UNITED NATIONS
ESCAP
Economic and Social Commission for Asia and the Pacific

TRADE, INVESTMENT AND INNOVATION DIVISION

Trade wars: Risks and opportunities for Asia-Pacific economies from US tariffs

Witada Anukoonwattaka

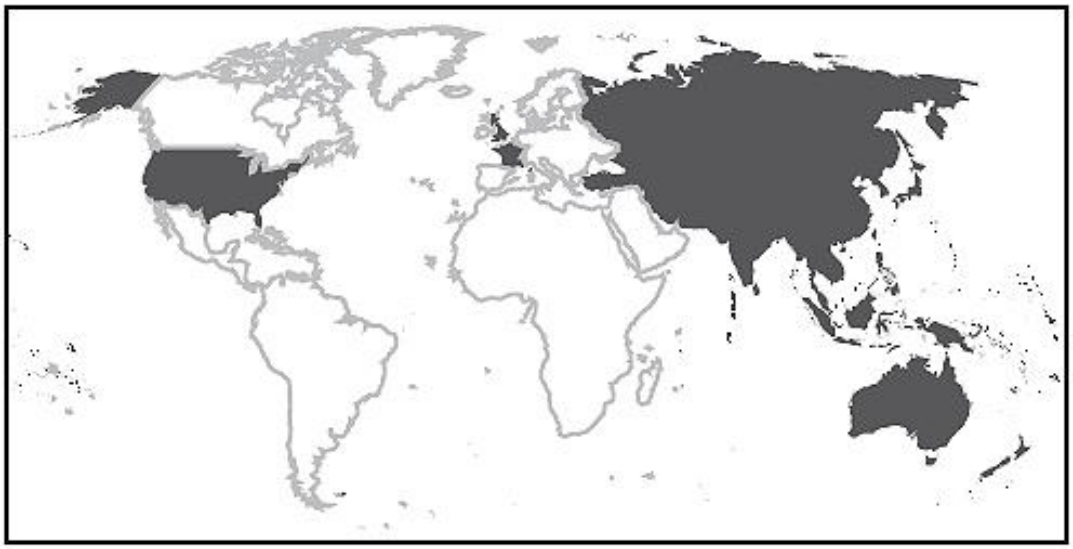
Richard Sean Lobo

Trade, Investment and Innovation

Working Paper Series

NO. 01 | May 19

The Economic and Social Commission for Asia and the Pacific (ESCAP) serves as the United Nations' regional hub promoting cooperation among countries to achieve inclusive and sustainable development. The largest regional intergovernmental platform with 53 Member States and 9 Associate Members, ESCAP has emerged as a strong regional think-tank offering countries sound analytical products that shed insight into the evolving economic, social and environmental dynamics of the region. The Commission's strategic focus is to deliver on the 2030 Agenda for Sustainable Development, which it does by reinforcing and deepening regional cooperation and integration to advance connectivity, financial cooperation and market integration. ESCAP's research and analysis coupled with its policy advisory services, capacity building and technical assistance to governments aims to support countries' sustainable and inclusive development ambitions.



Disclaimer: Views expressed through the Trade, Investment and Innovation Working Paper Series should not be reported as representing the views of the United Nations, but as views of the author(s). Working Papers describe research in progress by the author(s) and are published to elicit comments for further debate. They are issued without formal editing. The designation employed and the presentation of the material in the Working Paper do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The United Nations bears no responsibility for the availability or functioning of URLs. Opinions, figures and estimates set forth in this publication are the responsibility of the authors and should not necessarily be considered as reflecting the views or carrying the endorsement of the United Nations. Any errors are the responsibility of the authors. Mention of firm names and commercial products does not imply the endorsement of the United Nations.

Trade, Investment and Innovation

NO. 01 | May 19

Trade wars: Risks and opportunities for Asia-Pacific economies from US tariffs

Witada Anukoonwattaka and Richard Sean Lobo[1]

Please cite this paper as: Witada Anukoonwattaka and Richard Sean Lobo (2019), Trade wars: Risks and opportunities for Asia-Pacific economies from US tariffs, Trade, Investment and Innovation Working Paper No. 01/19, ESCAP Trade, Investment and Innovation Division, May 2019. Bangkok.

Available at http://www.unescap.org/publications

[1] Witada Anukoonwattaka is an Economic Affairs Officer, Trade Policy and Facilitation Section (TPFS), Trade, Investment and Innovation Division (TIID), United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). Richard Sean Lobo was an intern in the same unit at the time of writing this paper. Authors are grateful for the comments received from Mia Mikic, Director, TIID, ESCAP; Yann Duval, Chief, TPFS, TIID, ESCAP. We would like to give special thanks to Mahinthan J. Mariasingham, Asian Development Bank, for the ADB-MRIO data which are used in this paper. The authors are thankful to Pakkaporn Visetsilpanon for excellent assistance in laying out and formatting the final version of this paper and to Sanjana Rajgarhia for final copy-editing checks. All remaining errors are our own. Comments and suggestions may be sent to anukoonwattaka@un.org.

Abstract

What do trade tensions between the United States and China, the two largest trade partners of Asia-Pacific economies, mean for regional economies? This paper offers views on the implications for the rest of Asia and the Pacific from protectionism in the United States that focuses on exports from China.[2] Many economies in the Asia-Pacific region have deeply integrated with China through trade and production linkages. For them, China has been their export platform and has increasingly become a market provider. Meanwhile, the United States remains an invaluable economic partner. Value-added in Asia-Pacific economies makes its way to the United States either through direct exports or indirectly via China. As a result, the escalating tensions between the two economic giants cause concern in these other economies too. However, multinational corporations will adjust their investment strategies allowing for them to maintain and grow their shares in the American market. Therefore, there will be trade diversion in the form of picking a new import source or by production relocation, including back to United States, as a result of the United States increased protectionism against imports from China. Using data on trade in value-added between Asia-Pacific economies and the United States, we develop indices to identify countries that face highest risks, and countries that possibly benefit from the ongoing tensions between the two largest economies. The results confirm that opportunity arising from this trade war will be based on economies' specialization. Thus, even small economies can possibly become winners in certain industries.

JEL: F13, F14, O24

Keywords: Protectionism, tariffs, trade war, Asia-Pacific, global value chains, opportunities, risks

[2] A forthcoming paper by Anukoonwattaka and Lobo (forthcoming) examines the impacts of China's retaliatory tariffs on imports from the United States for Asia-Pacific economies.

Contents

Table of figures

1. Introduction

Over the course of 2018, protectionist policies in the world's largest economy have resulted in immense uncertainty regarding the future structure of global trade. The US – China tariff war is a core component of this protectionist stance and is particularly important for Asia-Pacific countries.[3] Many economies in the region are deeply integrated with China through production in global value chains (GVCs). They indirectly export to the US and the rest of the world by supplying raw materials and intermediate products for China's export production. In addition, China has increasingly become an important source of final demand in the region. As a result, the impacts of US tariffs on imports from China are expected to have negative ripple effects for countries in the region through the slowdown of both global and regional demand. At the same time, some countries may see new market opportunities open up if China's ability to export to the US is lastingly undermined and GVCs are redrawn.

Understanding the potential implications of US tariffs on imports from China for countries in the Asia-Pacific region will assist policy makers in formulating appropriate policies to mitigate the negative impacts, and to take advantage of potential opportunities. In this paper, we evaluate the potential risks and opportunities faced by Asia-Pacific countries as a result of US tariffs on China by constructing risk and opportunity indices at the country level, based on trade in value-added data obtained from the Asian Development Bank Multi-Regional Input-Output (ADB MRIO) database.

This paper is structured as follows. Section 2 presents a background of the trade tensions. Section 3 provides a review of literature relating to tariffs and their passage through GVCs. This literature is utilised in constructing a conceptual framework to analyse the potential opportunities and risks for Asia-Pacific countries arising from US tariffs on Chinese exports. Following this, section 4 presents the data and methodology used in the analyses. Section 5 presents and discusses the results of the analyses. At suitable junctures, the discussion provides anecdotal evidence that support the findings. Finally, section 6 concludes and provides policy recommendations.

2. Background

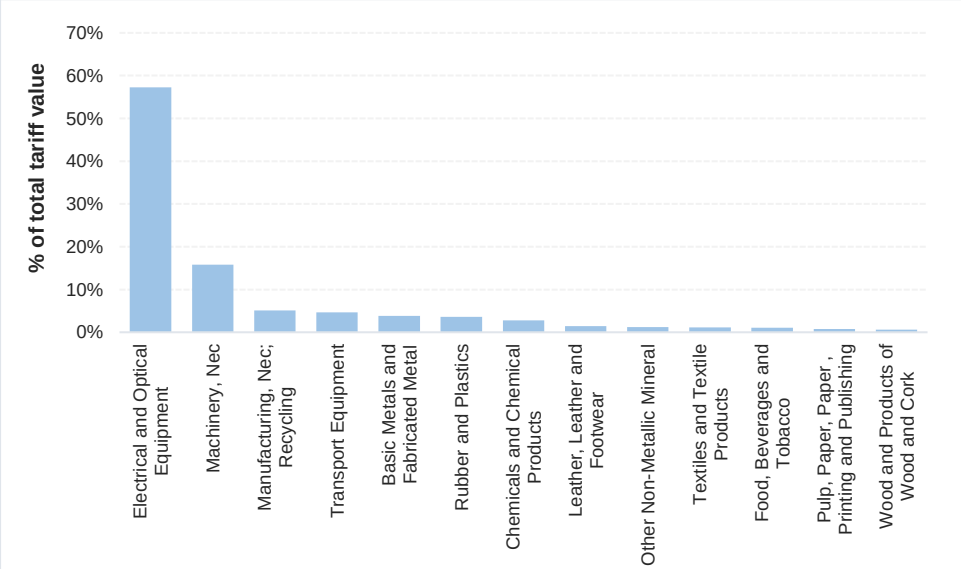
Since early 2018, the US has invoked a series of unilateral tariff actions against trading partners having a significant merchandise trade surplus with the country. The first official tariff action in the series was the global safeguard measures leading to imposition of tariffs on imports of solar panels and washing machines. Although these safeguard measures affect essentially all economies exporting to the US, China is among the largest exporters to the US. These initial measures were followed by tariffs on steel and aluminium, primarily impacting the European Union, Mexico and Canada (ESCAP, 2018).

