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Managed Trade:
What Could be Possible Spillover Effects of a Potential
Trade Agreement Between the U.S. and China?

by Eugenio Cerutti, Shan Chen, Pragyan Deb,
Albe Gjonbalaj, Swarnali A. Hannan, and Adil Mohommad

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**Managed Trade: What Could be Possible Spillover Effects of a Potential Trade Agreement Between the U.S. and China?[1]**

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**Abstract**

The trade discussions between the U.S. and China are on-going. Not much is known about the shape and nature of a potential agreement, but it seems possible that it would include elements of managed trade. This paper attempts to examine the direct, first-round spillover effects for the rest of the world from managed trade using three approaches. The results suggest that, in the absence of a meaningful boost in China's domestic demand and imports, bilateral purchase commitments are likely to generate substantial trade diversion effects for other countries. For example, the European Union, Japan, and Korea are likely to have significant export diversion in a potential deal that includes substantial purchases of U.S. vehicles, machinery, and electronics by China. At the same time, a deal that puts greater emphasis on commodities would put small commodity exporters at a risk. This points to the advantages of a comprehensive agreement that supports the international system and avoids managed bilateral trade arrangements.

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# I. INTRODUCTION

**As of August 2019, the dialogue between the U.S. and Chinese government continues.** Over the course of 2018 and 2019, the U.S. increased tariffs in different rounds on China's imports, which were met with retaliatory tariff increases by China on U.S. exports.[1] The rounds of higher tariff measures were followed by a period of "truce" between the U.S. and China at the end of 2018, which broke down in May 2019 when the U.S. increased tariffs on Chinese imports and, in response, China retaliated by increasing tariffs on some U.S. exports. More rounds of new and announced tariffs followed in August 2019. At the same time, there have been reports about progress toward an agreement to resolve these trade tensions.

**A successful completion of the U.S./China trade talks could lead to global macroeconomic benefits, but also divert existing trade patterns for third countries.** Depending on the particular outcome, the global benefits could be associated with lower tariffs, a decline in policy uncertainty, easing of financial markets conditions, and structural reforms reducing underlying barriers to trade and investment. At the same time, to the extent that the trade talks would involve some form of managed trade (e.g., directed Chinese purchases of U.S. goods), it could also lead to trade diversion distorting the existing global division of labor.

**This paper focuses on the direct, first-round spillover effects from managed trade using three approaches.** To identify the likely affected third countries, the paper considers a highly-stylized scenario with an agreement that will include measures to reduce the U.S./China bilateral trade deficit to almost zero during a short period of time. Specifically, it is assumed that China will close the trade deficit by purchasing U.S. goods, and China's total imports will not change—in other words, the extra purchases from the U.S. will be at the expense of cutting purchases from the rest of the world. Given little information about the structure of a potential U.S.-China trade deal, we use different approaches with different assumptions to form a picture about the potential trade diversion effects and the countries that could be affected. Throughout the paper, "export diversion" refers to the exports from third countries to China that could be potentially substitutable by U.S. exports.

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[1] See Bown and Kolb (2019) for a detailed timeline of the imposed US tariffs and/or quotas on imports, as well as the related reactions by its trade partners since 2018.

**Three different modeling approaches are used.**

- The "*size-based" approach* assumes that, given trading relationships are difficult to change overnight, China would boost purchases from the top-ten products (performed on 2-digit Harmonized System (HS) code) that are currently imported from the U.S, thus focusing on goods where there is already substantial trade between the two countries. Amongst the top-ten products, the allocation of the purchases would be in proportion to where there is scope for scaling up. In terms of spillover effects, China's top ten exporters for each product will be considered, in proportion to their current export exposure to China (for these products).

- The *"cascading" approach* uses more granular bilateral trade data (at the 6-digit level) and considers all trading partners (instead of top-ten exporters). Among these goods that may be potentially redirected, commodities are assumed to be redirected before manufactures, while goods such as aircraft, that may involve prior contracts, are assumed to be used last in the process of bridging the trade gap. The implicit assumption is that commodities would be more substitutable than manufactures, and items like aircrafts would be less substitutable than commodities or manufactures due to lengthier production cycles and contracts. With this ordering, closing the trade gap exhausts all potentially redirected commodity imports, and part of the identified set of manufacturing imports. Thus, the first approach fills the trade gap based on existing market shares among the top-ten products, while the second approach amounts to a cascade filling of the trade gap where commodities are redirected first, then manufactured goods.

- Finally, the *"hybrid" approach* is a combination of the first two approaches, with prior identification of 2-digit sectors which are assumed to be featured in a trade deal, and redirection within each of these sectors calculated using the more granular 6-digit bilateral trade data over all (not just top-ten, but around 200 economies) trading partners. As before, the allocation of the extra purchases at the 2-digit level is determined based on existing market shares across the top ten products imported by China from the U.S. However, the affected countries and the magnitude of export diversion are identified based on the granular 6-digit bilateral trade patterns within the broader groupings.

**The type of products that China agrees to purchase from the U.S. will play a role in determining which countries get affected due to trade diversion**. All the approaches highlight that bigger economies like the European Union, Japan, and Korea are likely to have substantial export diversion due to exposure in items like vehicles, machinery, and electronics.

However, the differences in the results among the three approaches highlight that the magnitude of the trade diversion and the particular sectors that could be hit for a third country would depend upon the allocation of China's purchases across sectors. In addition, the more disaggregated approach, which includes all countries with whom both China and U.S. have trade relationships, highlight the risk facing relatively small countries with high trade exposure to China, especially commodity exporters that compete with US producers.

**Our results complement other studies, but they benefit from higher data disaggregation, different assumptions, and have a relatively shorter-term focus**. Caceres, Cerdeiro, and Mano (2019) modeled the potential long-term effects of a 'transactional deal' between the U.S. and China to close their bilateral deficit. They find that spillovers to third countries are generally a function of direct exposures to the markets affected by the larger purchases of US goods by China (e.g., Korea, Malaysia, and Japan).[2] Zhu, Zhou, and Chang (2019) examined two potential deal scenarios with different assumptions of time horizons of closing the trade gap. They find that the potential countries that would be affected are EU (aircraft and autos), Japan (autos, machinery, electronics), ASEAN, Korea and Taiwan Province of China (electronics, machinery, energy), and Brazil (soybeans, energy). More generally, it is important to bear in mind that, as shown in Chapter 4 of IMF (2019a), overall current account balances reflect macroeconomic factors and can only be addressed through macroeconomic adjustments, not trade policies targeting bilateral trade balances (also discussed in Appendix A). In addition to trade diversion, there might be other spillover effects for the rest of the world due to disruptions in global value chains (GVCs). Evidence suggests that the U.S.-China tariff increases in 2018 and related uncertainties have led to a slowdown in global trade and industrial production and are weighing on investment and business sentiment (IMF, 2019b). The additional tariffs imposed by the U.S. and China in May 2019 and subsequent escalation in August, including the broadening into other areas such as technology, national security and exchange rate, are likely to decrease trade and weigh on confidence and financial market sentiment, negatively affecting investment, productivity, and growth (IMF, 2019c). It must be noted that, while our paper complements these studies, some of the channels (e.g. GVCs) are beyond the scope of this paper.

