

# A study on the relationship between the developments of China's trading economy and environmental factors

**Xueying Zheng\***

*Economic and Trade College, Zhejiang Business College, Hangzhou, Zhejiang Province, China, 310053*

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## Abstract

Trade environment refers to the social and economic environment facing trading economy, and it can directly affect the pace of trade development and trade structure. Establishing a good trade development environment can optimize trade structure, and promote the sustained and healthy economic development. This paper firstly analyzes the current environment of China's trade development with relevant theories, then analyzes the relationship between environmental factors and the development of trading economy based on indexes, builds error correction model, and uses the model to make in-depth analysis on the impacts of environment on the development of trading economy. According to the study results, the ratio of trade dependency over trade surplus exerts side effects on the development of trading economy, while trade openness exerts positive effects on the development of trading economy. In terms of import, the development of China's trading economy shows excessive dependence on foreign energy and other resource-based products, this seriously affects the stable development of economy. In terms of export, some Chinese companies that have overcapacity show over-reliance on international markets, thus reducing the competitiveness of export products, and leading to the situation where China's trading economy is vulnerable to fluctuations of international markets. Based on this, a method is proposed in the paper to improve China's trade environment.

*Keywords:* error correction model, trading economy, environment; impact

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## 1 Introduction

The economic relations between countries have shifted from simple import and export trading relationship to various forms of economic relations; import and export of goods has evolved into multiple forms, including labor input and output, commodity trade, technology trade and service trade. From commodities that can meet material enjoyment to tourism that can meet the spiritual enjoyment, trade structure and trade patterns have undergone great changes [1,2]. Trade has a very important position in international economic relations. All the world's developed countries are inward-looking, they are interdependent with other countries in terms of economy, so are the United States, Japan, European countries and other developed countries, these countries exert economic impacts on other countries while being under the influence of other countries, and this mutual influence phenomenon is caused by the "transfer" channel named foreign trade [3-5]. Since the 1990s, the rapid development of foreign trade to has made great contributions to China's economic growth. The breadth, depth and speed of China's foreign trading economy have surpassed any other period in history. Dynamic benefits generated from foreign trade enable economic sectors at all levels to have economic growth, thus boosting the overall growth

of the national economy [4-6]. Meanwhile, the development of foreign trade has effectively promoted China's diplomatic work, and made significant contributions to the establishment of favorable international environment for China's modernization construction. At present, China has become the world's largest trading nation; China's foreign trade has exerted significant influences on the world trade environment, while China's foreign trade can also be affected by the external environment. Based on the connotation of Kuznets Curve model [7-9], the paper presents an in-depth analysis of the internal and external environmental factors that affect China's foreign trade, and explores the countermeasures for China's trading economy, in order to promote the rapid and healthy development of China's foreign trade [10,11].

## 2 Analysis of China's current trade environment

First, China has increasing dependence on some foreign resources, especially energy and resource-based commodities. With the continuous development of China's economy, China has become a large energy consumption country. It is estimated that the degree of dependence on foreign energy is more than 80%, while some energy resources are almost 100% imported from other count-

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\*Corresponding author's e-mail: ysgao218@163.com

ries. Therefore, with the rapid economic development, China has increasing dependence on soybeans, iron ores, fish meal and other resource-based commodities. With increasing import quantum, China will be one of the world's major importers of energy and resource-based commodities. At present, the degree of China's dependence on imported crude oil, iron ore, aluminum and copper ores has reached 90%, with an increase of 40%. However, China is often forced to accept price increases in international trading of energy and resource-based commodities, and is subject to the external environment. In recent years, the price of various resources including fuel has constantly risen, resulting in the overall increase of China's domestic price level. This situation will be worsened with the development of China's economy.

Secondly, China's economic dependence on international markets is gradually increasing. In recent years, China's labor-intensive goods are basically saturated in the domestic market, this is mainly due to the international market. Therefore, if they are unsalable in the international market, foreign trade enterprises will suffer lethal blow, China's economy will also suffer huge damages, and the damages will increase with the increase of our export value. In addition to transferring excess capacity, China's dependence on the international market environment has also increased significantly in terms of import and export of goods and services, labor and employment. According to statistics, about 100 million people directly work for China's export trade, including 20 million in the textile industry with severe overcapacity of about 20 million, and more than 60 million in electronic product industry. It is estimated that China's output of shoes accounts for 60% of the world's total sales, the output of DVD accounts for 50% of the world's total sales. It can be seen that many China's sectors have over-dependence on the international market.

