

Shooting oneself in the foot? US trade policy coping with Global Value Chains

Since early 2018, the United States' administration has taken several measures to limit US imports, in particular from China. The affected countries retaliated. In addition to the measures already implemented, the belligerents currently contemplate two alternative routes: either open new fronts (particularly in the automotive industry, targeted primarily against the European Union and in particular Germany but also to Japan), or have a rest to avoid further damages. According to our estimates, the measures already implemented would cause significant value-added losses to China (USD 91 billion in the long run), but also to the United States (62 billion), due to the intertwining of global value chains. As in any war, imposing losses on an enemy comes at a high cost. If the tariff war were to escalate, German industry would pay a heavy toll. The opposite path, a lull through an agreement on industrial goods between the United States and the European Union, would avoid undesirable outcomes, but would bring little gain *per se* to the parties.

■ Global Value Chains and protectionism

Because of Global Value Chains (GVCs), products cross the borders several times before reaching the final consumer. These linkages should modify countries' incentives to impose import protection.¹ Nevertheless, the recent wave of protectionist measures taken by the United States (US), aiming at repatriate part of the value chain, goes against this trend.

For the most part, these measures increase trade barriers on intermediate goods, whereas historically goods for final consumption were the most protected. Can the United States protect its value added with such a trade policy? In this Letter, we show that the current trade policy will be detrimental not only to the targeted countries, but also to American value added. Two mechanisms operate, beyond the direct impact of retaliation, mainly from China and the European Union (EU). First, US imports subject to higher tariffs inevitably contain US value added (e.g. US

components assembled abroad), notwithstanding the fine-tuning of the lists of targeted products. The additional tariffs imposed by the first measures taken in 2018² taxed about USD 900 million of US value added embodied in imports.³ Second, US exports will also suffer a loss of competitiveness, as production costs increase in industries that use taxed imported goods as inputs. Early *ex post* evidence confirms the impact of customs duties on US prices.⁴

This Letter examines the consequences of the trade war by focusing on the disruption of value chains. We take on board all measures enforced at the time of writing (including retaliations and safeguards) as well as the current trade agenda, namely: (i) the US investigation on the automobile industry likely to trigger US trade sanctions by May 2019; (ii) the European decision of 15 April 2019 to launch negotiations with the US on a trade agreement restricted to industrial goods (but excluding the automotive sector). This analysis, in general equilibrium, takes into account not only vertical relationships between industries, but also the effects on US employment, income, consumption and investment.⁵

1. E. J. Blanchard, C. P. Bown & R. C. Johnson (2016), "Global Supply Chains and Trade Policy", National Bureau of Economic Research.

2. For a detailed list of measures in force, refer to e.g. <https://piie.com/blogs/trade-investment-policy-watch/trump-trade-war-china-date-guide>

3. C. Bellora, S. Jean & G. Santoni (2018), "Un chiffrage de l'impact des mesures de protection commerciale de Donald Trump", *La Lettre du CEPR*, no 388, June.

4. M. Amiti, S. Redding & D. Weinstein (2019), "The Impact of the 2018 Trade War on U.S. Prices and Welfare", Centre for Economic Policy Research (CEPR), Centre for Economic Policy Research (CEPR).

5. We do not take into account the potential escalation related to the disagreement on aviation subsidies, waiting for the conclusions by the compliance panel of the World Trade Organization, scheduled for the summer of 2019. The further increase from 10 to 25 p.p. in the additional tariffs on USD 200 billion US imports from China, announced in a tweet on May 5th, are also not included because they may just aim to strengthen the US position in the ongoing negotiation with China.

■ The EU little affected by ongoing battles but next target

Using the simple criterion of the impacted tariff revenue (initial imports times tariff increase), we first give an overview of the impact on trade of recent sanctions and retaliation already in place (Table 1). Among Chinese exports, Electronics is potentially the most affected sector: USD 167 billion of exports will face an average customs duty that will rise from 0.3% to 9.3%. Next comes Machinery, with an 11.7 percentage point (p.p.) increase in tariffs applied by the US on USD 103 billion of Chinese exports. Among all other sectors, tariff changes can be even larger, but trade is more limited. From the US point of view, the automotive sector is the most affected. The 12 percentage point increase in tariffs will curb USD 15 billion of US exports to China, with a huge toll on exports to China paid by German plants located in the US. Machinery, Non Ferrous Metals and Oilseeds will be the other US sectors impacted by Chinese retaliation.

The same exercise is carried out for policies not yet implemented: either a trade war extended to the automobile sector, or a negotiation to eliminate tariffs between the United States and the EU on industrial goods – excluding automobiles (Table 2).