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[2] Even though Caceres, Cordeiro, and Mano (2019)'s longer term approach does not include the adjustment costs in the move toward the new long-run equilibrium, their modeling includes the effect of indirect exposures through changes in supply chains (identifying 17 economic sectors), through the model's imbedded elasticities of substitution across foreign or domestic intermediate inputs, and elasticities of substitution across composite foreign and domestic inputs.

**The rest of the paper is organized as follows**. Section II, III, and IV presents the results of the three approaches. Section V compares the results of the three approaches. Section VI concludes.

## II. THE SIZE-BASED APPROACH USING MARKET SHARE AND TOP-TEN EXPORTERS

**The spillovers from trade diversion would be a function of how the bilateral trade deficit is closed**. For instance, Figure 1 shows China's product structure across the top-ten items imported from the U.S., ranked according to the size of imports—i.e. electronics is China's top import from the U.S. and wood pulp is the 10th largest. The right-hand side of the figure, showing other countries' export exposure towards



**Figure 1: China's Import Structure for Top Products Imported from U.S.**
(2017; Share of China's total imports of each product)

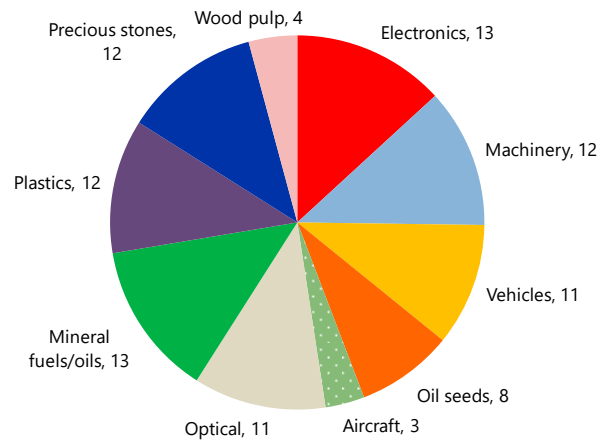Sources: UN Comtrade and IMF staff calculations.
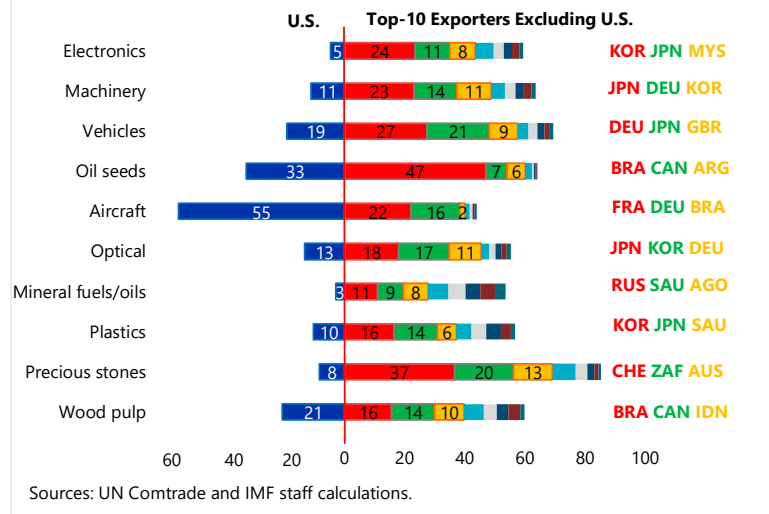
China's purchase of these products, gives an indication of which countries' exports might be at risk. For example, purchases of more oil seeds from the U.S. (e.g. soya beans) will affect countries like Brazil, Canada, and Argentina; purchases of more vehicles will affect Germany, Japan, and the U.K.; purchases of aircrafts will affect France and Germany; while purchases of machinery will affect Japan, Germany, and Korea.

**How would the extra purchases be distributed across products?**
Assuming that China will close the trade deficit (USD 337bn in 2017; trade deficit of goods and services) by purchasing U.S. goods and China's total imports will not change, the extra purchases from the U.S. will be at the expense of redirecting purchases from the rest of the world. The distribution of extra purchases across products (Figure 2)—taking into account U.S. catch-up potential and China's capacity constraints—is done using some simple assumptions:

Precious stones, 12
Wood pulp, 4
Electronics, 13
Machinery, 12
Plastics, 12
Vehicles, 11
Mineral fuels/oils, 13
Oil seeds, 8
Optical, 11
Aircraft, 3

Source: IMF staff calculations.

- One of the key assumptions of this approach is that substantial trading in a particular product suggests scope of scalability (that is, further increases in purchase of that product). Given that trading relationships are difficult to change overnight, it would be easier to increase purchases of goods where there is already existing relationship and substantial trade between the two countries. Hence, China would scale up purchases of U.S. imports in sectors where they are already importing U.S. products. *The analysis thus considers the top-ten products imported from the U.S.*

- Amongst the top-ten products, allocation of *the purchases will be in proportion to where there is more scope for scaling up.* For example, there is more scope for the U.S. to increase exports in electronics and mineral fuels/oils where its exposure to China's purchases is less, compared to aircrafts and oil seeds. Thus, this approach assumes that China would purchase goods from the U.S. where there is already substantial imports and opportunity for scaling up.

- The scale of the increases is *capped* so that the total purchase of each product does not exceed China's total imports of the product. The analysis does not pose any constraint on total U.S. exports across products. However, for most products, the allocation of purchases does not exceed total U.S. exports—hence, this seems less of a practical concern. The implicit assumption is that the U.S. exports could either be redirected to China from third countries or there could be some trade creation for the U.S.

