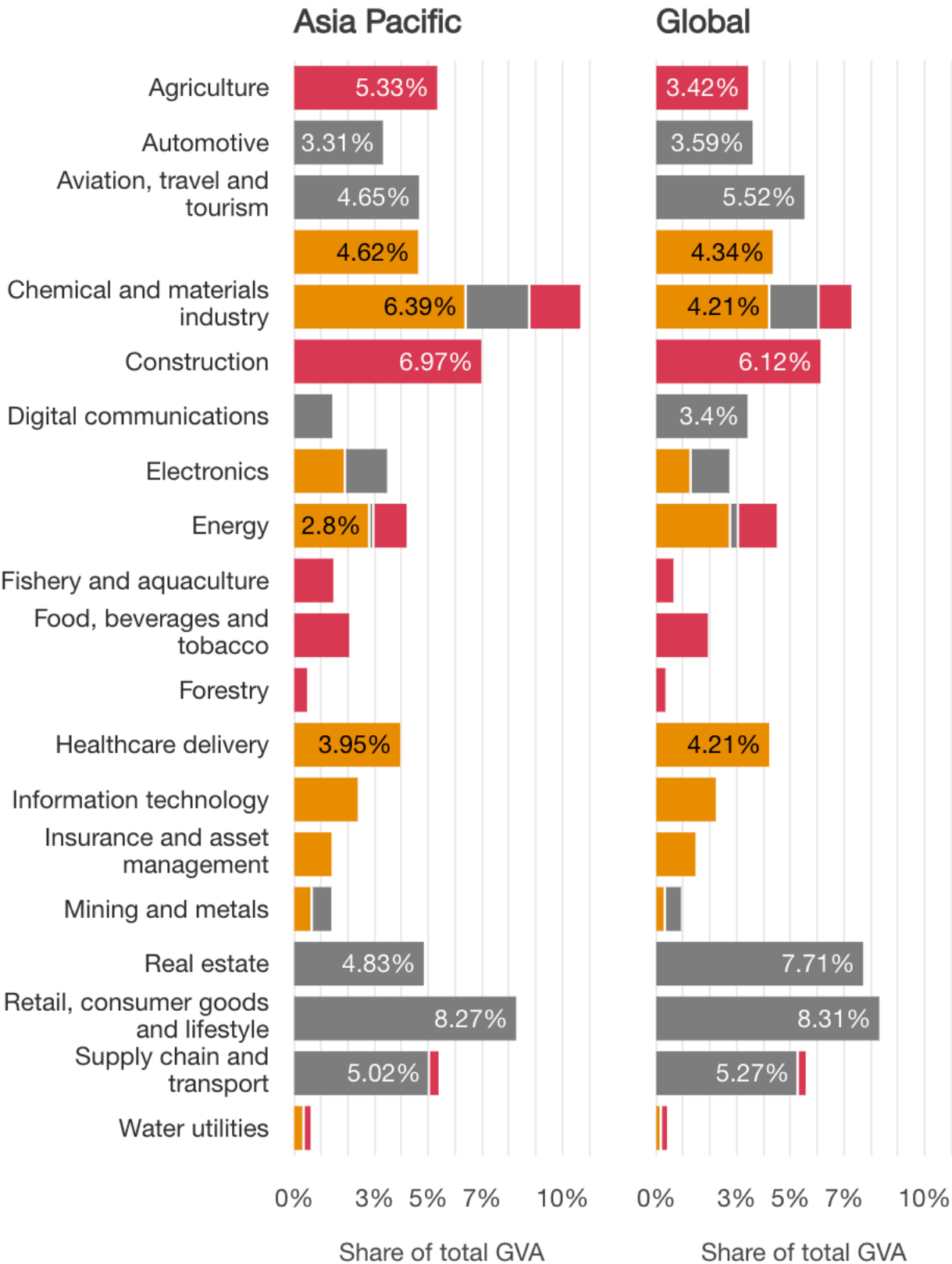
Almost every sector of the Asia Pacific economy is directly dependent on nature to a varying degree based on the ecosystem services that are being utilised. This dependency on nature and ecosystem services will likely translate into economic and financial risk if nature degradation and the impacts of this on economic actors are overlooked, and not properly considered in strategy, risk management and capital allocation decision making.

In this report, we analysed 20 individual sectors and found that the economy's higher dependency areas, which include nine sectors, account for 20% of GVA in Asia Pacific. Out of the nine higher dependency sectors, agriculture, construction, and food, beverages and tobacco collectively account for the majority (72%) of the GVA in this segment. The other six sectors are forestry, fishery and aquaculture, water utilities, energy, chemical and materials, and supply chain and transport.

The top three higher dependency sectors are heavily dependent on direct physical inputs from ecosystem services to maintain their production process, especially the availability of groundwater and surface water. In addition, the agriculture sector heavily relies on ecosystem services that enable production processes including pollination, soil and water quality and the hydrological cycle. Degradation of nature will diminish the capacity of nature to provide ecosystem services crucial to these sectors leading to a potentially significant financial material risk to them.

Sector share of total GVA (gross value added) and direct operations dependency on nature for global and Asia Pacific

■ Higher nature dependency
 ■ Moderate nature dependency
■ Lower nature dependency



Source: EXIOBASE, ENCORE database, PwC analysis



Nature-related risks and Asia Pacific capital markets

Analysing the nature dependency of companies in Asia Pacific stock exchanges provides an additional perspective of the dependency of the capital markets on nature. Understanding the dependency of stock exchanges is especially important for institutional investors that are predominantly invested in public capital markets to enable better understanding of their portfolio exposure to nature-related risk.

For individual exchanges in the Asia Pacific region, the share of stock market capitalisation comprising listed companies that are highly or moderately dependent on nature ranges broadly between 38% (on the National Stock Exchange of India (NSEI) and 75% (on the New Zealand Stock Exchange (NZX)). The variation is due to differences in sector composition, choice of listing location and market capitalisation¹⁰.

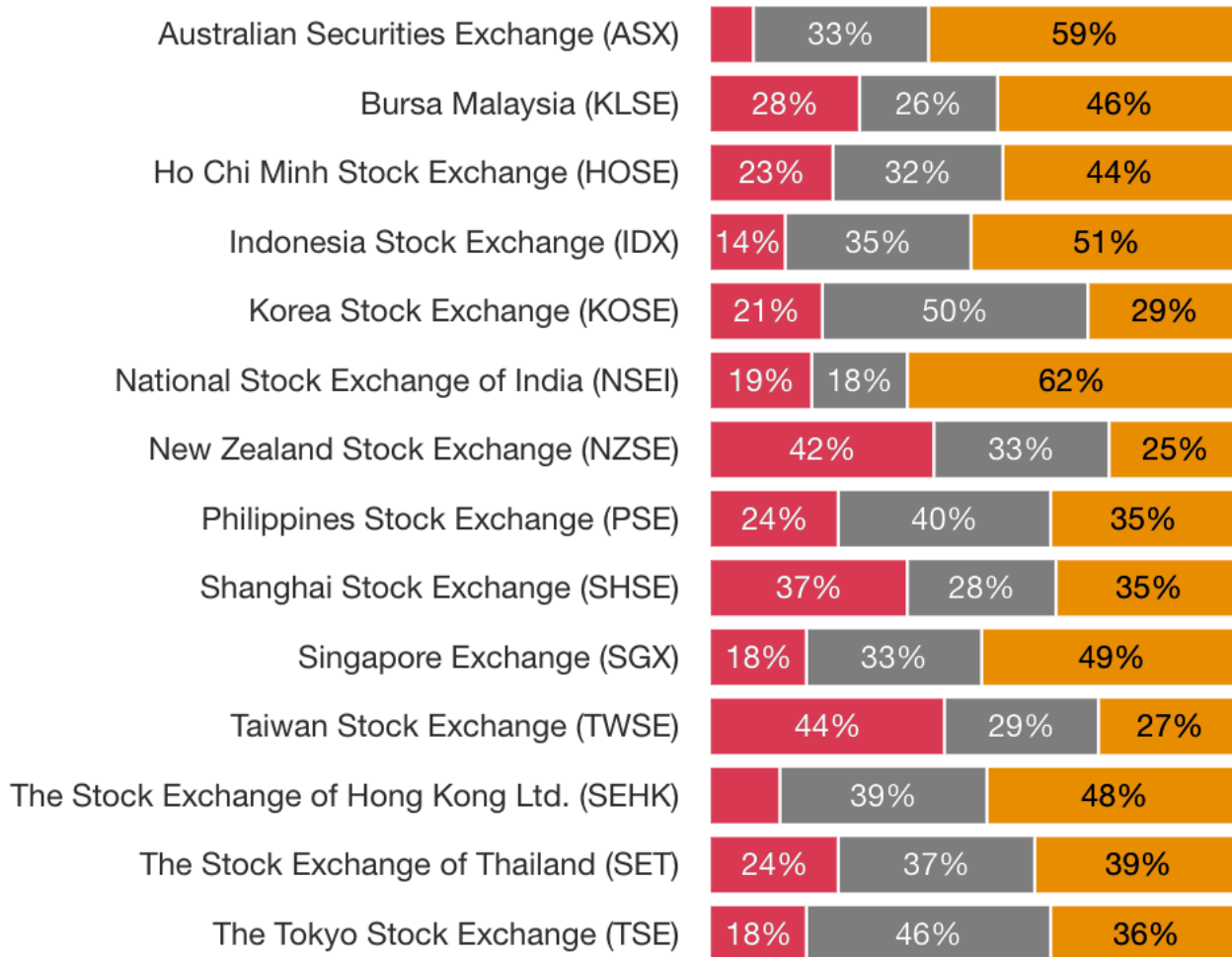
58%

of the combined market capitalisation of Asia Pacific stock exchanges (US\$17 trillion) includes companies with higher or moderate dependence on nature.

