Financing Impacts on Chinese Small and Medium-Sized Manufacturing Enterprises Based on the U.S.-China Trade Dispute

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Abstract

This study takes small and medium-sized manufacturing (export) enterprises in China as the research object. In the research methodology used, the impact effects of the financing difficulties of China's SMEs arising from the increase in U.S. tariffs are collated and discussed based on monthly customs data before and after the outbreak of the U.S.-China trade war (starting from the year before the outbreak of the trade war, i.e., 2016, (the latest data available as of August 2020), respectively. First, fill in the gaps in the existing literature and further sort out the underlying data work: which products are specifically involved in the three rounds of U.S. tariff increases (and subsequent exemption policies)? Statistics are compiled on typical facts such as the proportion of trade in products involved in the tariff increase in China's exports, the distribution of industries, and the degree of change in trade volume to visualize the impact of the U.S. tariff increase on China's exports. Second, empirical judgment: What is the negative impact of the increase in U.S. tariffs on the financing of Chinese small and medium-sized manufacturing enterprises? This study empirically investigates, at the normative level, whether small and medium-sized export manufacturing firms have significant financing difficulties in the face of the U.S. tariff hike, using the above-mentioned market segments as examples.

Keywords: *financing constraints, small and medium-sized enterprises, U.S.-China trade war*

1. Introduction

1.1. Background of the Research

After the financial crisis in 2008, international trade protectionism began to prevail, and the global trade liberalization process, typified by the reduction of import tariffs, was hit. In particular, a new wave of trade protectionism, led by the United States, has cast a shadow over the world economy. This has become more pronounced after the election of Donald Trump as US president, whose administration has often imposed trade sanctions on China and many other countries, using tariff increases as the main tool. As of 10 months into 2019, the U.S. had initiated three tariff increases against China since the U.S. launched the "301 investigation" in August 2017, involving a total of $750 billion in trade goods. The growing momentum of trade disputes has affected the economic and trade exchanges between the two countries. Its long-term nature and complexity cannot be ignored.

This research takes small and medium-sized manufacturing (export) enterprises (SMEs) in China as the research object. The research methodology is somewhat innovative in that it is based on historical monthly customs data before and after the outbreak of the U.S.-China trade war (starting one year before the outbreak of the trade war, i.e., in 2016 (the latest data available as of August 2020) to collate and discuss the impact effects of the financing difficulties of China's export SMEs arising from the U.S. tariff increase, respectively. First, fill in the gaps in the existing literature and further sort out the underlying data work: which products are specifically involved in the three rounds of U.S. tariff increases (and subsequent exemption policies)?

Statistics are compiled on typical facts such as the proportion of trade in products involved in the tariff increase in China's exports, the distribution of industries, and the degree of change in trade volume to visualize the impact of the U.S. tariff increase on China's exports. Second, empirical judgment: What is the negative impact of the increase in U.S. tariffs on the financing of Chinese small and medium-sized manufacturing enterprises? This study empirically investigates, at the normative level, whether small and medium-sized export manufacturing firms have significant financing difficulties in the face of the U.S. tariff hike, using the above-mentioned market segments as examples.

1.2. Methodology and Significance of the Study

This research uses Stata statistical software to process the collected data and conduct econometric analysis to empirically study the impact of the U.S. trade tariff increase on the leverage of small and medium-sized export enterprises through statistical analysis methods, which provides objective evidence and data reference for the research conclusions and policy recommendations of this study.

According to the theoretical and empirical findings of this study, it is of great practical significance to provide some policy guidance to prevent the financial risks caused by the trade tariff increase on the U.S. side and the dual objective of "stable growth."

