

Global Country Ranking: Trade Exposure to the Chinese Economy

- This report focuses on assessing countries' relative vulnerability to slowing economic growth in China based on their reliance on bilateral trade with China.
- Vietnam, Malaysia, Laos, Singapore, and South Korea form the global top-5 of our Chinese trade exposure-ranking, reflecting the proximity to the vast Chinese market and deeply integrated regional supply chains.
- Large differences in trade dependence with China exist in Asia-Pacific. Bangladesh, India, Indonesia, and Japan are significantly less exposed to weaker import demand in China than most of their regional peers.
- Chile and Peru appear relatively high in the ranking compared to many other countries outside Asia-Pacific, reflecting China's interest in their natural resources.

China will play an important role in shaping the global economic outlook over the coming quarters and years. Its economy is facing notable downward pressure on the back of three key considerations: 1) the trade conflict with the US; 2) the lagged impact of Chinese authorities' deleveraging efforts in 2017–18 in order to reduce risks in the financial system; and 3) China's structural transition to a services and consumer-driven economy. We forecast Chinese real GDP growth to decelerate to 6% y/y by next year (chart 1) from over 10% y/y in 2010.

The growth slowdown in China has global implications because of the size of the Chinese economy. In nominal terms, China is the world's second largest economy after the US. Its nominal GDP was USD 13.4 trillion in 2018, equivalent to 16% of global GDP (chart 2). In comparison, the size of the US economy was USD 20.5 trillion in 2018, 24% of world GDP. We project that China will surpass the US economy over the next ten years, assuming that its output growth slows only gradually and significant adverse shocks will not materialize.

This report focuses on assessing countries' relative vulnerability to the slowing Chinese economy based on their reliance on trade with China. Using principal component analysis, we build a trade exposure index for a sample of 33 countries globally, which allows us to rank these economies according to their trade-related dependence on Chinese demand (table 1). What follows is a discussion of their trade exposure to China, the index methodology, explanatory variables, and the results of our analysis.

TRADE EXPOSURE TO THE CHINESE ECONOMY

China is the world's second largest importer of goods after the US; in 2018, China imported USD 2.1 trillion worth of goods, 10.9% of global imports. Given that China has become a very important market for most countries, slower Chinese economic growth and shifting demand drivers from industrial goods to consumer goods will impact many countries globally. China's influence in Asia-Pacific is particularly pronounced and it has become the most important trading partner for

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Table 1

Country Ranking: Trade Exposure to China

1) Vietnam
2) Malaysia
3) Laos
4) Singapore
5) South Korea
6) Cambodia
7) Australia
8) Chile
9) Philippines
10) Thailand
11) Peru
12) South Africa
13) New Zealand
14) Brazil
15) Japan
16) Indonesia
17) Russia
18) Colombia
19) Hungary
20) Germany
21) Canada
22) US
23) India
24) Czech Republic
25) Mexico
26) UK
27) France
28) Argentina
29) Italy
30) Bangladesh
31) Poland
32) Turkey
33) Spain

Source: Scotiabank Economics.

a majority of the countries in the region. China's dominance as an assembly hub for manufactured goods exports combined with its strong demand growth have resulted in Chinese imports from Asia-Pacific increasing at an average annual rate of 6.7% over the past ten years.

After becoming an engine for intra-regional trade, which has boosted the economic performance of its Asian partners, China has substantially increased its economic might via growing overseas investment. Chinese interests abroad have typically concentrated on commodities and infrastructure with the principal aim of meeting strong Chinese demand for raw materials and facilitating their shipment to Asia^{1,2}. Against this backdrop, Chinese trade and investment flows tend to be correlated. According to data compiled by the American Enterprise Institute (AEI) China Global Investment Tracker³, accumulated Chinese investments abroad from 2005 to 2018 reached USD 1.14 trillion. This trend will likely persist through the foreseeable future as the Chinese economy continues to stand among global growth leaders (despite the slowing momentum) and becomes increasingly more integrated into the global economy. Nevertheless, following the lead of the US, some countries may restrict China's acquisitions over the coming years, particularly in the technology sector.