Thirdly, China still has great dependence on foreign product patents and core technologies. Due to lack of digestion and absorption ability of technologies and lack of innovative capacity, although China is the largest producing country of color TV, computers, mobile phones, stereos and other electronic equipment. China does not have the core production technology of these products, and has to import some key components and equipment. According to statistics, foreign enterprises control 85% of China's integrated circuits, more than 85% of pharmaceutical products, over 80% of chips,

more than 70% of CNC machine tools and textile machinery, and more than 90% of automobile patents. This means that China's domestic industrial development and export trade are hollow. As China needs to pay expensive royalties to foreign countries, production costs are increasing, China's technology innovation and development is vulnerable to pressure from foreign companies, forcing many state-owned enterprises and private enterprises to withdraw from the international market competition, thus affecting the core competitiveness of China's foreign trade.

Fourthly, China's foreign trade frictions are increasing, the scope of trade barriers is expanding. China has maintained the trend of trade surplus since the 1990s, and the scale has been increasing; this exerts varying degrees of impacts on related industries of developed countries and developing countries. With China's rapid economic development, China not only seized the international share of developing countries' competitive industries, but also occupied the domestic market, seriously affecting and even marginalizing their competitive industries and pillar industries. Therefore, some countries and regions constantly set various barriers on China's products in order to protect their own industries, and even cause trade disputes. Since 1979, foreign countries have launched a total of more than 1000 cases of trade disputes, involving 4000 kinds of products exported from China, and affected China's exports of nearly \$ 20 billion. According to WTO statistics, China's trade disputes have accounted for 15% of WTO anti-dumping cases since 1995, and these trade frictions are mainly caused by Chinese labor-intensive products that have competitive edges.

### 3 The construction and analysis of error correction model

#### 3.1 MODEL

Based on the above analyses, indexes including the ratio of total export-import volume over gross domestic product (GDP) ( $JZ$ ), export dependence ( $YN$ ), the ratio of trade surplus ( $MY$ ) and the growth rate of total export-import volume ( $ZZ$ ) are set, in order to analyze the relevance and establish an error correction model. The data are collect from statistical yearbook of 1979 to 2012 on China Statistical Information Network, they are sorted as shown in Table 1.

TABLE 1 Index data

Index	JZ	YN	MY	ZZ	Index	JZ	YN	MY	ZZ
1979	0.1119	0.0521	-0.1284	0.2806	1996	0.3391	0.1767	0.0882	0.0270
1980	0.1254	0.0597	-0.0924	0.2538	1997	0.3415	0.1920	0.2841	0.1174
1981	0.1503	0.0751	-0.0003	0.2900	1998	0.3181	0.1804	0.3094	-0.0044
1982	0.1449	0.0777	0.1575	0.0490	1999	0.3334	0.1802	0.1764	0.1135
1983	0.1442	0.0735	0.0391	0.1151	2000	0.3958	0.2080	0.1071	0.3137
1984	0.1666	0.0805	-0.0645	0.3963	2001	0.3847	0.2009	0.0925	0.0741
1985	0.2292	0.0897	-0.3569	0.7208	2002	0.4270	0.2239	0.1031	0.2180
1986	0.2511	0.1053	-0.2778	0.2486	2003	0.5189	0.2672	0.0612	0.3719
1987	0.2558	0.1219	-0.0893	0.1952	2004	0.5976	0.3071	0.0574	0.3555
1988	0.2541	0.1174	-0.1403	0.2392	2005	0.6322	0.3388	0.1543	0.2238
1989	0.2446	0.1151	-0.1108	0.0874	2006	0.6517	0.3587	0.2244	0.2057
1990	0.2978	0.1599	0.1598	0.3379	2007	0.6278	0.3520	0.2764	0.1836
1991	0.3317	0.1757	0.1260	0.2996	2008	0.5729	0.3197	0.2624	0.0783
1992	0.3387	0.1737	0.0524	0.2621	2009	0.4419	0.2406	0.1954	-0.1627
1993	0.3190	0.1496	-0.1172	0.2359	2010	0.5024	0.2665	0.1301	0.3390
1994	0.4229	0.2162	0.0464	0.8083	2011	0.4997	0.2605	0.0891	0.1719
1995	0.3866	0.2048	0.1271	0.1530	2012	0.4700	0.2490	0.1268	0.0328