[3] The US is currently (May 2019) imposing tariffs on half of its imports from China, whilst China is imposing retaliatory tariffs on two-thirds of its imports from the US. None of the other tariff escalations come near, in terms of magnitude of tariff impacts.

Among all trading partners of the US, trade tensions with China escalated more rapidly. After China responded to the US tariffs on steel and aluminium with retaliatory tariffs of 15-25% on 128 US products, including pork, cherries and scrap metals, the US announced a series of protectionist measures against China specifically. These measures began with the imposition of 25% tariffs on $50 billion worth of goods, primarily intermediate inputs and capital equipment. These tariffs followed US findings on China's unfair trade practices relating to technology transfer, intellectual property and innovation. China responded with 25% tit-for-tat tariffs on US goods, including soybeans, cars and aircrafts. China's retaliatory tariffs resulted in further US tariff escalation in the form of a 10% tariff imposition on $200 billion worth of imports from China. Therefore, thus far, US tariffs against China cover a total of $250 billion worth of imports, covering over half of China's total exports to the US (worth $430 billion) and 11% of China's total exports to the world (worth $2.3 trillion) (Bown and Kolb, 2018).

In terms of tariff coverage, the US tariffs against China appear to be targeted primarily at the electrical and optical equipment sector, and to a lesser extent the machinery sector (figure 1).[4] Owing to China's well-established position in electronics and machinery manufacturing GVCs, this finding suggests that US trade policy against China is targeted at sectors where China enjoys high market shares in the US market. Nevertheless, US tariffs against China also cover a number of high-tech (basic metals, transport equipment) and low-tech (manufacturing, recycling, rubber and plastics) manufacturing sectors, although the relative impact of these tariffs is small in comparison.

Figure 1. Sectoral coverage of US tariffs targeting imports from China



Source: Authors' calculations based on data obtained from UNCOMTRADE and CARD Trade War Tariffs Database (accessed December 2018).

Note: For brevity, sectors with negligible tariff coverage are excluded from the figure. Sectoral classifications follow ADB MRIO database nomenclature.

[4] The analysis is based on tariff data obtained from Li's (2018) CARD Trade War Tariffs database that categorises the products on the USTR (2018a, 2018b) tariff lists according to HS 6-digit codes. We utilise these products codes along with concordances obtained from WITS to classify them in accordance with the ADB MRIO database nomenclature. We then calculate the value of tariffs on each product and then aggregate these tariffs for every sector. The absolute value of the tariffs for each sector is then scaled as a percentage of the total value of tariffs.

As of May 2019, President Trump has threatened to follow up on the US's initial plan to raise tariffs on $200 billion worth of Chinese imports from 10% to 25%, stating that "[t]he Trade Deal with China continues, *but too slowly*, as they [China] attempt to renegotiate." President Trump also stated that an additional $325 billion worth of "untaxed" imports from China may face 25% tariffs "shortly" (Wearden, 2019). This deterioration in trade discussions has emerged quite abruptly as both countries agreed to hold off on tariff escalation for a 90-day period, starting 1 December 2018, and refrained from further tariff escalation even after the 1 March 2019 deadline had passed. Evidently it appears that trade tensions between the two largest economies will not conclude expeditiously.

3. Conceptual framework

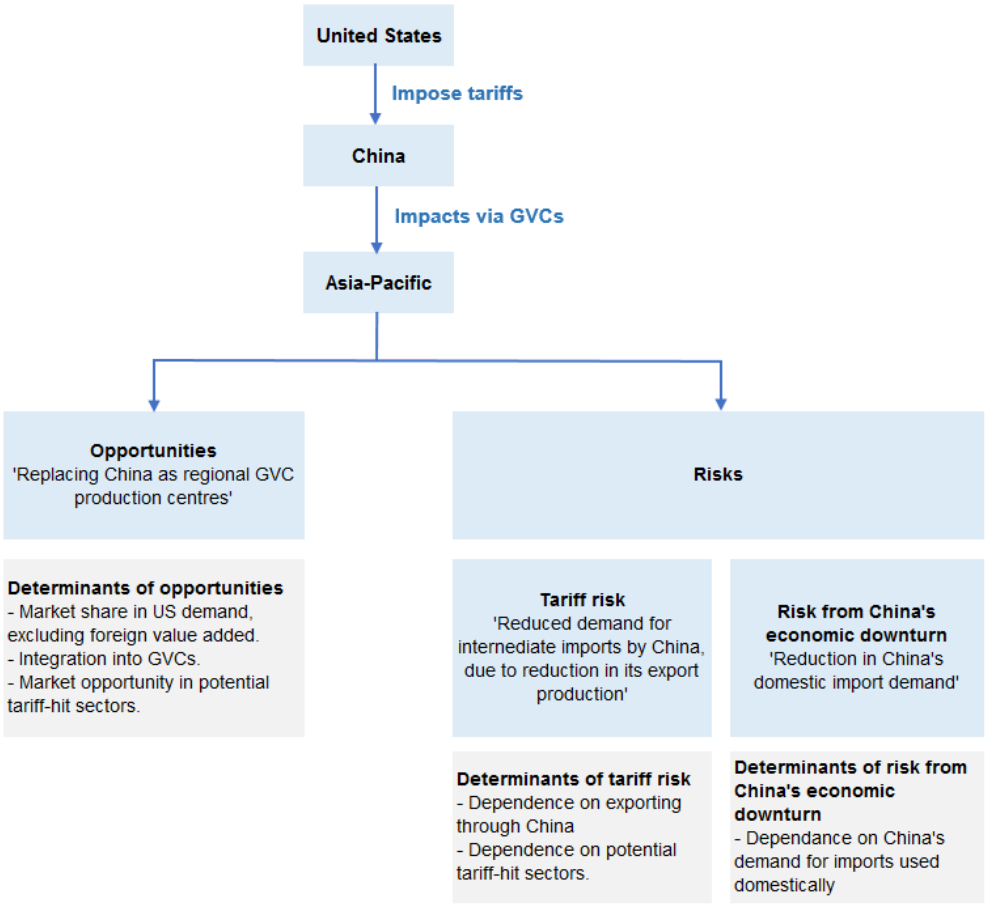
The US tariffs on imports from China can have strong implications for Asia-Pacific countries which integrate with China through trade and value chains. This section provides a conceptual framework to evaluate the risks and opportunities facing Asia-Pacific countries as a result of this policy. It will form the basis for the risk and opportunity indices applied in the study. Figure 2 illustrates the channels where risks and opportunities can be passed through to Asia-Pacific countries. Risk presents itself in two forms, namely risk from indirect tariffs and risk from China's economic downturn. For tariffs that the US imposed on imports from China, the risk transmitted to Asia-Pacific countries is mainly in the form of decreasing demand for raw-material and intermediate products of China's export sector. Following this, the first index of risk facing the rest of the countries in the Asia-Pacific region is determined by their dependence on exports through China as well as their reliance on exports in sectors facing potential tariff increases. The second index reflects the risk of relying on domestic demand in China. Trade conflicts are likely to cause China's economic downturn.[5] Hence, even a country that is not integrated in GVCs with China can be adversely affected when consumption and investment in China declines.

On the other hand, countries may find new market opportunities if they have the potential to attract redirected investment and source redirected imports in the US market. A factor determining such potential includes a country's performance in the US market. In this regard, the market share of a country in the export market is seen as representing the country's market potential (UNCTAD, 2005). Another factor determining the potential to attract redirected investment is a country's integration into GVCs. A country that is already well integrated into GVCs tends to have established networks with suppliers and buyers, and, to an extent, possesses soft and hard infrastructure required for participating in global production networks. Hence, countries that are already well integrated into GVCs tend to be in a better position to attract redirected and new investment in GVCs. Furthermore, an additional factor determining opportunity is the matching between a country's export basket and the potential scope of US tariffs on China's exports. Presumably, products in which China had large market share in the US tend to be hit by the unilateral tariffs.[6] Hence, countries competing with China in these products can see higher market opportunity in the US market.

[5] Qi et al. (2018) indicate the slowdown in China's industrial production and retail sales growth is forming risk against Asia-Pacific countries exporting to China's domestic market.

[6] According to Partington (2018), the main objective of US imposition of tariffs on imports from China appears to be to reduce US trade deficit. In addition, our findings on the sectoral coverage of US tariffs (presented in the preceding 'Background' section) support this proposition.

Figure 2.Conceptual framework



Source: Authors

The idea about risk transmission in this paper is loosely linked to a vast body of literature relating to the pass through of tariffs and other trade costs through GVCs. In general, the literature highlights the cumulative impact of tariffs along GVCs and finds that the indirect effect of tariffs on intermediate goods along international supply chains can be large even in the presence of low tariff barriers between direct importers and exporters due to tariffs faced by third countries involved in the production network.[7]

An implication from the literature is that a country's position in the value chain determines the extent and channels through which it is affected. De Backer and Miroudot (2013) elucidate that countries positioned upstream in GVCs are exposed to trade barriers along GVCs and the demand for their exports is conditional on final demand in third countries. Countries occupying downstream are more exposed to tariffs on their exports from countries of final demand as well as the tariffs passed through from upstream countries. With respect to US tariffs on exports by China, the tariffs may have limited effects being passed down the value chain because China's exports to the US are primarily downstream in majority of the GVCs (Weijuan and Zihua, 2017). However, countries upstream in GVCs that China is a part of are

[7] See for example, Hummels et al. (2001)

at risk of reduced intermediate demand from China, and also face the challenge of finding new markets for their intermediate exports.

The concept of opportunity arising from redirected trade and investment is in fact the standard thinking that export competitiveness is driven by an exporter's supply-side capacity as opposed to external factors, including specialization and market-access conditions compared across countries. The exporter's capacity to integrate into GVCs can be seen as part of the supply-side capacity, because it is associated with efficiency in trade, business environment, quality and availability of soft and hard infrastructure, as well as stocks of labour with requisite skills for specific tasks along the value chains (see OECD, 2014; UNIDO, 2017; Luo and Xu, 2018).

