

SELECTED ASPECTS OF THE US-CHINA TRADE DISPUTE

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Abstract

The world economy has been undergoing changes under the weight of the US-China trade dispute, which has a profound impact on rising foreign trade costs and changing foreign trade flows. To better understand the possible consequences of tariff barrier disruptions, the paper examines structural impacts on the individual exports of US states, which are strongly involved in foreign trade with China. Higher consumer prices will be a drag on consumer expenditures and changes in supply chains will manifest themselves on the labour market, while affecting trade relations with third countries. The main objective is to use the multiregional input-output model to capture changes in complex linkages among industries and countries with their effects on value added and employment. This method allows for analysing the importance of China as a trade partner for the US economy throughout the last years and identifying the key industries in terms of value added and employment. This way, it is possible to estimate the complex consequences of the US-China trade dispute including its indirect effects.

Key words: foreign trade, input–output model, trade dispute

JEL Code: F140, F150, F160

Introduction

One of the most significant papers dealing with the impact of customs tariffs on well-being was the paper written by Johnson, H. G. (1954). The author examined whether a country can benefit from introducing customs tariffs even if other countries adopt retaliatory measures. He claimed that a country may win a bilateral trade war if it holds sufficient relative monopoly power in the world trade. Ossa (2014) concluded that in the case of a world trade war, where trade partners behave in an optimal way, the well-being declines across the board and nobody is the winner. Lechthaler, W. – Mileva, M. (2018) came with the statement that a trade war can be beneficial for a proportion of the labour force, which may be therefore willing to support protectionist trends in the country. Regarding the US-China trade dispute, economists generally agree that the resulting increase of costs in foreign trade will lead to a decrease in the trade flows between these countries or it can also leads to higher consumer prices. It can also cause a larger diversification of the countries' trade relations (e.g. UN

(2019)). This has been also pointed out for instance in the study by Nicita, A. (2019). The paper claims that in the first half of 2019, customs duties introduced for Chinese products lead to a decline in their imports by 25%; however, Chinese companies managed to retain as much as 75% of their exports to the United States subjected to the higher customs tariffs, which shows their relatively high competitiveness. The paper further suggests that the trade conflict is detrimental for both countries, but while the negative impact in the United States has been felt especially by consumers in the form of higher prices, China's losses have been connected especially to lower exports. Some authors, such as Kashyap, U. – Bothra, N. (2019) and Amity, M. – Redding, S. J. – Weinstein, D., E. (2019) focused on explaining the impacts of the trade war on the supply chain in an international context. Misra, R. – Choudhry, S. (2020) used an input-output analysis to examine the potential impacts of increasing tariffs in the US-China trade dispute on third countries. The authors concluded that the trade conflict can bring certain benefits to these countries in the short and medium term arising especially from possible re-routing of trade flows; however, in the long term, a further escalation of tension in the trade relations of these two countries could have negative impacts on the global level. Abiad, A. et al. (2018) used a multiregional input-output model in their analysis of the effects of the trade war on developing countries in Asia. The model allows for capturing complex linkages among industries and countries. The authors estimated that in the worst-case scenario, China's GDP would decrease by more than 1% over two to three years, while the United States would only experience a decrease of roughly 0.2%. Authors claim that the effects of this trade war could be somewhat positive for developing countries in Asia especially because of the re-routing of trade in electronics and textiles.

The aim of this paper is to describe the relations of the United States and China in terms of foreign trade and labour market. This paper identifies the impact of the trade conflict between these two countries by analysing the direct and indirect effects on value added and employment generated by the US exports to China using a multiregional input-output model. It also analyses the intensity with which this trade conflict impacts the development of individual US states' exports.

1 Data and methodology

The main empirical analysis is based on the World Input-output Database (WIOD) specifically developed for the purposes of global input-output analyses. We used the 2016 release containing annual world input-output tables for 43 countries for the period from 2000

to 2014. The advantage of using this database is its ability to capture the complex flows of intermediates and final products among countries in a detailed division by industries for 15 years. Using the multiregional input-output model allows recording the indirect effects resulting from international trade as well. A detailed description of the model can be found e.g. in the monograph by Miller–Blair (2009) or Timmer et al. (2013). In particular, this paper captures trade relations between the US and the Chinese economy and identifies which of the two countries benefits more from them in terms of value added and employment generated directly and indirectly by the exports to the partner country.