In the event of new US sanctions on automobile (increase in tariffs from 1.8% to 25.7%), the cost for EU exports (worth USD 59 billion) would be USD 14.1 billion (an increase in tariff revenue similar to that estimated for the Chinese electronics sector in Table 1). Japan would also be severely affected (USD 13.1 billion). European retaliation in the automotive

Table 1 – Trade value and recent sanctions and retaliations – Most impacted bilateral flows

Sector	Exporter	Importer	Tariffs (in %)		Trade (USD bn)	Ch. in prot. rev.
			Ref.	Scen.		
Electronics	China	USA	0.3	9.3	167	15.1
Machinery	China	USA	1.5	13.2	103	12.0
Chemistry	China	USA	2.7	10.6	36	2.8
Oth. Manuf.	China	USA	1.5	5.0	69	2.4
Vehicles	USA	China	13.1	25.1	15	1.8
Metal Prod.	China	USA	2.1	11.2	19	1.7
Machinery	USA	China	4.1	9.6	29	1.6
Non ferrous met	USA	China	0.7	15.2	10	1.5
Oilseeds	USA	China	1.5	13.6	13	1.5
Vehicles	China	USA	1.0	10.6	14	1.4

Note: Sectors are ranked by decreasing impact on tariff revenue.

Reading note: in the "Electronics" sector, exports from China to the United States are subject to a customs duty of 0.3% in the reference situation (Ref.). With US sanctions, the average duty in this sector increases by 9 percentage points to 9.3% (Scen.). This new tariff applies to USD 167 billion of Chinese exports of electronic equipment to the United States in the baseline situation, with an impact in terms of affected tariff revenue of USD 15.1 billion (167x9/100).

Sources: BACI (2017), MAcMap-HS6, authors' calculations.

Table 2 – Trade value, possible future sanctions and retaliations – Most impacted bilateral flows

Sector	Exporter	Importer	Tariffs (in %)		Trade (USD bn)	Ch. in prot. rev.
			Ref.	Scen.		
Sanctions on Automobile and retaliations						
Vehicules	EU28	USA	1.8	25.7	59	14.1
Vehicules	Japan	USA	1.5	26.4	52	13.1
Oth. Transport eq.	USA	UE 28	1.5	18.9	44	7.6
Vehicles	Korea	USA	0.9	25.9	21	5.2
Vehicles	China	USA	1.0	23.6	14	3.3
Machinery	USA	Japon	0.2	16.1	15	2.4
Oth. Transport eq.	USA	Japan	0.0	22.9	7	1.6
Chemistry	USA	Japan	1.5	11.8	14	1.4
Food	USA	Japan	22.9	40.2	7	1.3
Phasing out of industrial tariffs between EU and the US						
Chemistry	EU28	USA	2.0	0.1	106	-1.9
Chemistry	USA	UE 28	2.9	0.0	63	-1.8
Machinery	EU28	USA	1.0	0.1	101	-1.0
Machinery	USA	UE 28	1.5	0.0	63	-0.9
Textile	EU28	USA	9.0	0.5	10	-0.8

Note: Sectors are ranked by decreasing impact on tariff revenue.

Source: BACI (2017), MAcMap-HS6, authors' calculations.

sector, the way we assume it, would have a much smaller impact on the United States. Other main sectors in which the US would be hit by retaliation include Machinery, Other transport equipment, Chemistry and Food.⁶ If, on the other hand, the EU and the United States remove their bilateral tariffs on industrial goods, tariff revenues would vary little, as initial tariffs are already low. The largest impact is on Chemistry and its magnitude is below USD 2 billion of tariff revenue on both sides of the Atlantic. Other sectors potentially impacted would be Machinery and Textile, for even lower amounts. Accordingly, this negotiation is worth having just for sake of cooling the protectionist tensions, but it would not deliver much in economic terms in case of success.

■ Scenarios at stake

To quantify the impacts of current trade tensions, we include detailed information at the tariff line level on sanctions and retaliation in a dynamic general equilibrium model under imperfect competition.⁷ Beyond separating trade impacts on intermediate goods and goods for final consumption, this type of model allows to track long-term effects on sectoral prices and value added. Three scenarios are contemplated.

6. Other transport equipment includes aircraft. The current US threat related to European aviation subsidies could reduce the EU's incentive to choose this sector for retaliation.

7. C. Bellora & L. Fontagné (2019), "Shooting Oneself in the Foot? Trade War and Global Value Chains", Mimeo, CEPII, April.