Given the close links between Chinese trade and investment, our trade exposure index includes three trade variables and one investment variable:

x_1 : each country's goods exports to China as % of GDP,

x_2 : total bilateral trade with China as % of GDP,

x_3 : exports to China as % of total international exports, and

x_4 : the accumulated Chinese overseas investment since 2005 (the first year data are available) until 2018 as % of the destination country's 2018 GDP.

These highly correlated variables help us look at trade exposure from different angles: the importance of trade with China to the overall economy, China's importance as a market for each country's export sector, as well as the significance of Chinese overseas investment, which tends to focus on trade-intensive sectors thereby supporting and solidifying the bilateral trade relationship. We chose to use AEI data on Chinese investment instead of IMF-compiled data on bilateral foreign direct investment because the latter has notable gaps in country coverage. Please refer to Box 1 for the construction of the index.

Chart 1

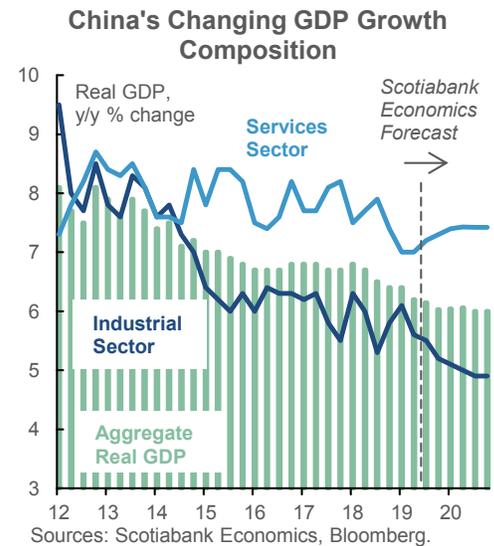
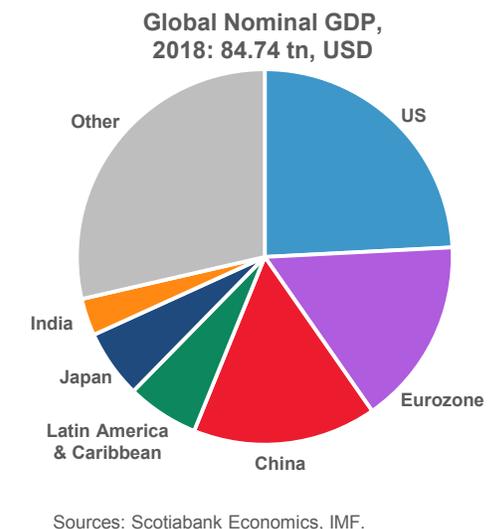


Chart 2



Box 1

Construction of the trade exposure index and the global country ranking

To quantify and compare countries' relative vulnerability to a Chinese economic slowdown, we constructed an index that ranks the 33-country sample according to each economy's trade exposure to China (table 1 and chart 7) based on the four variables listed above. We use principal component analysis (PCA) to study the underlying country data and to determine the optimal form for our index. Instead of arbitrarily selecting between many options for variables that capture certain aspects of trade exposure to China, the PCA allows us to use various related variables that seemingly measure the same thing; the PCA extracts strong common features in a dataset of correlated variables. The method produces an optimized linear combination of the trade variables, called the first principal component, which captures as much of the variability in the underlying country data as possible*. In other words, the PCA allows the data itself to determine the importance of each variable in our index. We then use the index values to rank countries according to their trade exposure to China. For further information regarding the construction of the index ranking, please refer to the study by Manage and Scariano (2013)⁴.

Box 1 (continues)

Construction of the trade exposure index and the global country ranking

$$\text{Index value} = w_1 x_1 + w_2 x_2 + w_3 x_3 + w_4 x_4,$$

where $w_1 = 0.304$; $w_2 = 0.294$; $w_3 = 0.244$; $w_4 = 0.158$;

x_1 = exports to China, % of GDP;

x_2 = total trade with China, % of GDP;