The international input-output tables are composed of the intermediate consumption matrix (\mathbf{Z}), the value-added vector (\mathbf{v}) and the final use matrix (\mathbf{Y}). Moreover, the vector of total production \mathbf{x} and the employment vector \mathbf{e} are used as well. Matrix \mathbf{Z} captures the flows of intermediates among individual industries i and countries p . It can be expressed as $\mathbf{Z} = \{z_{ij}^{pu}\}$. Similarly, matrix \mathbf{Y} includes information about where the final products produced by industries in individual countries are used. This matrix also includes e.g. the exports of cars from China for the final use in the United States. The total production vector $\mathbf{x} = \{x_i^p\}$ includes information about the production of industry i in country p .

The model is based on the input coefficients matrix \mathbf{A} , which is calculated as $\mathbf{A} = \mathbf{Z}\hat{\mathbf{x}}^{-1}$. Using vectors \mathbf{x} and \mathbf{y} and matrix \mathbf{A} , it is possible to construct a system of balance equations and deduce the Leontief model, in this case for several regions,

$$\mathbf{x} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{y} = \mathbf{L}\mathbf{y} \quad (1)$$

where matrix \mathbf{L} is the basis of the model and includes complex linkages among industries and countries. The extension of the model by value added and employment vectors allows us to analyse the effects of final demand and its changes on these variables. The effects can be expressed as:

$$\begin{aligned} \mathbf{v}^{\text{gen}} &= \hat{\mathbf{v}}_c \mathbf{L} \mathbf{y}^{\text{ex}} \\ \mathbf{e}^{\text{gen}} &= \hat{\mathbf{e}}_c \mathbf{L} \mathbf{y}^{\text{ex}} \end{aligned} \quad (3)$$

where \mathbf{v}^{gen} captures the effects on value added and \mathbf{e}^{gen} the effects on employment. Moreover, using the hypothetical extraction method inspired by Los et al. (2016) also allows for capturing the effects in the United States/China generated by the use of inputs from the United States/China by British producers to produce intermediate exports which end up used as inputs in another country (e.g. Germany). These effects help to create a more precise description of trade flows between the United States and China.

2 Selected aspects of foreign trade of the United States and China

The value of the mutual exchange of goods shows that China has long been an important trade partner for the United States. As can be seen in Table 1, China's exports to the United States gradually increased with time from USD 283.8 billion in 2010 to USD 479.7 billion in 2018. Thus, between 2010 and 2018, the average growth rate of exports from China to the United States was as much as 7%. An increase in the United States exports to China was between the 2010-2018 period rather moderate (3.6%), which caused growing problems in the balance of trade between the two countries. The ever-deepening trade imbalance started to come under the spotlight of US politicians, especially due to the increasing concerns of losing jobs in the United States as a result of increasing imports from China as well as due to possible problems of a heightened dependence of the United States from international loans. As it also can be seen in Table 1, the escalation of the trade dispute between the United States and China caused a decrease in export activities of both parties. This also resulted in the decline in the US's share of the China's total exports of goods from 19.2% in 2018 to 16.8% in 2019. The share of China's exports in the US's total exports also decreased between these years from 7.2% to 6.5%.

