



ON THE RELATIONSHIP BETWEEN FOREIGN TRADE AND REGIONAL DISPARITY IN CHINA IN THE POST-REFORM ERA



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ABSTRACT

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Since the reform and opening policy carried out in the 1980s, and after China joined the WTO, foreign trade becomes an important part of China's national income. Some regions have gained great benefits from foreign trade and developed in a dramatic speed while many other regions have not caught up with the high speed of development. The present work investigates whether (and how) the development of foreign trade in China is related to the ever-increasing economic disparity across different regions. After discussing the evolutions of regional economic disparity and regional foreign trade in China, this paper, by using a linear regression method, attempts to investigate the relationship between regional foreign trade disparity and regional income disparity. Our regression results show that there exists a positive relationship between the two.

1. INTRODUCTION

China's rapid economic growth since 1978 has relied heavily on the opening up and trade liberalization that has led to a sizable scale of foreign trade in China. The average GDP growth rate since 1978 is 9.83%, which makes China rank the second place among all the 206 countries and districts over the world. Meanwhile, the disparity in different regions' economy developed year by year.

The disparity of regional economy continues to be enlarged. Among 31 provincial administrative regions, Guangdong has the highest GDP amount of 6247.48 billion RMB in 2013, while the Tibet Autonomous Region has the lowest GDP amount of 81.57 billion RMB.

Since the regional disparity showed up, much attention has been paid to the disparity in regional economy. Nevertheless, foreign trade is rarely mentioned as a factor contributing to the regional economic disparity.

In fact, the effect of foreign trade cannot be ignored when discussing what makes the disparity in different regions in one country. The imbalance in different regions' economic growths to some extent matches the imbalance in foreign trade development in those regions. In the real world setting, an explicit difference of foreign trade development level can be seen between the East and the Midwest, and the economic disparity between the two regions is apparent.

When trying to find out why disparity in regional economy happens, many previous researchers have attributed many factors such as law and policies, resource endowment, nation's investment, geography location and etc. However, foreign trade, which is an important part of China's economy boom since 1978, is seldom taken as a factor contributing to regional economy disparity. On the other hand, previous studies on China's foreign trade or international trade focus on indexes that show how the whole nation's foreign trade mode and scale, and only a few researchers connect the difference in regions' foreign trade to the disparity in regions' economy.

In addition, most of the previous studies are done no later than 2005. Actually in the recent ten years, the mode and scale of foreign trade and the situation of economic disparity between regions didn't remain the same as 2005. The paper will contain the latest data from 2005 till now which haven't been used in researching the relation between foreign trade and regional disparity. Then, based on the latest data and latest conclusion, the paper will show advice with reality on solution to regional economy disparity.

The paper takes a look at the present situation of the difference in China's regional foreign trade development and its influence on the disparity of regional economic growth.

In general, the paper is conducted through theoretical and data analysis. The data used are mainly from National Bureau of Statistics of China and some other governmental websites.

2. LITERATURE REVIEW

Various scholars by analyzing proposed many important theories of regional disparity development and changes. And in the field of regional disparity research, China has always been a hot example for empirical studies.

2.1. Theories of regional disparity development

Regional economic disparity is always an issue that draws scholars' great attention. Various theories about regional economic disparity are raised year by year. For example, the inverted U-shaped Curve theory or the Kuznets Curve Hypothesis mainly states that the relationship between income inequality and the level of economic development tends to fit an inverted U-shaped curve. The inequality increases during the initial start point toward modern economy, then decreases when the country moving into more advanced phases.

After Kuznets, more scholars use evidence from developing countries and developed countries to support and extend the inverted U-shaped curve pattern. Williamson (1965), among others, contributes a lot to the pattern. By analyzing data of regional disparities of 24 countries in the 1950s, Williamson (1965) found that there was an inverted U-shaped relationship between regional economic disparity and development phases of the country. Though some theoretical and empirical researches support the inverted U-shaped distribution of regional disparities over the country's economic development, their research, as Williamson himself admits, failed to find the reason for the existence of the inverted U-shaped curve.

Myrdal proposed that the regional economy disparity will always continue to be enlarged during the development of the country, because the developed areas can circulate and accumulate what it already had through a feedback mechanism. This mechanism allows developed areas to strengthen its competitive position and to substantially develop within themselves. Also, the circulation and

accumulated effect will result in factors from backward areas flowing to developed regions. Therefore, the regional economy disparity will be larger and larger.