4. Data and methodology

This section provides an insight into the construction of indices utilised in the study. Details of the variables and data sources used are provided, following which the construction of opportunity and risk indices are described in detail.

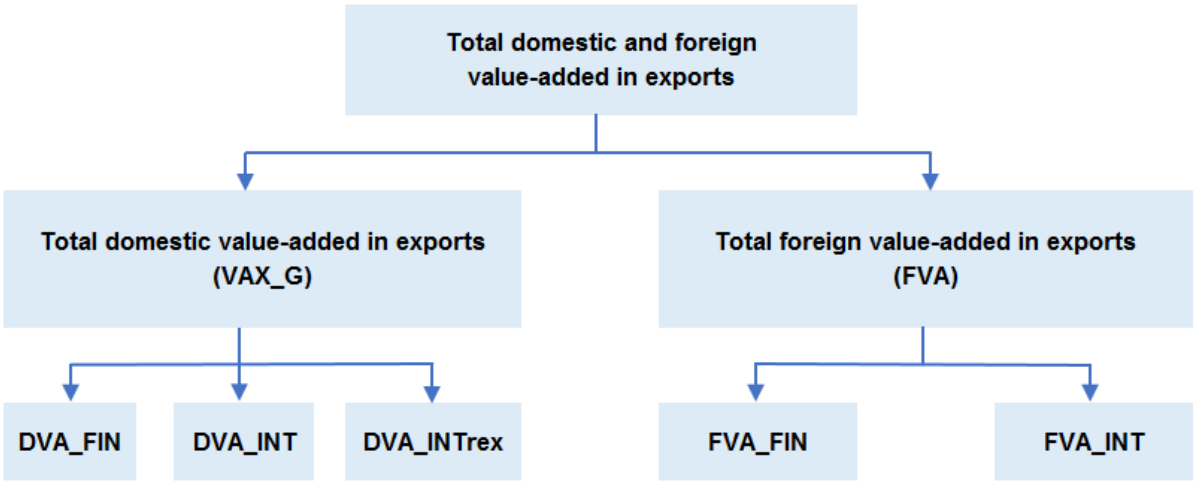
4.1 Data sources and variables used

Uncovering the potential risks and opportunities facing countries interconnected with China through GVCs requires international input-output analysis of production linkages between those countries and China. This study utilizes data on trade in value-added extracted from the Asian Development Bank's Multi-Regional Input-Output (ADB MRIO) database for this purpose. The ADB's MRIO database contains data on bilateral trade in value-added among 62 economies, 28 of which are located in the Asia-Pacific region. However, only 25 of these Asia-Pacific economies are considered in this study.[8] The database provides information about the value added in exports of these countries, disaggregated across 35 sectors and decomposed into seven components.[9] Variables in the ADB-MRIO database forming the basis for constructing the risk and opportunity indices in this paper are as follows (figure 3).

[8] Only ESCAP member countries are considered in this paper. China and Hong Kong, China are considered as one economy owing to their economic linkages.

[9] The decomposition of gross exports into value-added components follows the methodology developed by Wang et al. (2018). Their methodology decomposes gross exports into domestic value-added absorbed abroad, domestic value-added absorbed domestically, foreign value-added and pure double counted terms. We only consider domestic value-added absorbed abroad and foreign value-added in our analysis.

Figure 3.Decomposition of total domestic and foreign value-added in exports



Source: Authors' adaptation of Wang et al. (2018)

For an exporting country, its gross exports can be decomposed into foreign value-added in exports (FVA) and domestic value-added in exports (VAX_G).

DVA_FIN refers to an exporting country's domestic value-added in final exports. DVA_INT refers to an exporting country's domestic value-added in intermediate exports, used for producing a final product for domestic consumption in the importing country. DVA_INTrex is an exporting country's domestic value-added in intermediate exports used for export production in the importing country.

For the foreign inputs used in an exporting country's exports, foreign value-added in its gross exports include FVA_FIN and FVA_INT. The first term refers to the foreign value-added in its final exports. The second term refers to the foreign value-added in its intermediate exports.

4.2 The index of indirect tariff risk

The dependence on China's demand for intermediate imports used in the production of its exports is the key determinant of indirect tariff risk for Asia-Pacific countries, as US tariffs directly affect China's export-oriented industries. In addition, countries that concentrate their exports in sectors facing potential tariff increases will face higher risks than countries that have diversified export profiles.

Based on this concept, the index is constructed as the weighted mean of country X's share of value-added exports, directed towards China's export production. Equation (1) presents the formula for calculating the indirect tariff risk index. The ratio of $DVA\_INTrex\_XtoChina_i$ to $VAX\_G\_XtoWorld$ captures the dependence of country X on indirect exports in sector i through China (numerator) relative to country X's value-added exports to the world (denominator). The ratio of $VAX\_GChtoUS_i$ to $VAX\_GChtoUS$ represents sector i's weight in the risk index. It is based on the assumption that higher the importance of sector i in China's exports to the US, the more likely it is to be hit by US tariffs. The weight term is represented by the share of sector i (numerator) in China's value-added exports to the US (denominator). This weight quantifies

the relative risk from US tariffs faced by each sector in China.[10] A higher index value indicates higher potential loss in exports due to tariffs, stemming from greater share of indirect exports through China compared to a country's total exports (equation 3).

$$Indirect\ tariff\ risk\ index = \sum_{i=1}^{35}\left(\frac{DVA\_INTrex\_XtoChina_i}{VAX\_G\_XtoWorld} \times \frac{VAX\_G\_ChtoUS_i}{VAX\_G\_ChtoUS}\right) \times 100 \quad (1)$$

$$Let\ \Delta Y_i = DVA\_INTrex\_XtoChina_i \times \frac{VAX\_G\_ChtoUS_i}{VAX\_G\_ChtoUS} \quad (2)$$

ΔY_i is the average potential loss in exports due to tariffs, for sector i.

$$\therefore Indirect\ tariff\ risk\ index = \sum_{i=1}^{35}\left(\frac{\Delta Y_i}{VAX\_G\_XtoWorld}\right) \times 100 \quad (3)$$

4.3 Index of risk from China's economic downturn

China potentially faces a significant economic slowdown as a result of trade tensions (ESCAP, 2018). Countries that are highly dependent on China as an export market, therefore, will face a considerable degree of risk from less demand in China.[11]

Based on this concept, equation (4) presents the formula for calculating the index of risk from China's economic downturn. The ratio of $DVA(INT+FIN)\_XtoChina_i$ to $VAX\_G\_XtoWorld$ captures the dependence of country X on exports in sector i to meet China's domestic consumption demand (numerator) relative to country X's total exports of domestic value-added to the world (denominator). A higher index value suggests that country X is highly dependent on China's domestic demand for imports and thus faces higher risk from China's economic downturn.

$$Indicator\ of\ risk\ from\ China's\ economic\ downturn$$

$$= \sum_{i=1}^{35}\left(\frac{DVA(INT+FIN)\_XtoChina_i}{VAX\_G\_XtoWorld}\right) \times 100 \quad (4)$$

[10] The robustness of this weight has been tested, and its validity confirmed. The methodology and the results of this robustness test are available in section 5 of the Annex.

[11] The slowdown in China's industrial production and retail sales is expressive of the country's economic downturn (Qi et al., 2018). Following this reduction in domestic consumption a corresponding decline in import demand is likely.

4.4 The composite index of opportunity

Following the conceptual framework illustrated in figure 2, we construct a composite index of opportunity that considers the three dimensions of opportunity, namely market access to the US, GVC integration and sectoral market opportunity in potential tariff-hit sectors, encompassed in three composite indicators, I_1, I_2 and I_3, respectively. The formula for the composite index of opportunity is provided in equations (5) and (6). Each composite indicator, I_j, has been normalised across countries using the min-max approach.[12]

The geometric aggregation technique, using equal weights, is followed in aggregating the three composite indicators, I_1, I_2 and I_3, for sector i in country X. The reason for using geometric aggregation is due to it serving as a less compensatory approach, where only countries that perform well in all dimensions attain higher overall opportunity index scores (Nardo et al., 2005). To combine the sectoral aggregated indicators into a country-level indicator, the sectoral indicators are linearly aggregated, taking a simple average across i sectors $(i = 1, 2, \dots 35)$ within each country. Equation (7) provides the fully expanded composite opportunity index formula. The variables used in this formula are presented along with their respective descriptions.

$$Opportunity\ Index\ for\ country\ X = \frac{1}{35}\sum_{i=1}^{35}\left\{\prod_{j=1}^{3}\left[(I_j)^{w_j}\right]^{1/\sum_{j=1}^{3} w_j}\right\} \quad (5)$$

$$= \frac{1}{35}\sum_{i=1}^{35}\left\{\prod\left[(I_1)^{w_1} \times (I_2)^{w_2} \times (I_3)^{w_3}\right]^{1/\sum_{j=1}^{3} w_j}\right\} \quad (6)$$

$$= \frac{1}{35}\sum_{i=1}^{35}\left\{\prod\left[\left(\frac{DVA\_(t)\_XtoUS_i}{DVA\_(t)\_WtoUS_i}\right) \times \left(\frac{FVA\_(t)\_XtoW_i}{DVA\_(t)\_XtoW_i}\right) \times \left(\frac{DVA\_(t)\_ChtoUS_i}{VAX\_GChtoUS}\right)\right]^{1/3}\right\} \quad (7)$$

t= [FIN, INT + INTrex]

where,

t is a vector of the type of exports i.e. final goods (FIN) or intermediate goods (INT + INTrex).

$DVA\_(t)\_XtoUS_i$ is the domestic value-added in exports of t, by sector i in country X's exports to the US.

$DVA\_(t)\_WtoUS_i$ is the domestic value-added in exports of t, by sector i in the world's exports to the US.

[12] This technique involves subtracting each observation from the minimum and dividing by the range, ensuring that all values for the indicator lie between 0 and 1 (OECD, 2008).

$FVA\_(t)\_XtoW_i$ is the foreign value-added in exports of t, in country X's exports to the world from sector i.

$DVA\_(t)\_XtoW_i$ is the domestic value-added in exports of t, in country X's exports to the world from sector i.