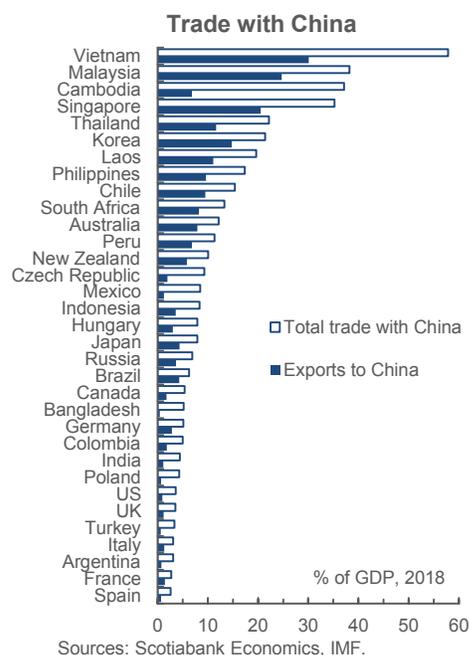
x_3 = exports to China, % of total exports;

x_4 = investment from China in 2005-2018, % of GDP.

Index values range between 0 and 1 with the latter implying extreme (untenable) trade dependence on the Chinese market. The average index value in our sample is 0.10.

*Our PCA results show that the eigenvalue of the first principal component is 2.5; as it is the only principal component with an eigenvalue greater than one (which is a common selection criterion), it is reasonable to utilize only the first principal component in our analysis. The first principal component captures a sufficiently large percentage (63%) of the total variance in the country data. The weights of the chosen variables in the index are derived from the eigenvector of the first principal component and rescaled to sum to one across the variables.

Chart 3



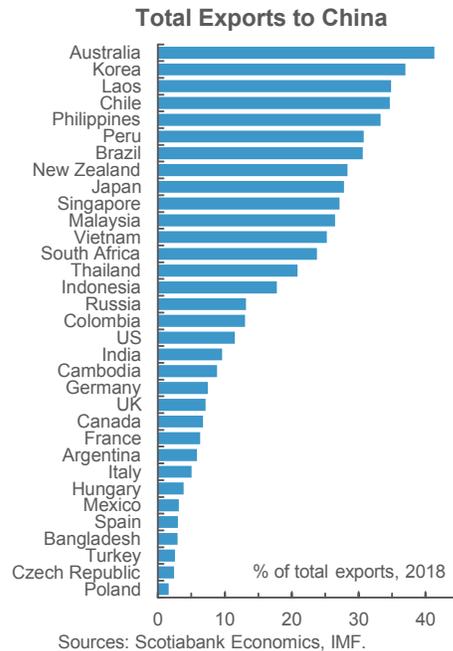
DISCUSSION OF THE VARIABLES

Looking into the explanatory variables in more detail, it is predictable that trade with China matters more for Asian economies (chart 3) given their proximity to the Chinese market and the deep integration of Asian supply chains. Vietnam’s exports to China—such as telephones, integrated circuits, broadcasting accessories, and cotton yarn—are equivalent to 30% of the country’s GDP. Exports to China are also important for Malaysia and Singapore, equivalent to 25% and 21%, respectively, of each country’s annual output. Similar outcomes are obtained when total trade (exports and imports) with China is considered (chart 3). We note that the inclusion of imports from China can be considered as an aspect of trade exposure, as shown by the recent threat by China to cut vital rare earth exports to the US. The variables x_1 and x_2 that measure the importance of trade with China to the economy as a whole are assigned the largest weights (0.304 and 0.294, respectively) in our trade exposure index.

The PCA assigns the variable x_3 —exports to China as a share of total exports—a smaller weight (0.244) in our index, reflecting the fact that the significance of the export sector to the overall economy varies across countries. When one takes stock of China’s importance as an export market to the list of sample countries, Australia, South Korea, Laos, Chile and the Philippines top the metric (chart 4). Australia, Laos and Chile focus on exporting primary goods to China (Appendix 1). Australia’s shipments to China consist mostly of commodities, particularly iron ore (46% of total exports to China in 2017), coal (11%), gold (10%) and petroleum gas (7%). Meanwhile, Chile’s exports to China are even more undiversified (Appendix 1), concentrated in copper; copper ore accounts for 36% of its shipments to China, followed by refined copper (33%), and raw copper (7%). Given that commodities typically support infrastructure and industrial activity, China’s structural transition toward a consumer and services sector-driven economy will likely adversely impact Australia’s and Chile’s—and other commodity exporters’—external sector prospects over the coming years. These countries would benefit from policies that help diversify their export destinations.