**Which countries would be affected?** China's top-ten non-U.S. exporters for each product is considered. For the identified amounts of each product, the loss in exports of other countries will

be proportional to their share in China's imports in that product—*the countries that are more exposed to these products would have more export diversion.*
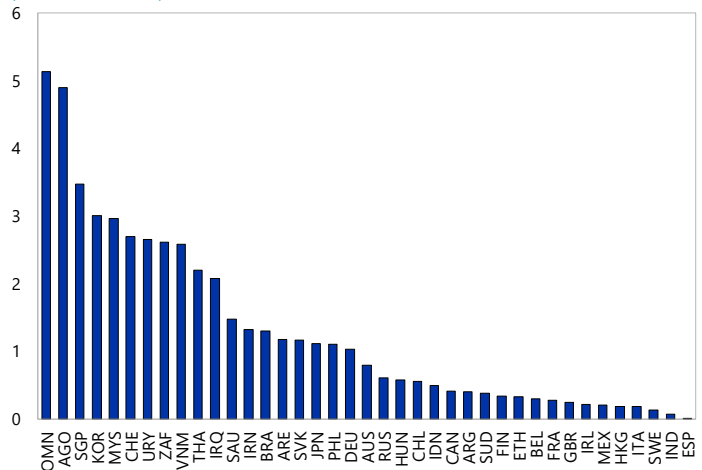
**There will be substantial export diversion or European Union, Japan, and Korea (Figure 3).**[3] Putting everything together, the scenario analysis shows that there is likely to be export diversion worth: USD 61bn from European Union countries included in our sample due to significant exposure in vehicles, machinery and aircraft; USD 54bn from Japan (machinery, vehicles, and electronics); USD 46bn from Korea

**Figure 3: Export Diversion**
In billions of US dollar

| | | |
|---|---|---|
| ■ Electronics | ■ Machinery | ■ Vehicles | ■ Oil seeds |
| ■ Aircraft | ■ Optical | ■ Mineral fuels/oils | ■ Plastics |
| ■ Precious stones | ■ Wood pulp | | |

Sources: UN Comtrade; and IMF staff calculations.

(electronics, opticals, plastics); and USD 45bn from ASEAN countries (electronics, plastics, machinery). In addition, there will be substantial export diversion from oil exporters and soya bean producers.
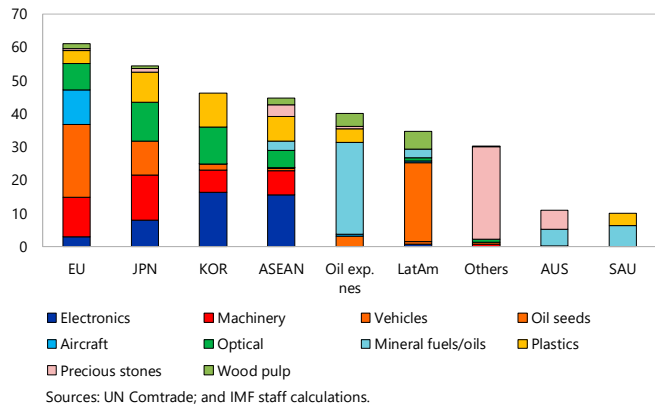
**In terms of individual exporters, the export diversion amount to higher than 3 percent of GDP for Oman, Angola, Singapore, and Korea (Figure 4).** Smaller oil exporting countries will have high export diversion as a share of their GDP. Some of the ASEAN economies (Malaysia, Vietnam and Thailand) will likely have export diversion higher than 2 percent of GDP, owing to items like electronics, machinery, and optical. Germany and Japan have an exposure
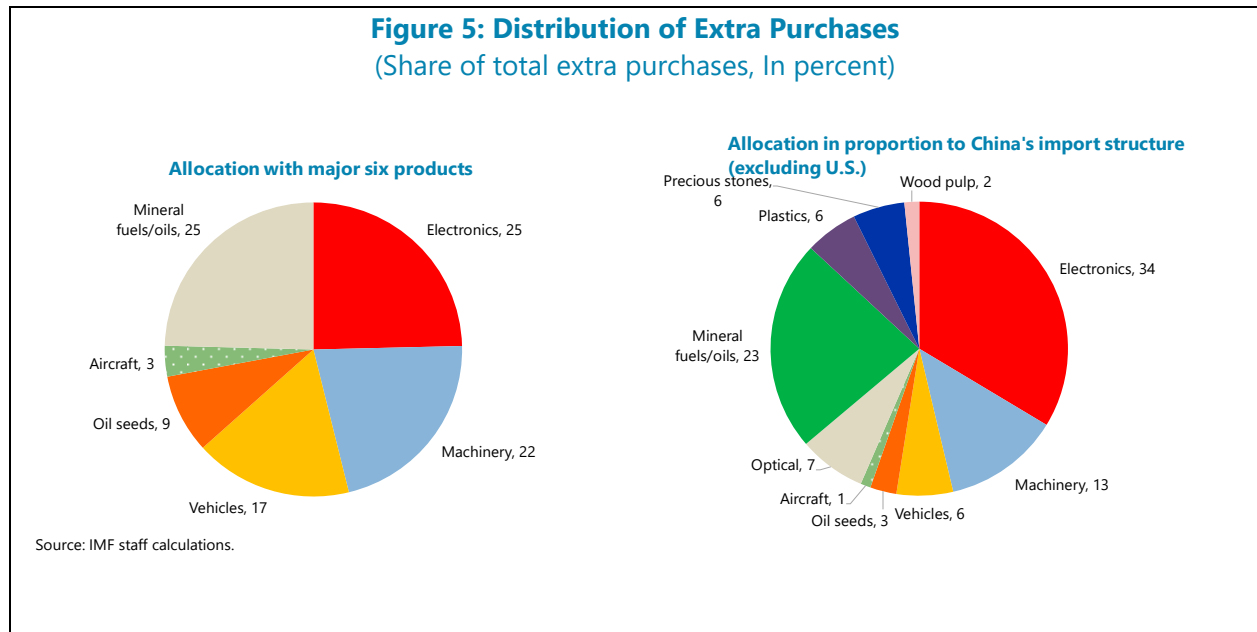
**Figure 4: Export Diversion,**
(Share of 2017 GDP)

Sources: UN Comtrade; IMF, World Economic Outlook; and IMF staff calculations.

of around 1 percent of GDP, due to electronics, machinery, and vehicles. Brazil has an exposure of 1.3 percent of GDP, predominantly due to oil seeds (e.g. soya beans).

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[3] The aggregates do not necessarily include all the countries present in that group. The aggregates are formed using the countries shown in the charts with individual economies.

**Figure 5: Distribution of Extra Purchases**
(Share of total extra purchases, In percent)

**Allocation with major six products**

Mineral fuels/oils, 25
Electronics, 25
Aircraft, 3
Oil seeds, 9
Vehicles, 17
Machinery, 22

Source: IMF staff calculations.

**Allocation in proportion to China's import structure (excluding U.S.)**

Precious stones, 6
Wood pulp, 2
Plastics, 6
Electronics, 34
Mineral fuels/oils, 23
Optical, 7
Aircraft, 1
Oil seeds, 3
Vehicles, 6
Machinery, 13

**Two alternative scenarios are considered assuming different allocation of purchases across products (Figure 5).** It is possible that not all the ten products will be targeted. The first alternative scenario thus assumes that the purchases will be scaled up for a sub-set of the ten products, comprising the big items and the products under discussion (e.g. soya beans, liquefied natural gas (LNG) and oil, manufactured items). The second alternative scenario distributes the extra purchases in proportion to China's import structure (excluding the U.S.).