$DVA\_(t)\_ChtoUS_i$ is the domestic value-added in exports of t, by sector i in China's exports to the US.

$VAX\_GChtoUS$ is the total value-added in China's exports to the US.

4.5 Sub-components of the opportunity index

Having discussed the construction of the composite index of opportunity, we now look into each sub-component of the index, i.e. I_1 , I_2 and I_3, presented in equations (5) and (6). As upstream and downstream GVC countries face different forms of opportunity, all index sub-components are calculated for intermediate exports and final exports separately.

The first index sub-component, i.e. I_1, is market potential in the US, which is quantified in terms of market share in US imports. It is defined as the ratio of $DVA\_(t)\_XtoUS_i$ to $DVA\_(t)\_WtoUS_i$. The ratio captures the market share of sector i, in country X's exports of t to the US (numerator) relative to the value-added in exports by the world to the US (denominator) (equation 7). The average value of this component is calculated for each country, across i sectors. A higher value is indicative of higher opportunity for country X as a result of greater US market potential.

The second index sub-component of opportunity is the degree of GVC integration, i.e. I_2. It is defined as the ratio of $FVA\_(t)\_XtoW_i$ to $DVA\_(t)\_XtoW_i$. It captures the share of foreign value-added in country X's exports of t, from sector i, to the world (numerator) relative to country X's domestic value-added in exports of t to the world (denominator) (equation 7). The average value of this component is calculated for each country, across i sectors. A higher value suggests that country X is highly integrated in GVCs, in a position similar to China, and therefore has a higher level of opportunity.

Finally, the third index sub-component is sectoral market opportunity in potential tariff-hit sectors, i.e. I_3. It is defined as the ratio of $DVA\_(t)\_ChtoUS_i$ to $VAX\_GChtoUS$, which captures the share of domestic value-added by sector i, in China's exports of t to the US (numerator) relative to China's total exports to the US (denominator) (equation 7). A higher value suggests a higher degree of opportunity for Asia-Pacific countries in sector i. [13]

[13] The robustness of this sub-component has been tested, and its validity confirmed. The methodology and the results of this robustness test are available in section 5 of the Annex.

5. Results

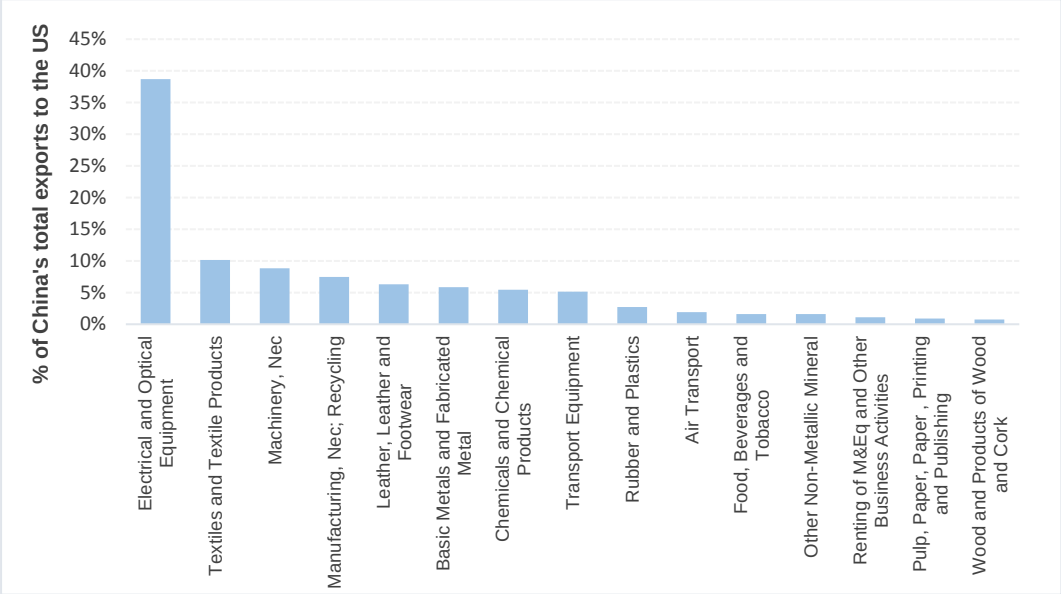
Based on the methodology explained in the previous section, we construct indices of risk and opportunity to rank countries in Asia and the Pacific according to the risks and potential opportunities they are facing from the US tariffs against imports from China. In addition to the country's overall ranking, this section discusses the performance at sectoral and index-subcomponent levels to highlight factors driving overall position of countries.

5.1 Risks facing Asia-Pacific economies

5.1.1 Risks from indirect tariffs

Indirect tariff risks capture the potential risks coming from a country's exports through China, which is the most important target of US unilateral tariffs. Assuming tariff risks will be higher in the key export sectors of China in the US market, the electrical and optical equipment sector is most prone to be a target. The sector accounted for almost 40% of China's value-added exports to the US in 2017 (figure 4). After the electrical and optical equipment sector, textiles, machinery, recycling, leather, basic metals and chemicals sectors follow in terms of sectoral-tariff risk.

Figure 4.China's value-added exports to the US by sector



Source: Authors' calculations based on data obtained from ADB MRIO database (accessed January 2019)

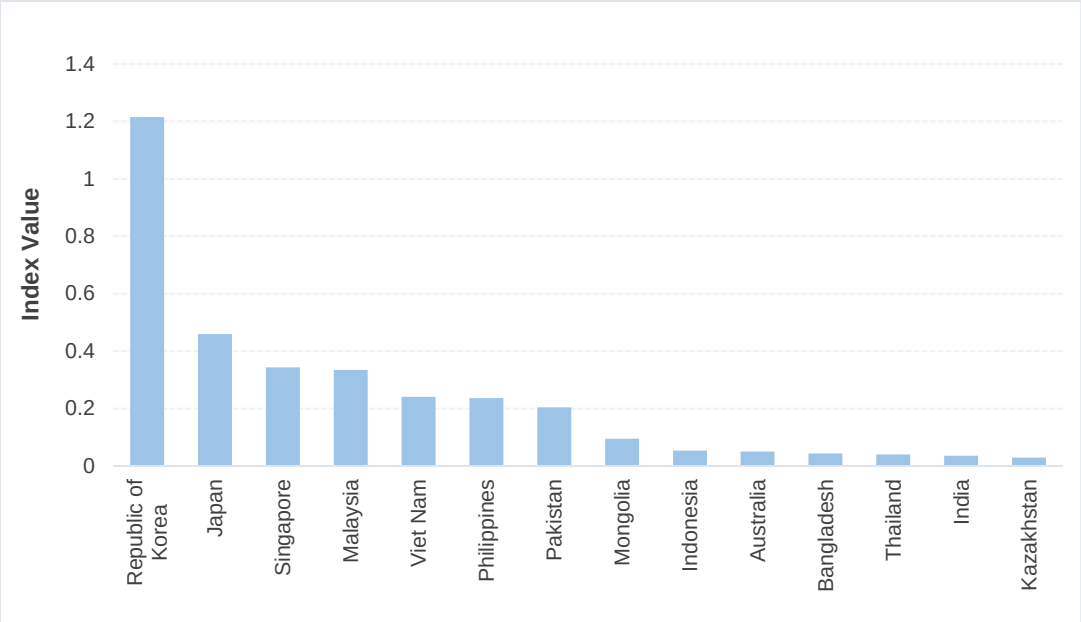
Note: For brevity, sectors with negligible shares in China's exports to the US are excluded from the figure.

Hence, countries deeply integrated with China through GVCs in the electrical and optical equipment sectors, such as Republic of Korea, Japan and ASEAN countries, are potentially affected the most from US tariffs targeting imports from China. These countries export intermediate goods which end up in China's exports from the electrical and optical equipment

sectors in particular. The index value indicates that approximately 1.2% of the Republic of Korea's total exports to the world are at risk of facing the impact of US tariffs on China, followed by Japan with 0.5% of its exports possibly being affected (figure 5).[14]

In addition, despite not being integrated to GVCs in electrical and optical equipment sectors, Pakistan presents with fairly substantial risks from the slowdown of China's exports in the textile sector. Mongolia faces risk due to its high dependence on exports to China in the mining and quarrying sector.

Figure 5.The index of indirect tariff risk, by most potentially affected economies



Source: Authors' calculations based on data obtained from ADB MRIO database (accessed January 2019)

Note: For brevity, countries with negligible index values are excluded. For index values of all countries considered in our analysis, please see section 3 of the Annex.

5.1.2 Risks from China's economic downturn

Decreasing consumption and private investment can reduce import demand in China. As China has increasingly become a source of final demand in the region, accounting for over 20% of total exports for twelve economies in the region,[15] the potential economic slowdown in China because of trade conflicts presents another important threat to the rest of Asia and the Pacific.

The index shows that countries focusing on mining and quarrying tend to be most affected by the slowdown of the Chinese economy (figure 6). Mongolia tends to face immense potential risks: About 58% of Mongolia's value-added in exports in 2017 can be affected by the

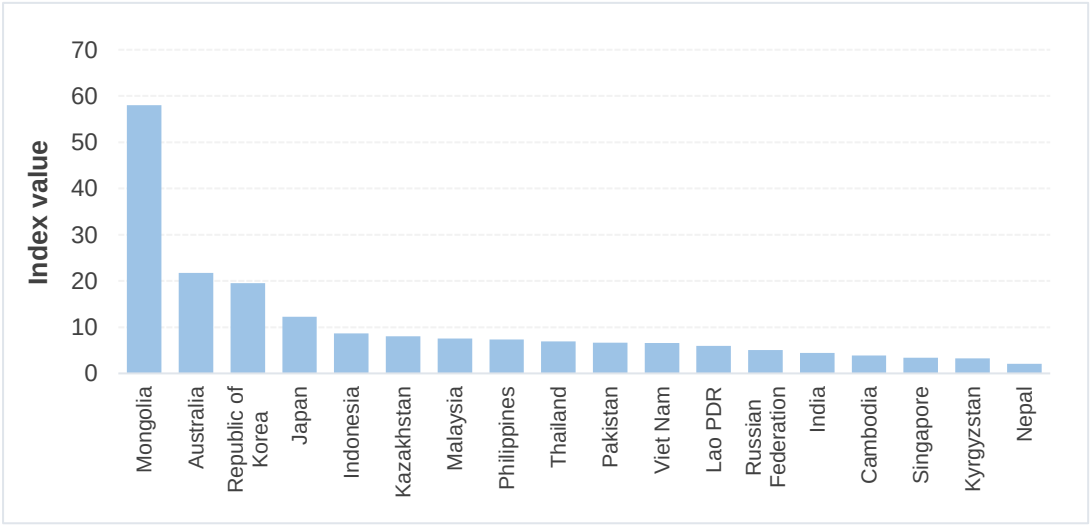
[14] Index value by country is available in section 3 of the Annex.