The conceptual framework of the polarization process is also an important theory in research history. The framework of the polarization process proposes that the regional inequality is an unavoidable and consequent part of economic growth itself, thus the imbalance between regions are inevitable. At the initial phase of development, there must be some regions that are economy-advanced centers, so-called “growth poles”, in the same country, during the development of economy in this country. Positions, geography and many other reasons may account for the existence of growth poles. The existence and development of these growth poles definitely have direct impact (favorable or adverse) on those relatively backward regions. Then, at a certain phase, there would be an apparent slow-down tendency of the expansion of growth poles. Gradually, the expansion will be more and more hampered and meanwhile the relatively backward regions will be at a relatively higher developing speed. At the end, the disparity will vanish. The emergence and the rapid growth of growth centers is the process of “polarization,” while the catching up of the backward areas is the “trickling down” effect.

The “new economic geography” deals with a new phenomenon called “agglomeration”: large firms agglomerate in certain areas and resources flow and accumulate in these areas, because of the increasing returns to scale and transportation costs. The emergency of the new economic geography relies on traditional regional science as well as modern trade theory. Researchers use an integrated approach combining traditional and modern insights to deal with interregional and international trade and to find out the factors that influence the geographical distribution of economic activity.

2.2. Empirical studies of regional disparity in China

Since 1990, many scholars have done empirical studies of regional disparity in China. There are two categories of researches: one is from static point, using disparity index to analyze the changes of regional economy disparity; the other is from dynamic point, using growth theory to test the convergence hypothesis of the regional economy.

From the perspective from static point, the following studies are worth mentioning in the whole research history. Some studies used national income data from 1952 to 1985 and Williamson’s coefficient of variation measurement to analyze the inter-provincial disparity in income and the amount of income spent. Other studies calculated the coefficient of variation of all provinces and of three typical regions then found that the economic disparity between three typical regions were shrinking smoothly after the reform and opening policy. Still other studies used the Theil’s index to calculate the inter-provincial disparities of per capita GDP across the Chinese regions. Additionally, some studies [such as Li (1991) and Zhang (2004)] tried to analyze the regional economy disparity in China through the “new economic geography” theory.¹

3. DESCRIPTION OF REGIONAL ECONOMIC DISPARITY IN CHINA

The ranking chart of all provincial administrative regions’ 2013 GDP in China shows that the difference between the first one and the last one is about 6165.91 billion RMB. The economic gap between provinces is serious.

3.1. Definition of regional economic disparity

In the following part definition of economic disparity and of regional economic disparity will be introduced.

¹ For more discussions, see, for example, Chen. (2005), Flecher (1968), He. (2007), Hu (1998), Krugman and Elizondo. (1992), Krugman and Venables. (1995), Liu (2005), Pang (2003), Wang (2010), Williamson (1965, 1995), Yuan (2007), and National Bureau of Statistics (1999).

Economic inequality refers to how economic metrics are distributed among individuals in a group, among groups in a population, or among countries. Economists generally think of three metrics of economic disparity: wealth (wealth inequality), income (income inequality), and consumption. The issue of economic inequality can implicate notions of equity, equality of outcome, and equality of opportunity.

Regional economic disparity refers to the aggregation of differences between regions in gross products², economy growth rate, economic structure³ and other factors that influence the economy development. In a word, regional economic disparity is the difference of integrated strength of economy development between regions. Generally speaking, regional economic disparity can be divided into three categories: absolute disparity, relative disparity, and integrated disparity. Absolute disparity refers to the absolute distance from a variable to the reference value; relative disparity refers to the relative distance from a variable to the reference value.

3.2. Defining the measurement

The measurement of regional economic disparity is complicated and many factors such as economic indicators and time period selected will greatly influence the final conclusion. Thus, it is necessary to define the measurement scale and research scope.

3.2.1. Economic indicators

In previous researches, per capita GDP or per labor GDP, GNP, average income and average consumption have been the main indicators when discussing the regional economic disparity. The core topic is the relationship between regional economic disparity and regional differences in foreign trade development, thus GDP is selected for study.

3.2.2. Time period

The data of provincial GDP and provincial export amount are incomplete in the early years, thus data from 1987-2013 are used in the present paper.

3.2.3. Regional classification

Concerning the difference in political system, Hong Kong, Macau and Taiwan is excluded in the present paper. Also, in order to keep data complete and meaningful, the research excludes Chongqing, Tianjin, Hainan and Tibet Autonomous Region because of data missing. The paper also compares data of coast and data of interior regions. The coastal provinces are: Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Guangxi Zhuang autonomous region. The interior provinces are: Beijing, Shanxi, the Inner Mongolia autonomous region, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan, Yunnan, Gansu, Qinghai, Shaanxi, Ningxia Hui autonomous region, Xinjiang Uygur autonomous region.

