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Study on the Influence of Global Value Chain Division on the Export Trade between China and Europe

-- Based on the Analysis of Exchange Rate Transfer Effect

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Abstract

Since the exchange rate reform in 2005, the RMB exchange rate has fluctuated greatly, triggering the discussion on its possible trade impact. In this context, the correlation between import and export prices and exchange rate has become a hot spot in the field of international finance. This paper focuses on the effect of exchange rate transmission in the context of global value chain (GVC), and analyzes how exchange rate fluctuations affect the export commodity prices in different industries. The development of the global value chain has reshaped the traditional international trade model. The production links of products are scattered in different countries and regions around the world, and the position and participation degree of different countries in the global value chain are significantly different. Therefore, the issue of exchange rate transmission has become an important topic in the field of international trade and financial research. In this study, the export trade data of 10 European countries, including China and Belgium, the Czech Republic, Germany, Spain, France, Great Britain, the Netherlands, Italy, Poland and Portugal from 2012 to 2021, were selected as the study sample. Referring to the classification standard of WIOS, the industry classification matching was carried out and studied from the perspective of 15 industries in C01-C15, namely trade in goods. A panel data model containing three dimensions of country, year and industry was constructed for analysis. This study draws on the method of Koopman (2010), constructs the global value added, and includes it in the FGLS model for empirical analysis and testing, and draws the conclusion that the higher the participation in the global value chain, the weaker the exchange rate transmission.

Keywords

Exchange Rate Transfer Effect; Global Value Chain; China-European Export Trade.

1. Introduction

There are many factors in the influence of exchange rate on the price of trade goods. Exchange rate transmission (Exchange Rate Pass-through, EPT) reflects the changes in the quantity and price of trade products caused by exchange rate changes. It can have an important impact on the trade welfare of producers and consumers of a country, and is also directly related to the formulation of national monetary policy and trade policy. Therefore, the issue of exchange rate transfer has become an important topic in the field of international trade and international finance research. At present, the exchange rate transmission is incomplete, that is, the exchange rate fluctuations cannot be fully transmitted to the price of export commodities, which has been supported by a large number of theoretical studies and empirical evidence. The key to study the exchange rate fluctuation and international trade issues is to study the possible causes of the incomplete exchange rate transmission and find a key variable to adjust it, so as to establish

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the feasibility analysis of the connection between the exchange rate fluctuation and the export trade. In the context of economic globalization, China's participation in the global value chain is also an important factor in the incomplete study of exchange rate transmission.

In china-EU trade, intermediate goods trade account for a large proportion. Increasing participation in the global value chain means that more intermediate products flow between the two countries. When the RMB depreciates against the euro, the price competitiveness of Chinese exported intermediate products in the European market increases, which may prompt European enterprises to increase the import of intermediate products from China, thus further promoting the exchange rate transmission effect of the RMB against the euro. For the final product trade, the exchange rate fluctuations have a more direct impact. The depreciation of the yuan against the euro will reduce the price of Chinese final products in the European market and increase the market share. In contrast, the appreciation of the yuan against the euro will reduce the competitiveness of China,final products in the European market. Increased participation in global value chains has also promoted technical cooperation and investment between China and the EU. The exchange rate fluctuation of RMB against the euro will affect the investment cost and return of Chinese enterprises in Europe, and thus affect the depth and breadth of technical cooperation.

2. Literature References

Since the implementation of the floating exchange rate system in the 1970s, the exchange rate transmission has become a hot issue in the international financial field. Kreinin (1977) [1] first proposed the concept of exchange rate transmission: the impact of the changes in the export price level (in foreign currency) or the import price level (in local currency). The exchange rate transmission is defined from the perspective of the influence degree of the exchange rate changes on the import and export prices. With the continuous development of open economics, some scholars, such as McCarthy (2000) [2], have further enriched the connotation of exchange rate transmission, and defined the exchange rate transmission as the fluctuation degree of consumer price and producer price caused by exchange rate fluctuations. The theoretical basis of the complete transfer effect of exchange rate is the "law of one price" and "purchasing power parity". The exchange rate elasticity theory assumes that the market is in a fully competitive state and that the exchange rate volatility can be fully transmitted to the import price of the product (Goldberg and Knetter, 1997) [3]. At this time, the import and export main enterprises become the passive recipient of the price, do not have any pricing power, the transmission between the exchange rate and the price is complete.