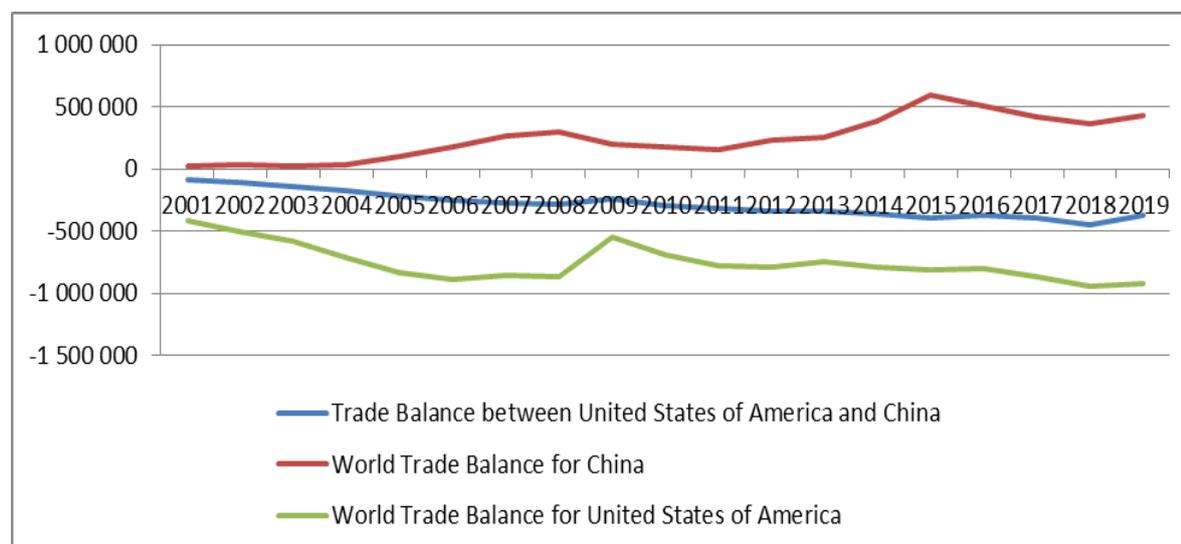
Tab. 1: Development of US and Chinese exports and imports, in USD billion

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
United States exports to China	91.9	104.1	110.5	121.7	123.7	116.1	115.6	129.8	120.2	106.6
United States exports globally	1,278.1	1,481.7	1,544.9	1,577.6	1,619.7	1,501.8	1,451.5	1,546.5	1,665.9	1,645.2
Share in %	7.2	7.0	7.2	7.7	7.6	7.7	8.0	8.4	7.2	6.5
United States imports from China	382.9	417.3	444.4	459.1	486.3	504.1	481.4	525.5	563.2	472.5
United States imports globally	1,968.3	2,263.6	2,334.7	2,326.6	2,410.9	2,313.4	2,249.1	2,406.4	2,612.4	2,568.4
Share in %	19.5	18.4	19.0	19.7	20.2	21.8	21.4	21.9	21.6	18.4
China's exports to the United States	283.8	325.1	352.4	369.1	397.1	409.9	385.7	430.3	479.7	418.6
China's exports globally	1,577.8	1,898.4	2,048.8	2,209.1	2,342.3	2,273.5	2,097.6	2,263.4	2,494.2	2,498.6
Share in %	18.0	17.1	17.2	16.7	17.0	18.0	18.4	19.0	19.2	16.8
China's imports from the United States	102.7	123.1	133.8	153.4	160.1	148.7	135.1	154.4	156.1	123.2
China's imports globally	1,396.1	1,743.4	1,818.2	1,949.9	1,959.2	1,679.6	1,587.9	1,843.8	2,134.9	2,068.9
Share in %	7.4	7.1	7.4	7.9	8.2	8.9	8.5	8.4	7.3	6.0

Source: Authors' calculations using International Trade Centre data

As can be seen in Figure 1, starting in 2001, the United States recorded the increasing trade deficit with China, which was one of the main reasons for the trade dispute between the two countries. Accusations of China by the United States government were connected especially to hindering the access of US exporters to the Chinese market by artificially undervaluing the yuan to dollar exchange rate, but also other illegal or immoral measures taken by the Chinese government to support Chinese exports and decrease imports from the United States. United States' annual balance of trade deficit with China reached roughly USD 443 billion in 2018, which is much more higher compared to 2001, when it was at the level of USD 83 billion. However, the balance of trade deficit then experienced a significant decrease between 2018 and 2019, which was a result of the fact that the United States imposed duties on imported Chinese goods.

