

# Research on the Factors Affecting the Export of High-tech Products in Jiangsu Province under Sino-US Trade War

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**Abstract.** In March 2018, the Trump administration of the United States imposed high tariffs on most of China's exports to the United States in order to reduce the US trade deficit. The main targeted items are China's high-tech exports to the United States. Jiangsu Province ranks the second in its total foreign trade volume in China and its largest trading partner is the United States. High-tech products account for a large proportion of its exports. Through the empirical research on the export factors of high-tech products in Jiangsu Province, this paper finds that the Sino-US trade war will mainly affect the export of high-tech products in terms of foreign direct investment and technological innovation. In order to mitigate the impacts of the Sino-US trade war, Jiangsu Province can further expand its opening up to actively attract foreign investment, increase investment in innovation and enhance the ability of independent innovation.

**Keywords:** Sino-US trade war; high-tech products; influencing factors; technological innovation; foreign direct investment.

## 1. Introduction

High-tech products refer to products that are made using the most modern technical knowledge and methods. The high-tech fields identified in China involve informatization of national economy, transformation of traditional industries, and development of emerging industries. In China's Project 863, high-tech products cover seven major fields: biology, aerospace, information, laser, automation, new energy and new materials. With rapid globalization, the export of high-tech products has become a main force of world trade development and an important way for China to create economic growth [1]. The increased tariffs on high-tech products exported by China will hinder the export of China's high-tech products and impact Chinese economy to some extent. The United States is a major importer of high-tech products produced in Jiangsu Province. The paper conducts the theoretical and empirical analysis of the main factors affecting Jiangsu's export of high-tech products in the context of the Sino-US trade war. The paper also attempts to provide recommendations in continuing the export of high-tech products in this trade context.

## 2. Sino-US Trade War and Export Status of High-tech Products in Jiangsu Province

### 2.1 Sino-US Trade War

On August 18, 2017, the US government conducted a Section 301 investigation on China's alleged technology infringement of US intellectual property rights and forced technology transfer. This unilateralism on the US side laid the groundwork for China-U.S. trade war. On April 4, 2018, the U.S. government imposed the first round of 25% tariffs on 1333 items of Chinese exports worth of USD 50 billion to the United States under Section 301. The affected products include the high-end manufacturing of mechanical equipment, electronic equipment, transportation equipment, and medicine [2]. On August 2, 2018, the United States announced a second round of tariffs on USD 200 billion Chinese products. The product categories involved have also expanded from the original two HS categories involving 18 sectors to the vast majority of sub-sectors (The clear classification comes

from HS coding category 6, category 7, and categories 15 to 20). High-end manufacturing remains on the target list of the second round of tariffs [3]. In response, China has also adopted counter-measures by imposing first round of tariffs on American products mainly including agricultural products and mineral products. The second round of tariffs on China's list expanded to almost all industries.