However, this is not the case in the real economy (Wang Yuzhe and Zhang Ming, 2014) [4]. Due to macro factors such as inflation and economic aggregate, when the price of export products drops (rises) caused by the 1% depreciation (appreciation) of the local currency is less than 1%, the exchange rate is not completely transmitted. At this time, the logic of "appreciation reduces exports, and depreciation promotes exports" will be weakened or even reversed. ShiJianhuai and Fu Xiongguang (2010) [5], cao wei (2016) [6] made a more detailed review of related literature, they think incomplete exchange rate is a common phenomenon, and different countries, different industries, different commodity exchange rate has significant differences, both the city pricing (pricing to market), market structure, product characteristics, such as micro causes, also have inflation environment, monetary policy, open degree of macro causes. The lack of correlation between export and exchange rate fluctuations is a long-standing puzzle in the field of international finance and international trade (Lu Xiaodong et al., 2019) [7].

Since the exchange rate reform in 2005, the RMB exchange rate has fluctuated significantly, triggering discussion on the possible trade impact on it (Liu Yaoet al., 2010[8]; Zhang Huiqing, Tang Haiyan, 2012[9]; Shen Guobing, 2015[10]). Historical empirical analysis shows that the

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exchange rate changes usually have a huge impact on the change of import and export volume. According to the IMF (2015), if an economy's currency depreciated by 10%, its real net exports to GDP will rise by roughly 1.5%.

However, with the rise of global value chains, there are some studies suggesting that they may weaken exchange rates with trade (Mr Wong, 2009[11]; Ollivaud, Rusticelli and Schwellnus, 2015[12]; Ahmed, Appendino and Ruta, 2015[13]). For example, Caglayan and Di (2010)[14] studied the impact of trade shocks between exchange rate fluctuations and the United States and the 13 developed and emerging economies using trade flow data from the industrial sector, and found that the effect was weak.

3. Empirical Analysis Section Headings

3.1. Description of the Indicators

The Considering the availability of data and the maximum control of the variables, select the trade data of Chinese exports to Belgium, Czech Republic, Germany, Spain, France, Britain, France, Europe, Italy, Poland and Portugal as the research object, European countries in similar economic and political level, can maximize the influence of goods trade exchange rate transfer effect under the introduction of global value chain mechanism.

3.1.1. The Import Price Index (imp)

Due to the lack of subdivision industry export price index, refer to the practice of most literature, using the unit value method proposed by Cerra and Saxena (2002) to calculate the unit value of export goods, and borrowed from the blob formula (Paasche formula), using the weight of the weight of the OECD ten Chinese import industry comprehensive price index, trade data from the United Nations trade database (UNCOMTRADE).

3.1.2. Bilateral Exchange Rate

In order to better study the conductivity of exchange rate transmission effect, the exchange rate index studied in this paper is the bilateral exchange rate between China and ten European countries, and the direct price method is adopted, that is, one unit of RMB is equal to the local currency of each country. The data comes from the World Bank database and the Bank for International Settlements (BIS).

3.1.3. The Global Value Chain Participation Index

The GVCs draws on the method of Koopman (2010), constructs the global value added with data derived from UIBEGVC, OECD, UNCOMTRADE and ADB database.

3.1.4. Domestic Supply Level

In this paper, the data of the price index of China exported to various countries in the world represent the supply capacity of domestic export products to a certain extent. The price index of export commodities is a statistical index reflecting the trend and range of the changes of export commodities in a certain period of time. Using the "unit value method", the data of the calculation index are all from the import and export goods trade statistics of the Chinese Customs. The unit of measurement is denominated in RMB, and the export price index is calculated in the FOB price (FOB).The data came from the Chinese Bureau of Statistics and was matched according to the WTOD classification. At the same time, it was adjusted to take 2012 as the base period to build the Chinese sub-industry price index to achieve comparability.

3.1.5. Foreign Demand Level

The CPI can best reflect the impact of prices on people's lives, mainly in two aspects: the CPI can truly reflect the actual disposable income level and the actual level of consumption expenditure of residents. Therefore, this paper uses the consumer price index (CPI) data to

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measure the demand level of each country, and also adjusts the base period of the index to 2012. Data were obtained from the OECD database.