Firstly, unit root test is carried out. ADF test is adopted, it is found that under the condition of no difference, they both have unit root; while after difference of first order, unit root is removed, and the sequences begins to be stable. For details, please see Table 2. Thus, an error correction model is established.

TABLE 2 The ADF test results of variables

Variable	t-Statistic	Prob.*
JZ	-4.6538	0.0007
MY	-5.0222	0.0003
YN	-4.9718	0.0003
ZZ	-6.5761	0.0000
1% level	-3.6537	
5% level	-2.9571	
10% level	-2.6174	

Then, the growth rate of total export-import volume (ZZ) is taken as the dependent variable, while the ratio of total export-import volume over gross domestic product (JZ), export dependence (YN) and the ratio of trade surplus (MY) are taken as independent variables, the least square method is adopted for correlation analysis. Related technologies are -3.4624, -0.5088 and 2.1755, then the error correction term can be established, it is Equation (1).

$$ECM = ZZ(-1) + 3.4624 * YN(-1) + 0.5088 * MY(-1) - 2.1755 * JZ(-1) \tag{1}$$

Then, the growth rate of total export-import volume (ZZ) is taken as the dependent variable, while the ratio of total export-import volume over gross domestic product (JZ), export dependence (YN) and the ratio of trade surplus (MY) are taken as independent variables for correlation analysis, the results are shown in Table 3. As

can be seen from the data in Table 2, the tail probability of all variables is less than 0.01, therefore it meets the requirements at a confidence level of 1%, and the relevant probability is 0.6457, the degree of correlation is very high. Therefore, the fitting degree of dependent variable and independent variables is very good, the model construction is very successful.

TABLE 3 The error correction model parameter estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
YN(-1)	-5.6146	3.93E-13	-8.82E+12	0.0000
MY(-1)	-0.2551	2.97E-14	-1.71E+13	0.0000
JZ(-1)	5.8537	2.06E-13	1.05E+13	0.0000
ECM	-0.9841	8.99E-15	1.11E+14	0.0000
C	0.0896	4.52E-15	-2.726609	0.0109
R-squared	0.6457	Mean dependent var		0.2303
Adjusted R-squared	0.6213	S.D. dependent var		0.1842

According to Table 2, the data model can be constructed as follows:

$$D(ZZ) = -5.6146 \cdot D(YN) - 0.2551 \cdot D(MY) + 5.8537 \cdot D(JZ) - 0.9841 \cdot ECM + 0.0896 + \mu \tag{2}$$

In which:

$$\begin{cases} D(ZZ) = ZZ - ZZ(-1) \\ D(YN) = YN - YN(-1) \\ D(MY) = MY - MY(-1) \\ D(JZ) = JZ - JZ(-1) \end{cases} \tag{3}$$

If Equation (1) and for Equation (3) are put into Equation (2), then:

$$\begin{aligned}
 ZZ - ZZ(-1) = & \\
 -5.6146 \cdot [YN - YN(-1)] - & \\
 0.2551 \cdot [MY - MY(-1)] + & \\
 5.8537 \cdot [JZ - JZ(-1)] - & \quad (4) \\
 0.9841 \cdot [ZZ(-1) + 3.4624 \cdot YN(-1) + & \\
 0.5088 \cdot MY(-1) - 2.1755 \cdot JZ(-1)] &
 \end{aligned}$$

After sorting Equation (4), then:

$$\begin{aligned}
 ZZ = 0.0159 \cdot ZZ(-1) - 0.6146 \cdot YN + & \\
 2.5140 \cdot YN(-1) - 0.2551 \cdot MY + & \\
 0.2456 \cdot MY(-1) + 5.8538 \cdot JZ - & \quad (5) \\
 3.7127 \cdot JZ(-1) &
 \end{aligned}$$