- In the first alternative scenario, the amount of export diversion would be more pronounced for Germany, Japan, and ASEAN economies due to items like electronics, machinery, and vehicles. As a share of countries' GDP, oil exporters will have higher exposure (Figure 6).

- With the caveat that the second alternative scenario is unlikely to happen, ASEAN economies and Korea would have higher export diversion due to their exposure on electronics. Like the first alternative scenario, small oil exporters would have higher exposure as a share of their GDP, since the purchase allocation mechanism gives higher weight to mineral and fuel oils in the two alternative scenarios.

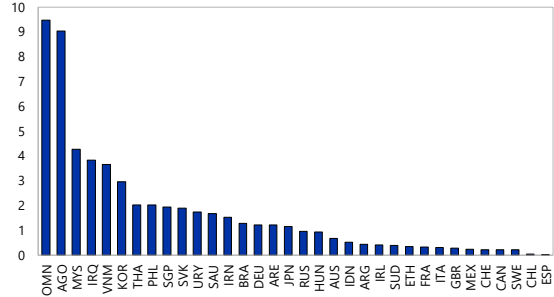# Figure 6. Results from Alternative Scenarios of the Trade Deal

*Distribution of extra purchases using major six products*

**Export Diversion**
In billions of US dollar
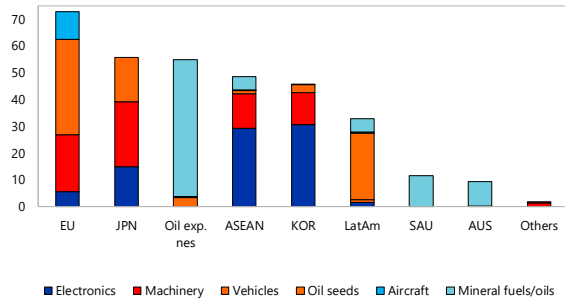


Electronics ■ Machinery ■ Vehicles ■ Oil seeds ■ Aircraft ■ Mineral fuels/oils

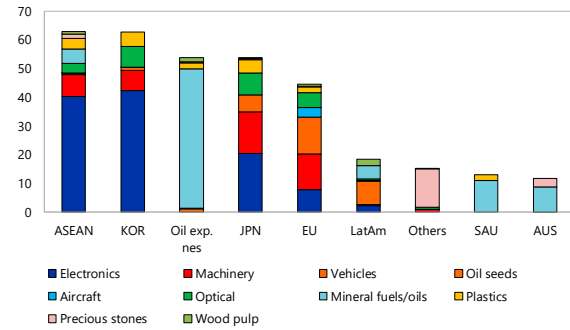Sources: UN Comtrade; and IMF staff calculations.

**Export Diversion**
(Share of 2017 GDP)



Sources: UN Comtrade; IMF, World Economic Outlook; and IMF staff calculations.

*Distribution of extra purchases in proportion to China's import structure (excluding the U.S.)*

**Export Diversion**
In billions of US dollar



Electronics ■ Machinery ■ Vehicles ■ Oil seeds
Aircraft ■ Optical ■ Mineral fuels/oils ■ Plastics
Precious stones ■ Wood pulp

Sources: UN Comtrade; and IMF staff calculations.

**Export Diversion**
(Share of 2017 GDP)



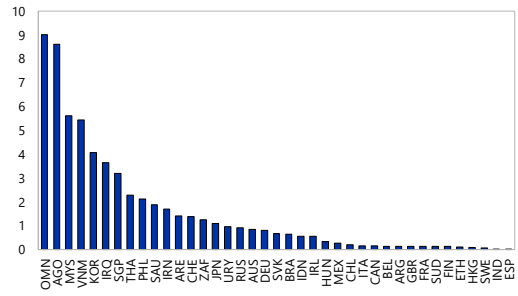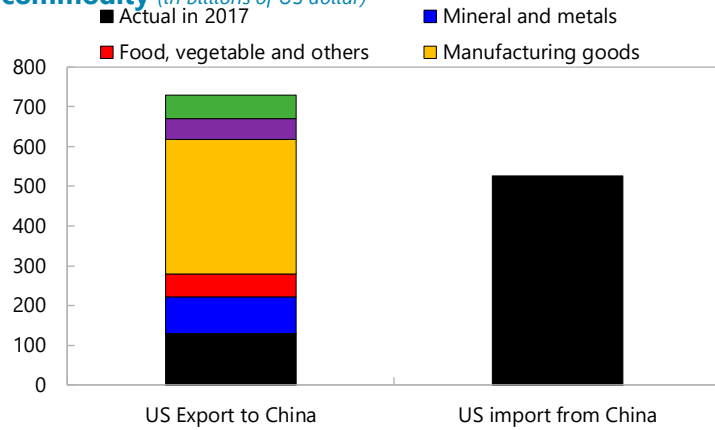Sources: UN Comtrade; IMF, World Economic Outlook; and IMF staff calculations.

## III. THE CASCADING APPROACH USING GRANULAR TRADE DATA FOR ALL TRADING PARTNERS

**The cascading approach constructs a measure of export diversion by mapping highly granular product-level bilateral trade data and considering simultaneously all countries with whom both China and U.S. have trade relationships.** This allows us to explore spillovers from a managed trade deal under a different set of assumptions. While the size-based approach uses 2-digit HS codes from UN Comtrade, this approach uses the most detailed (HS-6-digit level) bilateral UN Comtrade data available on a comparable cross-country basis. The details of the methodology are presented in Appendix B. In brief, this approach constructs a measure of export diversion for all exporters to China (excluding the U.S.) by adding up the potential redirection to the U.S. of each 6-digit level good imported by China from its other trading partners, as long as the U.S. also exported that product in 2017. Total U.S. exports are assumed to be unchanged from 2017 levels—there is no assumed increase in U.S. production of a given good.

**Figure 7: Potential impact on US export to China by commodity** *(in billions of US dollar)*



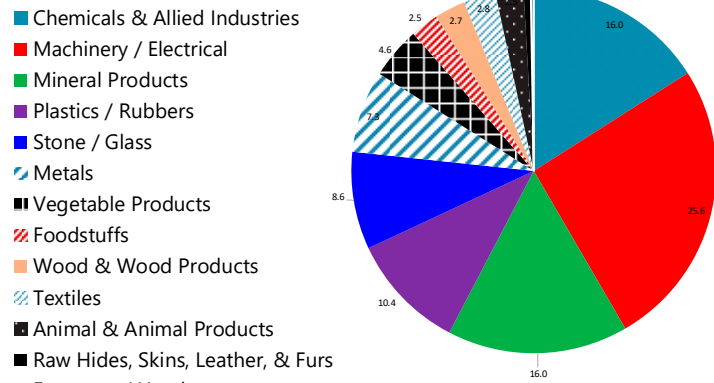Sources: UNComtrade; and IMF staff calculations.