PwC analysis, EXIOBASE, ENCORE database, 2024

Share of market capitalisation by dependency of nature

■ Higher nature dependency
 ■ Moderate nature dependency
■ Lower nature dependency



For the detailed individual stock exchange dependency on nature, please refer to the interactive chart below.

- 11 out of the 14 stock exchanges fell into the higher to moderate dependency on nature, i.e. these are the three with highest value that's dependent on nature: New Zealand Stock Exchange (NZSE), Taiwan Stock Exchange (TSE), and Korea Stock Exchange (KOSE) at 75%, 73% and 71% respectively.
- The energy and food, beverage, and tobacco sectors predominantly contribute to higher to moderate dependency rating across these exchanges.
- Only three stock exchanges fall into the category of lower dependence on nature, namely the National Stock Exchange of India (NSEI), Australian Securities Exchange (ASX) and Indonesia Stock Exchange (IDX).
- Notably, the information technology, banking and capital markets sectors emerge as top contributors to lower nature dependency across these exchanges, as they rely on digital infrastructure, skilled human capital, and technological innovations to operate, reducing direct reliance on natural resources.

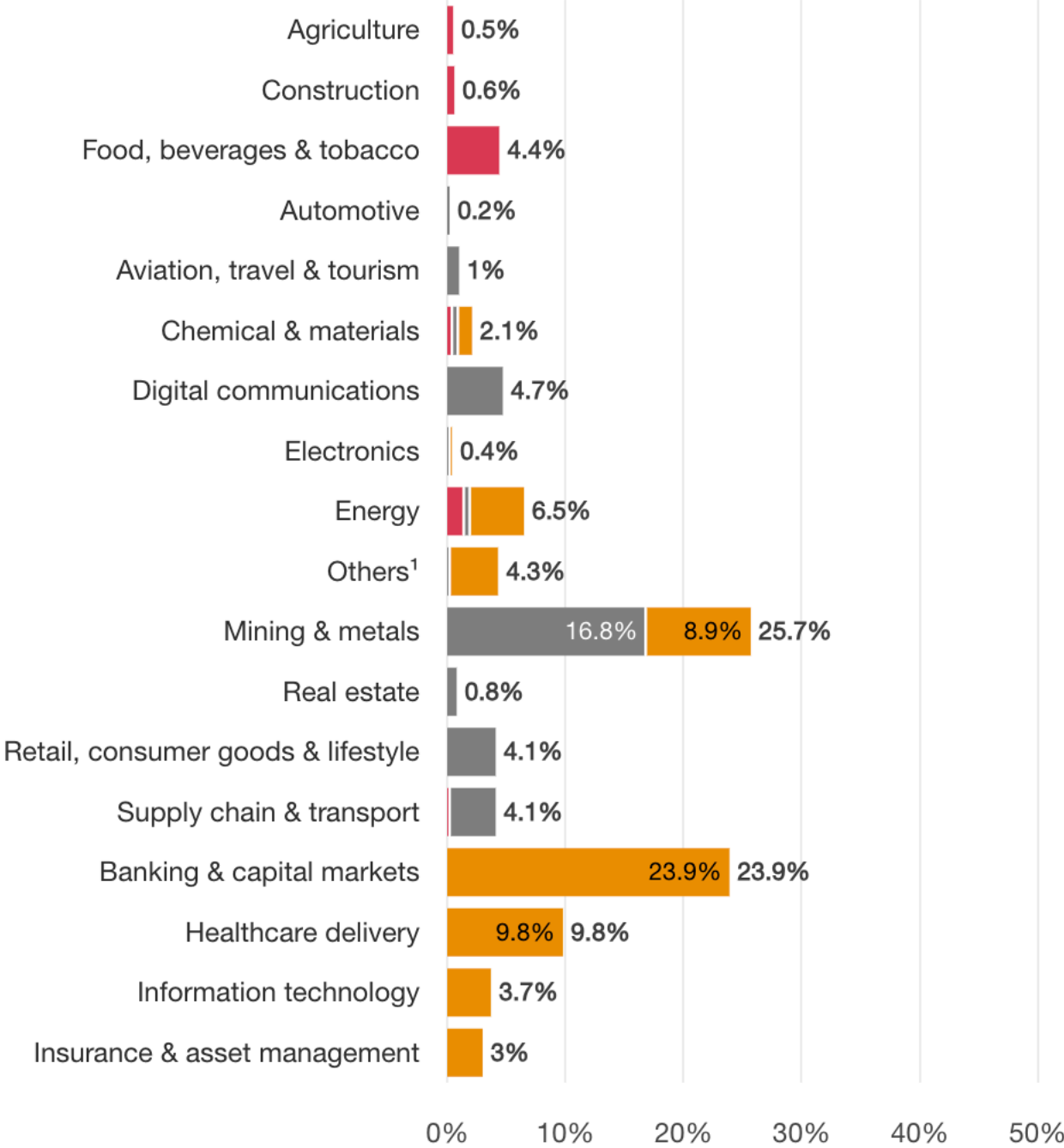
Although nature dependence is generally less significant in these industries, there will be some exceptions from indirect exposure. An example is the healthcare delivery industry, which has dependence upstream in its supply chain, due to nature's role in the production of medicines.

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

Australian Securities Exchange (ASX)

■ Higher nature dependency
 ■ Moderate nature dependency
 ■ Lower nature dependency

The Australian Securities Exchange has a total market capitalisation of US\$600 billion in sectors with high to moderate dependency on nature, representing 41% of the exchange's entire value. Mining, metals, and energy are the leading...



¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

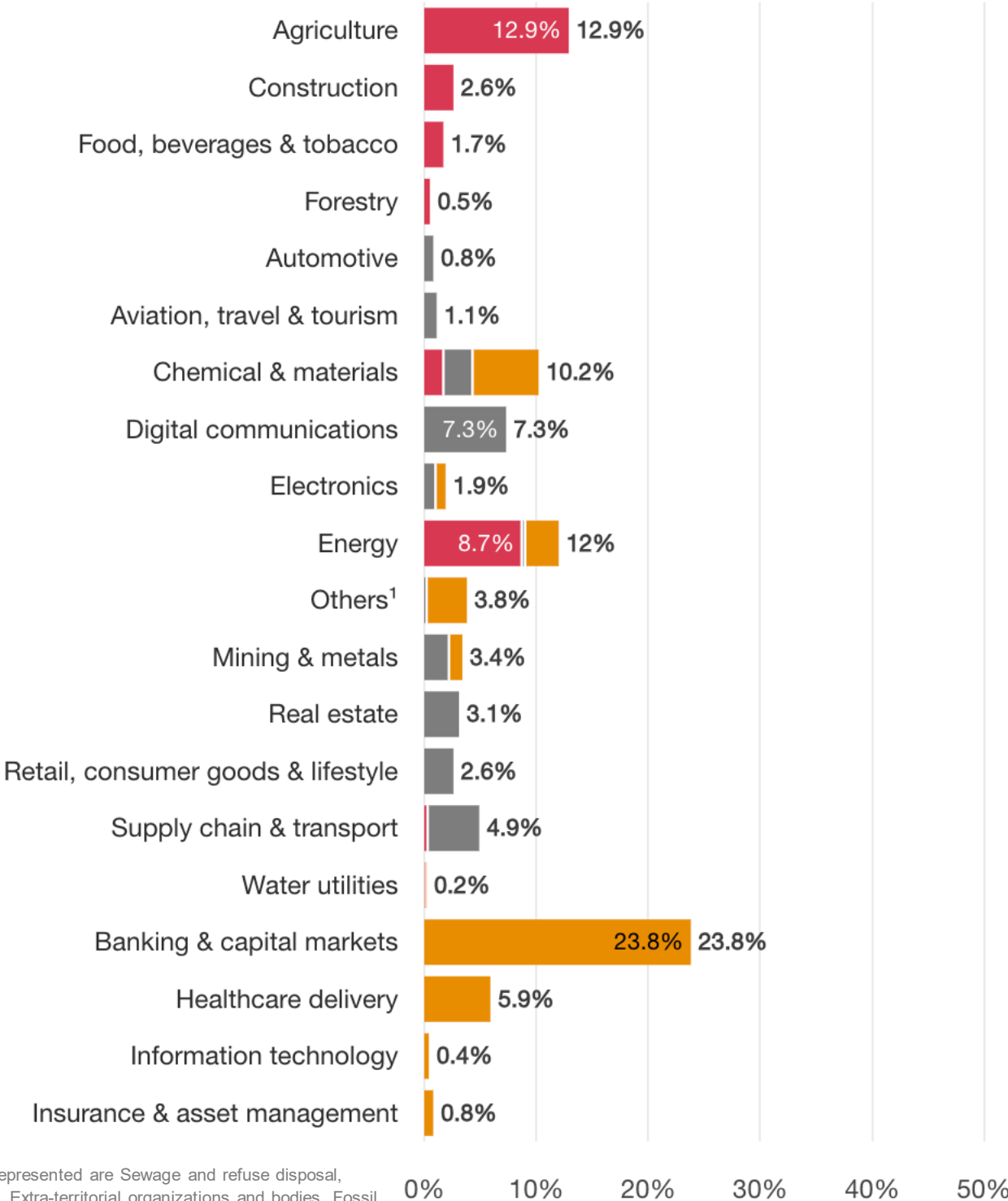
Source: EXIOBASE, ENCORE database, PwC analysis

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

Bursa Malaysia (KLSE)

■ Higher nature dependency
 ■ Moderate nature dependency
 ■ Lower nature dependency

Bursa Malaysia has a total market capitalisation of US\$199 billion, with companies in sectors with high to moderate dependency on nature accounting for 54% of the exchange's overall market value. Agriculture and energy are the mo...



¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

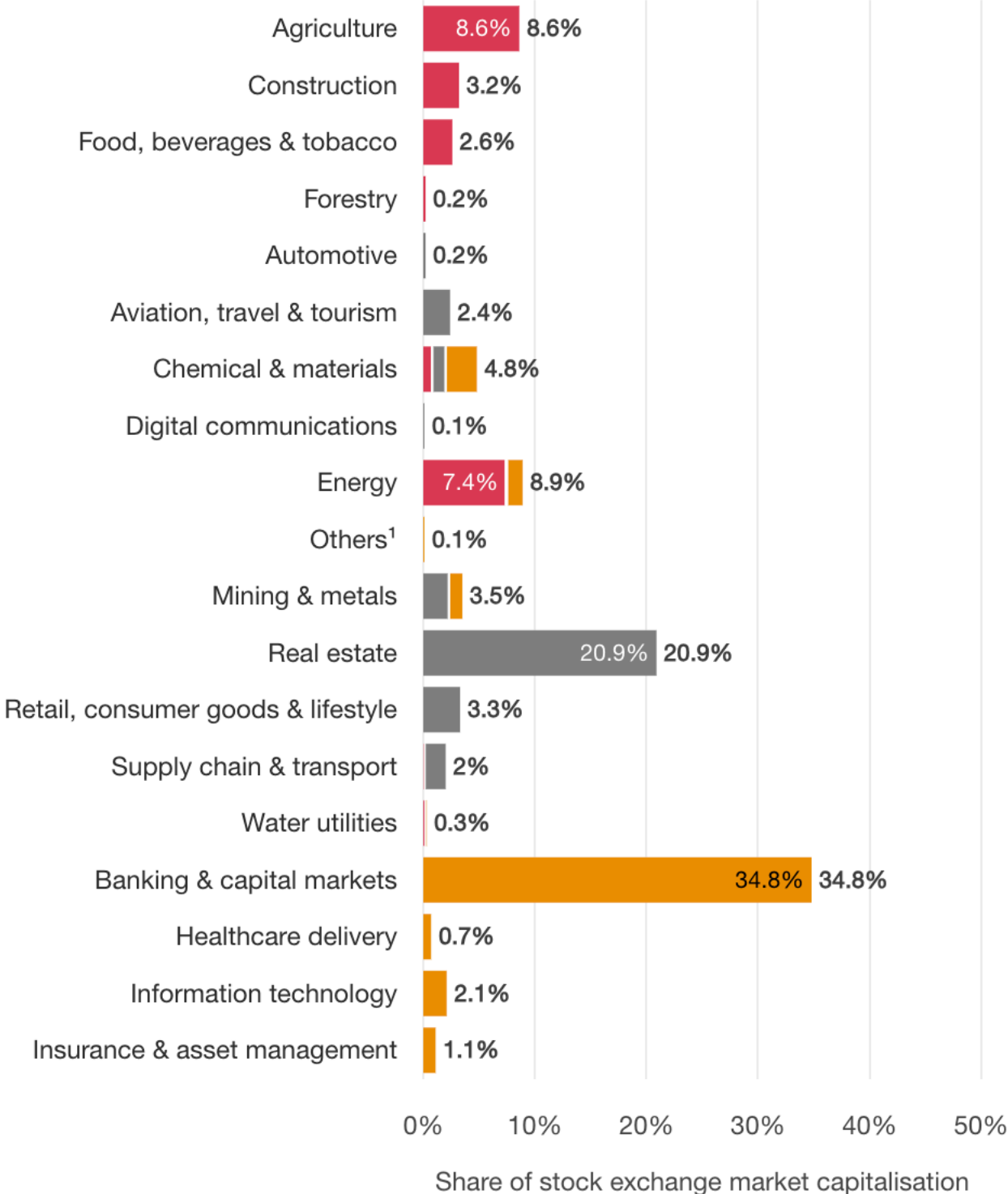
Source: EXIOBASE, ENCORE database, PwC analysis

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

Ho Chi Minh Stock Exchange (HOSE)

■ Higher nature dependency
 ■ Moderate nature dependency
 ■ Lower nature dependency

The Ho Chi Minh Exchange has a total market capitalisation of close to US\$113 billion in sectors with high to moderate dependency on nature, representing 55% of the exchange's entire value. The most significant are the real estate and ener...



¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

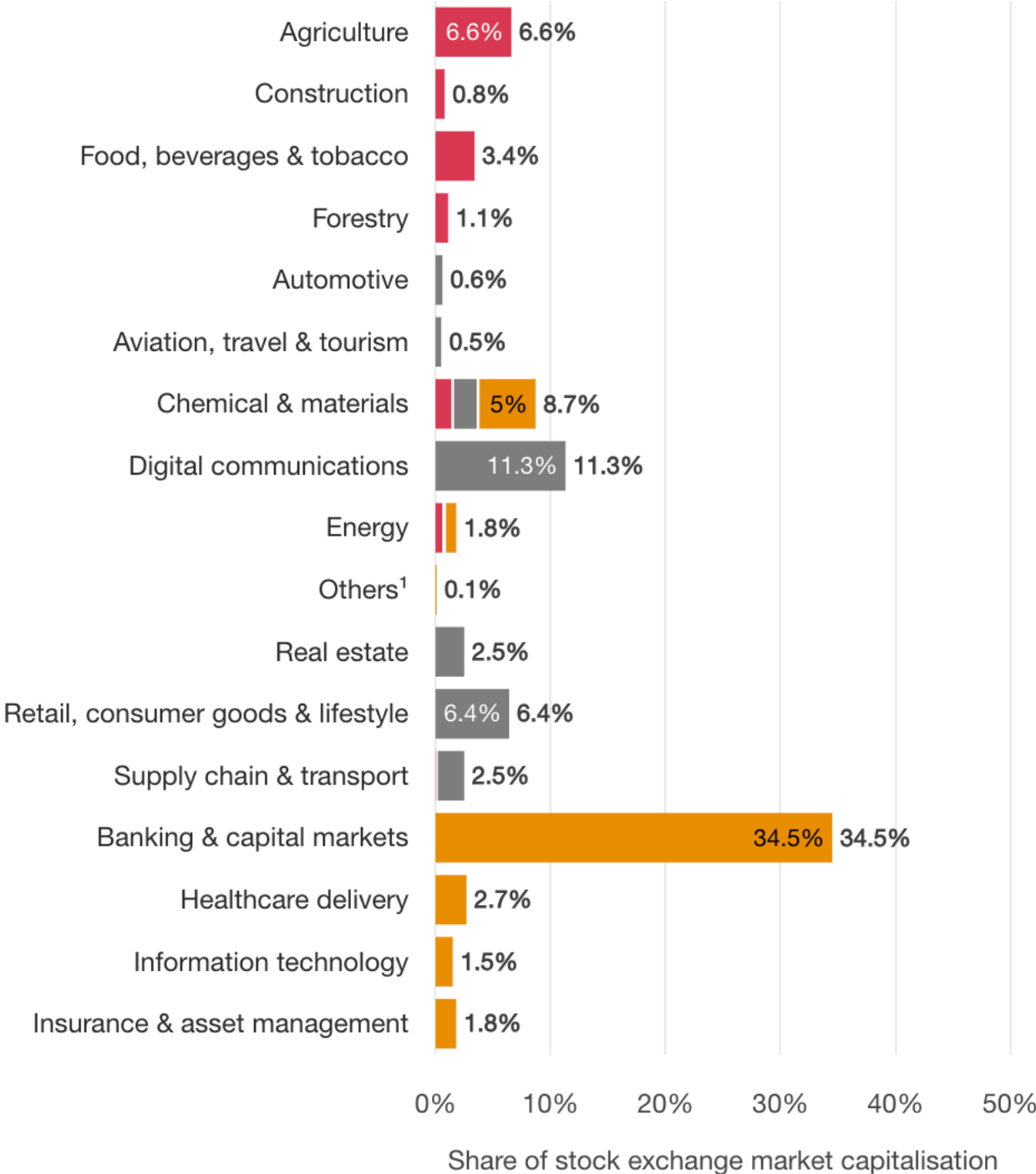
Source: EXIOBASE, ENCORE database, PwC analysis

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

Indonesia Stock Exchange (IDX)

■ Higher nature dependency
 ■ Moderate nature dependency
 ■ Lower nature dependency

The Indonesia Stock Exchange has a total market capitalisation of more than US\$290 billion in sectors with high to moderate dependency on nature, representing 49% of the exchange's entire value. Mining and metals and digital...



¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

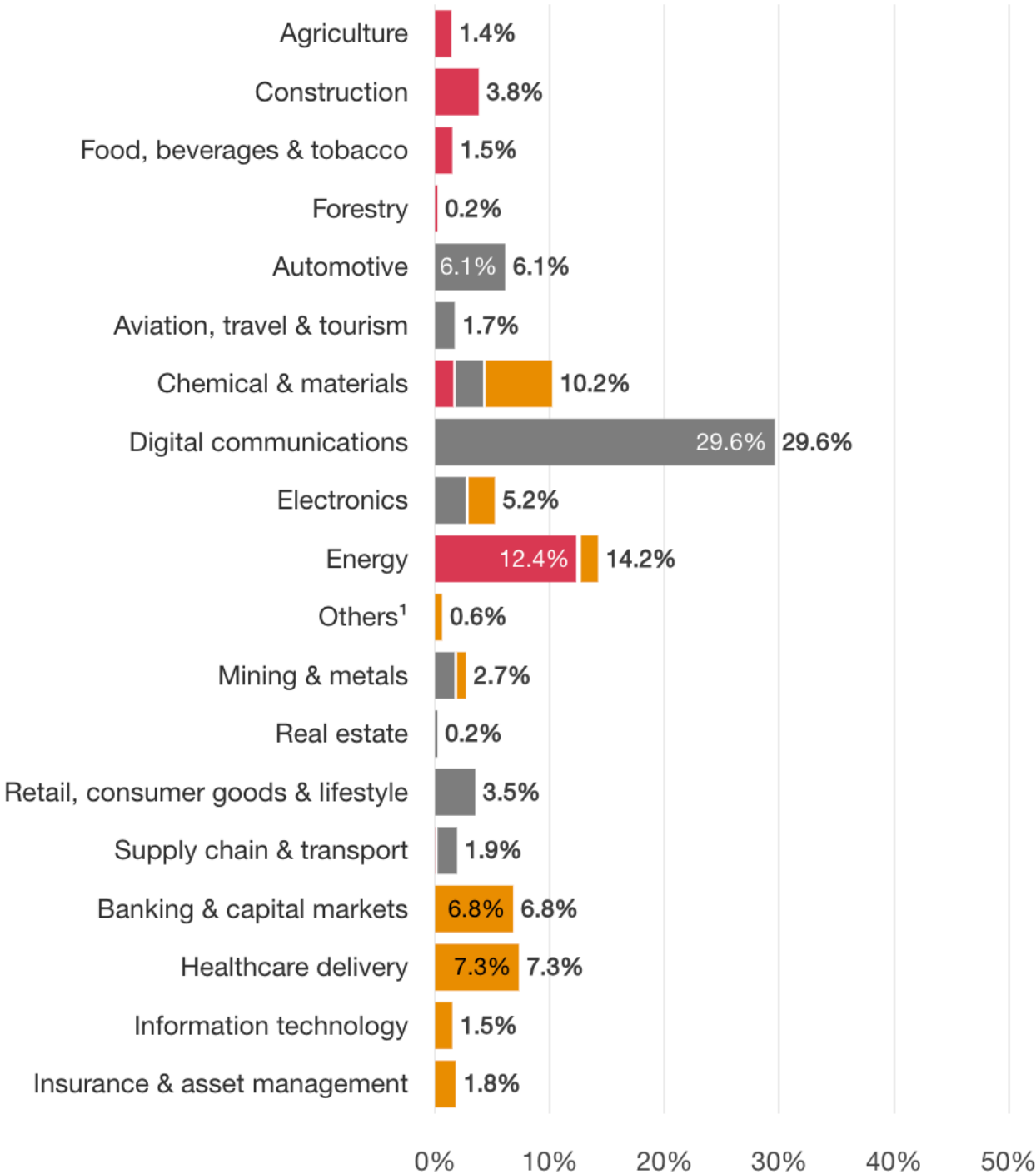
Source: EXIOBASE, ENCORE database, PwC analysis

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

Korea Stock Exchange (KOSE)

■ Higher nature dependency
 ■ Moderate nature dependency
 ■ Lower nature dependency

The Korea Stock Exchange has a combined market capitalisation of around US\$989 billion across sectors with high to moderate dependency on nature. These sectors represent 71% of the exchange's total value, with digital...



¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

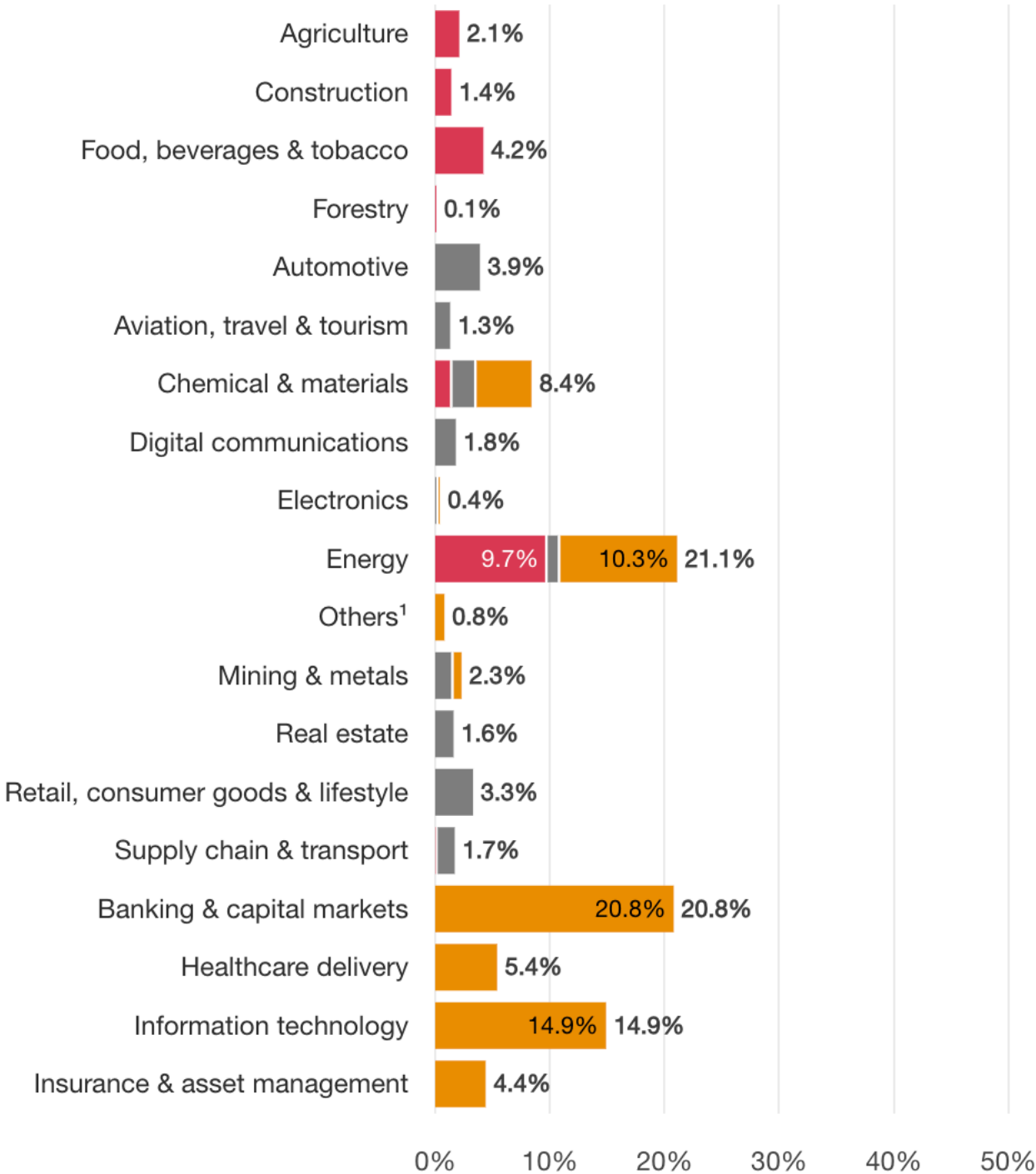
Source: EXIOBASE, ENCORE database, PwC analysis

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

National Stock Exchange of India (NSEI)

■ Higher nature dependency ■ Moderate nature dependency
■ Lower nature dependency

The National Stock Exchange of India has a total market capitalisation of nearly US\$855 billion across sectors with high to moderate dependency on nature. These sectors constitute 37% of the exchange's overall value, with energy and...