South Korea and the Philippines are notable suppliers of electronics components to China (Appendix 1); integrated circuits alone account for around a third of their exports to China. These goods may not necessarily be intended to satisfy local Chinese demand

Chart 4



but are often assembled into final goods in China and shipped further to the rest of the world. China's ambitions to become a global technology powerhouse should continue to buttress Chinese demand for electronics parts. Simultaneously, however, rising tensions in the technology space between the US and China may prove to be disruptive for Asian electronics supply chains.

The bulk of Chinese overseas investment globally is concentrated in the energy sector (32% of total; chart 5), followed by the metals (12%) and transport sectors (10%). Chinese overseas investment typically helps satisfy and facilitate strong Chinese demand for commodities; in contrast, Japanese and South Korean overseas investment—e.g. in automobiles and electronics sectors—is typically meant to satisfy local demand in the destination country (or nearby) and cut down logistical costs¹. Given the distinctive nature of Chinese investment abroad, it is unsurprising that a country's exports to China tend to rise following a Chinese investment project completion. Nevertheless, we recognize that some Chinese investment may make the destination country more resilient even if China's economic growth is slowing; for example, a Chinese corporation may decide to invest in a neighbouring country to benefit from lower labour costs and to circumvent US import tariffs. Reflecting the two-sided impact of Chinese investment to the destination country, it is rational that the PCA assigns the investment variable x_4 the smallest weight (0.158) in the trade exposure index.

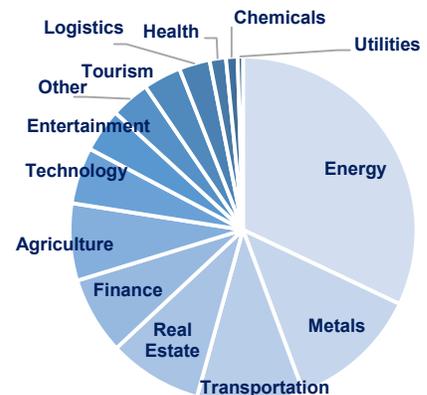
Within our country sample, Laos and Cambodia have accumulated the largest stock of Chinese fixed capital, equivalent to 47% and 24% of GDP, respectively (chart 6); the energy sector—hydro in particular—dominates in both countries, being the main destination of Chinese investment into these countries (43% and 58% of all Chinese investment, respectively). The third largest stock of Chinese investment has been accumulated in Peru, equivalent to 10% of GDP. The bulk of these transactions—82%—have focused on the metals sector, predominantly copper. Singapore and Australia also stand out for their stock of Chinese capital investment (9.2% and 6.2% of GDP, respectively); in Singapore, the logistics sector is the key recipient (34% of total) while in Australia the key targets have been the energy and metals sectors (36% and 34% of total, respectively).

RESULTS

According to our ranking (table 1 and chart 7), Vietnam, Malaysia, Laos, Singapore and South Korea are the five countries most dependent on trade with China. Hence, they would likely be the most adversely affected if growth in China—and its import demand for these countries' goods—softened notably. Similarly, the countries would benefit the most should the Chinese economy pick up. Reflecting the linearity of our index, Vietnam can be considered to be more than twice as exposed as the Philippines and Thailand, for instance, highlighting the fact that all Asian countries cannot be categorized alike regarding their trade dependence on China. Meanwhile, we note that the top countries are at very different stages of economic development; this implies that both advanced and developing nations—particularly in Asia-Pacific—will be affected by China's fluctuating demand conditions and authorities' policy stimulus decisions.

