RESEARCH ARTICLE

Sector Structure and Economic Growth: A Case of Guangdong-Hong Kong-Macau Great Bay Area

Tingting Ling*

School of International Business, Ji'nan University, China.

Abstract

The degree of optimization of industrial structure has become one of the core powers of modern economic growth engine. Using the data from 1996 to 2016 and taking the Guangdong-Hong Kong-Macao great bay area as an example, this paper made an empirical analysis on the contribution of industrial structure adjustment variables of the Guangdong-Hong Kong-Macao great bay area to economic growth, and concluded that the optimization and adjustment of industrial structure in the great bay area had a significant positive correlation with economic growth. In order to strengthen the bay area economy, bay area cities should speed up the adjustment of industrial structure and the elimination of backward production capacity. Furthermore, bay area cities should combine the elements of innovation-driven development, explore the tertiary industry with local characteristics, and take the tertiary industry as the engine for the economic development of the whole bay area.

Keywords: *Economic Growth, Guangdong-Hong Kong-Macao great bay area, Optimization of industrial structure.*

Introduction

The Guangdong-Hong Kong-Macao great bay area refer to urban agglomerations consisting of 9 cities (Guangzhou, Shenzhen, Foshan, Dongguan, Huizhou, Zhuhai, Zhongshan, Jiangmen, Zhaoqing) and two special administrative regions (Hong Kong and Macao). It is an important space carrier for the construction of world-class urban agglomerations and participation in global competition.

It is one of the four largest bays in the world alongside the Bay Area of New York, the San Francisco Bay Area and Tokyo Bay Area in Japan. Among them, Hong Kong and Guangzhou were rated as first-tier cities in the world by Ga WC- the world's most authoritative world's urban research institution, and Shenzhen was ranked second-tier city in the world [1].

At the 5th session of the 12th National People's Congress held on March 5, 2017, Premier Li Keqiang proposed in the government work report that it is necessary to promote the deepening of cooperation between the Mainland and Hong Kong and Macao, study and formulate plans for the development of cities and towns in Guangdong, Hong Kong and Macau in the Great Bay Area, and play Hong Kong and Macao Unique advantages. On April 7, the National Development and Reform Commission formulated and published the "Key Points for the Innovation of the Institutional Mechanism of the National New District in 2017".

Among them, the key points of work in Nansha New District of Guangzhou are to deepen the exploration of in-depth cooperation between Guangdong, Hong Kong and Macao, to promote the construction of professional service agglomeration areas in Guangdong, Hong Kong, and Macao, the industrialization platform for scientific and technological achievements in Hong Kong and Macao, and the talent cooperation demonstration area, leading the innovation in regional cooperation and development and the development of kinetic energy conversion [2].

In 2017, Guangzhou added more than 4,000 national high-tech companies, the increase is second only to Beijing, with a total of more than 8,700, the total number of high-tech enterprises and hard science and technology development index rank the top three in the country. Over 3,000 Internet companies in Guangzhou have been born with WeChat, Vipshop, YY Voice, Cool Dog Music, Netease, UC Browser, etc.

In the "Top 100 Internet Companies in China" list in 2016, a total of eight companies were listed in Guangzhou, and the total number ranked first in Guangdong. Guangzhou has assembled 97% of the country's key disciplines, 80% of universities, 70% of scientific and technical personnel, and 95% of doctoral degrees.

The total number of university students in the country ranks first in the country. In 2016, Guangzhou absorbed 163,200 college graduates, the most in the province. The per capita disposable income of Guangzhou residents ranks first in the province. The cooperation between Guangdong, Hong Kong, and Macao is not a new concept. The proposal for the urban agglomeration of the bay area should be an upgraded version of the integration of the cities of the Pearl River Delta, including Hong Kong and Macao [3].

It has been upgraded from the economic and trade pattern of the post-store factory to advanced manufacturing over the past 30 years ago. The most important demonstration areas for the organic integration of industry and modern service industries; the rise of regional economic cooperation to a national strategy for all-round opening to the outside world; this has brought new opportunities for the future development of Guangdong.

Hong Kong, and Macao cities, and has also given new missions. On March 6, 2017, at the Guangdong delegation's plenary session of the Fifth Session of the Twelfth National People's Congress, Ningxia, the deputy to the National People's Congress and the chairman of the Guangdong Provincial Development and Reform Commission, made a systematic discussion on the construction of the Guangdong-Hong Kong-Macao great bay area. He Ningka quoted data pointing out that in 2015, the economic scale of

Guangdong, Hong Kong, and Macau in the bay area was 1.36 trillion U.S. dollars, the annual throughput of port containers exceeded 65 million Standard boxes, and the annual throughput of airport passengers reached 175 million; the industrial structure is based on advanced manufacturing. With the modern service industry as the mainstay, the value-added ratio of the service industry in Hong Kong and Macao accounts for about 90% of the GDP. The manufacturing bases of the nine cities in the Mainland are strong and have formed a two-wheel drive industrial system for advanced manufacturing and modern service industries.