Fig. 1: United States' total balance of trade with China in USD million



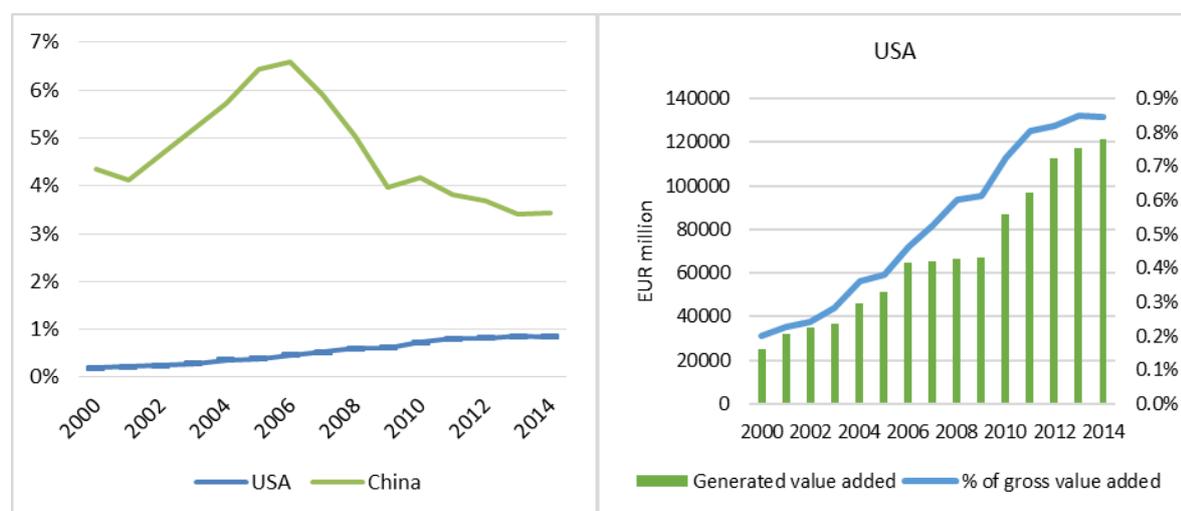
Source: Authors using International Trade Centre data

ITC (International Trade Centre) data show that China, together with Mexico and Canada, is one of the markets with the highest export potential for the United States. Out of all countries, China has the highest difference between the current and potential exports in absolute terms; the untapped potential for the next five years is estimated at USD 88.8 billion. Sub-sectors with the highest export potential from the United States to China include oil seeds and oleaginous fruits, machinery, mechanical appliances and parts thereof, optical instruments and apparatus, clocks and medical or surgical instruments. The fast-growing middle class with an ever-increasing purchasing power in China opens up immense opportunities for American companies, so for this reason it is important to solve this trade dispute between these two countries as soon as possible.

3 Value added and employment generated by exports

The indirect effects generated by the mutual trade between the United States and China show that the shares of value added are much higher for China. However, it seems that the importance of the United States as a trade partner for China has been decreasing. The share of value added in China on total value added in the country generated by the exports to the United States fell by 0.93 pp throughout the observed period (from 4.36% to 3.43%).