2. Review of Literature

2.1. Research Results of the Sino-US Trade Dispute

Research on the U.S.-China trade dispute is divided into several aspects, including causes, degree of impact, and countermeasures. Some of the research results suggest that the U.S. tariff increase is the result of trade protectionism superimposed on other factors. For the quantitative research on the degree of impact, there are several mature models, such as the research results based on the equilibrium model of Eaton and Kortum (2002). Among them, Song and Zhang (2019) argue that the United States imposes tariffs on imports from China, which will raise the prices of these imports. And the trade deficit still exists. Ma and Chen (2019) and Wang and Dong (2020), empirically analyzed the exports of manufacturing, steel, and textile industries, respectively, while Liu (2018) looked at the tea industry. These studies for specific types of enterprises show that the increase of tariffs by the U.S. will definitely have an impact on the above industries or enterprises in China, but the degree of impact varies. Ding and Zhang (2020) argue that the increase in U.S. tariffs directly affects Chinese manufacturing firms that rely on cheap labour for low-end cost advantage, and that rising trade costs will be transmitted to upstream and downstream industries due to the reduction in profits of these firms. Regarding China's coping strategies, Jin and Jin (2020) discuss how Chinese firms seek to handle the transfer of their exports in the context of increased U.S. tariffs. As can be seen, China may be affected by the trade war and tariffs imposed by the United States. However, the extent of this impact can be reduced through proactive countermeasures.

2.2. Linkage Factors of Financing for SMEs

Research in other countries on the impact of trade disputes on corporate finance is mainly based on the fact that trade disputes increase transaction risk and raise transaction costs. It has been shown that trade risk undermines investor confidence and discourages investors from replicating the returns of one security in another portfolio. As well as a high correlation between macroeconomic variables such as exchange rate, GDP per capita and the level of corporate indebtedness due to trade disputes. Kalemli-Ozcan *et al.* (2015) conducts a regression analysis using business data from firms in EU member states and shows that bilateral trade tariff hikes present a threshold effect on corporate leverage and affect corporate leverage, in the case of overly significant unilateral tariff hikes by trade counterparties. In the case of too significant unilateral

tariff increases by trade counterparties, there is a significant decline in firm leverage and this decline is mainly caused by issues such as underinvestment by firms and higher government debt costs.

At this point, scholars in China have conducted less research on the impact of trade disputes, especially tariff hikes, on corporate leverage. One contains three major features of differential capital intensity, limited competition in financial markets and vertical industry linkage, and the study shows that trade disputes will indirectly affect upstream and downstream firms through the industrial value chain. Another demonstrates through empirical research that different corporate leverage ratios are affected by corporate transaction costs, soft budget constraints and corporate tax burden, which are all influenced by China's foreign trade and investment patterns supported by stable exports. In addition, because commercial bank credit is the main source of financing for SMEs in China, and the development of capital market in China is not yet mature and the financing channels are not smooth enough, the economic uncertainty caused by foreign trade disputes is also the reason for the difficulty of financing SMEs in China. It has also been shown through empirical evidence that SMEs in a financing constraint dilemma have small loan size and often lack sufficient fixed assets, which makes large banks face the problem of "high cost, difficult collateral and high risk" when lending to SMEs. When the outlook of trade disputes is uncertain, banks prefer to finance state-owned enterprises and government financing platforms rather than lending to SMEs, making it difficult for SMEs to raise funds.

In conclusion, owing to the special situation in China, the research results obtained abroad do not explain the situation faced by China well, and although some scholars in China have conducted preliminary research on the tariff increase in trade disputes and corporate financing leverage, and obtained certain research results, the empirical research on whether there is a correlation between the two is still insufficient. In addition, most of the previous studies have used data from listed companies, and the findings based on listed companies may not be able to explain the difficulties faced by SMEs in China because they are the leading enterprises in the industry, have closer relationships with the government, and have greater advantages in financing channels than ordinary small and medium-sized export enterprises. In this paper, we consider the database of industrial enterprises as the research object according to the development characteristics and data availability of small and medium-sized export enterprises in China, so the final conclusion of this paper may have more explanatory power for small and medium-sized export enterprises in China.

3. Data Analysis and Research Hypothesis

3.1. Basic Data Cleaning and Analysis

This paper first compares the details of the timing and rates of tariffs imposed by the U.S. on Chinese exports during the study period (see Table 1).