3.2.4. Measurement

Various measurements such as coefficient of dispersion, standard variation, range, Theil's index⁴ and Gini coefficient⁵ have been used in previous literature. In the present paper, coefficient of variation is used to measure the regional economic disparity in China.

3.3. Regional economic disparity 1978-2013

The following part discusses the regional economic disparity from 1978 to 2013 from different perspectives.

² Gross products: the overall amount of GDP (Gross Domestic Products) and GNP (Gross National Products).

³ Economic structure: Generally speaking, it refers to the proportion of primary industry, secondary industry and tertiary industry in a nation's or a region's economy.

⁴ Theil's index: also known as Theil's entropy measure; an indicator to reflect the disparity in income between different regions.

⁵ Gini coefficient: an important indicator for disparity among a nation's individuals.

3.3.1. Regional GDP scale disparity

The regional GDP scale is a direct indicator of the economy development in different regions. The Table below shows regional GDP in different years and the regional GDP growth rate in different time period. The beginning time is 1978, the year the reform and opening policy was proposed; the mid-year is 1987, because the data analysis in Section 4 focus on data from 1987 to 2013; the end time is 2013, the latest data that can be found from the website of National Bureau of Statistics⁶.

As the Table 1 shows, in 1978, the province with the highest GDP was Shanghai (27.281 billion RMB), the province with the lowest GDP was Ningxia Hui Autonomous Region (1.3 billion RMB), and the disparity amount was 25.981 billion RMB. In 1987, the province with the highest GDP was Jiangsu (92.233 billion RMB), the province with the lowest GDP was Ningxia Hui Autonomous Region (3.963 billion RMB), and the difference was 88.27 billion RMB. Then in 2013, the province ranked NO.1 in the GDP chart was Guangdong (6247.479 billion RMB), the lowest one was Qinghai (212.206 billion RMB), and the disparity amount this time rose to 6035.273 billion RMB.

Also from the Table 1, it is clearly seen that the GDP scale disparity between the highest province and lowest province developed from 25.981 billion RMB in 1978, to 88.27 billion RMB in 1987, and eventually to 6035.273 billion RMB in 2013. From the result of calculation above, conclusion can be drawn that the disparity is significantly rising up during the years since the reform and opening.

Table-1. The description of regional GDP and the growth rate from 1978 to 2013

Region	GDP 1978 (billion RMB)	GDP 1987 (billion RMB)	GDP 2013 (billion RMB)	growth rate (1978-1987)	growth rate (1987-2013)
Beijing	10.884	32.682	1980.081	2.002	59.586
Hebei	18.306	52.192	2844.295	1.851	53.496
Shanxi	8.799	27.8	1266.525	2.159	44.558
Neimenggu	5.804	21.227	1691.65	2.657	78.693
Liaoning	22.92	71.91	2721.322	2.137	36.843
Jilin	8.198	29.749	1304.64	2.628	42.854
Heilongjiang	17.48	45.46	1445.491	1.600	30.796
Shanghai	27.281	54.546	2181.815	0.999	38.999
Jiangsu	24.924	92.233	5975.337	2.700	63.785
Zhejiang	12.372	60.699	3775.658	3.906	61.202
Anhui	11.396	44.235	1922.934	2.881	42.470
Fujian	6.637	27.924	2186.849	3.207	77.314
Jiangxi	8.7	26.29	1441.019	2.021	53.812
Shandong	22.545	89.229	5523.032	2.957	60.897
Henan	16.292	60.96	3219.13	2.741	51.807
Hubei	15.1	51.777	2479.183	2.428	46.881
Hunan	14.699	46.944	2462.167	2.193	51.449
Guangdong	18.585	84.669	6247.479	3.555	72.787
Guangxi	7.585	24.156	1444.99	2.184	58.819
Sichuan	18.481	53.086	2639.207	1.872	48.715
Guizhou	4.662	16.55	808.686	2.549	47.863
Yunnan	6.905	22.903	1183.231	2.316	50.662
Shaanxi	8.107	24.496	1620.545	2.021	65.155
Gansu	6.473	15.962	633.069	1.465	38.661
Qinghai	1.554	4.338	212.206	1.791	47.917
Ningxia	1.3	3.963	257.757	2.048	64.040
Xinjiang	3.907	14.85	844.384	2.800	55.860

3.3.2. The coast-interior regional disparity

Since the reform and opening policy made the coastal regions such as Guangdong province special economic zone and promoted these regions' economy development, it is necessary to analyze the

⁶ National Bureau of Statistics Website: <http://data.stats.gov.cn/>

economy disparity between China's coast and interior regions since 1978. The classification of provinces based on coast and interior standard is stated in 3.2.