**The diversion of trade is based on the actual pattern of bilateral trade at the 6-digit level and no prior assumption is made regarding broad sectors where redirection can potentially occur**. However, redirection is assumed to be easier among commodities than manufactures, and least among goods that may involve prior contracts (such as aircraft and other transportation goods). This

**Figure 8: Distribution of Extra purchases**
(share of total)

- Chemicals & Allied Industries
- Machinery / Electrical
- Mineral Products
- Plastics / Rubbers
- Stone / Glass
- Metals
- Vegetable Products
- Foodstuffs
- Wood & Wood Products
- Textiles
- Animal & Animal Products
- Raw Hides, Skins, Leather, & Furs
- Footwear / Headgear



Sources: UNComtrade; and IMF staff calculations.

amounts to a cascade "filling" of the trade gap, where commodities are redirected first, and then manufactured goods, until the gap is filled.

**This approach highlights the risk facing relatively small countries with high trade exposure to China, especially commodity exporters.** Apart from identifying the spillover effects, the underlying assumptions of this approach helps to identify the total amount of China's imports that could be potentially redirected from existing exporters to the U.S. (see Appendix B for

**Figure 9: Export Diversion**
*(percent of 2017 GDP)*
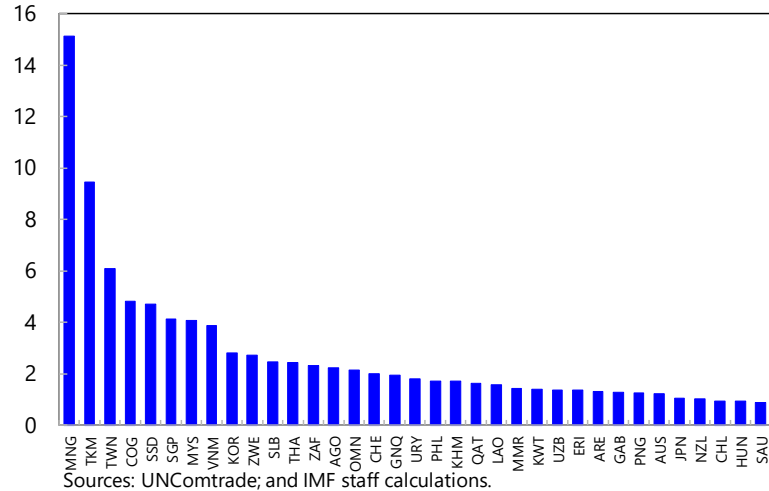
Sources: UNComtrade; and IMF staff calculations.

details). Figure 7 (LHS) shows that according to WITS data, China imported about US$ 130bn worth of goods from the US in 2017 (the black segment of left-hand bar in Figure 7), while it exported about US$ 526bn worth of goods to the US that year, implying a trade gap of about US$ 400bn. To fill this gap in our hypothetical scenario, we estimate that there are about US$ 600bn worth of imports by China from countries excluding the U.S. in 2017, that could be potentially substituted with imports from the U.S. (the colored segments in Figure 7). Since the trade gap is less than the total amount that could potentially be substituted with imports from the U.S., not all goods from the US$ 600bn set are used in the gap-filling, and as discussed above, commodities are chosen first, then manufactured goods, while certain items such as aircraft are excluded completely. With this ordering, closing the trade gap exhausts all potentially redirected commodity imports, and part of the identified set of manufacturing imports. In Figure 8, we show the distribution of the goods that are used to fill the gap in terms of HS sections. Each section comprises of several HS2-digit sub-categories, which we do not show due the large number of such categories that are included in this scenario. Finally, Figure 9 shows the potentially large spillovers from a scenario where the trade gap is fully closed. Export diversions are shown in relation to exposure to China's imports for all affected trading partners.

**Countries with a high degree of trade exposure to China, especially intensive commodity exporters like Mongolia (coal, copper), Turkmenistan (petroleum gas) and African countries such as the Congo (cobalt), could stand to lose significantly, especially if there is**
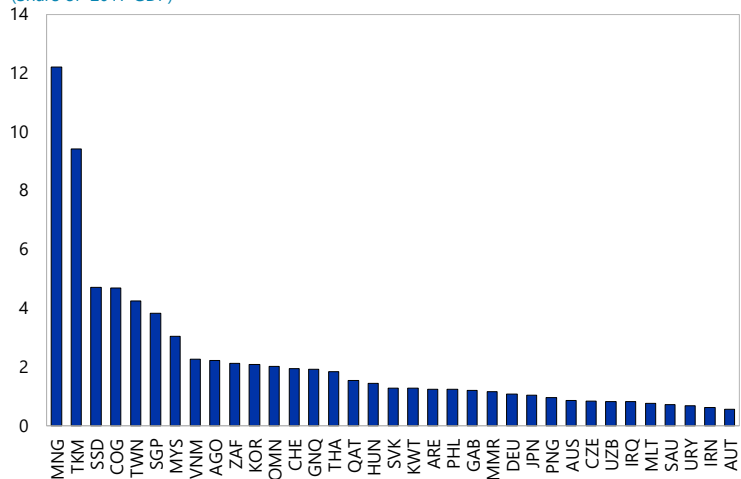
**price market segmentation.**[4] East Asian countries such as Taiwan Province of China, Malaysia, Vietnam, Singapore, Korea and Thailand—countries with relatively diversified exports—are also highly exposed. China's other emerging and advanced economy partners are relatively impacted in relation to their larger economic size. We check for robustness by repeating this exercise on 2016 data (shown in Appendix B) and find that the countries at risk appear very similar.

For countries that appear affected under both the size-based and cascading approaches, the difference in magnitude of export diversion could be due to differences in the underlying sectoral assumptions. Below, a third approach shows that merging the sectoral assumptions of the first approach with the granular data of the second approach yields broadly similar results across many countries, though there are differences in the estimated export diversion in some cases.