[15] See ESCAP (2018) for more detailed information.

slowdown of China's domestic demand. Australia follows with 22% of its value-added exports directed towards China's domestic demand, with the mining and quarrying sector accounting for more than half of these exports.

Countries exporting electrical and optical equipment tend to face moderate risks because their export destinations are relatively diversified. The group includes Republic of Korea, Japan, and most ASEAN countries. Economies in South and South-West Asian (SSWA) as well as North and Central Asian (NCA) sub-regions face limited risks from the slowdown in Chinese demand because they are less integrated with China and moderately dependent on exports to China.

Figure 6.The index of risk from China's economic slowdown, by most vulnerable economies



Source: Authors' calculations based on data obtained from ADB MRIO database (accessed January 2019)

Note: For brevity, countries with negligible index values are excluded. For index values of all countries considered in our analysis, please see section 3 of the Annex.

5.2 Opportunity

5.2.1 The composite index of opportunity

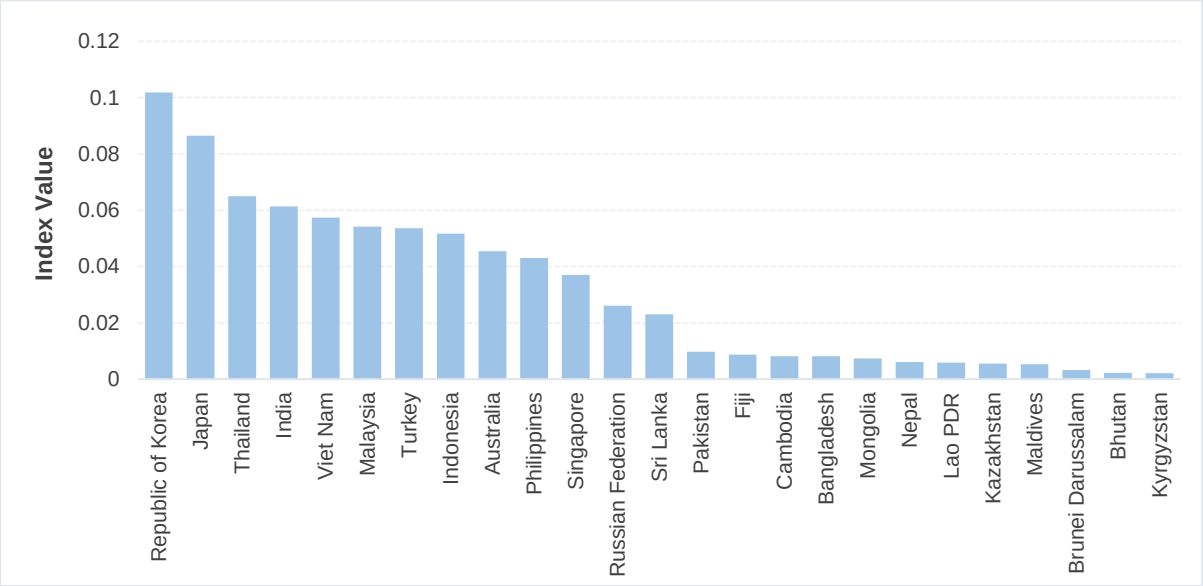
When tariffs cause importers in the US to look for alternative suppliers, opportunities will open up for countries that can leverage their competitiveness to attract the redirected trade and investment. As China has been involved in GVC processes both at downstream and upstream positions, new opportunities for a country to replace China in the US market can be in final exports or intermediate exports depending on its specialization.

As discussed, the composite index takes into account the country's market potential in the US and participation in GVCs of each sector weighted by the respective sector's potential exposure to US tariffs. The section starts with showing the results from the composite index, and then looks into subcomponents to understand the major drivers of the results.

Figures 7 and 8 present the results from the composite indices of opportunity in intermediate and final exports to the US market, respectively. The ten largest potential beneficiaries in intermediate export opportunity are mostly concentrated in East and North-East Asia (ENEA) and ASEAN. Republic of Korea and Japan in particular tend to be the largest potential beneficiaries, driven by their export potential and deep integration in GVCs of high-tech sectors, namely basic and fabricated metals, chemicals and chemical products, electrical and optical equipment, and machinery. For ASEAN, the opportunity is driven by a number of sectors, but prominently electrical and optical equipment, and textiles. Most of these sectors have been fairly important targets of US unilateral tariffs.[16]

In addition, the 10 largest potential beneficiaries also include India and Turkey. India's export opportunity tends to be driven by export performance in a diverse group of manufacturing sectors, ranging from rubber and plastics to chemicals, while Turkey's export opportunity tends to be driven by its performance in textiles and leather sectors. On the other hand, least developed countries (LDCs) and landlocked developing countries (LLDCs) are not in the list of largest beneficiaries in any sector. They currently have poor market access and limited integration in GVCs of the sectors that are likely to be affected by US tariffs.

Figure 7.The index of opportunity in intermediate sectors, by economy



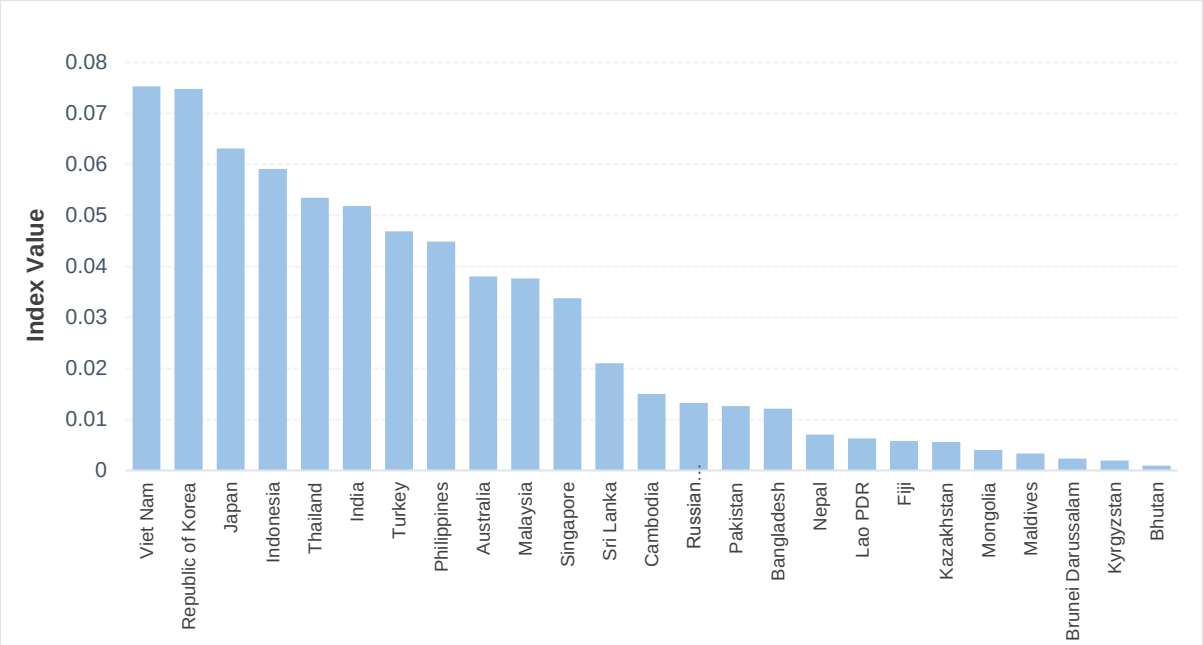
Source: Authors' calculations based on data obtained from ADB MRIO database (accessed November 2018)

Figure 8 presents country rankings for opportunity relating to final exports. The results are quite similar to the opportunity from redirected intermediate exports. However, ASEAN economies, Viet Nam and Indonesia in particular, stand out prominently in downstream export opportunity. The export opportunity of Viet Nam tends to be driven primarily by leather and textiles. The country is found to have a large US market share and high GVC integration in

[16] In line with our findings, Nomura's Import Substitution Index finds Japan and Thailand among the top countries that will substitute China in meeting US import demand, whilst Nomura's Production Relocation Index places Viet Nam, India and Malaysia in top positions to replace China as regional production centres (Curran, 2018).

these sectors, both of which are relatively labour-intensive.[17] Indonesia's opportunity is driven by the same sectors as Viet Nam, in addition to electrical and optical equipment. In the upstream cases, Republic of Korea and Japan present with more opportunities to expand their exports in basic and fabricated metals, electrical and optical equipment, and machinery. For Republic of Korea, there is also high opportunity in exports of services related to the manufacturing sector, such as renting of machinery and equipment.

Figure 8.The index of opportunity in final sectors, by economy



Source: Authors' calculations based on data obtained from ADB MRIO database (accessed November 2018)

In general, opportunities are opening up as a result of trade tensions, however the opportunities are spread unevenly across Asia-Pacific countries. Countries strongly connected to GVCs, such as ASEAN and advanced ENEA countries, tend to have advantages because they have already established soft and hard infrastructure supporting the development of trade networks and market access. In contrast, LDCs and LLDCs, still have limited capacity to integrate into the network, and hence will not be in a position to attract a significant volume of the redirected trade and investment.