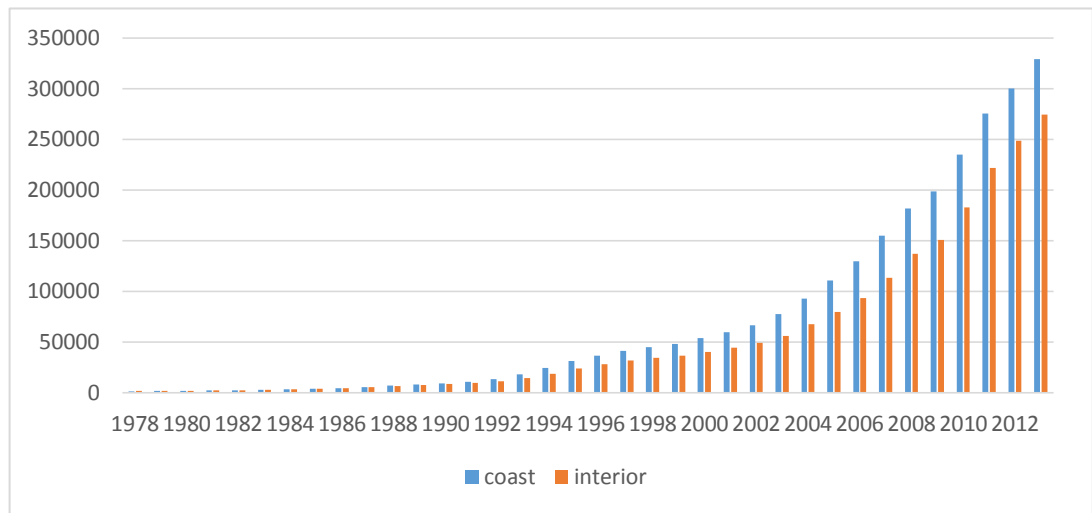


Figure-1. Coast-Interior regional GDP

The figure above shows the GDP of coastal regions and interior regions from 1978 to 2013. In the very beginning, the 10 coastal regions were poor than interior regions. Then the situation changed: the coastal regions' GDP rose dramatically and caught up with and surpassed the interior regions. After that, the disparity continued to increase and in recent years the disparity is significant. In this section, tables and figures are given to show the evolution of China's regional GDP disparity. Generally speaking, the inter-provincial economic disparity is increasing. From another perspective, the economic disparity between coastal regions and interior regions shows an interesting evolution: in 1978, the interior regions produced higher GDP than coastal regions; then quickly in 1980s the coastal regions caught up with and surpassed the interior regions; After that, especially in 1990s and 2000s, the disparity continue to increase greatly every year.

4. DESCRIPTION OF FOREIGN TRADE IN CHINA

Since the reform and opening policy was carried out, the openness of China increases greatly. Coastal regions such as Guangdong, Zhejiang have taken advantage of location and achieved significant development of foreign trade, while some interior regions didn't develop foreign trade so well. The regional disparity of foreign trade is discussed in this section.

4.1. Definition of foreign trade

Foreign trade, also known as International trade, is the exchange of capital, goods, and services across international borders or territories. In most countries, such trade represents a significant share of gross domestic product (GDP). While international trade has been present throughout much of history (see Silk Road, Amber Road, Salt road), its economic, social, and political importance has been on the rise in recent centuries. It is the presupposition of international trade that a sufficient level of geopolitical peace and stability are prevailing in order to allow for the peaceful exchange of trade and commerce to take place between nations.

4.2. Measurement defining

4.2.1. Indicators

Foreign trade scale is selected as the main indicator.

4.2.2. Time period

The data are incomplete in the early years, thus data from 1987-2013 are used in the present paper.

4.2.3. Regional classification

Concerning the difference in political system, Hong Kong, Macau and Taiwan is not in the research scope in the present paper. Also, in order to keep data complete and meaningful, the present research excludes Chongqing, Tianjin, Hainan and Tibet Autonomous Region because of these regions' data missing in the China's early years' statistics reports. The present paper also compares data of coast and data of interior regions. The coastal provinces are: Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Guangxi Zhuang autonomous region. The interior provinces are: Beijing, Shanxi, the Inner Mongolia autonomous region, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan, Yunnan, Gansu, Qinghai, Shaanxi, Ningxia Hui autonomous region, Xinjiang Uygur autonomous region.

4.2.4. Measurement

In the present paper, foreign trade dependence, coefficient of variation is used to measure the regional foreign trade disparity in China.

4.3. Regional disparity of foreign trade 1978-2013

The following part discusses the regional disparity of foreign trade development from 1978 to 2013 from different perspectives.