Scenario 1 takes into account measures implemented by the United States related to the "Section 232" on aluminium and steel (including exemptions, tariff quotas and retaliation) and to the "Section 301" applied to US imports from China (as well as Chinese retaliation).

Scenario 2 adds to Scenario 1 the possible US sanctions on imports of automobiles and their parts, planned for spring 2019. We assume that the main exporters of autos to the US retaliate, increasing by 25 p.p. the tariffs on the main products they imports from the US (excluding energy and pharmaceutical products), up to the value of their targeted car exports.

Finally, Scenario 3 simulates the removal of bilateral industrial tariffs between the US and the EU, while measures on steel and aluminium against US partners other than the EU and measures on Section 301 against China would remain in place (Figure 1).⁸

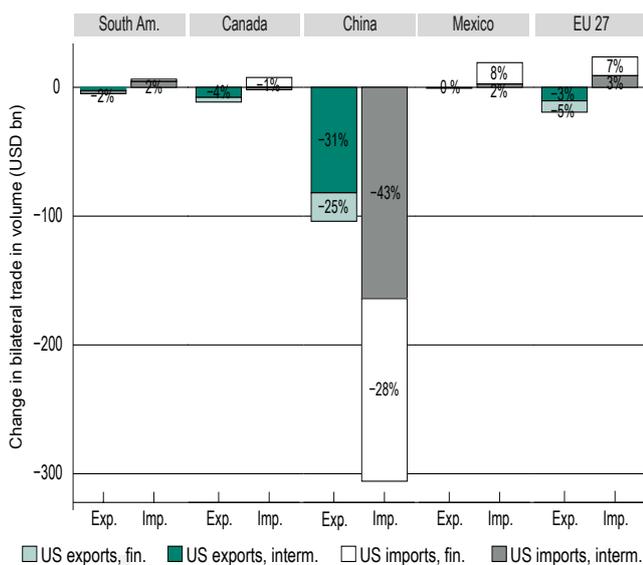
According to our simulations, the current trade battles (scenario 1) translate into a 28% cut in US imports of goods for final consumption from China. The cut amounts to 43% for intermediate goods. US exports of intermediate goods to China also record a 31% drop (compared to 25% for final goods), partly due to retaliation but also to the impact of US sanctions on US value added contained in the targeted Chinese goods. In the end, US exports to the world fall by 5.9% due to sanctions but also to reduced competitiveness: the cost of imported intermediate inputs (and of their US substitutes as well) increase, leading to an increase in producer prices. Overall, Chinese exports to all destinations combined fall slightly, by

3.1%, meaning that China manages to compensate for the reduced access to the US market by redirecting its exports, but at the expense of reduced producer prices. As a result, China's terms of trade deteriorate slightly, by 0.7%.

A new battle in the automotive industry (scenario 2) would first lead to a massive drop in Japanese exports of cars (-72.6%) and automotive components (-71.6%) to the United States. In this sector, European exports to the United States would also be affected, particularly those from Germany, which would fall by USD 8.8 billion (to which should be added a USD 2 billion drop in exports of car components). France would be impacted differently, mainly on its component exports, since only the French Toyota and Daimler plants export assembled vehicles to the United States. By reducing their export prices, French car manufacturers would compensate for the modest losses (in value terms) on the American market with additional exports of car components to Canada and Mexico (where assembly lines would develop).⁹

The easing of trade tensions (scenario 3) through the elimination of transatlantic tariffs on industrial goods would have no visible impact on third countries but Mexico. US exports of intermediate goods to the EU would record a slight increase compared to a trade war (an increase of 6% instead of a decrease of 3% compared to the baseline scenario without trade war and without agreement). In contrast, EU exports of final and intermediate products to the United States would record a two-digit increase (by 14% and 13% respectively) in the event of a transatlantic agreement.

Figure 1 – Scenario 1 – Long term impacts on US trade flows



Note: The results of scenarios 2 and 3 are not represented in this graph but are available from the authors (see also Bellora & Fontagné, 2019).

Source: Simulations MIRAGE-v.2, authors' calculations.