Table 1: List of Tariffs Imposed by the U.S. on Chinese Exports during the Study Period; **source:** author

Levy Increases	Dates of Levy Increases	Rate of Tax Increases
U.S. $34 billion list[1]	July 6, 2018-October 15, 2019	25%-30% (to be)
U.S. $16 billion list[2]	August 23, 2019- October 15, 2019	25%-30% (to be)
U.S. $200 billion list[2]	September 24, 2019- May 10, 2019- October 15, 2019	10%-25%-30% (to be)
U.S. 300 billion list	September 1, 2019- December 15, 2019	15%

Notes: [1] 7 batches have been excluded; [2] 2 batches have been excluded

According to the Standard International Trade Classification (SITC) for international trade, there are ten categories of import and export commodities, with a commodity code system ranging from ST0 to ST9, of which ST0 refers to the animal category, which is less common in international trade; ST1 for cigarettes

and beverages; ST2 for non-food raw materials; ST3 for energy raw materials; ST4 for animal and vegetable oils and fats; ST5 for products related to chemicals; ST6 is primary manufactured products of raw materials; ST7 is large machinery and equipment; ST8 is grocery products; ST9 is other imported and exported products not otherwise classified. In the data sorting stage, this paper needs to analyze the trade structure of China-US trade according to trade classification. The main data are obtained from the Global Trade Barriers Database (http://www. Globaltradealert.org), which shows that the share of primary products such as raw materials in China's exports to the U.S. has decreased, while the share of industrial manufactures such as large machinery and equipment has increased year by year. In order to ensure the accuracy of the data source, the list of tariffs imposed on Chinese products in this study period is downloaded directly from the official website of the U.S. side (note: the U.S. side uses the HTS 8-bit code). Excel was used for data cleaning work.

Table 2: List of Previous U.S. Tariff Increases during the Study Period (Partial Schematic); **source:** Original Research

	15% Additional Tariff	Effective September 1, 2019
2105.00.30
2105.00.50
2106.90.06
2106.90.12
2106.90.18
2106.90.24
2106.90.28
2106.90.34

At the level of the 6-digit HS code, this paper continues to exclude the products involved in the "exemption list" announced during the three rounds of tariff increase by the U.S. side, and finally arrives at the list of products actually affected by the tariff increase policy of the U.S. side. The list of products that are actually affected by the U.S. tariff increase policy is finally eliminated, and the descriptions of the products by the U.S. side that do not need to be covered in this paper are deleted. A total of 11,503 items were recorded, as shown in Table 3.

Table 3. Second Step Cleaning Results (Partial Schematic); **source:** Original Research

	A		A
11477	9610.00.00	11490	9615.90.20
11478	9613.20.00	11491	9615.90.30
11479	9613.80.60	11492	9615.90.40
11480	9614.00.28	11493	9615.90.60
11481	9614.00.94	11494	9616.20.00
11482	9615.11.10	11495	9617.00.10
11483	9615.11.20	11496	9617.00.30
11484	9615.11.30	11497	9617.00.60
11485	9615.11.40	11498	9619.00.31
11486	9615.11.50	11499	9619.00.41
11487	9615.19.20	11500	9619.00.46
11488	9615.19.40	11501	9619.00.61
11489	9615.19.60	11502	9619.00.68
		11503	9619.00.79

In the third step, since the U.S. side uses the HTS8-bit code, and the first 6 bits of which are common internationally and can be directly converted to the HS6-bit code used in China, the data generated in the second step are converted from HTS8-bit to HS6-bit code, and the same items are combined and sorted. The list of 5171 HS6-bit codes was obtained. This is shown in Table 4.

Table 4: Third Step Cleaning Results (Partial); **source:** Original Research

HS8	HS6	HS8	HS6
9208 10 00	9208 10	9603 29 40	9603 29
9404 30 40	9404 30	9603 40 20	9603 40
9503 00 00	9503 00	9605 00 00	9605 00
9504 40 00	9504 40	9610 00 00	9610 00
9504 50 00	9504 50	9613 20 00	9613 20
9505 10 40	9505 10	9615 11 40	9615 11
9505 90 20	9505 90	9615 19 20	9615 19
9506 40 00	9506 40	9615 90 20	9615 90
9507 10 00	9507 19		

Finally, the goods affected by the tariffs imposed by the U.S. side involving Chinese enterprises are sorted by category. This is used as the basis for selecting the types of products manufactured by small and medium-sized export enterprises for the empirical study of this paper (see Table 5).