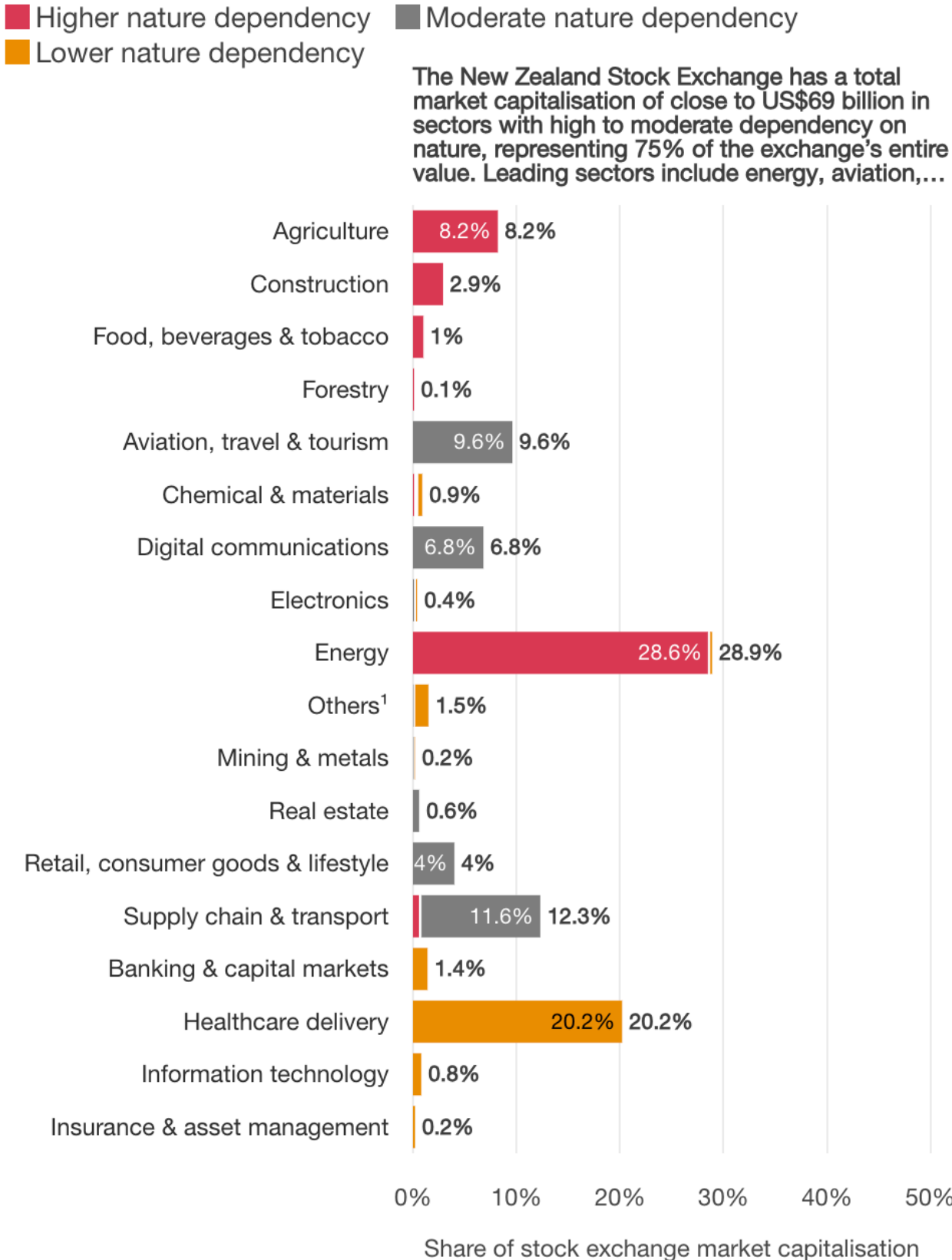


¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

Source: EXIOBASE, ENCORE database, PwC analysis

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

New Zealand Stock Exchange (NZSE)



¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

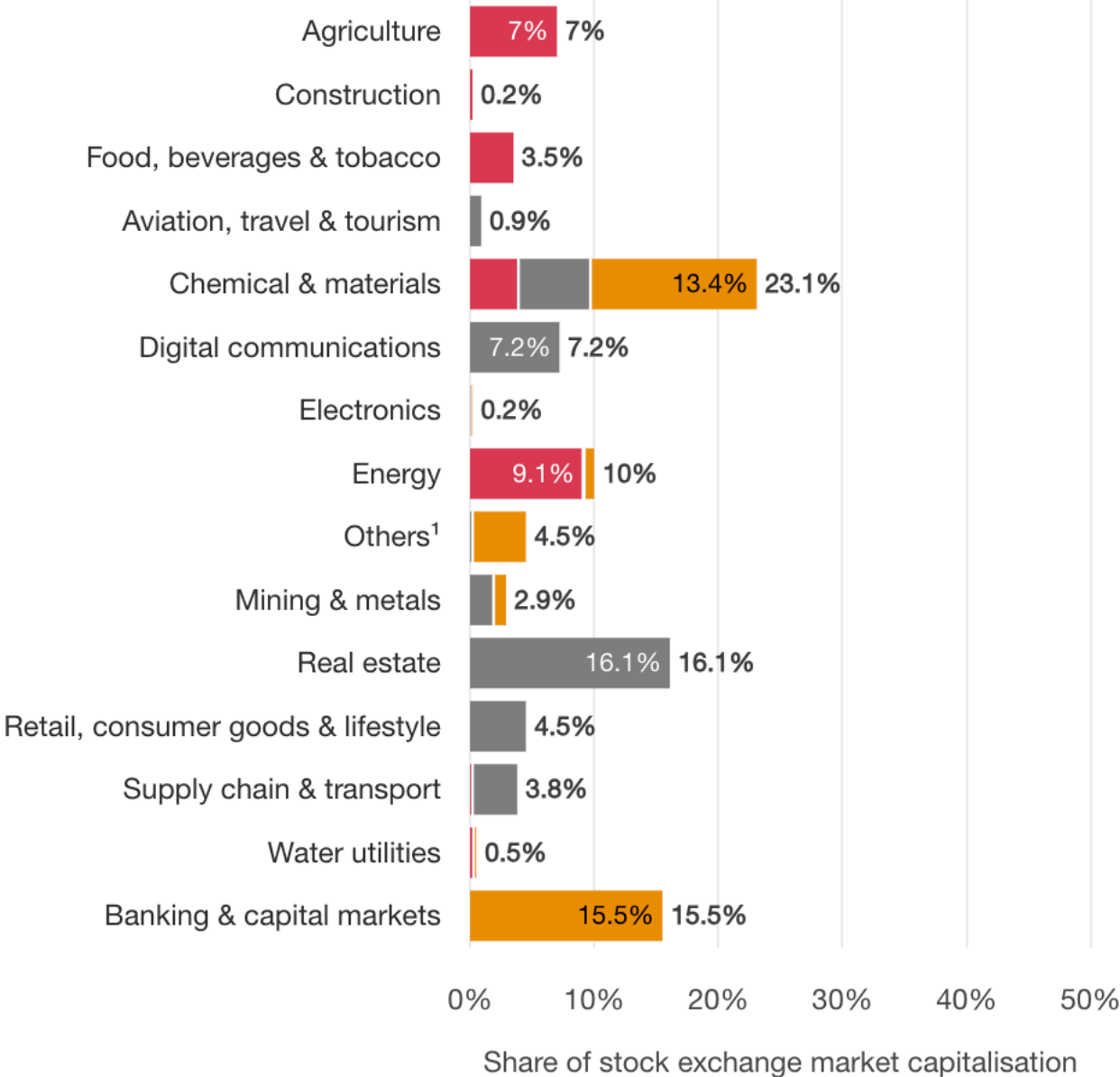
Source: EXIOBASE, ENCORE database, PwC analysis

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

Philippines Stock Exchange (PSE)

■ Higher nature dependency ■ Moderate nature dependency
■ Lower nature dependency

The Philippines Stock Exchange has a total market capitalisation of more than US\$148 billion in sectors with high to moderate dependency on nature, representing 64% of the exchange's entire value. Chemical and materials, as well as real...



¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

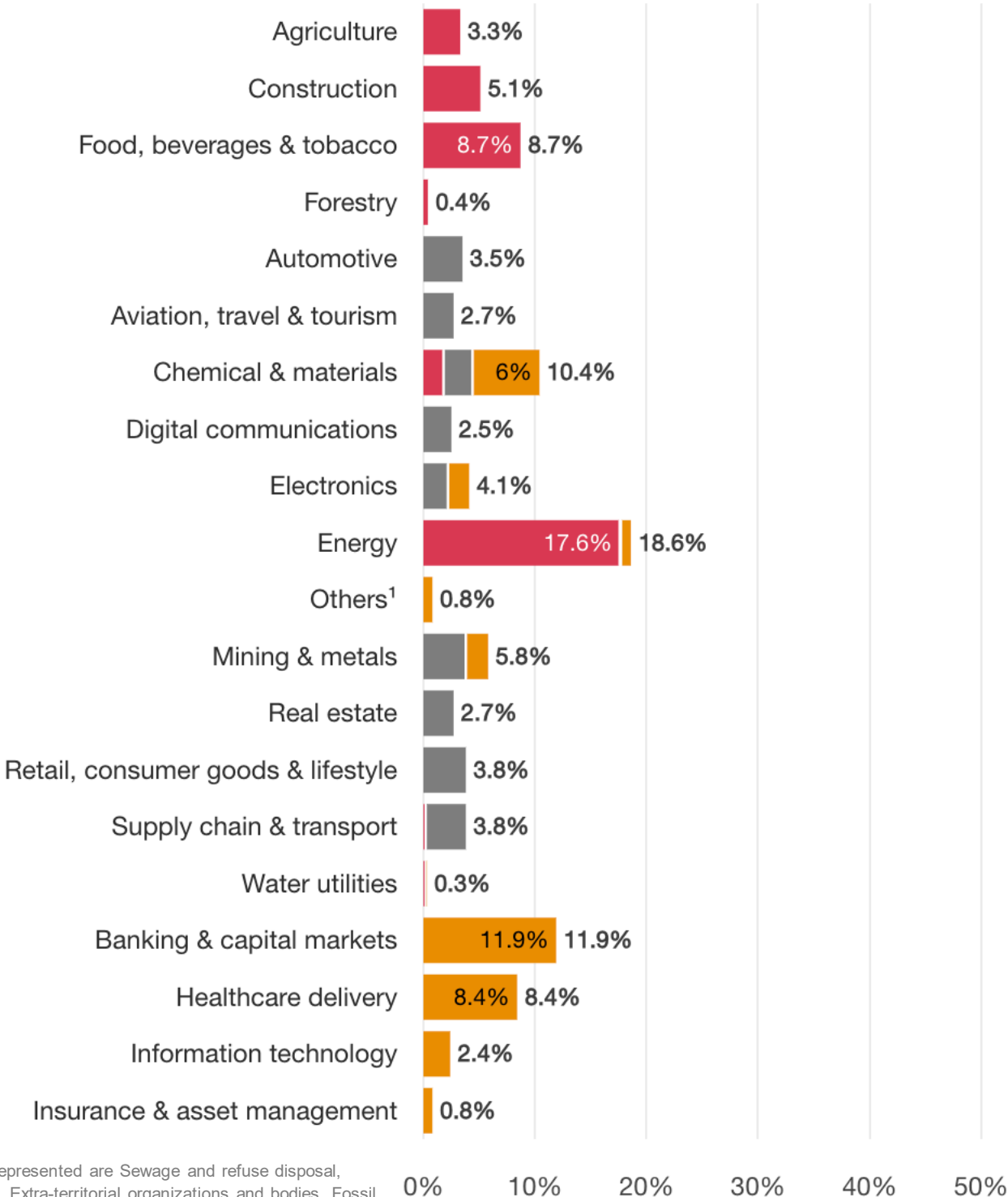
Source: EXIOBASE, ENCORE database, PwC analysis

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

Shanghai Stock Exchange (SHSE)

■ Higher nature dependency
 ■ Moderate nature dependency
 ■ Lower nature dependency

The Shanghai Stock Exchange has a total market capitalisation of more than US\$3.55 trillion in sectors with high to moderate dependency on nature, representing 65% of the exchange's entire value. Leading are the energy, chemical and...



¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

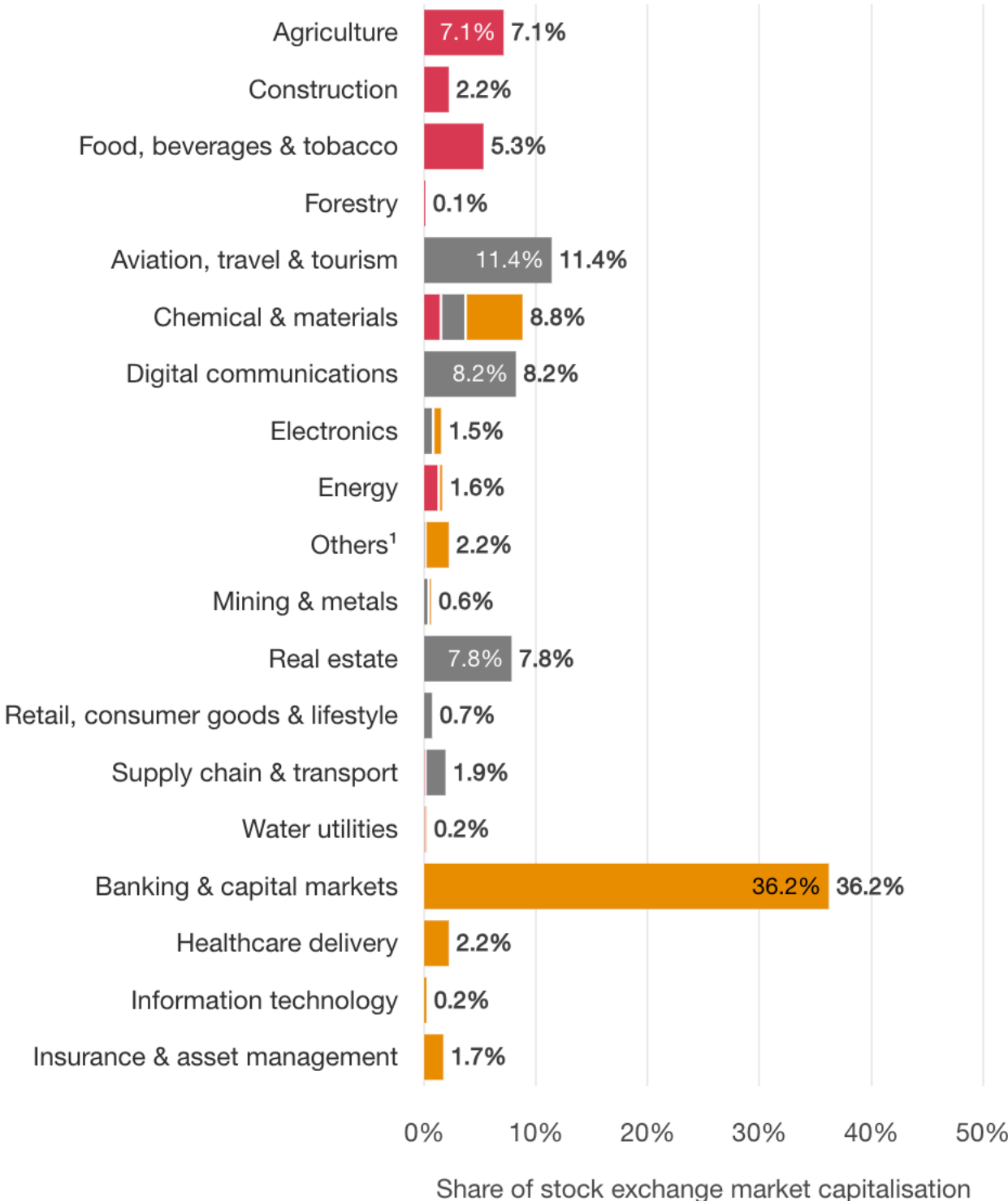
Source: EXIOBASE, ENCORE database, PwC analysis

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

Singapore Exchange (SGX)

■ Higher nature dependency
 ■ Moderate nature dependency
 ■ Lower nature dependency

The Singapore Exchange has a total market capitalisation of more than US\$210 billion in sectors with high to moderate dependency on nature, representing 51% of the exchange's entire value. Aviation, travel and tourism, and chemical...

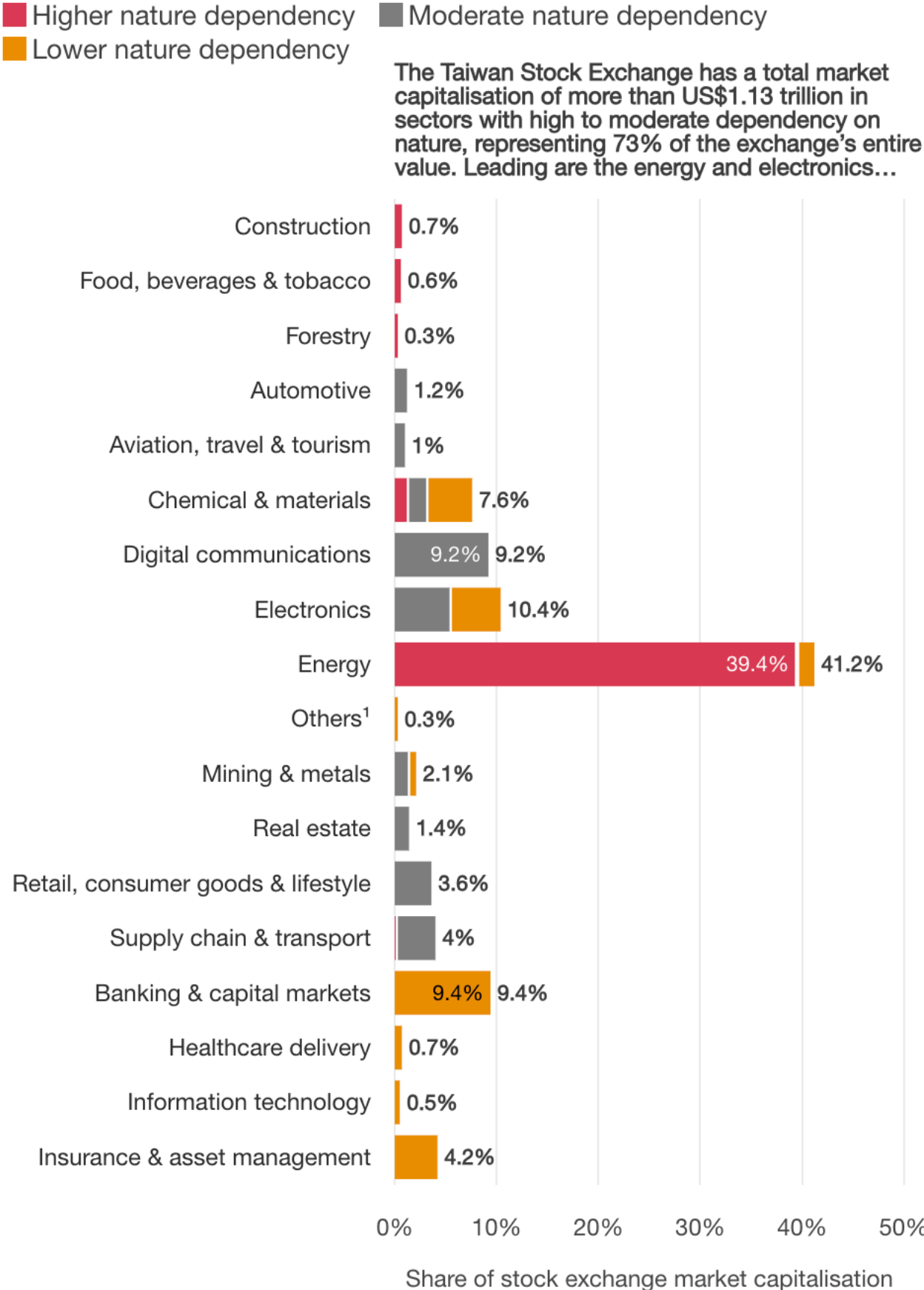


¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

Source: EXIOBASE, ENCORE database, PwC analysis

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

Taiwan Stock Exchange (TWSE)



¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

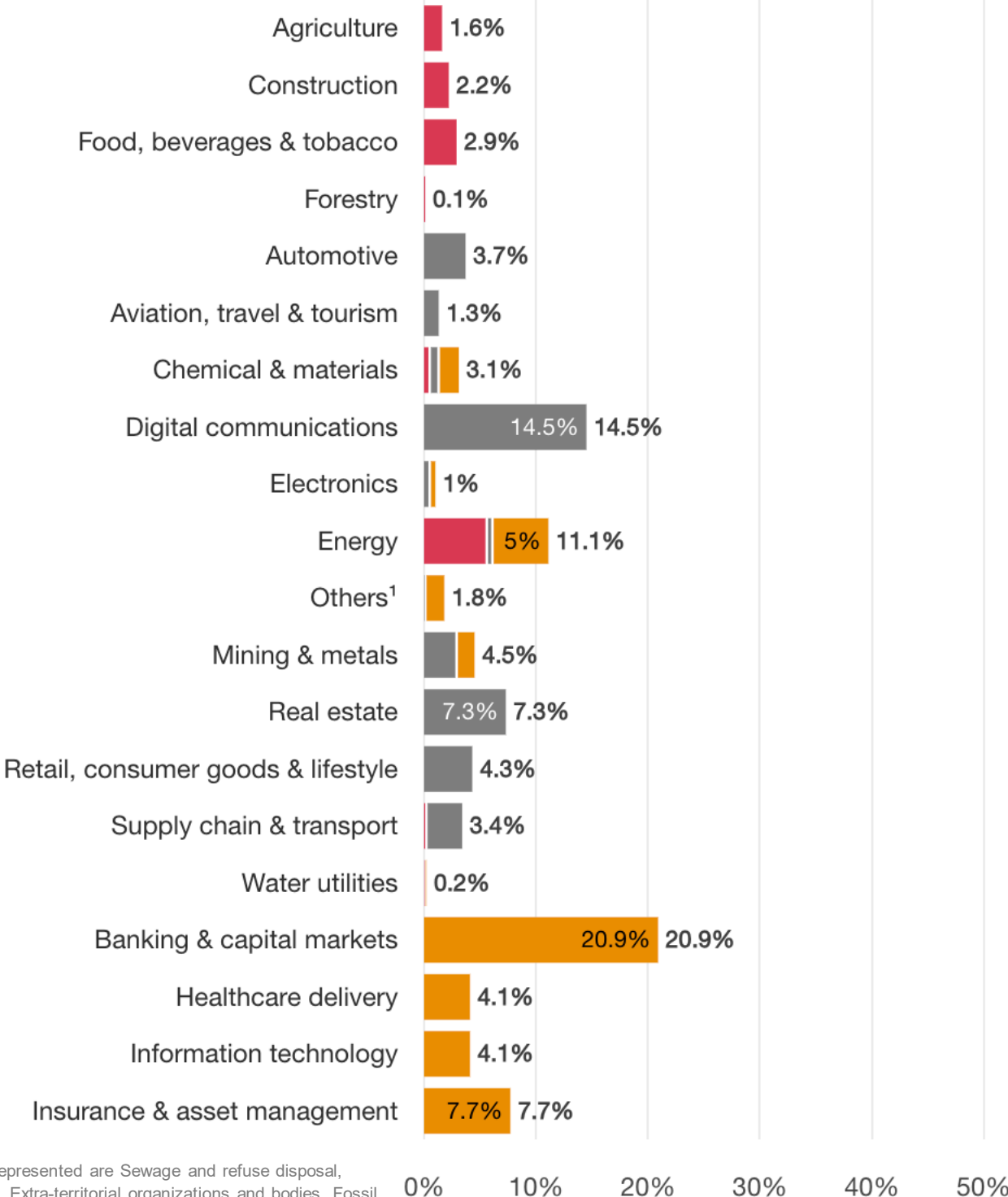
Source: EXIOBASE, ENCORE database, PwC analysis

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

The Stock Exchange of Hong Kong Ltd. (SEHK)

■ Higher nature dependency
 ■ Moderate nature dependency
 ■ Lower nature dependency

The Stock Exchange of Hong Kong Ltd has a total market capitalisation of close to US\$2.84 trillion in sectors with high to moderate dependency on nature, representing 52% of the exchange's entire value. Leading are the digital communications a...



¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

Source: EXIOBASE, ENCORE database, PwC analysis

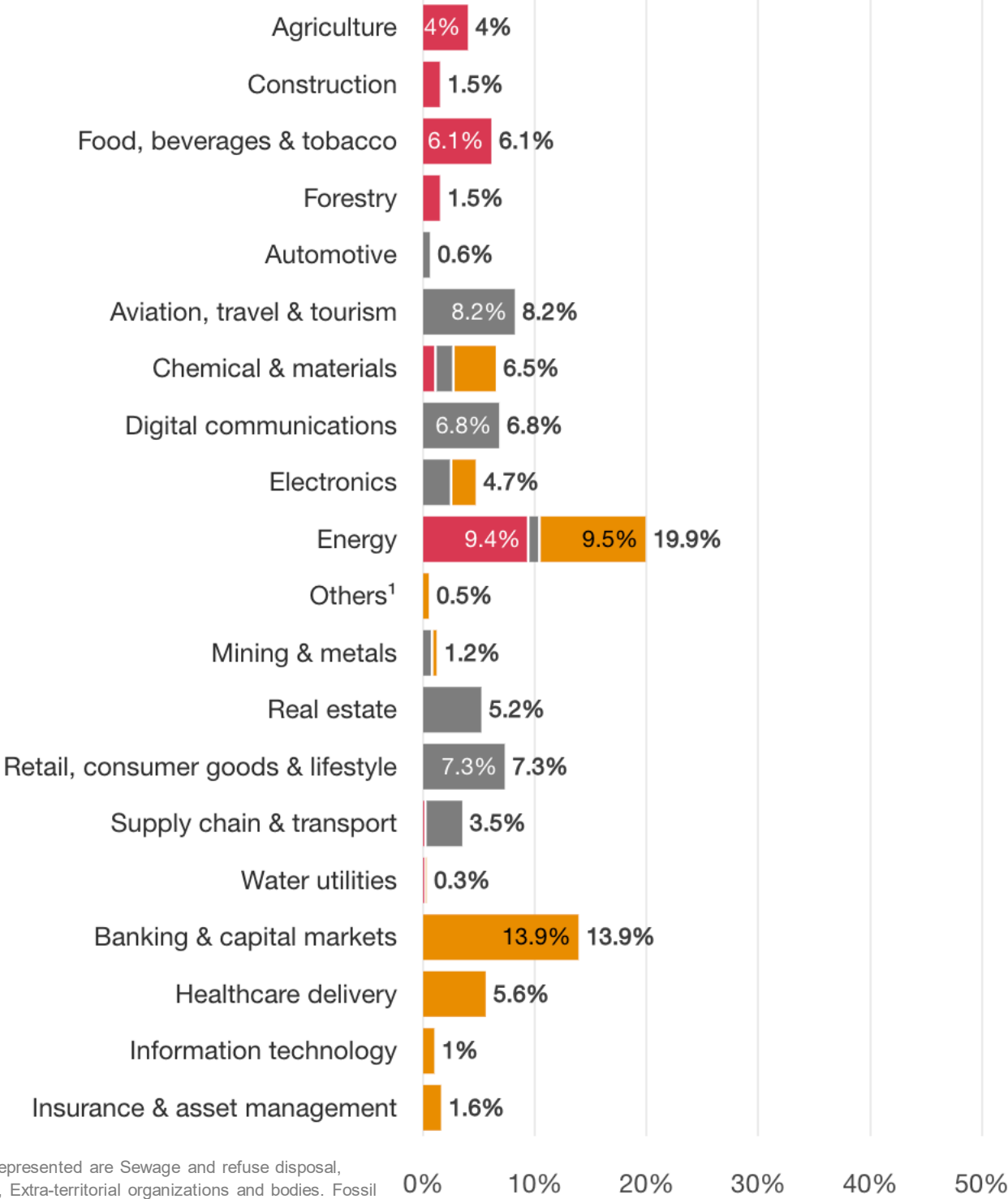
Share of stock exchange market capitalisation

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

The Stock Exchange of Thailand (SET)



The Stock Exchange of Thailand has a total market capitalisation of more than US\$366 million in sectors with high to moderate dependency on nature, representing 61% of the exchange's entire value. Leading sectors include energy, aviation,...



¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

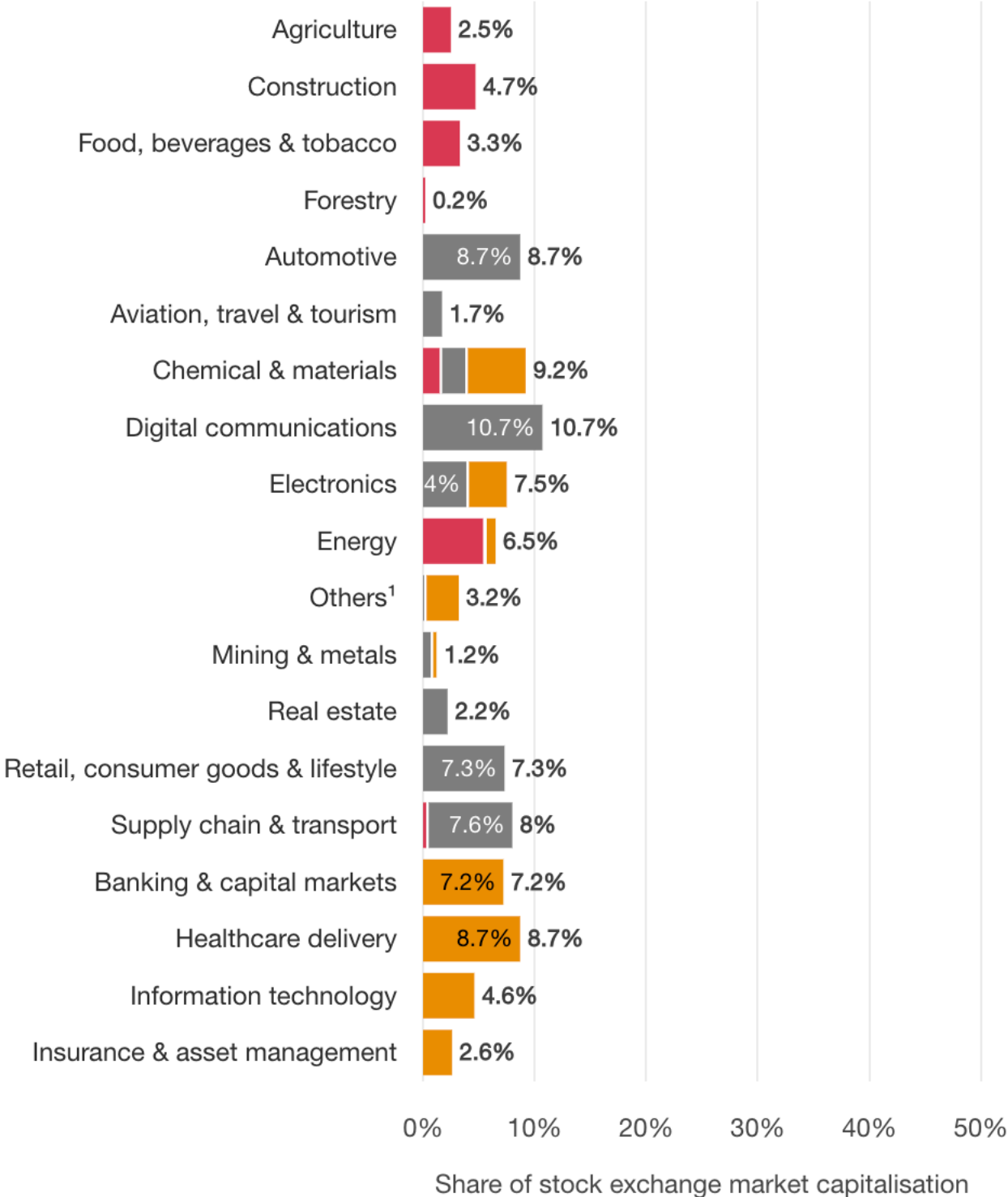
Source: EXIOBASE, ENCORE database, PwC analysis