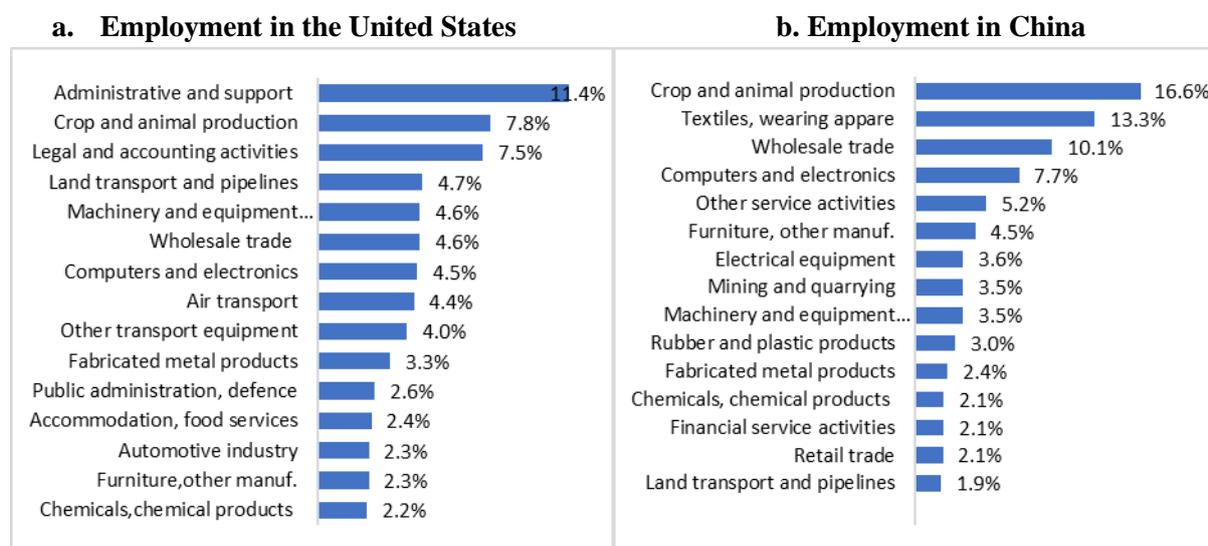
Fig. 2: Comparison of value added generated in the United States by the exports to China and vice versa (shares on the total gross value added in the respective country). The United States in more detail in the right panel.



Source: Authors' calculations using WIOT data (wiod.org).

On the other hand, the share of value added in the United States generated by the exports to China has been increasing constantly. Although it still generated only 0.9% of the total value added in 2014, one can observe the increase of 0.65 pp compared to 2000. Moreover, this is also observable in absolute values (see the right panel of Figure 2). In 2014, the total generated employment in the United States accounted for almost 768 thousand jobs, which is 0.5% of the country's total employment. Industries in the United States that benefit most from the US-China trade in terms of employment are mainly administrative and support activities (11.4%), crop and animal production (7.8%) and legal and accounting activities (7.5%). Next, the manufacture of machinery, wholesale trade and the manufacture of computer, electronic and optical products represent almost 5% of the US employment generated by the exports to China (Fig. 3a). The automotive industry, i.e. the manufacture of motor vehicles, trailers and semi-trailers, as well as the manufacture of fabricated metal products and the manufacture of chemicals, played an important role in the mutual trade.

Fig 3: Structure of employment in the United States and China generated directly and indirectly by exports to China and the US, respectively (2014) – top industries



Source: Authors' calculations using WIOT data (wiod.org).

From the perspective of China, more than 22 million jobs were generated by exports to the United States, representing 2.6% of China's total employment. The most prominent is crop and animal production (16.6%), the manufacture of textiles, wearing apparel and leather products (13.3%) and wholesale trade (10.1%). A significant part of the generated employment was in the manufacture of computer, electronic and optical products, other service activities and the manufacture of furniture and other manufacturing. These industries represented more than 4.5% of the total employment in China.

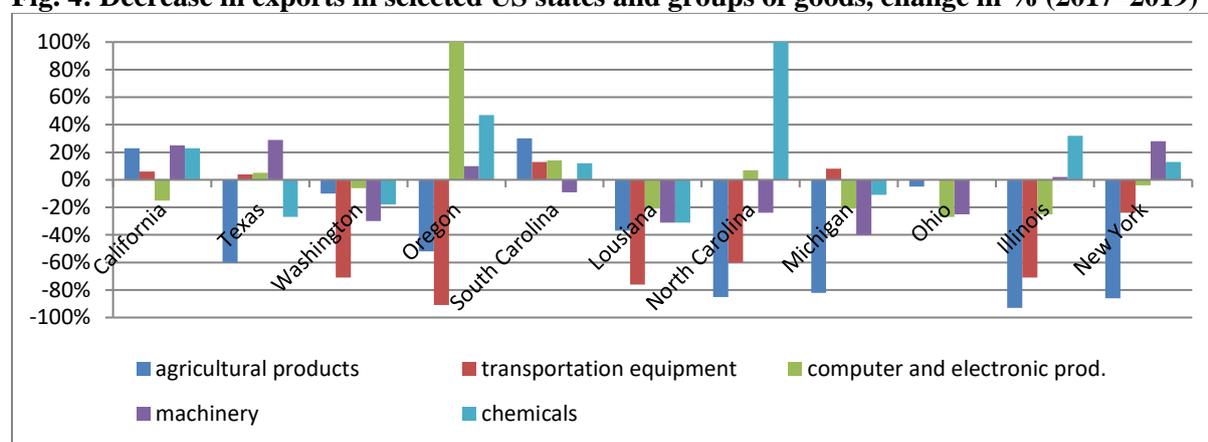
4 Trade diversion effects of the trade dispute on selected US states