4.3.1. Foreign trade dependence

Foreign trade degree of dependence is an important indicator of openness and the degree to which a region's economy relies on foreign trade. Foreign trade degree of dependence (FTD) refers to the ratio of foreign trade scale and GDP in a nation or a region in a certain time period.

$$FTD = \frac{EX + IM}{GDP}$$

in which EX refers to export scale and IM refers to import scale.

Foreign trade degree of dependence can be affected by the following factors. First of all, the economic scale, i.e. GDP of the country or region. Generally speaking, in an open economy, a small country's FTD is higher than a big country's because a small country has limited resources and markets and it has to depend on export. Secondly, the structure of national income is another important factor that will directly affect a region's foreign trade dependence. A country in the primary stage of economy development has lower foreign trade degree of dependence because agriculture being the main part in economic structure and few manufactured goods makes the country poor in competitive power of export. Other factors such as economic development strategy and exchange rate also affect the FTD.

From Table 2 we can see the regional disparity of FTD changes from 11% in 1978 to 81.4% in 1987, then to 201% in 2013. The disparity is increasing greatly. At the beginning, big cities such as Beijing and Shanghai have greater openness and depend more than other cities on export and import. But the overall openness is not so high, the disparity is not so significant. After the reform and opening policy, coastal regions such as Guangdong achieved great openness and developed quickly. These regions rely much on foreign trade to develop regional economy, therefore, China's regional foreign trade disparity became larger and larger.

4.3.2. The Coast-interior regional disparity

Special Economic zones such as Shenzhen city in Guangdong province have achieved great economic success because of the development of foreign trade. Interior regions, however, didn't develop foreign trade so well. Therefore, the coast-interior regional disparity of foreign trade deserves attention. The classification of the provinces based on the coast and interior standard is shown in 4.2.

Table-2. The foreign trade dependence degree in different years

Region	FTD 1978	FTD 1987	FTD 2013
Beijing	0.726	0.817	0.664
Hebei	0.016	0.031	0.317
Shanxi	0.001	0.015	0.135
Nei moggol	0.003	0.014	0.085
Liaoning	0.069	0.059	0.446
Jilin	0.005	0.021	0.193
Heilongjiang	0.003	0.021	0.190
Shanghai	0.111	0.110	1.990
Jiangsu	0.017	0.031	0.993
Zhejiang	0.006	0.025	0.968
Anhui	0.001	0.014	0.202
Fujian	0.031	0.066	0.706
Jiangxi	0.008	0.018	0.234
Shandong	0.039	0.040	0.570
Henan	0.007	0.012	0.195
Hubei	0.011	0.022	0.144
Hunan	0.011	0.016	0.099
Guangdong	0.001	0.002	2.051
Guangxi	0.036	0.033	0.268
Sichuan	0.002	0.013	0.209
Guizhou	0.004	0.008	0.059
Yunnan	0.015	0.015	0.134
Shaanxi	0.000	0.014	0.125
Gansu	0.005	0.010	0.108
Qinghai	0.007	0.012	0.040
Ningxia	0.023	0.022	0.101
Xinjiang	0.006	0.021	0.445