To highlight factors driving countries' potential to capitalise from the emerging opportunity, the results from index subcomponents are discussed below:

[17] Consistent with the findings, foreign investors from Japan, Republic of Korea and China have invested over $2 billion in Viet Nam's garment and textile sector since the start of 2018, providing strong evidence of a shift in production lines to Viet Nam. Viet Nam exported garments worth $12.3 billion to the US in 2017, representing 50% of its readymade garment exports (EIU, 2018). Vu (2018) highlights that Viet Nam's exports are set to rise by 14.8% in 2018 to $35 billion. The author emphasizes that textile exports to the US have played a major role in this growth, with garment exports to the US rising 12%, amounting to $10.5 billion between January and October, 2018.

a) Market potential

The first dimension of opportunity we consider is market potential, represented by a country's market share in the US. Figure 9 shows countries ranked by market shares in the US's intermediate and final imports. Japan and Republic of Korea stand out with the largest shares in the US market for intermediate exports, mainly because of their competitiveness in transport equipment, machinery, electrical and optical equipment in particular. Thailand, India and Malaysia followed with the market shares of 1.7%, 1.7% and 1.6%, respectively, in intermediate imports by the US in 2017. The market shares of Thailand and Malaysia are mainly driven by diverse sectors, including transport services, while India has market shares mainly concentrated in the textile and leather sectors (figure 9a).

Figure 9.Market potential in intermediate and final exports to the US, by economy

Figure 9a: Intermediate exports

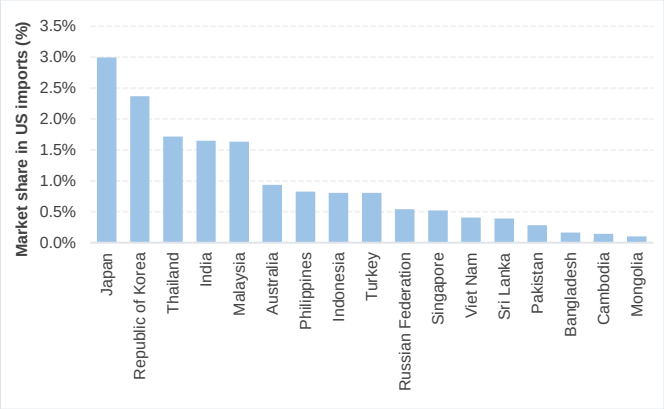
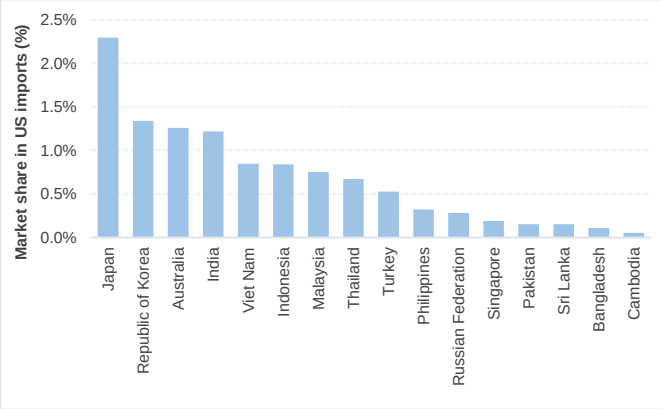


Figure 9b: Final exports



Source: Authors' calculations based on data obtained from ADB MRIO database (accessed November 2018)

Note: For brevity, countries with negligible market shares in US imports are excluded from the figures.

Similarly, the same high-tech sectors drive the large market shares of Japan and Republic of Korea in final trade in the US. Meanwhile, Australia's market potential was driven by food, beverages and tobacco as well as transport service sectors, and India was mainly competitive in textiles and wood products sectors. Viet Nam, Indonesia, Malaysia, and Thailand, are major ASEAN countries having potential to have a larger share in the US final demand for imports. For View Nam, this is particularly in textiles and leather, whilst Indonesia's market potential includes both these sectors in addition to the food, beverages and tobacco sector. Thailand and Malaysia have market shares concentrated in the same sectors as in the case for intermediate goods. For LDCs and LLDCs, even though in general final export production tends to be more labour intensive than upstream ones, they still tend not to be able to capitalise on the new market opportunity (figure 9b).

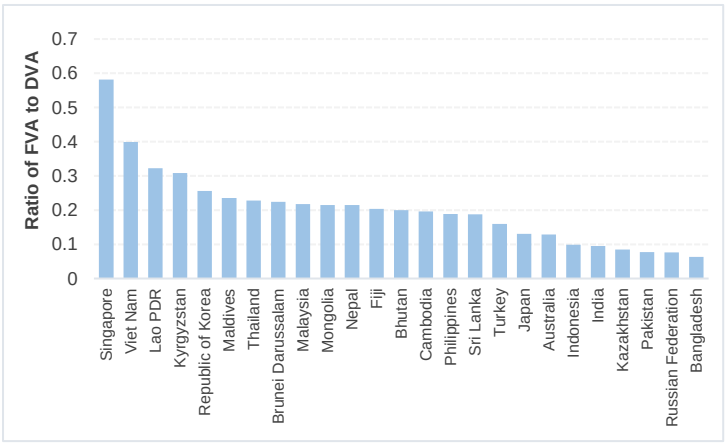
b) GVC integration

GVC integration is indicative of capacity to serve as a regional GVC production centre. Participation in GVCs also indicates the country's readiness in terms of soft and hard infrastructure, a labour force with the right skills, and openness to foreign trade and investment.

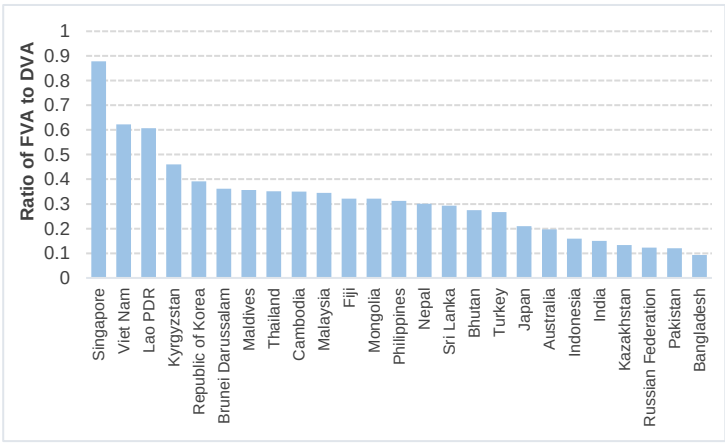
The extent of Asia-Pacific country integration into intermediate goods GVCs is presented in figure 10a. The results indicate that Singapore is the most highly GVC integrated country in the region with respect to intermediate goods production, followed by Viet Nam. However, examining the data in more detail reveals that Singapore's high degree of GVC integration is driven by its fuel sector, which reflects its position as an international hub for refining.[18] The foreign value-added in intermediate exports from this sector is 3.7 times the value of domestic value-added. This particularly high imported content is because Singapore needs to import crude oil used in its refineries (EIA, 2013).

Figure 10.GVC integration for intermediate exports, by economy

10a: Intermediate exports



10b: Final exports



Source: Authors' calculations based on data obtained from ADB MRIO database (accessed November 2018)

It also emerges that a majority of ASEAN countries are in a relatively good position from the perspective of GVC integration. This is due to their well-established participation in electronics and machinery GVCs. In the case of Viet Nam, its high degree of GVC integration in intermediate exports is found to be spread across diverse manufacturing sectors, including basic and fabricated metals, chemical and chemical products, electrical and optical equipment, transport equipment, machinery, and rubber and plastics. These findings support the assertions of Hollweg et al. (2017), which highlights that Viet Nam specialises in export of intermediate goods from the automobile, electronics, textiles and agri-business sectors. In

[18] Singapore is among the top three oil trading and refining centres in the world due to its strategic location as well as its world-class refining, storage and distribution infrastructure (EIA (2013).

contrast, SSWA countries such as Bangladesh, Pakistan, India and Turkey appear to be those with the lowest GVC integration. This finding is substantiated by their limited participation in regional value-chains.

Foreign value-added in exports are high also in LLDCs, namely Lao PDR and Kyrgyzstan. However, their high level of foreign value-added in exports is driven mainly by excessive transportation costs because of transport services provided by foreign service providers. In contrast, the main exporting sectors of these economies in terms of export volume, i.e. mining and electricity, gas and water supply for Lao PDR and basic and fabricated metals for Kyrgyzstan, remain negligibly represented in GVCs.

GVC integration in final sectors for Asia-Pacific countries are very similar to the case of intermediate sectors, with Singapore and Viet Nam emerging as the highest GVC integrated countries for the same reasons (figure 10b).[19] Similar to the previous case, GVC integration in Lao PDR and Kyrgyzstan is driven by high foreign input in transport services, whilst the key export sectors in these LLDCs remain insignificantly integrated in GVCs. As before, most ASEAN countries enjoy moderate GVC integration due to their participation in electronics and machinery GVCs.

c) Potential tariff-hit sectors

Sectors potentially at risk of increased tariffs serve as a weight term in the calculation of weighted average of opportunity facing a country across sectors. This indicator points towards sectoral opportunity that is constant across countries because it represents the likelihood that US imports from China in the sector will face tariffs if the trade war escalates.

Figure 11 presents the results of sectors in China most at risk of increased US tariffs on intermediate and final imports. For intermediate exports (figure 11a), the results indicate that the electrical and optical equipment sector is distinctly the most at-risk sector in China, because it accounted for the largest share in China's value-added exports to the US (12%). Four other sectors also face notable risk to US tariffs, including chemicals (4.3%), machinery (3.8%), basic and fabricated metals (3.4%) and transport equipment (3.2%).

[19] The findings of UNIDO (2017) provide further clarity on the reasons behind Viet Nam's high GVC integration. The report finds that in Viet Nam, the electrical and optical equipment sector is dominated by a single firm, Samsung, which accounts for 23% of Viet Nam's total merchandise exports. It is also highlighted that Samsung imports most inputs while domestic suppliers are limited to providing low value-added services such as packaging. In light of this, our results align with the firm and country-level information on Viet Nam's export production structures.