The Guangdong, Hong Kong and Macao regions have conducted in-depth cooperation and exchanges in economy, trade, technology and finance, and are entering a comprehensive and in-depth stage of cooperation. In addition, Guangdong-Hong Kong-Macao great bay area need to give full play to the leadership and spillover effects of the three central cities of Hong Kong, Guangzhou, and Shenzhen in the modern service industry and advanced manufacturing industries in the Pearl River Delta region [4].

As soon as possible, a group of companies that can compete with Baidu, Ali and Tencent will be formed. New industries and new enterprises based on the Internet, promote the specialization and diversification of industries with regional integration to cope with the construction of Guangdong, Hong Kong, Macau and the world-class urban agglomerations.

Therefore, in order to understand how to accelerate the construction of the bay area, it is of great practical significance to study the correlation between economic growth and industrial structure of the Guangdong-Hong Kong-Macao great bay area. Next, this paper will make an empirical analysis of the contribution of industrial structure adjustment variables in the Guangdong-Hong Kong-Macao great bay area to economic growth from 1996 to 2016.

Empirical Analysis

Descriptive Analysis

Table 1: Descriptive Analysis

	GDP?	ONE?	TWO?	THREE?	FOUR?
Mean	12.14908	7.315423	10.99990	11.29668	2.439697
Median	12.10290	8.269200	11.28750	11.25980	0.770000
Maximum	14.61670	10.36430	13.56450	14.50610	26.03000
Minimum	9.847000	-3.296800	0.000000	0.000000	0.380000
Std. Dev.	1.261804	3.325132	1.805923	1.944284	4.132479
Skewness	0.218540	-2.201962	-2.936675	-2.301081	3.108371
Kurtosis	2.078093	6.680899	18.59785	15.68861	13.92989
Jarque-Bera	10.01917	317.0819	2673.720	1753.489	1521.812
Probability	0.006674	0.000000	0.000000	0.000000	0.000000
Sum	2806.437	1689.863	2540.978	2609.533	563.5700
Sum Sq. Dev.	366.1945	2542.996	750.1125	869.4553	3927.799
Observations	231	231	231	231	231
Cross sections	11	11	11	11	11

Dependent Variable: GDP?
Method: Pooled EGLS (Cross-section random effects)
Date: 03/25/18   Time: 16:57
Sample: 1996-2016
Included observations: 21
Cross-sections included: 11
Total pool (balanced) observations: 231

Table 2: Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic		Prob.
C	8.300212	0.248025	33.46518		0.0000
ONE?	-0.509519	0.041098	-12.39757		0.0000
TWO?	0.358032	0.126643	2.827105		0.0051
THREE?	0.323106	0.122251	2.642967		0.0088
FOUR?	-0.004973	0.016776	-0.296400		0.7672
Random Effects (Cross)					
C1--C	1.290779				
C2--C	-0.116234				
C3--C	-0.259677				
C4--C	1.185625				
C5--C	0.042448				
C6--C	-0.023688				
C7--C	0.782967				
C8--C	0.519353				
C9--C	0.573608				
C10--C	0.627467				
C11--C	-4.622647				
		Effects Specification			
			S.D.		Rho
Cross-section random			0.530217		0.6841
Idiosyncratic random			0.360304		0.3159
		Weighted Statistics			
R-squared	0.656749	Mean dependent var			1.782074
Adjusted R-squared	0.650674	S.D. dependent var			0.796083
S.E. of regression	0.470516	Sum squared resid			50.03300
F-statistic	108.1026	Durbin-Watson stat			0.180803
Prob(F-statistic)	0.000000				
		Unweighted Statistics			
R-squared	-0.668016	Mean dependent var			12.14908
Sum squared resid	610.8184	Durbin-Watson stat			0.014810

Hausman Test

If the probability is less than 0.05, the study should select fixed effect model; conversely, If the probability is greater than 0.05, the study should select random effect model.