Table 5: Ranking of Product Categories Affected by the U.S. Tariff Increase; **source:** Original Research

HS Code (First 4 Bits)	Category Description
2903	Halogenated derivatives of hydrocarbons:
0307	Shelled or shelled mollusks, live, fresh, cold, frozen, dried, salted or salted; smoked shelled or shelled mollusks, whether or not cooked before or during the smoking process; fine powder, coarse powder and pellets of mollusks suitable for human consumption:
5407	Woven fabrics of synthetic filament yarns, including those of the materials listed in tariff item 54.04:
6204	Women's suits, casual suits, tops, dresses, skirts, dress pants, pants, chest protectors, pants and shorts (except swimming costumes):
3824	Mold and core adhesives; other chemical products and preparations for the chemical industry and related industries not listed in the tariff number (including those consisting of a mixture of natural products):
0305	Dried, salted or salted fish; smoked fish, whether or not cooked before or during the smoking process; fine, coarse and dough fish suitable for human consumption:
5205	Cotton yarn (except sewing thread), containing 85% or more cotton by weight, not for retail use:
5402	Synthetic fiber filament yarn (except sewing thread), not for retail sale, including synthetic fiber monofilaments of fineness below 67 dtex:
6104	Knitted or crocheted women's suits, casual suits, tops, dresses, skirts, skirts and pants, pants, chest protectors, breeches and shorts (except swimming costumes):
0306	Shelled or shelled crustaceans, live, fresh, cold, frozen, dry, salted or salted; smoked shelled or shelled crustaceans, whether or not cooked before or during the smoking process; steamed or boiled shelled crustaceans, whether or not cold, frozen, dry, salted or salted; crustaceans suitable for human consumption of fine powder, coarse powder and dough:
5206	Cotton yarn (except sewing thread), containing 85% or less cotton by weight, not for retail sale
5516	Woven fabrics spun from man-made fiber staple:
0207	Fresh, cold, frozen meat and edible mince of poultry listed in tariff item 01.05:
3920	Other non-foam plates, sheets, films, foils and flat strips, not reinforced with other materials, laminated, supported or combined with similar methods:
5208	Cotton woven fabrics, cotton content by weight is 85% and above, the weight of each square meter does not exceed 200 grams:
1605	Production or conservation of crustaceans, mollusks and other aquatic invertebrates:
2905	Alcohols and their halogenated, sulfonated, nitrated or nitrosated derivatives

3.2 Research Hypothesis

Leverage is created on a firm's balance sheet as a result of the firm's need to engage in capital borrowing and lending activities, which is an effective way to help the firm cover its capital shortfall. A firm chooses to incur debt, which means it acquires credit resources and generates corporate leverage. This leverage is usually influenced by various factors such as economic conditions (recessionary or aggressive), business conditions, government policies, etc. The focus of this paper is on the extent of the impact of the U.S. tariff increase on the financing leverage of China's export SMEs in the U.S.-China foreign trade dispute.

Generally speaking, when the economy is in recession because the field situation deteriorates, companies facing difficulties in operations will be forced to restructure or close down, and the overall corporate

leverage will fall, while companies that persevere will be able to wait until the economy enters a boom period to expand production, and corporate leverage will rise again, which is the market performance of corporate leverage. The impact of trade disputes, on the other hand, can be seen as a small-scale recession or economic uncertainty.

Based on the above analysis, this paper proposes the hypothesis that the rise in the U.S. tariff increase leads to a decrease in the debt level of small and medium-sized exporters, i.e., a decrease in corporate leverage.