Figure 11.Potential tariff-hit sectors

Figure 11a: Intermediate exports

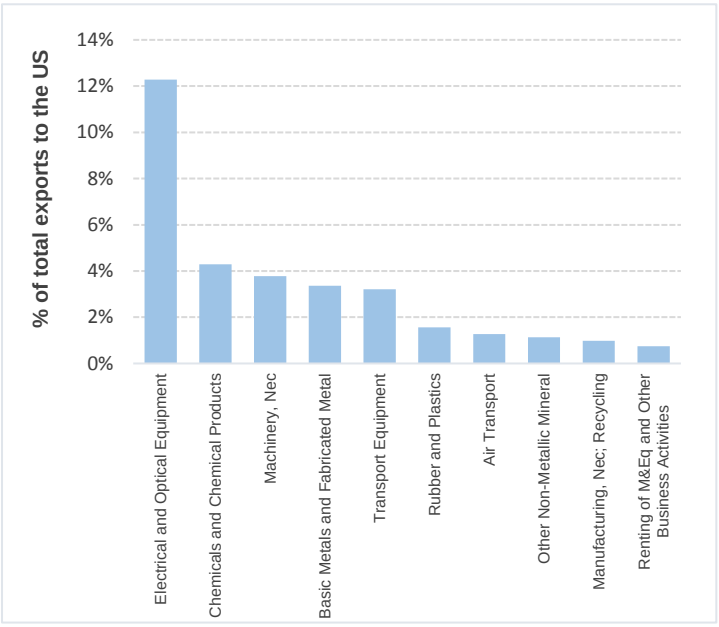
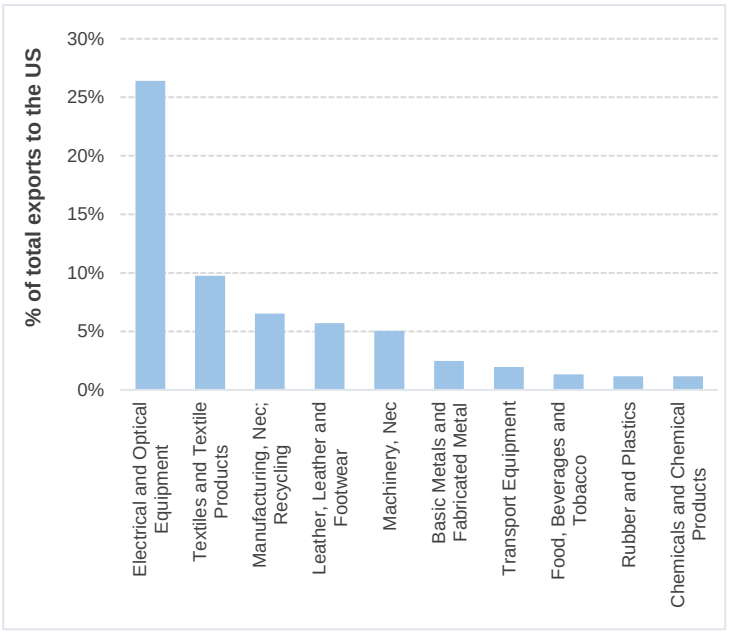


Figure 11b: Final exports



Source: Authors' calculations based on data obtained from ADB MRIO database (accessed November 2018)

Note: For brevity, sectors with negligible shares of exports to the US are excluded from the figures.

The analysis of China's potential tariff-hit sectors exporting final products to the US is presented in figure 11b. As in the previous case, the results indicate that electrical and optical equipment faces the highest risk of US tariffs. However, it is interesting to note that the indicator value in final exports is twice that of the intermediate exports. This is because China faces particularly high threats for sectors exporting final goods to the US. China's textiles sector emerges as having considerable risk to US tariffs because of its sizeable (10%) share in total domestic value-added exports to the US. Overall, manufacturing and recycling, leather, machinery, and basic and fabricated metals appear to be the other Chinese sectors facing a notable degree of risk with regards to US tariffs.

6. Conclusions

This paper discusses the implications of US tariffs on imports from China for the trade of rest of Asia and the Pacific. The paper provides country rankings based on export risks and opportunities facing them from the potential escalation of US tariff protection on imports from China. The risk assessment is based on two perspectives: the export risks channelling through integrated value chains which have China as a major export platform, and the risks from slowing down of final demand in China as a consequence of the trade war. On the other hand, opportunities open up for countries to leverage their specialization and enabling business environment to attract this redirected investment and replace China in the export markets.

Risks

Despite not being a direct target, the rest of Asia and the Pacific are affected by strong indirect impacts from US tariffs on their trade. China has been a major export platform for countries integrated in GVCs for about two decades. Exports by China contain tangible and intangible inputs from many countries that are part of the value chain. Hence, trade barriers against exports from China are, de facto, making trade difficult for those countries exporting through China to the US and the rest of the world. Among Asia-Pacific economies, advanced East Asian and ASEAN countries face the highest risks because of indirect export through China. The risks are mainly driven by production linkages in GVCs, particularly in the electrical and optical equipment sector. In addition, China is a growing source of final demand in the region. Countries exporting raw materials and commodities such as Mongolia and Australia will face the largest risks because of their heavy reliance on China as a major export market.

In relation to the risks facing Asia-Pacific countries, the results show that concentration in terms of export destination and production bases would put countries all along value chains at high risk. In this regard, diversification of trade partners would be necessary to mitigate risk. Governments usually have a key role to play in promoting regional integration initiatives. In addition to this, the private sector can also be proactive in working with the government and within itself to seek out new markets. Malaysia is a leading example of a proactive private sector collaborating with the government to promote access to new markets.

Opportunities

While countries are facing risks on their indirect exports through China, the same countries could also see new opportunities when China's exports are restricted. The opportunities would depend on their enabling conditions to attract GVC-related FDI being redirected from China.

Because of their relatively high degree of readiness in supply capacity and good integration into GVCs, ASEAN and advanced ENEA countries face the highest opportunity arising from US tariffs on imports from China. Opportunity sharing between the groups tend to follow their specialization. For example, the Republic of Korea and Japan, with their relative abundance of capital, enjoy higher opportunity in upstream production. On the other hand, Viet Nam and Indonesia, with their relative abundance of labour, possess the largest downstream potential. The sharing of potential benefits implies a case of collective winners in the region.

However, despite the potential for selected Asia-Pacific countries to become new centres for GVCs, the re-configuration of GVCs requires significant and time-consuming redirection of investment. Unless these trade tensions become permanent, we do not expect to see a complete redirection of GVCs in the region. Instead, it is more likely that multinational enterprises will diversify their investments as a risk mitigation strategy in the medium term. In the immediate term, we would see them following a wait-and-see strategy on their FDI. Hence, impacts of the trade war would be felt much more by FDI than by trade flows, and consumers would bear additional costs through increases in retail and wholesale prices, especially in the two participating countries.

Key takeaway

Converting opportunity into concrete export and income gains will depend strongly on countries' abilities to expand productive capacity. This is in turn linked to their ability to invest or attract FDI. It seems that countries' relative positions, as assessed by the index, point to the necessity for long-term investment to establish supply capacity, develop market access, and facilitate participation in GVCs. These investments would help tackle long-term development issues including strengthening infrastructure supporting regional and global connectivity, developing human capital, and maintaining openness in trade and investment.

The results discussed in this paper, therefore, illustrate lessons for economies to learn from their peers with regards to development strategies for building resilience against external shocks. Countries that have followed proactive approaches towards trade integration, investment in hard and soft trade-related infrastructure and human capital development would find themselves enjoying the advantages and be in a better position to withstand and possibly even benefit from external shocks. In contrast, the lack of productive capacity, poor connectivity with regional and global markets, and cumbersome trade and investment environments prevent most LDCs and LLDCs from capitalising on their abundance of labour and other resources in a timely manner when new opportunities open up.

References

Anukoonwattaka, Witada and Richard Sean Lobo (forthcoming). Trade wars: Risks and Opportunities for Asia-Pacific economies from China's retaliatory tariffs. ESCAP TIID Working Paper. Bangkok.

Asian Development Bank. 2010-2017 Multi-Regional Input-Output Tables. Manila.

Bown, Chad . P. and Melina Kolb (2018). *Trump's Trade War Timeline: An Up-To-Date Guide,* Washington: Peterson Institute for International Economics.

Curran, Enda (2018). These Are the Asian Countries That Benefit From the Trade War. *Bloomberg,* 20 November. Available at: https://www.bloomberg.com/news/articles/2018-11-20/these-asian-nations-to-benefit-most-from-u-s-china-trade-war

De Backer, Koen and Sébastien Miroudot (2013). *Mapping Global Value Chains,* Paris: OECD.

EIA (2013). *Singapore,* Washington: US Energy Information Administration .

EIU (2018). *Creative disruption Asia's winners in the US-China trade war ,* London: The Economist Intelligence Unit.

Hollweg, Claire H., Tanya Smith and Daria Taglioni (2017). *Vietnam at a Crossroads Engaging in the Next Generation of Global Value Chains,* Washington: World Bank.

Hummels, David, Jun Ishii and Kei-Mu Yi (2001). The nature and growth of vertical specialization in world trade. *Journal of International Economics,* vol. 54, pp. 75–96.

Li, Minghao (2018). CARD Trade War Tariffs Database. Available at https://www.card.iastate.edu/china/trade-war-data/

Luo, Xubie and Xuejiao Xu (2018). Infrastructure, value chains, and economic upgrades. *Journal of Infrastructure, Policy and Development*, vol. 2, No. 2, pp.1-15.

Nardo, Michela, Michaela Saisana, Andrea Saltelli and Stefano Tarantola (2005). *Tools for Composite Indicators Building,* Ispra: European Commission.

OECD (2014). *Global value chains: challenges, opportunities and implications for policy*, Report prepared for submission to the G20 Trade Ministers Meeting. Sydney.

OECD (2008). *Handbook On Constructing Composite Indicators Methodology And User Guide,* Paris: OECD.

Partington, Richard (2018). Why is Donald Trump threatening more tariffs – and what next? *The Guardian*, 19 June. Available at: https://www.theguardian.com/business/2018/jun/19/donald-trump-tariffs-us-china

Qi, Liyan, Grace Zhu and Lin Zhu (2018). China's economy flashes new warning signs, *The Wall Street Journal*, 14 December. Available at https://www.wsj.com/articles/chinas-economy-flashes-new-warning-signs-11544771116

United Nations Conference on Trade and Development (UNCTAD) (2005). *Developing Countries In International Trade 2005 Trade And Development Index,* New York: UNCTAD.