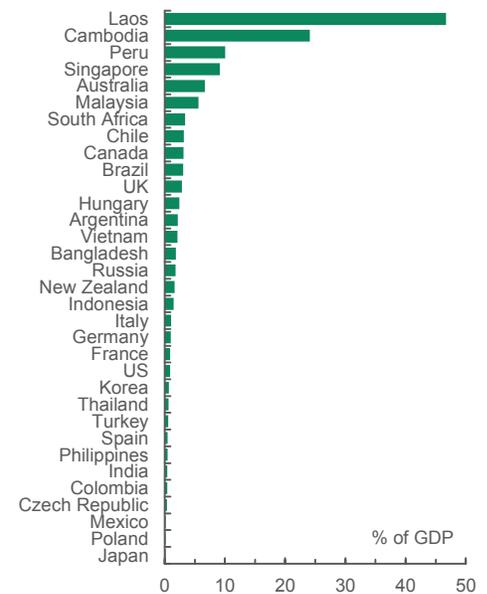
The top ranking of Vietnam reflects the country's massive direct trade dependence on China, however, the country has—somewhat surprisingly—not attracted outsized investments from China (equivalent to only 2% of GDP). Malaysia's direct trade dependence is somewhat smaller, yet Chinese investment stock is equivalent to 6% of Malaysian GDP. Laos, on the other hand, has received huge amounts of Chinese energy-sector investments. Singapore's trade ties with China are strong and it has also attracted a significant stock of Chinese investment in recent years, though the range of sectors is broader (such as logistics, energy, consumer, and real estate). In contrast, South Korea has kept Chinese investment at bay (0.7% of GDP), yet its exposure stems from tight bilateral trade links. Outside Asia-Pacific, Chile (ranked #8) and Peru (#11) stand out, reflecting the fact that China

Chart 5
China's Overseas Investment by Sector
% share of total, 2018



Sources: Scotiabank Economics, AEI.

Chart 6
Investment, 2005–18



Sources: Scotiabank Economics, IMF.

is an important export market for these commodity exporters. Moreover, they have received sizable Chinese investments in recent years in the commodities and infrastructure sectors owing to China's goal of meeting its strong demand for raw materials and enabling their shipment to Asia.

OTHER CONSIDERATIONS AND THE ROAD AHEAD

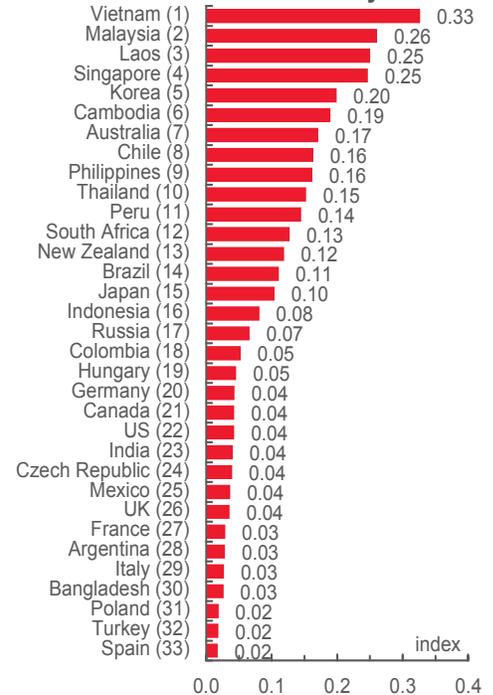
Our exposure ranking focuses on the trade of goods. Given that the services sector is becoming increasingly important for the Chinese economy—it accounted for 53% of Chinese GDP in the second quarter of 2019 compared with the industrial sector's 41% share—the country's demand for services imports is likely a material source of trade exposure for many economies globally. Unfortunately, because bilateral data are not available, services trade was omitted from our analysis. Presumably, the lack of a services sector variable in our index may place many services sector-oriented advanced economies in a deceptively favourable (i.e. low) position in the global ranking. Moreover, the type of goods that are shipped to China—e.g. commodities vs. high-technology products—place countries at different levels of exposure as the Chinese economy evolves, yet our index does not differentiate between product categories. Therefore, the results may understate the vulnerability of commodity exporters, such as Australia, Chile, Peru, and Canada, to a slowdown in the Chinese economy, given that China's import demand for commodities over the coming years will likely slow more than its demand for consumer goods, for instance, as the economy develops and becomes less industrial sector-oriented.

We note that countries can also have various other types of links to the Chinese economy; this ranking solely reflects the exposure stemming from goods trade. Interconnectedness of financial markets and bilateral portfolio investments create significant links that make countries exposed to developments—both good and bad—in Chinese capital markets and the banking system. We leave such considerations for future research.