4. Empirical Test of the Impact of U.S. Tariff Hikes on the Leverage of Export SMEs

4.1. Empirical Model and Selection of Each Variable

Through the theoretical analysis in the previous chapter, the following benchmark model was developed for analysis by directly incorporating tariff increases as explanatory variables in the model.

$$Debt\_firm_{i,j,t} = a_0 + a_1 Tariff\_ind_{jt} + \sum \gamma X_{it} + \sum \delta Z_{it} + \lambda_t + \lambda_i + \mu_{ijt} \text{ (4-1)}$$

In the above formula, i, j, t represent different enterprise individuals, industries, and years respectively. Debt_firm is the individual firm leverage, and Tariff_ind is the industry tariff rate. x is the macro-influencing factor. z is the micro-influencing factor. λi, λt are firm and time fixed effects.

The dependent variable used in this paper to reflect the level of corporate leverage is corporate leverage (Debt_firm), which, from the microfinance point of view, refers mainly to the behaviour of the household sector or the corporate sector in reducing the cost of capital occupation by borrowing and lending funds to carry out productive activities. Through the use of leverage, it is possible to increase the gains or reduce the losses of the economic sector. In this paper, total liabilities divided by total assets is used to measure corporate leverage. In this paper, 1,780 observations with a time horizon of 10 years were created for export SMEs that survived between 2010 and 2020 as the study population.

Macro-level influences: (1) Gross domestic product (PGDP) per capita is the ratio of the market value of all final products produced by economic activities in a region to the resident population in that region in a certain period of time, and the specific value is obtained from the National Bureau of Statistics. (2) Inflation level, this paper, in line with general experience, uses the average annual growth rate of the consumer price index to measure the inflation rate, with data obtained from the National Bureau of Statistics. Micro-level influencing factors: (1) Enterprise asset size, in this paper, the logarithm of fixed asset size of enterprises is used to measure the size of enterprises. (2) Enterprise guarantee value, in this paper, the enterprise guarantee value is the sum of the enterprise's fixed assets and inventory divided by the enterprise's total assets. Generally speaking, the larger the enterprise guarantee value is, the easier it is to obtain loans from various sources. (3) Enterprise profitability, enterprise profitability is generally measured by the return on assets, the higher the return on assets indicates the higher the efficiency of enterprise assets utilization, and this paper also adopts the return on assets as an indicator of enterprise profitability.

4.2. Statistical Description and Correlation Analysis

Table 6: Statistical Variables and Descriptions; **source:** Original Research

Variable	N	Mean	Minimum	Maximum	Standard Deviation
Corporate leverage	1780	0.308	0.029	0.491	0.28
Industry tariff rates	27	0.131	0.106	0.537	0.09
GDP per capita	270	10.2	8.386	11.46	0.654
Consumer Price Index	270	1.002	0.908	1.055	0.028
Enterprise guarantee value	170627	0.342	0.019	0.956	0.206
Corporate Profitability	175483	0.182	-0.089	0.8	0.141
Enterprise fixed asset size	176419	11.04	7.992	15.4	1.414

Table 7: Interpretation and Expectations of each Explanatory Variable; **source:** Original Research

Variable	Predicted Impact of Financing Leverage with Export SMEs	Expected Symbol
Industry tariff rates	The greater the industry tariff rate, the more difficult it is for export SMEs to raise financing, and the lower the amount of financing	-
Corporate Profitability	The higher the profitability of the enterprise, the higher the amount of financing for export SMEs	+
Enterprise fixed asset size	The larger the size of a company's fixed assets may simultaneously result in a greater need for debt raising, but also greater pressure to service debt.	To be tested
GDP per capita	Higher GDP per capita and generally positive local economic conditions may simultaneously lead to more government debt or increased debt service.	To be tested
Consumer Price Index	The higher the CPI tends to be, the more indebted the local government is likely to be; it also indicates a tightening of the local fiscal situation.	To be tested
Urban unemployment rate	The tighter urban unemployment tends to be, the higher the amount of financing for SMEs	+

Table 8: Results of Correlation Analysis of Variables; **source:** Original Research