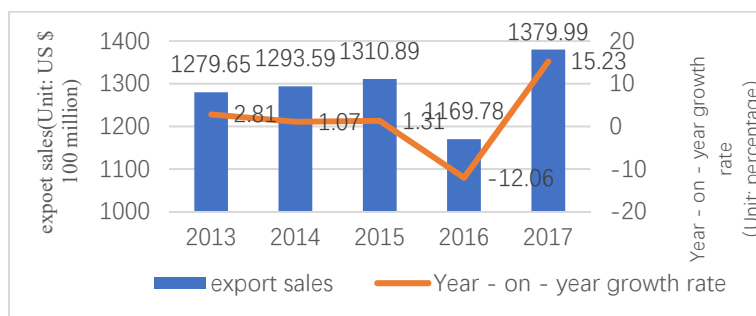
Table 1. US Tariffs on Chinese Products

	the scale of the first batch of tariffs (billion US dollars)	China's total exports to the United States (billion US dollars)	Proportion of the first batch in China's total exports	Proportion of the second batch in China's total exports (%)	Proportion of the two batches in China's total exports(%)
Category 1	0.0	20.1	0.0	77.2	77.2
Category 2	0.0	15.9	0.0	67.8	67.8
Category 3	0.0	0.8	0.0	11.4	11.4
Category 4	0.0	38.3	0.0	48.4	48.4
Category 5	0.5	16.2	3.1	89.8	92.9
Category 6	4.6	139.5	3.3	73.6	76.9
Category 7	49.7	185.4	26.8	25.3	52.1
Category 8	0.0	68.2	0.0	64.0	64.0
Category 9	0.0	39.9	0.0	88.6	88.6
Category 10	0.0	41.4	0.0	75.4	75.4
Category 11	0.0	424.5	0.0	9.6	9.6
Category 12	0.0	159.6	0.0	9.9	9.9
Category 13	0.1	73.4	0.1	71.5	71.7
Category 14	0.0	35.9	0.0	18.6	18.6
Category 15	40.9	225.1	18.2	54.9	73.1
Category 16	245.5	1,985.4	12.4	51.2	63.6
Category 17	93.9	196.8	47.7	48.5	96.2
Category 18	48.1	106.4	45.2	18.4	63.6
Category 19	0.4	0.8	50.0	0.0	50.0
Category 20	16.3	510.3	3.2	49.2	52.4
Category 21	0.0	0.5	0.0	96.7	96.7
Category 22	0.0	13.2	0.0	0.0	0.0

Source: Ministry of Commerce website, Wind Information, Suning Financial Research Institute

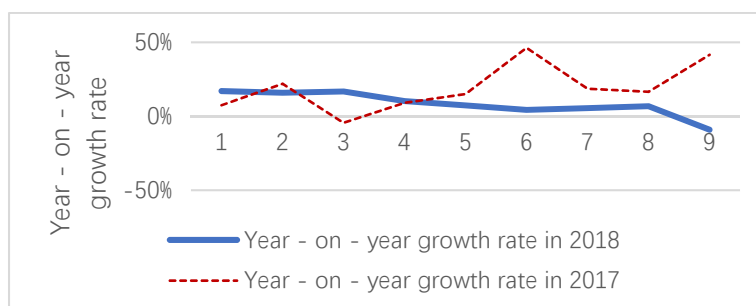
## 2.2 Jiangsu's Export Status of High-tech Products

Jiangsu's high-tech products mainly come from aerospace manufacturing, electronic computer and office equipment manufacturing, medical equipment and instrumentation manufacturing. In 2017, the export value of high-tech products in Jiangsu Province reached 139.99 billion dollars, accounting for 38% of the total export value in the province. The export volume of high-tech products in Jiangsu Province had continued to grow in the past few years and peaked in 2017. In the first three quarters of 2018, there remains an overall upward trend, but the year-on-year growth from 2018 has shown a significant downward trend since March, which also shows that the Sino-US trade war has affected the export of high-tech products in Jiangsu Province.



Source: Jiangsu Statistical Yearbook

Fig. 1 2013-2017 Jiangsu Province High-tech Products Exports (Unit: 100 million dollars)



Source: Nanjing Customs

Fig. 2 Year-on-year Growth Rate of High-tech Exports in 2017 and 2018(Q1-Q3)

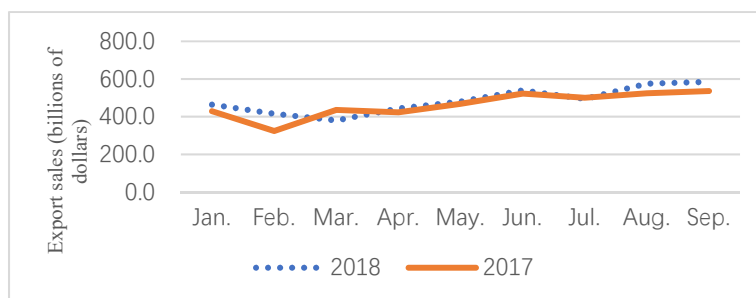
The export of high-tech products in Jiangsu Province is mainly concentrated in the electronics and communication equipment manufacturing industry and the computer equipment industry. The exports of these two types of high-tech products account for about 70% of the total exports of high-tech products. The low proportion of exports in aerospace and new materials reflects the imbalance in the exports of high-tech products in Jiangsu Province. Affected by the external factors like US-China trade war, the export in electronic communications showed a significant downward trend in the first three quarters of 2018. For example, the export volume of LCD panels and tablets was RMB 28.71 billion and RMB 28.0 billion, down 12.6% and 12.7% respectively from a year earlier.