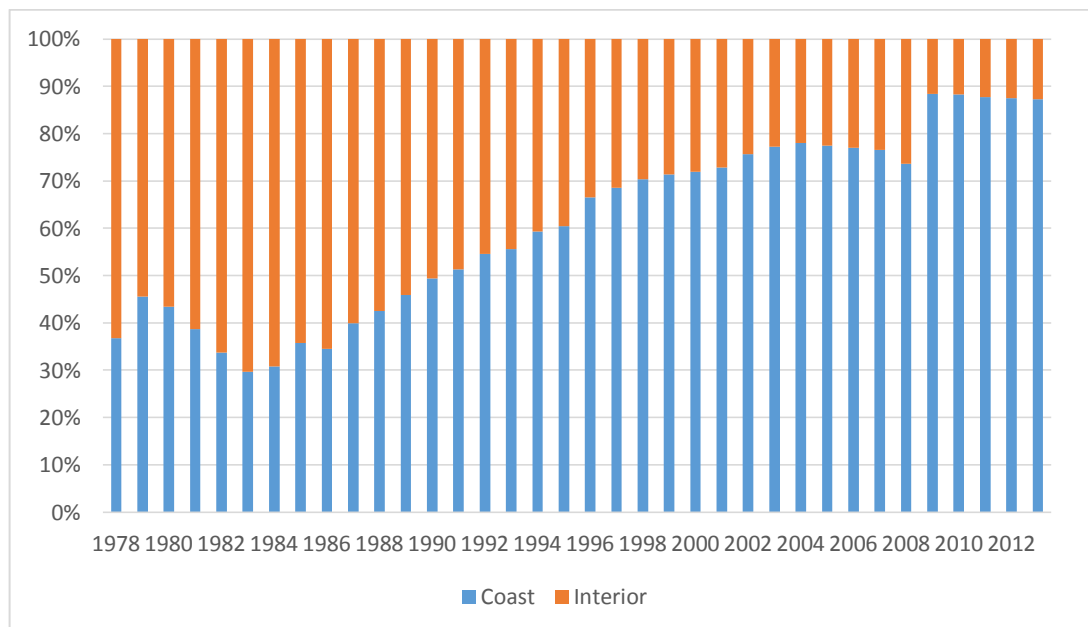


Figure-2. Coast-interior foreign trade disparity

Figure 2 shows each year the coast and interior each contributes to the nation's foreign trade. The Interior occupies more and more in China's foreign trade year by year during the beginning year (1978-1982) and reached the highest level at around 31% in 1983. Then the coastal provinces starts to develop foreign trade and greatly increase its occupation in China's foreign trade scale. From 2006 to 2008, there is a small drop of coastal regions' occupation, which may explain by the global financial crisis that ruined coastal region's export. In the year of 2009, recovered from the crisis, the coastal provinces occupy extremely high proportion of that year's foreign trade.

In this section, tables and charts are shown to describe the evolution of regional foreign trade disparity. From the perspective of foreign trade degree of dependence, the provinces that developed foreign trade well rely heavily on foreign trade, while other provinces show less dependence on foreign trade; the openness disparity among different cities became larger and larger during years. From the perspective of coast-interior regional disparity, similar with the regional GDP disparity between coast and interior, the coast provinces at first lagged behind, but then quickly caught up with and surpassed the interior provinces. Especially in recent years, the coast-interior disparity in foreign trade stays in very high level.

5. REGRESSION: RELATION BETWEEN FOREIGN TRADE AND REGIONAL ECONOMIC DISPARITY

In this section, a liner regression model will be adopted to prove the correlation between foreign trade disparity and economic disparity. The observed time period is 1987-2013, and the variable selected is coefficient of variation.

5.1. Model specification

The coefficient of variation (CV) is used to describe the degree of dispersion of regional GDP and regional foreign trade amount, which indicates the regional economic disparity and regional foreign trade development disparity. The model and liner regression is used to simply find out whether there is a relationship between regional foreign trade amount and regional economic disparity. Using general assumptions, an equation describing the regional economic disparity (CV of regional GDP) as a function of the factor regional foreign trade amount (CV of foreign trade amount) can be derived. The function can be represented as:

$$F = \beta_0 + \beta_1 X_1,$$

Where F is the coefficient of variation of regional GDP (which represents the economic disparity among provinces), X_1 is the coefficient of variation of regional foreign trade (which represents the foreign trade development disparity among provinces).

There are undoubtedly other factors that will affect the coefficient of variation of regional GDP besides the regional foreign trade amount disparity among provinces. Since the present paper is to discuss whether there is a relationship between regional economic disparity and regional foreign trade development disparity, the impact of other factors are neglected and assumed to be random and independent.

Thus, the model appears in the following form:

$$CV_{GDP} = \beta_0 + \beta_1 CV_{FT}$$

5.2. Variables: coefficient of variation

The coefficient of variation (CV) is a standardized measure of dispersion of a probability distribution or frequency distribution. It is defined as the ratio of the standard deviation σ to

the mean μ . It is also known as unitized risk or the variation coefficient. The absolute value of the CV is sometimes known as relative standard deviation (RSD), which is expressed as a percentage. The formulation of Coefficient of Variation is:

$$v = \frac{\sqrt{\frac{\sum_{i=1}^n (X_i - \bar{X})^2}{n}}}{\bar{X}}$$

According to the formulation above, the provincial calculation result can be calculated and the result is shown in Figure 3.