	Leverage of Export SMEs	Industry Tariff Rates	GDP per Capita	Consumer Price Index	Enterprise Guarantee Value	Corporate Profitability	Enterprise Fixed Asset Size
Leverage of export SMEs	1						
Industry tariff rates	0.0322	1					
GDP per capita	0.102	0.209	1				
Consumer Price Index	0.139	-0.0467	-0.0621	1			
Enterprise guarantee value	0.272	-0.0229	-0.271	-0.0164	1		
Corporate Profitability	0.0374	0.0418	0.0247	0.204	-0.0372	1	
Enterprise fixed asset size	-0.0849	0.0364	0.177	-0.0432	0.0847	0.149	1

The results of the correlation analysis of the variables are given in Table 8, and it can be seen that the correlation coefficients of the variables in the table are less than 0.3, so it can be judged that there is little if any multicollinearity between the variables.

4.3. Baseline Regression Results

At the time of data processing, there were very few firms with abnormally large and abnormally small financing leverage, so they were eliminated from the sample by shrinking the tail at 1%, and then regression analysis was performed.

From Table 9 (below), the estimated coefficient of industry tariff rate on leverage of export SMEs is always negative, which indicates that it has an impact on firm leverage when considering the increase in tariff rate in trade disputes. With the gradual inclusion of control variables such as consumer price index, urban unemployment rate and micro-level of enterprises, the coefficient of industry tariff rate on enterprise leverage changes continuously and finally reaches -0.103, i.e., for every 1 percentage point increase in industry tariff rate, enterprise leverage will decrease by 0.103 percentage points. This indicates that the industry tariff rate does have a negative impact on the leverage of SME financing. Moreover, the results of the benchmark regression show that GDP per capita, consumer price index, enterprise guarantee value, enterprise profitability, and enterprise fixed asset size all have an impact on enterprise leverage.

Table 9: Baseline Regression Results of Industry Tariff Rates and Firm Leverage; **source:** Original Research

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Industry tariff rates	-0.040**	-0.018***	-0.032*	-0.0741***	-0.114***	-0.103***
	(-2.146)	(-4.478)	(-1.709)	(-3.248)	(-3.321)	(-2.886)
GDP per capita		0.121***	0.137***	0.132***	0.149***	0.297***
		(61.369)	(60.029)	(63.297)	(62.368)	(63.697)
Consumer Price Index			3.232***	3.453***	3.454***	3.526***
			(83.615)	(93.804)	(94.854)	(102.041)
Enterprise guarantee value				0.697***	0.694***	0.661***
				(43.262)	(37.194)	(34.724)
Corporate Profitability					0.0101***	0.0297***
					(10.361)	(3.942)
Enterprise fixed asset size						-0.381***
						(-48.908)
Constant term	0.575***	-0.612***	-4.831***	-4.672***	-4.322***	-2.038***
	(166.112)	(-30.237)	(-88.796)	(-82.473)	(-83.573)	(-66.363)
Time fixed effects	Control	Control	Control	Control	Control	Control
Corporate fixed effects	Control	Control	Control	Control	Control	Control
N	176374	176374	176374	175986	175852	175783
R-sq	0	0.009	0.051	0.184	0.192	0.273

5. Research Conclusions and Policy Recommendations

In this paper, we first sort out the list of products that are actually affected by Chinese exporters under the U.S. tariff increase policy. On this basis, the industry distribution of the listed goods in China's exports is statistically combined with China's customs trade data to visually reflect the impact of the U.S. tariff increase on China's export enterprises. Second, after cleaning the above basic data, the extent of the negative impact of the U.S. tariff increase on China's export manufacturing enterprises SMEs is assessed through empirical analysis, and the paper focuses on all the practical hot issues of the U.S. tariff increase. The established data model helps export SMEs to make further decisions based on the validation and summary of previous research results.

The data used in this study has the limitation that it can only be broken down to the 4-digit HS code level, and the U.S. tariff levies are imposed at a more disaggregated product level, so the findings are somewhat coarse. This study warrants further in-depth study when subsequent 6-bit (or even 8-bit) HS code data are available.

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