Correlated Random Effects-Hausman Test

Pool: Baay

Table 3: Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	163.406293	4	0.0000

Table 4:Cross-section random effects test comparisons

Variable	Fixed	Random	Var(Diff.)	Prob.
ONE?	-0.939160	-0.509519	0.001185	0.0000
TWO?	0.361487	0.358032	0.002081	0.9396
THREE?	0.586485	0.323106	0.002706	0.0000
FOUR?	-0.032070	-0.004973	0.000016	0.0000

Dependent Variable: GDP?
Method: Panel Least Squares
Date: 03/25/18   Time: 16:59
Sample: 1996 2016
Included observations: 21
Cross-sections included: 11
Total pool (balanced) observations: 231

Table 5:Cross-section random effects test equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.496014	0.193039	44.01186	0.0000
ONE?	-0.939160	0.053608	-17.51904	0.0000
TWO?	0.361487	0.134607	2.685491	0.0078
THREE?	0.586485	0.132858	4.414363	0.0000
FOUR?	-0.032070	0.017243	-1.859906	0.0643

Effects Specification

Cross-section Fixed (Dummy Variables)

R-squared	0.923426	Mean dependent var	12.14908
Adjusted R-squared	0.918463	S.D. dependent var	1.261804
S.E. of regression	0.360304	Akaike info criterion	0.858993
Sum squared resid	28.04087	Schwarz criterion	1.082526
Log likelihood	-84.21365	Hannan-Quinn criter.	0.949152
F-statistic	186.0579	Durbin-Watson stat	0.200623
Prob(F-statistic)	0.000000		

Dependent Variable: GDP?
Method: Pooled Least Squares
Date: 03/25/18   Time: 17:00
Sample: 1996 2016
Included observations: 21
Cross-sections included: 11
Total pool (balanced) observations: 231

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.496014	0.193039	44.01186	0.0000
ONE?	-0.939160	0.053608	-17.51904	0.0000
TWO?	0.361487	0.134607	2.685491	0.0078
THREE?	0.586485	0.132858	4.414363	0.0000
FOUR?	-0.032070	0.017243	-1.859906	0.0643
Fixed Effects (Cross)				
C1--C	1.867872			
C2--C	-0.675425			
C3--C	0.138206			
C4--C	1.733341			
C5--C	0.588399			
C6--C	0.014160			
C7--C	2.060683			
C8--C	1.458935			
C9--C	1.538997			
C10--C	-0.094372			
C11--C	-8.630795			

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.923426	Mean dependent var	12.14908
Adjusted R-squared	0.918463	S.D. dependent var	1.261804
S.E. of regression	0.360304	Akaike info criterion	0.858993
Sum squared resid	28.04087	Schwarz criterion	1.082526
Log likelihood	-84.21365	Hannan-Quinn criter.	0.949152
F-statistic	186.0579	Durbin-Watson stat	0.200623
Prob(F-statistic)	0.000000		

Table 6: Results of Hausman Test

Test Summary	Chi-Squ.Stat	Chi-Squ.d.f.	Prob.
Cross-section random	163.406293	4	0

Empirical Results

Fitness of the Model

In this OLS, the Function can be Written

$$Y= \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + U \qquad (1)$$

Y means every city's GDP, X_1 represents the logarithm of the primary industry, X_2 represents the logarithm of the secondary industry, X_3 represents the logarithm of the tertiary industry, and X_4 represents the ratio of the tertiary industry to the sum of the primary and secondary industries We assume that the intercept and slope estimates, estimated valueβ_1, β_2, β_3 and β_4 have been obtained for the given sample of data.

We can obtain the fitted value for each observation. By definition, each fitted value is on the OLS regression line. The OLS residual associated with observation I, estimated u, is the difference between y and its fitted value. The idea case for observation i is when estimate $U_i = 0$, but in most cases, every residual is not equal to zero. In other words, none of the data points must actually lie on the OLS line. According to data, R-square is 0.923426, very close to 1. The probability (F-statistic) is 186.0579 which is fitted of the model. However, the Probability (t-Statistic C) is 0.0643.

Explanation of the Model

The probability is less than 0.05, so the study should select fixed effect model. In the fixed model, the first and the forth dependent variables are negative, and others are positive.

Effect of Independent Variables on Dependent Variable

According to the graph and data analysis, the ratio of the tertiary industry to the traditional industry is negatively correlated with GDP, but the coefficient is small, indicating a weak negative correlation. This shows that although the third industry is important, traditional industries cannot be ignored, and a city with better economic development needs to be balanced. In addition to the special political status of Hong Kong and Macau, other cities should be based on the traditional industry and develop the third industry.

Table 7: Results of Regression

Variables	Coefficient	St. Dev.	t-Stat.	Prob.
gdp	8.3	1.26	33.46	0.00
one	-0.5	3.33	-12.39	0.00
two	0.35	1.81	2.83	0.0051
three	0.32	1.94	2.64	0.0088
four	-0.0049	4.13	-0.296	0.7672
R^2	0.657			
Adj-R^2	0.651			
F-Stat	108.1026***			

Note : *implies significant in the level of 10%; ** implies significant in the level of 5%; *** implies significant in the level of 1%.