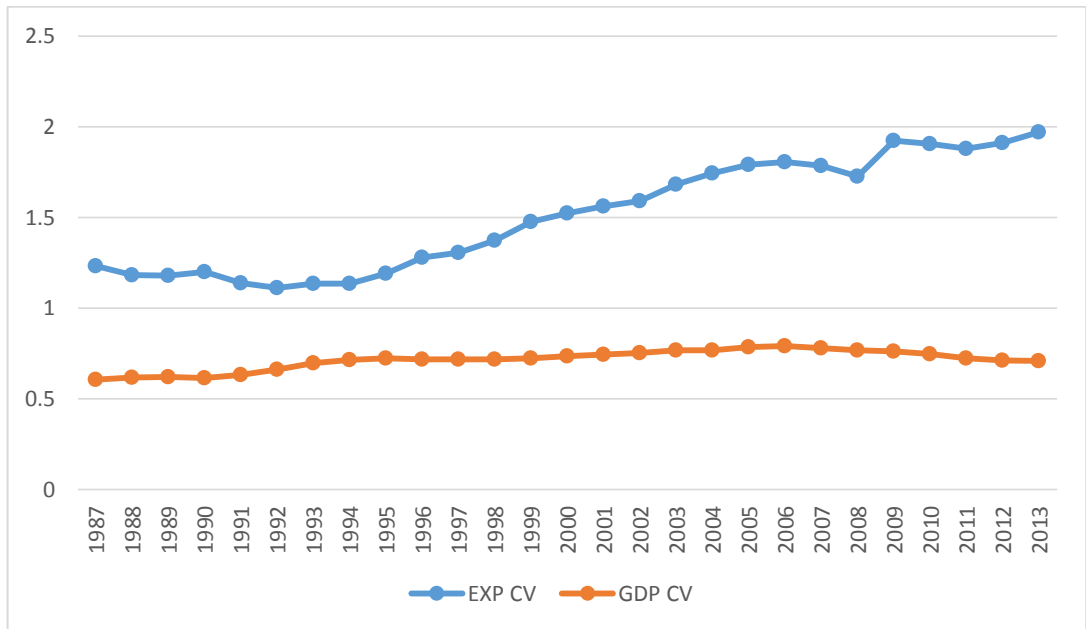


Figure-3. Coefficient of Variation of regional economic disparity and regional foreign trade amount

In the Figure 3, the regional GDP CV shows a generally increasing pattern. The lowest point is around early 1990s, and the highest point of 2006. Despite some tiny decreases, from 1987 to 2006, the regional economic disparity goes larger and larger. After 2006, the curve keeps stable in a high level.

The figure also shows that the CV of regional foreign trade scale generally fits an inverted U shaped curve. From the very beginning (1978), the regional disparity of foreign trade keeps dropping, and the lowest point is at 1992. In 1992, the differences between regions are relatively small. Then, after 1992, the disparity increases steadily till the sudden drop in 2008 (which may be explained by the global financial crisis that greatly harm the foreign trade). After 2008, the disparity of foreign trade changed very little in a high level.

5.3. Correlation of economic disparity and foreign trade

Before liner regression, the correlation between foreign trade disparity and regional economic disparity must be verified. The Scatter Diagram⁷ below shows a rough correlation between economic disparity and foreign trade.

⁷ Scatter Diagram: The scatter diagram graphs pairs of numerical data, with one variable on each axis, to look for a relationship between them.

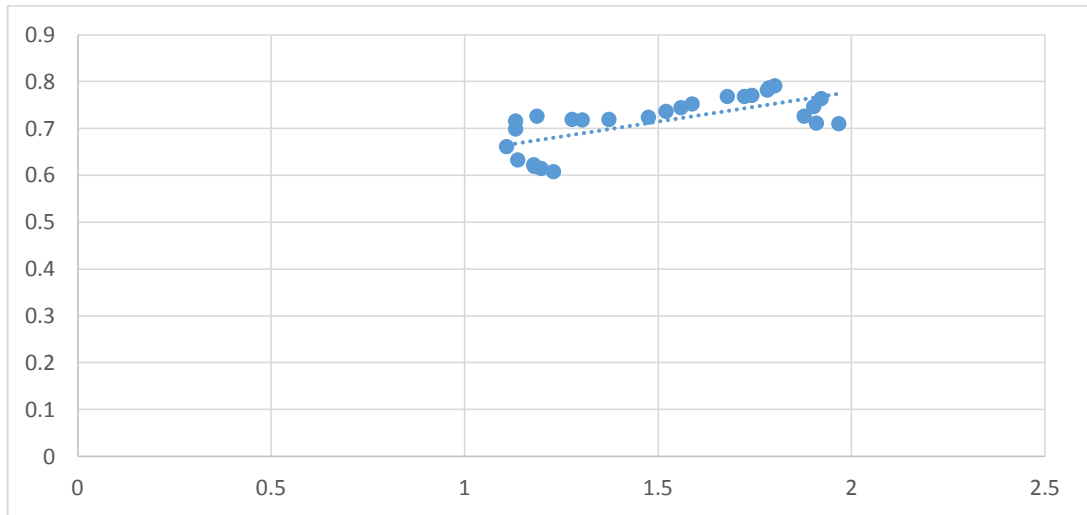


Figure-4. Scatter diagram of the CV_{GDP} and CV_{FT}

In the diagram a predicted line⁸ is drawn to show a liner relationship between regional economic disparity and foreign trade disparity. In order to investigate more accurately, calculation of coefficient of correlation is needed.