United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) (2018). *Asia-Pacific Trade And Investment Report 2018 Recent Trends And Developments,* Sales No. E.19.II.F.3.

UNIDO (2017). *Global Value Chains And Industrial Development Lessons From China, South-East And South Asia,* Vienna: UNIDO.

United States Trade Representative (USTR) (2018a). *USTR Issues Tariffs on Chinese Products in Response to Unfair Trade Practices*, Washington: United States Trade Representative.

_____ (2018b). *Tariff List – September 17, 2018,* Washington: United States Trade Representative.

Vu, Khanh (2018). Vietnam garment exports surge on US-China trade war. *Reuters*, 2 November. Available at: https://www.reuters.com/article/vietnam-garments/vietnam-garment-exports-surge-on-us-china-trade-war-idUSL3N1XD23M

Wang, Zhi, Shang-Jin Wei and Kunfu Zhu (2018). *Quantifying International Production Sharing At The Bilateral And Sector Levels,* Cambridge: National Bureau Of Economic Research.

Wearden, Graeme (2019). Trump escalates trade war with China with plan to raise tariffs. *The Guardian,* 6 May. Available at: https://www.theguardian.com/business/2019/may/05/trump-escalates-trade-war-with-china-with-plan-to-raise-tariffs

Weijuan, Lai and Zhong Zihua (2017). China's Position in Global Value Chains Compared with the EU, US and Japan. *China Economist,* vol. 12, No. 6, pp. 86-99.

Annex

1. List of Asia-Pacific countries included in our analyses, classified by ESCAP Asia-Pacific sub-regions:

ENEA	SEA	SSWA	NCA	Pacific
Japan	Brunei Darussalam	Bangladesh	Kazakhstan	Australia
Mongolia	Cambodia	Bhutan	Kyrgyzstan	Fiji
Republic of Korea	Indonesia	India	Russian Federation	
	Lao People's Democratic Republic	Maldives		
	Malaysia	Nepal		
	Philippines	Pakistan		
	Singapore	Sri Lanka		
	Thailand	Turkey		
	Viet Nam			

Note: ENEA - East and North East Asia; SEA - South East Asia; SSWA - South and South West Asia; NCA - North and Central Asia.

2. Sectors included in the ADB MRIO database:

Sl No.	Primary Sector	Manufacturing Sector	Service Sector
1.	Agriculture, Hunting, Forestry and Fishing	Food, Beverages and Tobacco	Construction
2.	Mining and Quarrying	Textiles and Textile Products	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel
3.		Leather, Leather and Footwear	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles
4.		Wood and Products of Wood and Cork	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods
5.		Pulp, Paper, Paper, Printing and Publishing	Hotels and Restaurants
6.		Coke, Refined Petroleum and Nuclear Fuel	Inland Transport
7.		Chemicals and Chemical Products	Water Transport
8.		Rubber and Plastics	Air Transport
9.		Other Non-Metallic Mineral	Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies
10.		Basic Metals and Fabricated Metal	Post and Telecommunications
11.		Machinery, Nec	Financial Intermediation
12.		Electrical and Optical Equipment	Real Estate Activities
13.		Transport Equipment	Renting of Machinery and Equipment; Other Business Activities
14.		Manufacturing, Nec; Recycling	Public Admin and Defence; Compulsory Social Security
15.		Electricity, Gas and Water Supply	Education
16.			Health and Social Work
17.			Other Community, Social and Personal Services
18.			Private Households with Employed Persons

Note: Nec - not elsewhere considered

3. Index values for risk:

Country Name	Indirect tariff risk	Risk from China's economic downturn
Australia	0.05	21.8
Bangladesh	0.04	1.4
Bhutan	0.0003	0.9
Brunei Darussalam	0.001	0.7
Cambodia	0.003	3.9
Fiji	0.003	1.1
India	0.04	4.4
Indonesia	0.05	8.6
Japan	0.46	12.3
Kazakhstan	0.03	8
Kyrgyzstan	0.007	3.3
Lao People's Democratic Republic	0.005	5.9
Malaysia	0.33	7.5
Maldives	0.0001	1.4
Mongolia	0.1	58
Nepal	0.002	2.1
Pakistan	0.2	6.6
Philippines	0.24	7.3
Republic of Korea	1.21	19.5
Russian Federation	0.01	5.1
Singapore	0.34	3.4
Sri Lanka	0.004	0.8
Thailand	0.04	6.9
Turkey	0.008	1.3
Viet Nam	0.24	6.6

Source: Authors' calculations based on data obtained from ADB MRIO database (accessed January 2019)

4. Index values for opportunity:

Country name	Intermediate goods	Final goods
Australia	0.038	0.046
Bangladesh	0.012	0.008
Bhutan	0.001	0.002
Brunei Darussalam	0.002	0.003
Cambodia	0.015	0.008
Fiji	0.006	0.009
India	0.052	0.061
Indonesia	0.059	0.052
Japan	0.063	0.086
Kazakhstan	0.006	0.006
Kyrgyzstan	0.002	0.002
Lao People's Democratic Republic	0.006	0.006
Malaysia	0.038	0.054
Maldives	0.003	0.005
Mongolia	0.004	0.007
Nepal	0.007	0.006
Pakistan	0.013	0.010
Philippines	0.045	0.043
Republic of Korea	0.075	0.102
Russian Federation	0.013	0.026
Singapore	0.034	0.037
Sri Lanka	0.021	0.023
Thailand	0.053	0.065
Turkey	0.047	0.054
Viet Nam	0.075	0.057

Source: Authors' calculations based on data obtained from ADB MRIO database (accessed November 2018)

5. Robustness test for our measures of potential tariff hit sectors

Having constructed and utilised measures of potential tariff-hit sectors that are based on our own assumptions, it is helpful to compare how accurate our estimates are to the actual tariffs being imposed by the US on China. In this regard, we utilise tariff data obtained from Li's (2018) CARD Trade War Tariffs database that categorises the products on the USTR (2018a, 2018b) tariff lists according to HS codes. We utilise these products codes along with concordances obtained from WITS to classify them in accordance with the nomenclature used in the ADB MRIO database. Once classified, the absolute value of the tariffs for each sector is calculated and scaled as a percentage of the total value of tariffs.

The correlation coefficients between the actual sectoral tariff coverage and each of our measures of potential tariff-hit sectors are provided in table 1A below. The results clearly highlight the strong correlation between actual sectoral tariff coverage and our measures of potential tariff-hit sectors. Thus, the results validate our assumption that US imposition of tariffs on China is targeted at sectors where the US imports the most from China. This helps establish the robustness of our approach in measuring potential tariff-hit sectors and, consequently, provides support in favour of the results obtained using our indices of risk and opportunity.

Table 1A: Correlation coefficients between actual and estimated tariff coverage

	China's potential sectoral tariff risk	Potential tariff hit sectors (intermediate)	Potential tariff hit sectors (final)
Actual tariff coverage	0.96	0.94	0.91

Source: Authors' calculations based on data obtained from ADB MRIO database, UNCOMTRADE and CARD Trade War Tariffs Database (accessed December 2018)

Table 2A: Sectoral values for tariff coverage

Sector	Actual tariff coverage (%)	China's potential sectoral tariff risk (%)	Potential tariff hit sectors (intermediate) (%)	Potential tariff hit sectors (final) (%)
Agriculture, Hunting, Forestry and Fishing	0.14	0.15	0.08	0.06
Basic Metals and Fabricated Metal	3.83	5.84	3.37	2.47
Chemicals and Chemical Products	2.81	5.45	4.30	1.16
Coke, Refined Petroleum and Nuclear Fuel	0.40	0.51	0.37	0.14
Electrical and Optical Equipment	57.28	38.69	12.28	26.41
Food, Beverages and Tobacco	1.08	1.63	0.29	1.34
Leather, Leather and Footwear	1.47	6.29	0.58	5.71
Machinery, Nec	15.77	8.82	3.78	5.04
Manufacturing, Nec; Recycling	5.13	7.49	0.98	6.51
Mining and Quarrying	0.08	0.38	0.14	0.24
Other Community, Social and Personal Services	0.06	0.13	0.06	0.07
Other Non-Metallic Mineral	1.22	1.61	1.14	0.47
Pulp, Paper, Paper, Printing and Publishing	0.75	0.92	0.66	0.26
Renting of Machinery and Equipment; Other Business Activities	0.00	1.12	0.74	0.38
Rubber and Plastics	3.61	2.73	1.57	1.16
Textiles and Textile Products	1.10	10.14	0.39	9.75
Transport Equipment	4.63	5.16	3.21	1.96
Wood and Products of Wood and Cork	0.63	0.77	0.52	0.25

Source: Authors' calculations based on data obtained from ADB MRIO database, UNCOMTRADE and CARD Trade War Tariffs Database (accessed December 2018)

Notes:

$$1.\ \text{Actual tariff coverage} = \frac{t_i \times M_i}{\sum_i^n t_i M_i}$$

where,

t_i is the tariff rate on product i,

M_i is the import value of product i.

$$2.\ \text{China's potential sectoral tariff risk for sector i } = \frac{VAX\_G\_ChtoUS_i}{VAX\_G\_ChtoUS}$$

where,

$VAX\_G\_ChtoUS_i$ is the total value-added by sector i in China's exports to the US.

VAX_G_ChtoUS is the total value-added in China's exports to the US.

$$3.\ \text{Potential tariff hit sectors (intermediate)} = \frac{DVA\_(INT + INTrex)\_ChtoUS_i}{VAX\_GChtoUS}$$

$DVA\_(INT + INTrex)\_ChtoUS_i$ is the domestic value-added in all intermediate exports of China to the US, for sector i.

$VAX\_GChtoUS$ is the total value-added in China's exports to the US.

$$4.\ \text{Potential tariff hit sectors (final)} = \frac{DVA\_(FIN)\_ChtoUS_i}{VAX\_GChtoUS}$$

$DVA\_(FIN)\_ChtoUS_i$ is the domestic value-added in final exports of China to the US, for sector i.

$VAX\_GChtoUS$ is the total value-added in China's exports to the US.