### 3.2 MODEL ANALYSIS

According to the error correction model, the following points can be seen:

Firstly, the development speed of trading economy has positive correlation with the ratio of total import-export volume over gross domestic product (GDP). The total import-export volume can reflect China's domestic overcapacity. When overcapacity becomes more serious, the development of trading economy can also address capacity issues, thus promoting the growth of trading economy to some extent. However, with overcapacity and excessive development of trading economy, if the ratio of trade economy over the total domestic economy increase, trading economy will exert more impacts on the growth of national economy, China's economy is more vulnerable to the impacts of estimated markets. Meanwhile, the larger the proportion of import-export volume in GDP, the greater the degree of China's opening up, and this can also promote the development of trading economy.

Secondly, the development speed of trading economy has positive correlation with export dependence, but is negatively correlated with the current period export dependence. It is in proportional with export dependence, because current exports are an important part of the current trade economy, therefore the larger the proportion is, the more the volume of trading economy. It is in inversely proportional to previous exports, overall speaking, it is in inversely proportional to export dependence, this indicates that the pace of development speed of trading economy is negatively correlated with trade dependence. This negative correlation indicates that export dependence will exert side effects on the development of trading economy, the greater the export dependence is, the more side effects will be exerted on trading economy. This is mainly because that great export dependence will put China's economy and foreign trade under the influences of fluctuations in international markets, and be short of bargaining power.

Thirdly, the development speed of trading economy has positive correlation with the ratio of trade surplus.

This is mainly because that trade surplus will bring more resistances, such as trade friction, deteriorated international trade relations, thus impeding the development of trading economy. This is also the main reason for increasing trade disputes and trade tensions over the years when China maintained trade surplus. Other countries will inevitably take various measures to protect their products, such as preparing various high-specification provisions to limit the entry of Chinese products, or using of a variety of national trade laws to hamper the entry of Chinese products.

### 4 Measures to improve the trading environment

It can be seen from above analyses that the ratio of trade dependency over trade surplus has side effects on the development of trading economy, and openness degree of trade has positive effects on the development of trading economy. Based on this, in order to promote the growth of China's trading economy and promote economic growth, it is recommended to improve the trade environment from the following perspectives:

Firstly, the construction of international trade environment should be enhanced. This is not only an economic task, but also a political mission. Trade surplus is an inevitable part in the development of China's trading economy. Completing the shift from trade surplus to trade deficit is the basic task of strengthening the construction of international trading environment. Therefore, emphasis should be attached to the maintenance and construction of China's trade environment, promoting the development of foreign trade and construction of international trade environment. A good international trade environment is essential for us to seize strategic opportunities and realize more strategic goals, and it is also a necessary external condition to construct China's harmonious society and achieve peaceful development.

Secondly, to constantly balance the development of China's industries, improve the technical level and reduce some industries' dependence on international trade. Over dependency on international markets, technologies and resources will exert adverse effects on the development of China's trading economy, and affect the domestic economy; this also reflects the imperfections of China's industrial development. The current imbalance in China's industrial development is very serious, the over dependency on imports leads to the increasing price of imported products, and unstable domestic economy. Technology is indeed the vital dilemma in China's economic development, the trade pattern can only be improved when great technological breakthroughs are made.

Thirdly, to actively participate in the competition in international market, and keep the balanced development of foreign and domestic trades. Trading economy is very important, so great attention should be paid to it. However, China, as a major consumer market in the

world, is also China's economic center. Therefore, when promoting the development of trading economy, domestic market should be protected and occupied, the balanced development of domestic and foreign trades should be

constantly promoted. In fact, establishing a stable domestic market is the first step of establishing a stable trade environment, and the basic measure to promote the development of foreign trade and trading economy.

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Author	
	<p><b>Zheng Xueying, born in August 1972, Hangzhou, Zhejiang Province, P.R. China.</b></p> <p><b>Current position, grades:</b> the associate professor of Zhejiang Business College, Hangzhou, Zhejiang Province, China.</p> <p><b>Scientific interest:</b> international trade and E-commerce.</p> <p><b>Publications:</b> more than 10 papers.</p> <p><b>Experience:</b> teaching experience of 14 years, 6 scientific research projects.</p>