Conclusion and Suggestion

From the above analysis, we can conclude that the amount of GDP in Hong Kong and Macao Bay Area in the bay area ratio of third industry city in the first and second industry is higher, the city of bay area GDP the total contribution is higher, especially in Guangzhou, Shenzhen, Hongkong. So we can draw a conclusion, in order to enhance the bay area economy, the bay area city should speed up industrial restructuring; accelerate the elimination of backward production capacity.

And the, with elements of innovation driven development, we can explore the local characteristics of the third industry, such as the characteristics of financial services, tourism and other three industries. Ultimately, we can take third industry as the engine driving the entire bay area economic development.

Suggestion

The development of Hong Kong and Macao Bay area, four policy suggestions for our country "National" 13th Five-Year "in March 2016 to develop a plan" proposed to promote Guangdong Bay area and major inter provincial cooperation platform ". In July 2017, three places signed" to deepen cooperation to promote the construction of Hong Kong and Macao Bay Area framework agreement "agreement, putting forward to perfect the innovation cooperation mechanism , promoting mutually beneficial and win-win cooperation, building plan livable industry life circle and Guangdong cooperation demonstration zone.

And then, putting forward to strengthen Guangdong as the country's reform and opening up the first area. Finally, it promotes Hongkong in the three central positions of national finance, shipping, and trade. It also can establish the construction of Macao World Tourism and leisure center cooperation. But now, If let Hong Kong and Macao Bay area compared with the other three of the famous Bay Area in the development, there are still some deficiencies [5].

First, compared with the other three Bay areas, Hong Kong and Macao Bay area's development degree is not enough. At present, the development of the world three Bay areas mainly depends on the center of the city in the bay area. These cities drive around other city common development. In the process of development, these cities occupy the leading position of the Bay City. For example, in the United States in the New York Bay area, New York Bay Area as the center of the city, the population and the proportion of GDP was more than 85%.

Tokyo as the only core city of Tokyo Bay area, where the seven world famous port; and the San Francisco Bay Area in the city of San Francisco are the commercial and cultural center. The city of San Jose is science and technology innovation center. But in contrast, the Pearl River Estuary in Guangdong, Hong Kong and Macao are multi-level equilibrium.

There is no clear division of labor in all cities, so there is no strong cohesive force. In last 10 years, the problem of "how to integrate the advantages of resources and the implementation of regional coordinated development" has been the Guangdong Bay area needs to solve the problem. Second, the gap between the degrees of urban integration is large. As Guangdong, Hong Kong and Macau face the situation of "one country, two systems", how to realize the integration of rules, laws and humanities exchanges and the facilitation of information in the social field will be the biggest challenge in implementation.

This not only requires the emergence of a normalized coordination agency between Guangdong, Hong Kong and Macao, but also the unified coordination and coordination of the central government. Third, when compared with the three famous international areas, ecological environment quality of China's Guangdong Bay area is a prominent short board of its development.

As a core area of "strategic fulcrum, The Belt and Road" and the Pearl River Delta manufacturing industry, the urgent need to promote clean energy, to carry out clean Bay area plan to protect the ecological environment of the industrial development of Hong Kong and Macao Bay area measures in.

In view of this, we can learn from the development experience of the famous overseas Bay area, and explore a way suitable for the development of China's Bay Area Based on the characteristics and needs of our Bay area construction.

References

1. Chen Libing (2018) Research on the Talent Development of Building International Science and Technology Industry Innovation Center in Guangzhou, Academic Search for Truth and Reality, 06:71-79.

2. Liu Zuojing, Chen Jie (2019) Development Strategy of Guangdong, Hong Kong and Macao Talent Cooperation Demonstration Zone in the New Period, Science and Technology Management Research, 39(08):122-127.

3. Chen Zhao, Lin Tao (2018) the Influencing Factors of the Market Integration of Guangdong, Hong Kong and Macao under the New Economic Geography Perspective, World Economy Studies, 12:72-81+133.

4. LIN Jiang, YAO Cuiqi (2019)Seek Common Ground while Reserving Differences for Constructing Guangdong-Hong Kong-Macao Greater Bay Area, Financial Minds, 4(01): 103-123+144.

5. Chen En, Liu Xiling, Yu Qianwen (2019) the Advantages, Bottleneck and Countermeasures for Urban Agglomerations in the Guangdong-Hong Kong-Macao Bay Area, Urban Insight, 01:27-39.