3.2. Empirical Test

3.2.1. Benchmark Model

$$\ln imp_{ijt} = \alpha_{ijt} + \beta_1 \ln e_{it} + \beta_2 \ln \exp_{jt} + \beta_3 \ln cpi_{it} + \mu_{ijt} \quad (1)$$

Where the subscript i is the country, j is the industry, and t is the time year, that is, 2012-2021. Among them, imp, as the dependent variable, is the import price index of country j and industry, e is the explanatory variable, is the bilateral exchange rate (direct price method) between importing countries and China, and exp and cpi are two control variables, which represent the supply capacity of China's export goods and the demand level of European countries. The coefficient β in the model is the influence parameter corresponding to each index, and u represents the random interference term.

3.2.2. Added the GVC Indicators

The participation index of the global value chain is the proportion of the sum of the foreign added value and the indirect added value (IV) of a country in the total value of foreign trade exports, which can be expressed as:

$$GVC\_participation_{ir} = \frac{IV_{ir} + FV_{ir}}{E_{ir}} \quad (2)$$

$$\ln imp_{ijt} = \alpha_{ijt} + \beta_1 \ln e_{it} + \beta_2 \ln e_{it} * gvc\_pt_{ij} + \beta_3 \ln \exp_{jt} + \beta_4 \ln cpi_{it} + \mu_{ijt} \quad (3)$$

Multicollinearity tests were first performed, and the VIF values were 1.93, respectively, all less than 5, thus all passed the test at the significance level of 5%. To address the problem of sequence correlation and heteroscedasticity, so the FGLS regression analysis was used to improve the accuracy of the model.

3.2.3. Empirical Results

Table 1. The regression results of the models

VARIABLES	lnimp
lne	-0.100***
	(0.0156)
Lne*gvc_up	
Lne*gvc_dp	
Lne*gvc_pt	0.0837***
	(0.0149)
lnexp	-0.127
	(0.0823)
lncpi	0.689***
	(0.241)
Constant	2.004*
	(1.052)
Observations	1,360
Numberofid	138

Standard errors in parentheses***p<0.01,**p<0.05,*p<0.1

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According to the regression results in the table above for comparison, the level of foreign demand and the constant terms have roughly the same impact on the degree of exchange rate transmission. Exchange rate and global value chain index and exchange rate of import price index under the 1% of significance level is significant effect, and the three global value chain index coefficient is positive, this is consistent with the previous theoretical analysis expected, namely, the higher the exchange rate transfer degree will be lower, the regression coefficient from the regression equation is positive. That is to say, from the theoretical perspective, the positive indicators show that in economic globalization, the embedding of various industries in the global value chain will weaken the exchange rate transmission.

4. Research Conclusion

In this paper, through the empirical analysis and discussion of exchange rate transfer effect, can draw the following conclusion: in the prediction of China and European currency exchange rate changes, especially the yuan and the euro, trade in the analysis, the analysis of the global value chain background industry GVC participation, can more effectively to understand the exchange rate changes and forecast exchange rate changes, the exchange rate risk control. Therefore, there are different suggestions for the country and the enterprises respectively.

4.1. National Level

We will encourage enterprises to increase investment in research and development, enhance their capacity for independent innovation, and move to the high end of the global value chain. We will strengthen brand building, increase the added value of our products, and enhance our international competitiveness. Promote the upgrading of industrial structure, increase the proportion of high value-added products, and reduce the export of low value-added products. We will expand emerging markets actively, reduce their over-reliance on traditional markets, and reduce the risk of exchange rate fluctuations.

We will continue to deepen economic cooperation with major trading partners, promote bilateral trade and investment liberalization and facilitation, and enhance synergies in global value chains. We will actively participate in global governance, promote the reform and improvement of the multilateral trading system, and maintain a fair, just and transparent international trading environment.

The government should provide relevant policy support, such as exchange rate risk management training and subsidies for financial instruments, to help enterprises improve their exchange rate risk management capabilities.

4.2. Enterprise Level

Enterprises should use financial instruments such as forward contracts and options to hedge their exchange rates to reduce the risks caused by exchange rate fluctuations.

Export enterprises need to adjust their prices flexibly according to the exchange rate changes in order to maintain their competitiveness. If the exchange rate transmission is incomplete, exporters can absorb some of the effects of the exchange rate fluctuations by adjusting costs and optimizing production processes, rather than simply raising prices. Different markets have different sensitivity to price changes. If the demand elasticity in the target market is higher, a small increase in prices may lead to a sharp decline in demand. Therefore, exporters need to consider the elasticity of market demand when adjusting prices to avoid losing market share due to excessive price adjustment.

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