## IV.  THE HYBRID APPROACH—COMBINING DIFFERENT ASPECTS OF THE FIRST TWO APPROACHES

**The hybrid approach is a hybrid of the first two approaches.** The extra purchases are distributed across the same top-ten products as the main scenario of the first approach. The analysis is however conducted on the more granular HS 6-digit and considers the sample of around 200 economies, as in the second approach. Starting from the allocation of purchases across the ten products, changes are made such

**Figure 10: Export Diversion,**
(Share of 2017 GDP)

Sources: UN Comtrade; IMF, World Economic Outlook; and IMF staff calculations.
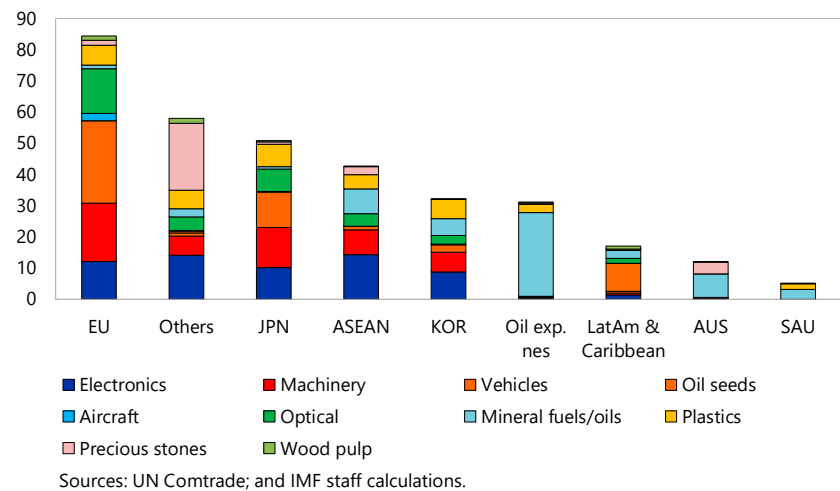
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that the allocation does not exceed: (i) China's current imports from the rest of the world at the 6-digit level, and, (ii) the U.S. current exports to the rest of the world at the 6-digit level. The allocation within each product (the 6-digit allocation for each 2-digit product identified) is then made using the cascading method of the second approach. Overall, the third approach looks at the top-ten products (assumes that China will purchase in categories where there is already existing relationship) but performs the exercise of filling the trade-gap using granular trade data over all trading partners (to account for the fact that the trade diversion effect could go beyond the top ten exporters and hit smaller countries).

**In a scenario where China diverts its imports from a large set of countries, not just its key importers, smaller economies might have significant trade diversions due to their commodity exposure (Figure 10).** The hybrid approach suggests that Mongolia and Turkmenistan have export exposure amounting to 12.2 and 9.4

**Figure 11: Export Diversion**
(In USD billions)



Sources: UN Comtrade; and IMF staff calculations.

percent of GDP respectively. However, it must be cautioned that the analysis does not take into account country-specific circumstances or contracts that might preclude such a large export diversion from small economies. Asian economies like Vietnam, Malaysia and Singapore might have export diversion in the range of 2 to 4 percent of GDP, owing to items like electronics and machinery. Advanced economies like Germany would continue to have an export diversion of around 1 percent of GDP, owing to exposure to items like vehicles, machinery, and electronics. Depending upon how the adjustment takes place, European exporters could see declines of exports of around US$ 84 billion (Figure 11). It must be noted that the total export diversion in US dollar terms for *aggregates* can differ between the size-based approach and the hybrid approach due to the inclusion of more countries in the latter approach (see footnote 3). As the next section shows, the underlying country exposures are similar in most cases.

## V. COMPARING THE RESULTS OF THE THREE APPROACHES

**All the approaches point towards substantial exposure for some economies.** Figure 12 compares the potential export diversion across the three approaches for the countries in the size-based approach and the countries that had substantial exposure in the cascading approach.

- Advanced economies like Japan, Germany and Australia have an export exposure of around 1 percent of GDP in all the approaches, while Switzerland has an exposure of 2-3 percent of GDP. Similarly, Korea has an exposure of 2-3 percent of GDP, with the size-based, cascading and hybrid approach yielding export diversions of 3.0, 2.8, and 2.1 percent of GDP respectively.

- All the approaches suggest that Asian economies have substantial export exposure: Singapore and Malaysia around 3-4 percent of GDP, Vietnam around 2-4 percent of GDP, and Thailand around 2 percent of GDP.

### Figure 12: Export Diversion using Three Approaches,
(Share of 2017 GDP)
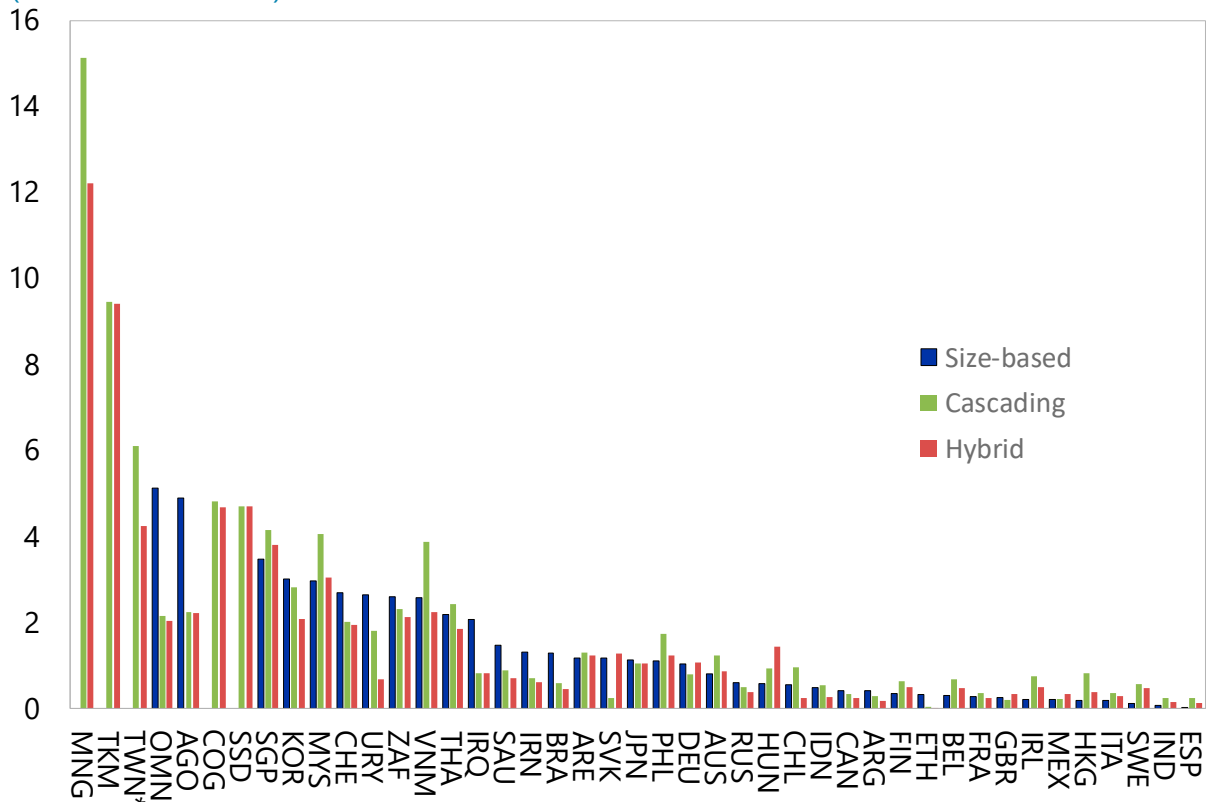


Sources: UN Comtrade; IMF, World Economic Outlook; and IMF staff calculations.
*TWN is not included in size-based approach.