In terms of market destinations for Jiangsu's exports, the main export markets for Jiangsu's products are developed countries or regions. Export data from 2013 to 2017 showed that the largest import markets for Jiangsu's exports were the United States, followed by the European Union, Hong Kong and Japan. Jiangsu's exports depend on the United States as a major destination. The overall exports for Jiangsu's Province showed an upward trend in the first three quarters in 2018, but the amount of Jiangsu's exports to the United States in March 2018 was the lowest in the first three quarters. The year-on-year growth rate in 2018 is significantly lower than that in 2017, indicating that the growth trend of Jiangsu's export to the United States has dropped significantly.

Table 2. Distribution of Jiangsu Province's Export Market (Unit: 100 million dollars)

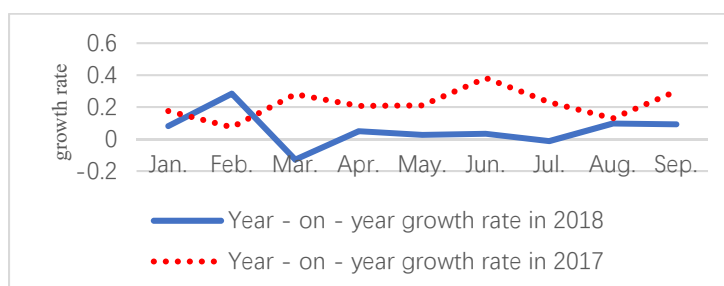
Region \ Date	2013	2014	2015	2016	2017
America	654.30	701.72	727.97	717.29	855.85
EU	571.21	635.05	607.85	594.8	687.25
Hong Kong, China	368.34	348.46	347.9	272.69	304.77
Japan	312.37	308.62	280.82	259.8	273.01

Source: Jiangsu Statistical Yearbook



Source: Nanjing Customs

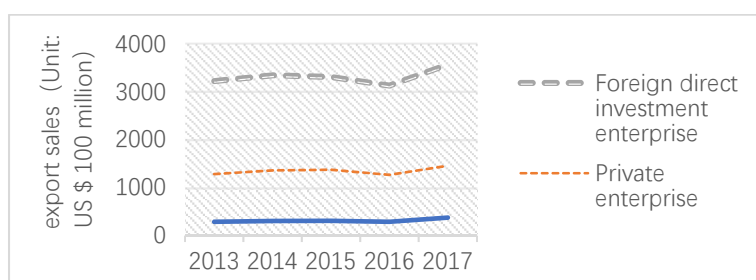
Fig. 3 China's Export Sales to the US in 2017 and 2018(Q1-Q3)



Source: Nanjing Customs

Fig. 4 Year-on-year Growth Rate of Jiangsu's Exports to US in 2017 and 2018(Q1-Q3)

The types of export manufacturers in Jiangsu Province include state-owned enterprises, private enterprises and foreign-invested enterprises. As can be seen from Figure. 5, from 2013 to 2017, the export value of foreign-invested enterprises accounts for 60% of the total export value of foreign-invested enterprises. The foreign-invested enterprises are mainly concentrated in high-tech industry. This also shows that the core technology and high-added-value are in the hands of foreign-funded enterprises. The local enterprises in Jiangsu Province are mostly engaged in less profitable processing trade. From the perspective of development, this will lead to a lack of momentum for sustained growth in the export of high-tech products. Moreover, once the foreign capital is withdrawn, it will negatively impact the high-tech industries in Jiangsu Province.



Source: Jiangsu Statistical Yearbook

Fig. 5 Exports Under Different Business Types in Jiangsu Province from 2013 to 2017

### **3. Analysis of Factors Affecting the Export of High-tech Products in Jiangsu Province**

#### **3.1 Theoretical Analysis on the Export Factors of High-tech Products in Jiangsu Province**

The scholarly research on the factors affecting the export of China's high-tech products indicate that technological innovation, foreign direct investment and exchange rate are major influencing factors.