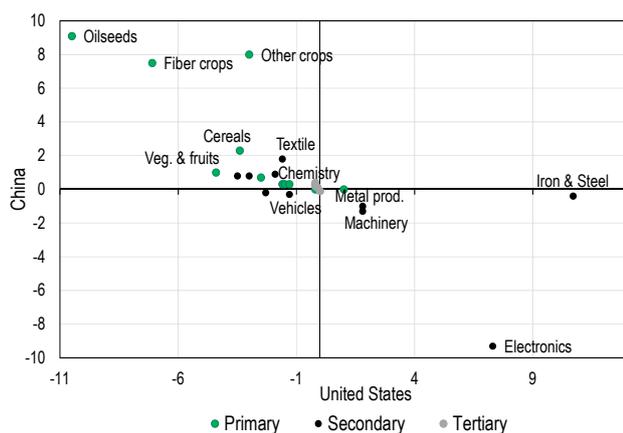
The deleterious impact of trade wars on economies deeply involved in GVCs

Which sectors are ultimately winners and losers of the ongoing tariff battle? We answer this question by calculating the relative changes in sectoral value added (Figure 2). The trade war fails to create value, so there are no gains for all participants at once (the northeast quadrant of Figure 2 is empty). In some sectors, China losses more than what American industries gain (southeast quadrant): in the Electronics sector, Chinese value added is down 9%, while the United States gains 7%. In value and in the long term, Chinese losses in this sector are even more impressive, with a USD 40 billion drop, while US gains reach only USD 4.2 billion. In the Iron and steel sector, US gains are also sizeable (+11% in value added, an increase of USD 8.5 billion), but the impact on China is negligible even taking on board as we did European safeguards. As anti-dumping measures already excluded China from the US steel

8. The simulations carried out are long-term ones. We assume a soft Brexit and present results for the EU 27.

9. In this framework, we do not account for the requirements on minimal content of US value added embodied in the cars exported to the US negotiated in the USMCA.

Figure 2 – Relative changes in value added, by sector (%) – Scenario 1



Source: Simulations with MIRAGE-e v.2, authors' calculations.

market before the trade war, the new measures have little impact. Finally, Machinery and Metal products post modest gains for the US and modest losses for China.

Trade war may also result in only losers (southwest quadrant). This is the case in the Food sector, with limited losses, and in the Vehicles sector, where losses are larger in the United States (-2.3%, a decrease of USD 4 billion). The US automotive sector suffers from reduced competitiveness due to increased prices of steel and aluminium, as well as of other car components imported from China. However, according to our estimates, it is the situation where the United States loses and China gains that affects the largest number of sectors (northwest quadrant). First, Chinese retaliation measures severely affect oilseeds produced in the United States: American value added in the Oilseeds sector fall by 10.5% (or USD 6.5 billion, which is of the same order of magnitude as American gains in the Iron and steel sector). US producers of Fiber crops, Other crops, Cereals, Vegetable and fruits also pay their tribute. Among industrial sectors, Chemistry is hit by a 1.9% drop in value added, representing more than USD 10 billion given the size of this sector. The same remark pertains to the US Transport equipment industry (other than cars), posting a 3.5% and

USD 5.3 billion drop in value added, which suffers from more expensive inputs.

If the tariff war were to spread (scenario 2), Germany would be severely hit in the car industry, with a USD 2.4 billion loss of value added, while this industry would not suffer much in France, for several reasons. First, Germany would lose market shares in the US market, due to US tariffs on assembled cars. Second, vehicles assembled in the United States by German producers for import into the EU would be hit by European retaliation, leading to a sizeable loss of German sales in the European market. Another transmission channel is through the imports of American parts and components in Germany, again as a consequence of European retaliations. In contrast, French car manufacturers would recover some of the market shares lost by Germany in Europe.

Finally, if the choice were not to open new fronts but to ease tensions (scenario 3), the impact would be, as expected, limited. None of the industrial sectors in Germany or France would record a change in value added of more than USD 0.5 billion, with the exception of Machinery in Germany (USD 2 billion).

The exercise carried out here confirms the deleterious impact of trade wars for economies deeply involved in GVCs. Beyond the usual effect of targeted retaliation (here on US agriculture), increases in intermediate consumption prices reduce the competitiveness of downstream industries. Conversely, the imposition of tariffs on imports of final goods harms the domestic upstream industries that supply the components necessary for the assembly of these goods abroad. In a tariff battle, indirect effects weigh heavily on the countries that protect themselves, and the more so that value chains are complex.

Cecilia Bellora & Lionel Fontagné
cecilia.bellora@cepil.fr

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RÉDACTION :
Centre d'études prospectives
et d'informations internationales
20, avenue de Ségur
TSA 10726
75334 Paris Cedex 07

Tél. : 01 53 68 55 00
www.cepil.fr – @CEPII_Paris

DIRECTEUR DE LA PUBLICATION :
Sébastien Jean

RÉDACTION EN CHEF :
Jézabel Couppey-Soubeyran
& Thomas Renault

RÉALISATION :
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SUR L'ÉCONOMIE MONDIALE