Individual Asia Pacific stock exchanges dependency on nature by sector and market capitalisation

The Tokyo Stock Exchange (TSE)

■ Higher nature dependency
 ■ Moderate nature dependency
 ■ Lower nature dependency

The Tokyo Stock Exchange has a total market capitalisation of approximately US\$3.3 trillion. Sectors with moderate to high reliance on nature constitute 64% of the exchange's overall value, with digital communications and chemicals &...



¹Sectors represented are Sewage and refuse disposal, Education, Extra-territorial organizations and bodies. Fossil fuel refinery, Other manufacturing, Machinery and equipment, Business activities, Other service activities, Private households with employed persons, Public administration, Pulp and paper products, Recycling, and Rental.

Source: EXIOBASE, ENCORE database, PwC analysis

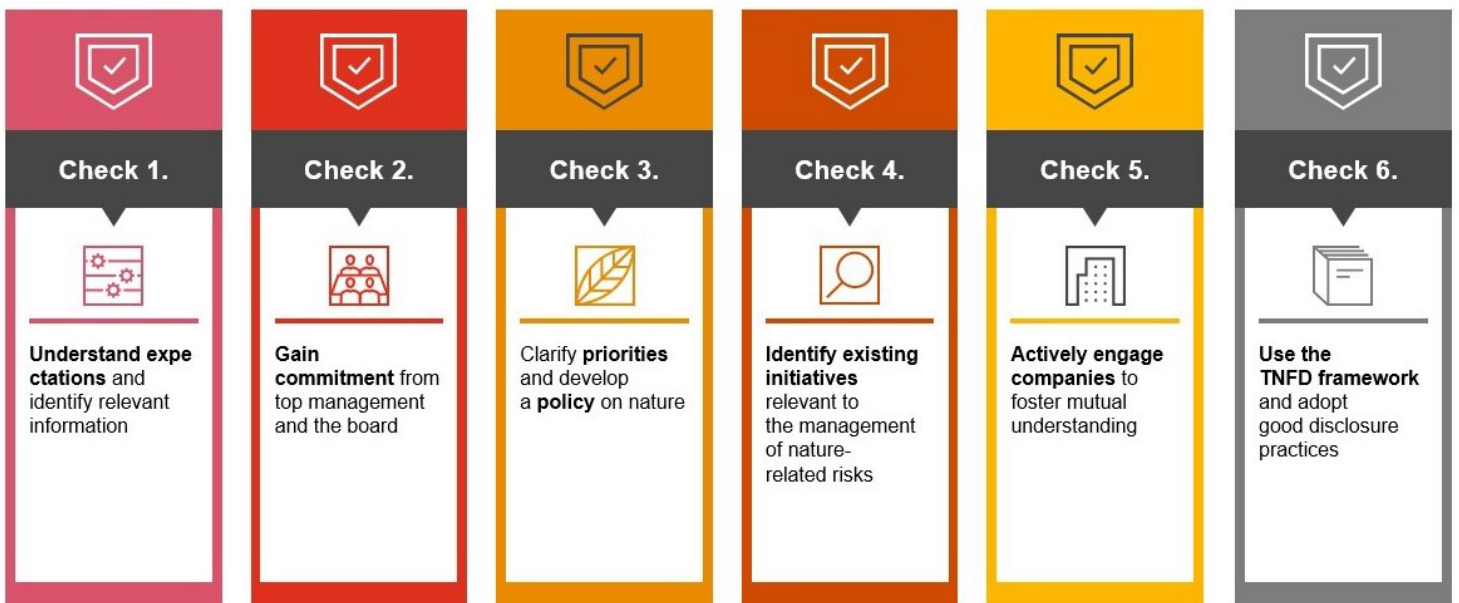


How investors can get started on managing nature-related risks

Assessing direct and indirect dependence is one of the starting points in managing nature-related risk. However, understanding dependence can be difficult when investment portfolios are spread across multiple sectors of varying nature dependencies in different geographic locations.

The following checklist provides guidance for investors on how to prioritise their efforts to manage nature risks, and on how to initiate appropriate reporting and disclosure practices.

A checklist for investors on managing nature risks



Source: PwC and AIGCC

1. Understand expectations and identify relevant information

Start by identifying areas of nature dependencies including current environmental and sustainability issues relevant to each sector and impacts that are relevant and material to an asset or investment portfolio. This helps investors to better understand what should be prioritised and how to efficiently allocate resources.

2. Gain commitment from top management and the board

Management and board support helps to ensure overall commitment and enables availability of resources internally. It is of great importance to ensure internal top management support and buy-in for how investors approach nature within the organisation. Building an internal business case which links to existing nature-relevant initiatives within the organisation will better engage investors' board and top management.

3. Clarify priorities and develop a policy on nature

It is important to prioritise the nature issue and sectors that are most material. Investors should apply the “double materiality” approach when prioritising areas of focus for nature, not only the financial impact of nature-related issues, but also the impacts that investments may have on nature.

4. Identify existing initiatives relevant to the management of nature-related risks

Sector-wide initiatives may already be underway in many regions to manage significant nature-related risks. By identifying these initiatives, investors can quickly establish a knowledge base and blueprint for targeted approaches while avoiding the duplication of efforts.

5. Actively engage companies to foster mutual understanding

By actively engaging with companies, investors can better understand the actions that they are taking, and the challenges faced and can more effectively monitor their progress. Engagement also helps companies better understand investor expectations on addressing nature-related risks.

6. Use the TNFD framework and adopt good disclosure practices

The TNFD provides a risk management and disclosure framework to identify, assess, manage and disclose nature-related issues and is structured on the same four pillars (governance, strategy, risk management and metrics and targets) as the Taskforce on Climate-related Financial Disclosures (TCFD) recommendations. Investors should consider reporting or disclosing based on a framework such as this that meets relevant regulatory requirements and stakeholder expectations.



Look beyond risks to nature-related opportunities

Investors that have identified nature-related risks and ways of mitigating or addressing these risks, will be better positioned to go beyond just reducing nature loss, by moving towards achieving a nature positive future. Understanding nature-related risks can help investors to explore potential nature-related opportunities, through adaptation and innovation, and through the transformation of business models and investments, to support nature restoration and regeneration.

Opportunities include the sustainable use of natural resources, nature protection, restoration, and regeneration and improved investor returns. Although nature-based investment is still in its early stages, investors can begin to explore investment opportunities in companies or assets that directly provide nature-based solutions or support nature improvements.

With every sector within Asia Pacific dependent on nature, nature-related risks cannot be ignored or fully diversified. It is vital that investors take the initial step to prioritise the nature-related issues in their portfolios and asset allocation based on materiality and direct their efforts toward action that will have the greatest impact.

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Methodology

Use of the ENCORE database to assign industry dependence levels

The ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure) database in partnership with UNEP-WCMC (UN Environment Programme World Conservation Monitoring Centre) was used to assign dependence ratings to sectors. This database reflects current academic consensus on how dependent different sectors are on ecosystem services.

Industry breakdown of gross value added (GVA)

For this publication, we analysed the nature dependence of 163 industry sectors across a variety of ecosystem services, using the Natural Capital Finance Alliance and UNEP-WCMC's ENCORE database.

Each ENCORE industry sector was assigned an overall dependence rating based on the multiple ecosystem service dependencies it contained. This includes the number and strength of nature dependencies of the industry sector.

By aligning these sector-level dependency ratings to GVA data, split by industry sector and country, we estimated the amount of direct GVA generated with a high, moderate, and low nature dependence.

Nature dependence of equities listed on stock exchanges

We analysed the nature dependence of the market capitalisation for all companies listed on 14 major stock exchanges in the Asia Pacific region using data from S&P Capital iQ to provide the market capitalisation and industry sector of all primary listings on each of the 14 stock exchanges. Market capitalisations were taken for the end of each quarter of 2022 and used to calculate an average value for the 2022 calendar year. The S&P Capital iQ sectors were mapped to the ENCORE database's nature-dependence ratings for sectors. This mapping was used to calculate how much of each listed company's market capitalisation has high, moderate, or low nature dependence in its direct operations.

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