The scatter diagram can reflect the relationship between two variables and the direct of the relationship, but it cannot accurately show the degree of correlation of the two variables. Thus the coefficient of correlation is designed. The coefficient of correlation is an indicator of the degree of the correlation between two variables.

The covariance indicates the expectation of the overall error of two variables. The covariance can be calculated by the following equation:

$$Cov(X, Y) = E[(X - E[X])(Y - E[Y])]$$

The calculation of coefficient of correlation can be achieved by the following equation:

$$r = \frac{\sum_{i=1}^n (X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^n (X_i - \bar{X})^2 \cdot \sum_{i=1}^n (Y_i - \bar{Y})^2}}$$

Table-3. Covariation of regional foreign trade CV and regional GDP CV

	FT CV	GDP CV
FT CV	0.089	
GDP CV	0.011	0.003

Table-4. Coefficient of correlation of regional foreign trade CV and regional GDP CV

	FT CV	GDP CV
FT CV	1	
GDP CV	0.700	1

The result of calculation shows regional foreign trade CV has significant positive correlation, i.e. a liner relationship between regional foreign trade disparity and regional foreign trade difference can be expected.

⁸ Predicted Line: a line that best fits the trend of the points in the scatter diagram.

5.4. Estimation results and analysis

In this part, a liner regression is applied, based on the model equation described in 5.1, $CV_{GDP} = \beta_0 + \beta_1 CV_{FT}$, and using the data calculated in 5.2, the coefficient of variation of regional GDP (CV_{GDP}) and the coefficient of variation of regional foreign trade amount (CV_{FT}). And the regression aims at further proving the correlation between regional economic disparity and regional foreign trade development disparity, which is discussed in 5.3.

Table-5. Estimation results of the liner regression

Regression Statistics						
Multiple R	0.700					
R Square	0.490					
Adjusted R Square	0.469					
Standard Error	0.040					
Observation	27					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	1	0.039	0.039	24.045	4.783E-05	
Residual	25	0.040	0.001			
Total	26	0.080				
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.519	0.041	12.742	0.000	0.435	0.603
Square Feet	0.127	0.026	4.904	0.000	0.073	0.180

According to Table 5, therefore, the result of the regression is

$$CV_{GDP} = 0.1278CV_{FT} + 0.5225$$

$$R^2 = 0.4903, F = 24.0451$$

Through residual analysis, the independence of errors, normality and equal variance has been proved. The regression also passes the F test at the 0.01 degree. Thus, the liner relationship is proved.

Through liner regression, this section proves a general positive liner relationship between the regional foreign trade disparity and regional economic development disparity. When China's provincial foreign trade disparity increases 1 unit, the provincial economic disparity increases 0.1278 units.

6. CONCLUSION

The present paper analyzes an issue and reaches a brief conclusion in each of the previous sections. This section will provide a summary of all the above research findings and point out the limitations of the present research as well as implications for further research. From Section 1 to Section 5, the present paper introduces the definition and situation of regional economic disparity and foreign trade disparity, presents the previous literature on this topic, uses different indicators to analyze the evolution of regional economic disparity and foreign trade disparity in China, and applies a liner regression model to prove the correlation between regional economic disparity and foreign trade disparity. The current situation of China's regional economic disparity is severe and there is no apparent trend that the disparity is going to be narrower in the near future. The regional foreign trade disparity observed by coefficient of variation is even more severe than regional economic disparity. When observing GDP data and foreign trade data from the perspective of coast-interior division, both foreign trade disparity and economic disparity shows a change: at first the coastal regions were backward but then quickly they caught up with and surpassed interior regions. Using

coefficient of variation to indicate the disparity, the current research finds that there is a strong correlation between regional foreign trade disparity and regional economic disparity. Furthermore, a liner regression shows that the relationship between the two variables can be described as $CV_{FT} = 0.1278CV_{GDP} + 0.5225$, which means that when China's provincial foreign trade disparity increases 1 unit, the provincial economic disparity increases 0.1278 unit.

The present paper has limitation in the scope and data support. First of all, this research only applies some but not many economic indicators such as Theil's index (which was removed because the results points to the same conclusion as coefficient variation does) and Gini index (which was not taken into consideration because lack of data). More indicators may enrich the paper. Also, due to the data missing in the early years and the changes in nation's statistics measurement method, though may be credible enough to analyze the situation in the past years, the data may not be able to support future prediction.

The regional economic disparity and the development of foreign trade in China will definitely continue to be a heated topic that always draws the public's attention. Though it cannot be a prediction of the future situation, the present paper can still be a reference, containing empirical analysis from the reform and opening policy till the latest year (2013), for the future researchers. Given more detailed data and more advanced measurement, a more accurate result can be expected.

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