- Looking at emerging markets, all the approaches suggest that South Africa would have an export diversion of around 2-3 percent of GDP, while Russia has an export exposure of 0.4-0.6 percent of GDP, and Indonesia has an exposure of 0.3-0.6 percent of GDP.

- Comparing the size-based to the hybrid approach[5], the set of countries with relatively high exposure is broadly similar despite the expanded set of countries in the hybrid approach. While there are variations in the results of the two methods, of the 39 economies reported in the size-based approach, the differences in the export diversion (as a share of individual economies' GDP) are within 1 percentage points for 35 and within 0.1 percentage points for 8.

**In addition, the cascading approach highlights the risks for small commodity exporting countries.** The cascading approach, by including a larger set of countries and filling up the gap using commodities and manufacturing products, highlight that relatively small commodity exporters might be affected—small commodity exporters are mostly not included in the size-based approach since it considers the top-ten exporters only.

## VI. CONCLUDING THOUGHTS

**This paper explores the spillover effects of a potential managed-trade component of a trade agreement between the U.S. and China.** The analysis attempts to pin down the direct, first-round effects of the managed trade aspects of a possible settlement, not taking into account any general equilibrium repercussions or the effects of other potential characteristics of a deal. Specifically, it is assumed that the U.S.-China trade gap is closed by China stepping up purchases of U.S. goods, at the expense of purchases from other countries. Given the uncertainties associated with such a deal (if materialized), the paper considers three approaches using different assumptions. While there is some variation in the countries affected and the magnitudes of export diversions, all the approaches in the paper suggest that, in the absence of a meaningful boost in China's domestic demand and imports, bilateral purchase commitments are likely to generate substantial trade diversion effects. This could impose significant losses on affected countries if accompanied by some type of market segmentation. Trade tensions between

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[5] The hybrid approach also provides a robustness check of the size-based approach, using a wider set of countries and granular product data.

the U.S. and China should thus be quickly resolved through a comprehensive agreement that supports the international system and avoids managed trade.

**Some of the caveats of the three used approaches should be borne in mind.** The scenarios assume perfect substitution of imports across countries and do not take into account rigidities associated with existing GVCs, established relationships, etc. Also, export diversion is not the same as the potential loss to value added. The impact on value added depends upon other factors including the ease of switching production lines to other markets. And, as noted earlier, the impact also depends on whether there is market segmentation. Finally, the set of countries identified as at risk is sensitive to sectoral assumptions: smaller countries appear more affected if the burden of adjustment falls more on primary products and more easily substitutable homogeneous commodities and less on sophisticated manufactured goods and electronics. Notwithstanding these caveats, in the absence of more information on the structure of an actual deal, the different scenarios are usefully illustrative. To some extent, the use of the most granular bilateral trade data available across a large set of countries and the different assumptions regarding the sectoral distribution of the managed trade deal help address these issues.

**In addition, it is worthwhile re-emphasizing that the analysis focuses narrowly on the managed trade aspect of a possible agreement.** A possible agreement between the U.S. and China might touch on other aspects, including action to strengthen the multilateral trading system or further market opening in China. If this is the case, a comprehensive analysis would need to complement the discussion provided here by a broader assessment, including incorporation of general equilibrium considerations, to obtain a fuller picture of the likely spillover effects for the rest of the world.

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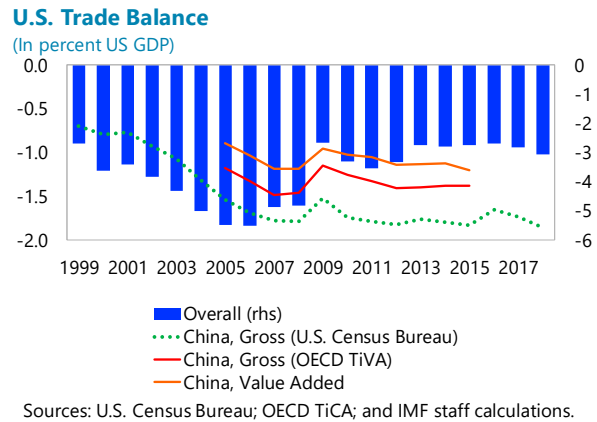
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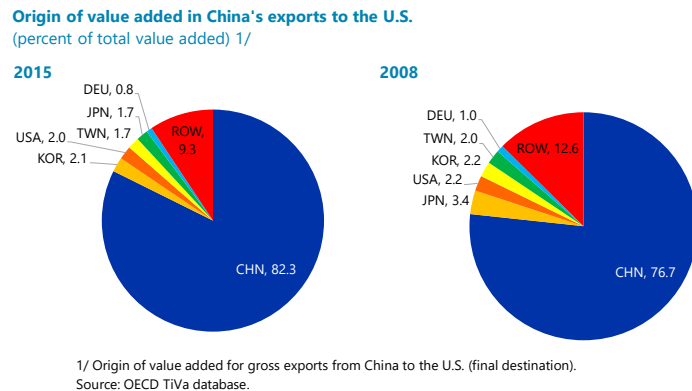
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## APPENDIX A: THE U.S. BILATERAL TRADE DEFICIT WITH CHINA

Targeting bilateral trade balances will not help to reduce a country's overall current account deficit. Changes in current account balances—the difference between national saving and investment—is best achieved through adjustments to macroeconomic policies that influence saving/investment decisions, not trade policies (see IMF 2019a; IMF 2018). Tariff increases, for example, will have no significant effect on the trade balance, as the impact of lower imports will be offset by an appreciation of the currency. Hence, reducing the bilateral trade deficit with China might not result in a decline of the overall U.S. trade balance.
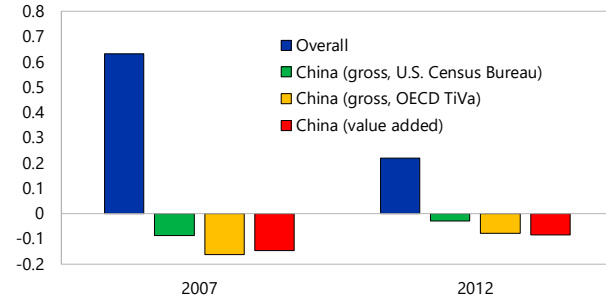
**U.S. Trade Balance**
(In percent US GDP)



- Overall (rhs)
- China, Gross (U.S. Census Bureau)
- China, Gross (OECD TiVA)
- China, Value Added

Sources: U.S. Census Bureau; OECD TiCA; and IMF staff calculations.