Foreign-funded enterprises have always been an important factor in the export of high-tech products in Jiangsu Province. From 2015 to 2017, foreign direct investment in high-tech industries accounted for about 40% of total investment. Investment from the United States is an important part. The Sino-US trade war initiated by the Trump administration aimed in part to curb its direct investment in China, and thus curb China's trade dominance. Since the high-tech industry in Jiangsu Province relies heavily on foreign investment in the United States, if the reduction in direct investment in the United States could affect the structural adjustment and upgrading in Jiangsu's high-tech sector and hence affect the export of high-tech products in Jiangsu Province.

The exchange rate directly affects the competitiveness of export products. The exchange rate is constantly changing due to the influence of various factors. Since the Sino-US trade war broke out, the RMB currency was under the selling pressure. From May to August 2018, the RMB exchange rate against the US dollar fell all the way to 6.9348, down 6.1% from the beginning of this year and down 9.97 %from the highest point of this year. The decline in the exchange rate will ease the impact of the trade war on Jiangsu's export of high-tech products.

Scientific and technological progress is a booster for the export growth of high-tech products, which has a positive effect on the high-tech industry. Ming Jie et al. (2015) found that the scientific research investment of Jiangsu Provincial Government plays an important role in promoting the export competitiveness of high and new technology products [4]. Chu Xue (2017) found that the increase of R&D investment in Jiangsu Province promotes the development of the related industries and creates the economy of scales, thus promoting the export of high-tech products [5]. In terms of technological innovation, Jiangsu Province relies heavily on the United States for both the capital and the technical support. To a certain extent, the trade war will possibly affect the US investment in Jiangsu's high-tech industry. In addition, the recent US trade protection policy will affect the capital and technical support in developing the core technology of high-tech products in Jiangsu Province and hence might compromise the export quality of high-tech products. Moreover, Jiangsu has been aiming to get integrated into the global industrial chain. The trade war will undoubtedly have a much negative impact on the Jiangsu's efforts to be more competitive in the industry value chain.

In order to test whether these factors have an impact on Jiangsu Province's export of high-tech products, the results will be tested by multiple regression of these factors.

#### **3.2 Empirical Analysis of Factors Affecting Exports of High-tech Products in Jiangsu Province**

##### **3.2.1 Selection of Variables**

The dependent variable is the export value  $Y$  of high-tech production in Jiangsu Province from 2006 to 2017. Independent variables include technological innovation, foreign direct investment, and exchange rate. Explanations for selection are as follows:

(1) Technological innovation: High-tech products are inseparable from scientific and technological innovation capabilities. The ability to innovate in science and technology includes not only talent investment but also R&D capital investment. Therefore, the investment in R&D funds represents technological innovation.

(2) Foreign direct investment: The actual use of foreign capital is used to represent foreign direct investment.

(3) Exchange rate: The exchange rate between RMB and USD is used in the study.

### 3.2.2 Multiple Collinearity Test

In order to determine whether there is multicollinearity between the independent variables, the statistical analysis software spss19.0 is used to test the three variables using the VIF (variance expansion factor) method. The test results are as follows:

Coefficients <sup>a</sup>								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1199.704	1021.854		1.174	.274		
	RD	.172	.065	.496	2.642	.030	.405	2.468
	FDI	1.622	.941	.373	1.723	.123	.305	3.279
	E	-1.027	1.109	-.261	-.926	.382	.180	5.567

a. Dependent Variable: Y

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Fig. 6 VIF test results

The results show that the VIF values of the three explanatory variables are all less than 10, indicating that there is no serious multicollinearity problem between them.

### 3.2.3 Sequence Stationarity Test

In order to avoid the phenomenon of pseudo-regression, the ADF test is performed on each variable with Eviews8.0. The original sequence of each variable has a result greater than 0.05, so the nonstationary sequence is considered. But the second-order difference term of each sequence is less than 0.05. Both are stationary sequences.