The trade dispute between the United States and China and the introduction of tariff barriers to the imports of goods has impacted the development of exports of individual US states differently. This paper examines those US states that are the most important in terms of export volume (accounting for as much as 66% of total exports), and focuses on industries that are important for the United States in terms of exports and the creation of jobs and value added, as identified by the input-output analysis. The retaliatory increase in customs tariffs by China related especially to the imports of agricultural products and transport equipment, but in the United States, the higher duties also affected other important industries, such as computers and electronics, chemicals or machinery. Taking the structure of exports into account, it can be said that between 2017 and 2019, North Carolina managed to increase its

exports of chemicals to China by as much as 543%, and Oregon expanded its exports of computers and electronics by 162% (Figure 4).

In contrast, for Louisiana, agricultural products represent the main export product to China, and so the economic impacts of the decrease of exports are all the more serious, reaching 37%, or over USD 2.1 billion. Washington is in a similar situation: agricultural products are the most important export product too, and their exports to China decreased by around 10% between 2017 and 2019. Another sensitive group of products subject to the trade dispute is transport equipment, which is the main export product to China for the United States as such and also for many US states. As regards trade with China, it is apparent that besides agricultural products, the most affected states exported transport equipment.

Fig. 4: Decrease in exports in selected US states and groups of goods, change in % (2017–2019)



Source: Authors' calculations using ITA (2020)

In terms of nominal losses, Washington is one of the most affected states in the case of transport equipment, just like in the case of agricultural products. It is the largest exporter of this category in the whole United States. The most common export product to the Chinese market for many US states are computers and electronics. In China, the demand for computers and electronics is mainly driven by contracted producers of electronics. As it seems, in contrast to agricultural products and transport equipment, American computer and electronics producers have bigger competitive advantages in the international comparison, and their production cannot be easily replaced in third countries. The situation was similar for machinery too. Another commodity not affected as negatively by the Chinese retaliatory measures are chemicals, representing the most important export product for a total of sixteen US states. Moreover, in 2017–2019 roughly half of them recorded an increase in the export volume to China. Then there are other states, such as Texas, Louisiana and Michigan, which recorded a decrease of the export volume of chemicals to China in the examined period.

Conclusion

The value of the mutual exchange of goods shows that China has long been an important trade partner for the United States. Despite the trade dispute, China (together with Mexico and Canada) remains one of the markets with the highest export potential for the United States, while the untapped potential in this country for the next five years is estimated at USD 88.8 billion. It is unclear how the situation evolves in 2020; a partial trade agreement between the United States and China should decrease the tension in the trade relations of these two countries, but the COVID-19 outbreak could slow down the world economy and significantly affect trade among countries. An ongoing trade dispute could also negatively affect the labour market in both countries. The input-output analysis showed that almost 768 thousand jobs in the United States are directly and indirectly dependent on the exports to China, which represents roughly 0.5% of the total employment in the country. In China, there are over 22 million jobs dependent directly or indirectly on the exports to the United States, representing 2.6% of the country's total employment.

In terms of the impact of Chinese retaliatory measures on the exports of goods from individual US states, it can be stated that it depends especially on the structure of goods exported to the Chinese market. On the one hand, there are states which export mainly agricultural products and transport equipment, such as Louisiana, Alabama, Illinois and Washington, and they experienced a steep decrease in the exports to the Chinese market. On the other hand, there are states that predominantly export computers, electronics and chemicals to China, like Oregon and North Carolina, which saw an increase in the exports to China in the examined period, and the introduction of retaliatory measures for the exports from the United States did not have any negative effect in their case.

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