Though declining over time, China's gross exports to the U.S. continue to include significant value added from other countries (including U.S.). The U.S. bilateral trade balance with China in 2015 (the latest available data in OECD TiVa database) was 13 percent lower in value added, compared to gross terms (see 2019 China Selected Issues Paper *"The Drivers, Implications and Outlook for China's Shrinking Current Account Surplus"*). Similarly, China's gross exports to the U.S. (as the final destination) included 82.3 percent of China's domestic value added in 2015, up from 76.7 percent in 2008, with the rest of the value added coming from economies like Germany, Japan, Taiwan Province of China, Korea, and U.S. In other words—apart from the traditional channels of trade diversion—policies affecting U.S.—China bilateral trade will also have direct implications for the rest of the world due to supply chain linkages amongst countries.

**Origin of value added in China's exports to the U.S.**
(percent of total value added) 1/

2015

DEU, 0.8
JPN, 1.7
USA, 2.0
TWN, 1.7
KOR, 2.1
ROW, 9.3
CHN, 82.3

2008

DEU, 1.0
TWN, 2.0
KOR, 2.2
USA, 2.2
JPN, 3.4
ROW, 12.6
CHN, 76.7



1/ Origin of value added for gross exports from China to the U.S. (final destination).
Source: OECD TiVa database.

China's role in reducing the U.S. overall trade deficit has been limited in recent times. Documenting the role of bilateral trade balances in past episodes of large trade deficit adjustments across countries, IMF 2019a (Chapter 4, Box 3) finds that (i) overall trade adjustments are not necessarily driven by disproportionate adjustments of the top deficit partners, (ii) large adjustments of the top deficit partners do not guarantee large

**Change in U.S. Trade Balance During Recent Troughs**
(percentage points)



Sources: U.S. Census Bureau; OECD TiVA; IMF, World Economic Outlook; and IMF staff calculations.

adjustments in overall trade balance. In line with these observations, the U.S. trade deficit with China widened in recent cases of improvement of the U.S. overall trade deficit from troughs, suggesting that overall trade deficits can be reduced without large corrections in trade balances of key deficit partners.

## APPENDIX B: DATA AND METHODOLOGY OF THE SECOND APPROACH

Data for this exercise consist of HS6-digit bilateral trade between the U.S. and all its trading partners, and China and all its trading partners. This consists of about 5299 individual product lines for each country pair. We use 2017 data and perform a robustness check with data for 2016 as well.

First, we estimate the total potential for redirection of China's imports from other countries to imports from the U.S. We impose one restriction, namely that any good imported by China can only be potentially redirected if that 6-digit good is also exported by the U.S. We also impose the restriction that China's total imports of any particular good remain at the 2017 level (i.e. there is no change in market size). By value in 2017, such potentially redirectable goods account for about US$ 700 billion of imports by China, which is more than the 2017 U.S. trade deficit in goods with China of US$ 396 billion.
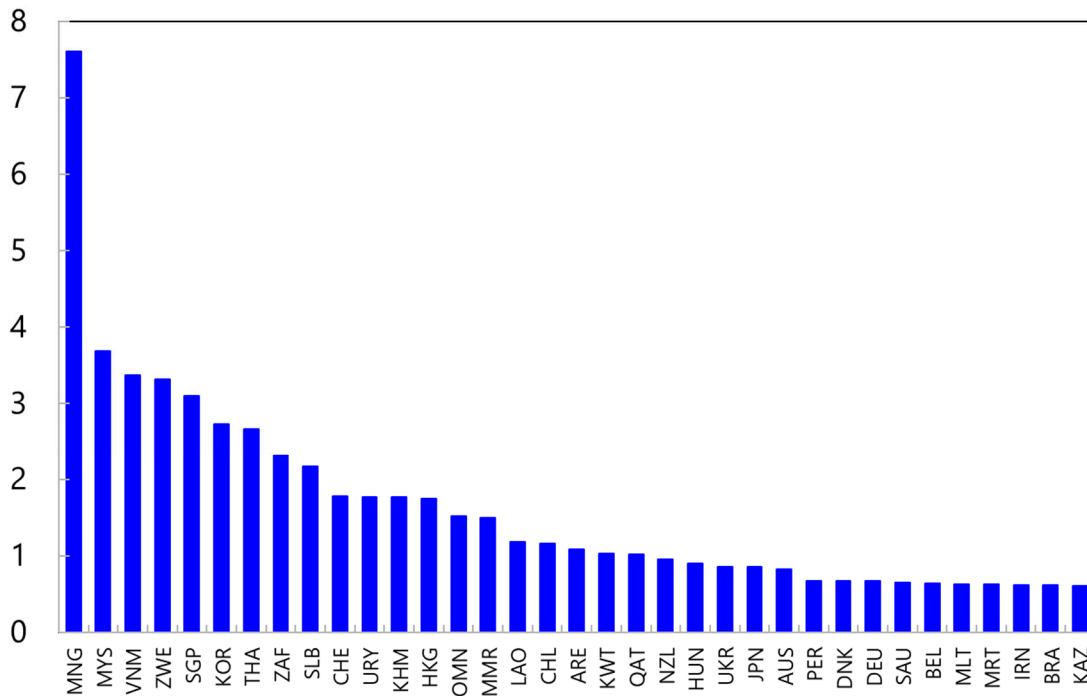
This scenario assumes that a hypothetical managed trade agreement fully closes the trade gap. It also assumes that the gap-filling will be performed by sequentially redirecting China's imports of commodities, then its imports of manufactured goods, then products such as aircraft and transportation goods including cars, and finally miscellaneous goods. The rationale for this approach is that widely traded relatively homogenous goods would be easier to substitute (such

as soy) than sophisticated manufactured goods, some of which may also be subject to lengthier contractual obligations (such as aircraft).

With this ordering, closing the US$ 396 billion gap exhausts all potentially redirected commodity imports, and part of the identified set of manufacturing imports. For each 6-digit item, China's imports from each trading partner (excluding the U.S.) are reduced in proportion to their share in total imports by China of that good. Aggregating this for all 6-digit goods in redirected set, for each non-U.S. trading partner, we obtain a measure of "exports at risk" for these countries. This corresponds Figure 2 in the text. As a check we also conducted this exercise using 2016 data and obtain a similar picture (below).

## Export Diversion: Cascading Approach
*(2016 exports, in percent of GDP)*



Sources: UNComtrade; and IMF staff calculations.