### 3.2.4 OLS Regression Results and Discussions

OLS regression is conducted as follows:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1199.673	1021.884	1.173983	0.2742
FDI	1.621919	0.941473	1.722747	0.1232
RD	0.171544	0.064941	2.641533	0.0296
E	-1.026839	1.108940	-0.925965	0.3815
R-squared	0.885702	Mean dependent var		1150.056
Adjusted R-squared	0.842840	S.D. dependent var		221.9182
S.E. of regression	87.97608	Akaike info criterion		12.05321
Sum squared resid	61918.32	Schwarz criterion		12.21484
Log likelihood	-68.31925	Hannan-Quinn criter.		11.99337
F-statistic	20.66406	Durbin-Watson stat		2.628463
Prob(F-statistic)	0.000400			

Fig. 7 OLS regression results

From the regression results, it can be seen that the value of R-Square is 0.885, and the F value is tested by the significance of 0.05, indicating that the overall fitting effect is quite good. From the analysis of a single explanatory variable, FDI, RD and E all have significant influence on the export of high-tech products in Jiangsu Province through the t significance test.

The coefficient of foreign direct investment is 1.62, indicating the positive effect of foreign investment on the export of Jiangsu's high-tech products. At the same time, this indicates that the export of high-tech products in Jiangsu Province is dependent on foreign capital. Therefore, the fluctuation of foreign capital has a great impact on the export of high-tech products in Jiangsu Province.

High-tech R&D investment is the source of technological development. With the R&D coefficient of 0.17, it can be seen that the increase in R&D investment promotes the export of high-tech products in Jiangsu Province, but this value also indicates that Jiangsu's R&D investment is relatively insufficient. This also restricts the technological innovation of high-tech products.

The coefficient of exchange rate is -1.026, indicating that the exchange rate has a reverse effect on the export of high-tech products in Jiangsu Province.



## **4. Suggestions on Jiangsu's Export of High-Tech Products under the Sino-US Trade War**

### **4.1 Expand Export Markets**

In order to reduce market dependence in the United States, Jiangsu Province should strengthen the development of markets in developed economies such as Europe and Japan so that the medium and high-end supply of the industrial chain and value chain will avoid the risk of disruption.

### **4.2 Optimize Foreign Investment**

It is the time to improve Jiangsu's high-tech export position in the global value chain. By further opening up to the outside world, the appropriate investment of foreign capital should be attracted and used to encourage the growth of the related domestic enterprises. Absorption and transformation of the new technology should be strengthened so that the spillover effects of technology can be used to promote the development of local high-tech industries.

### **4.3 Build up Economic Partnerships Along the "Belt and Road" Initiative**

China's Belt and Road Initiative is committed to build an interconnected partnership among countries along the route, and to build an all-round, multilevel and complex interconnected network. To achieve diversified, independent, balanced and sustainable development of countries along the route [6]. This is a huge opportunity for Jiangsu Province to strengthen its ties with Asia, Europe and Africa because the countries and regions along the Belt and Road Initiative have great growth potentials and strong market demands. Jiangsu Province can expand the trade volume in the high-tech products to trading partners along the Belt and the Road.

### **4.4 Support Technical Innovation**

In terms of technological innovation, the government's R&D investment has a positive effect on the export of high-tech products. Therefore, Jiangsu government needs to fully support innovative enterprises, to establish special funds for product innovation enterprises, and create a favorable business environment. Local banks can be given the incentives to provide financing to the manufacture and export of high-tech products. Businesses must also improve their ability to innovate because enterprises without core innovative ability do not have the potential for development. Therefore, enterprises should strengthen the absorption and transformation of new technologies introduced. They should also training and retain talents. More importantly, enterprises need to increase investment in scientific research and innovation and the protection of intellectual property rights as well.

## **5. Conclusion**

The high-tech products exported by Jiangsu Province mainly depend on foreign capital and foreign core technologies. The Sino-US trade war mainly affects the export of high-tech products from Jiangsu Province in terms of foreign direct investment and high-tech acquisition. Therefore, when Jiangsu Province addresses the challenges brought by Sino-US trade, the Province can explore new export markets along the Belt and Road and strengthens the ties with developed countries such as Europe and Japan. Meanwhile, Jiangsu Province needs to attract foreign capital to inject new blood into the high-tech industries. In addition, the Province needs to upgrade production structure, increase investment in scientific and technological research so that the Province can reduce dependence on foreign advanced technology.

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