China's dominance in the global economy is here to stay. The rise of protectionist and inward-looking policies in the US may—ironically—be facilitating a faster shift in the balance of power from the West to the East. While our ranking does not incorporate any elements of political power, we note that the escalating rivalry between the US and China—particularly in the technology sector—poses additional risks to the global economy and supply chains, particularly if nations will have to choose sides between the two. Moreover, as the Chinese administration remains committed to ongoing economic liberalization and openness that will further integrate the country into the global economy, the rest of the world will not be able to ignore China's domestic economic cycles, policy decisions, and potential spillovers. As such, strategies and economic policies that take the changing landscape into account are now more important than ever. Our trade exposure ranking provides a useful guide to which countries should act and why they might be among the most vulnerable. We believe promoting a multilateral rules-based trading framework is the best way to collectively advance China's integration into the global market and ensure the country's continued economic liberalization.

Chart 7

Country Ranking: Trade Exposure to the Chinese Economy



Source: Scotiabank Economics.

References and Further Reading:

1. McCully, Tuuli and Raffi Ghazarian. 2018. The Evolving Economic Relationship Between Asia-Pacific and Latin America. Scotiabank Economics. Available at https://www.gbm.scotiabank.com/content/dam/gbm/scotiaeconomics63/2018-01-04_I&V.pdf
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4. Ananda B. W. Manage and Stephen M. Scariano. 2013. An Introductory Application of Principal Components to Cricket Data, Journal of Statistics Education, Volume 21, Number 3.

APPENDIX 1

Australia: Top 5 Exports to China		
Sector	% exports to China	% total exports
Metal Ores, slag & ash	49.7	20.8
Mineral fuels, oils & products	16.5	6.9
Precious, semi-precious stones, metals & jewellery	14.5	6.1
Wool, fine or coarse animal hair; horsehair yarn and woven fabric	2.0	0.8
Copper and articles thereof	1.9	0.8
Laos: Top 5 Exports to China		
Sector	% exports to China	% total exports
Metal Ores, slag & ash	32.8	18.3
Commodities not specified according to kind	23.2	12.9
Wood and articles of wood	13.5	7.5
Rubber and articles thereof	12.2	6.8
Copper and articles thereof	5.3	2.9
Chile: Top 5 Exports to China		
Sector	% exports to China	% total exports
Copper and articles thereof	38.5	11.9
Metal Ores, slag & ash	38.3	11.8
Fruit & nuts	7.5	2.3
Pulp of wood or other fibrous cellulosic material	6.5	2.0
Wood and articles of wood	1.8	0.6
South Korea: Top 5 Exports to China		
Sector	% exports to China	% total exports
Electrical machinery, equipment & parts thereof	52.8	18.9
Nuclear reactors, boilers, machinery, mechanical appliances & parts	9.0	3.2
Optical, photographic, cinematographic, medical or surgical equipment	7.3	2.6
Organic chemicals	6.3	2.3
Plastics and articles thereof	5.8	2.1
Philippines: Top 5 Exports to China		
Sector	% exports to China	% total exports
Electrical machinery, equipment & parts thereof	61.8	21.9
Nuclear reactors, boilers, machinery, mechanical appliances & parts	16.1	5.7
Metal Ores, slag & ash	5.1	1.8
Precious, semi-precious stones, metals & jewellery	4.7	1.7
Copper and articles thereof	2.0	0.7
Vietnam: Top 5 Exports to China		
Sector	% exports to China	% total exports
Electrical machinery, equipment & parts thereof	49.4	11.7
Commodities not specified according to kind	17.3	4.1
Cotton	3.7	0.9
Optical, photographic, cinematographic, medical or surgical equipment	3.3	0.8
Footwear	3.1	0.7
Malaysia: Top 5 Exports to China		
Sector	% exports to China	% total exports
Electrical machinery, equipment & parts thereof	61.5	15.3
Mineral fuels, oils & products	12.4	3.1
Nuclear reactors, boilers, machinery, mechanical appliances & parts	7.3	1.8
Rubber and articles thereof	2.8	0.7
Animal or vegetable fats, oils & products	2.4	0.6
Singapore: Top 5 Exports to China		
Sector	% exports to China	% total exports
Electrical machinery, equipment & parts thereof	50.7	16.0
Mineral fuels, oils & products	11.3	3.5
Nuclear reactors, boilers, machinery, mechanical appliances & parts	10.4	3.3
Precious, semi-precious stones, metals & imitation jewellery	8.6	2.7
Plastics and articles thereof	5.0	1.6

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