

Empirical Analysis of Factors Influencing Economic Growth in Island Regions: A Case Study of the Zhoushan Archipelago New Area

Jionglng Wu

Shanghai Normal University Tianhua College, Shanghai, China, 201815

ABSTRACT

Economic growth in island regions is influenced by a combination of factors, including geographical conditions, resource endowments, and policy support. This study focuses on the Zhoushan Archipelago New Area as a case study to empirically analyze the key factors affecting economic growth in island regions. Based on the findings, policy recommendations are proposed to promote sustainable economic development in these areas. The research reveals that industrial structure optimization and infrastructure development are critical drivers of economic growth in the Zhoushan Archipelago New Area.

KEYWORDS

Zhoushan Archipelago New Area; island economic development; empirical analysis; influencing factors

1 Introduction

With the acceleration of economic globalization and regional economic integration, island regions have become an increasingly important component of regional economic development. As unique economic units, island regions have long been constrained by factors such as limited resource endowments, inadequate transportation, and a monotonous industrial structure.

The Zhoushan Archipelago New Area, China's first national-level island new area, is located at the forefront of marine economic development. It bears the dual responsibilities of advancing the national marine strategy and addressing the challenges of high-quality regional economic development. In recent years, the Zhoushan Archipelago New Area has made significant achievements in sectors such as port logistics, marine fisheries, and tourism. However, its economic growth still faces issues such as imbalanced industrial structure and lagging infrastructure development.

According to the Seventh National Census, the total population of the Zhoushan Archipelago New Area reached 1.1578 million. Data from the Zhoushan Bureau of Statistics indicates that in the first three quarters of 2024, the proportions of primary, secondary, and tertiary industries in the regional economy were 8.31%, 49.58%, and 42.11%, respectively. The uneven development of these three industries suggests that there remains untapped potential in the development of marine fisheries and other marine economic sectors in the Zhoushan Archipelago New Area.

2 Current Economic Development of the Zhoushan Archipelago New Area

Following the official approval of the Development Plan for the Zhoushan Archipelago New Area by the State Council in 2013, the Zhoushan Archipelago New Area, as China's first national-level island new area, has made significant economic progress in recent years by leveraging its unique marine advantages. Data from the first three quarters of 2024 shows continuous growth in regional GDP, steady increases in import and export volumes driven by port logistics, and substantial improvements in the per capita disposable income of all residents.

(1) Insufficient Industrial Structure Optimization

In the first three quarters of 2024, the secondary industry remained heavily reliant on traditional sectors. Despite breakthroughs in modern marine industries, traditional marine fisheries and low-value-added industries still account for a significant proportion, indicating that the industrial structure has yet to be fully optimized. Furthermore, inadequate technological innovation and the relatively low share of high-end manufacturing and modern services hinder the overall competitiveness of the local economy.

(2) Incomplete Infrastructure Development

Although the Ningbo-Zhoushan Port has become a world-class hub port, connectivity with surrounding regions remains a bottleneck, limiting the convenience and efficiency of economic activities. Additionally, the pace of digital infrastructure development has lagged, with slow progress in building information and smart infrastructure.

(3) Limited Market Scale

The total population of the Zhoushan Archipelago New Area is relatively small, leading to limited market demand. The constrained domestic market makes it difficult to support large-scale consumer industries, particularly in sectors like services and retail that heavily depend on local consumption. Moreover, due to geographical constraints, the economic

linkages between the local market and core cities in the Yangtze River Delta remain weak, hindering the area's integration into the regional economic cycle.

(4) Talent Drain

Despite increases in regional GDP and educational expenditure, the area struggles to attract and retain high-level talent in innovation, management, and technology. The relative isolation of the island region contributes to the outflow of talent, with many students pursuing higher education elsewhere and unwilling to return for work. This talent drain poses a significant challenge to sustainable development in the New Area.

3 Empirical Analysis

Economic development in island regions is influenced by a variety of factors, both economic and non-economic. Conducting an objective analysis of these factors helps identify the advantageous and limiting conditions for the development of the Zhoushan Archipelago New Area, facilitating its long-term growth. Building on the methodologies of scholars such as Yu (2006) and Zhang & Tian (2010), this study uses a logarithmic regression model to investigate the primary factors driving the economic development of the Zhoushan Archipelago New Area.

To measure economic development, regional GDP is selected as the dependent variable, given its comprehensive reflection of a region's economic performance. Independent variables include the added value of the three industries, infrastructure, and human capital.

This empirical approach aims to determine the key driving forces and constraints in the economic growth of the Zhoushan Archipelago New Area, providing a data-driven foundation for proposing strategies to enhance its sustainable development.

Note: The empirical analysis is based on data from: Zhoushan Bureau of Statistics (<http://zstj.zhoushan.gov.cn>)

(1) The Three Industries and Economic Growth in the New Area

The regression model is expressed as follows:

$$\ln Y = A + \alpha_1 \ln \Delta X_1 + \alpha_2 \ln \Delta X_2 + \alpha_3 \ln \Delta X_3 + \varepsilon$$

In the model, The dependent variable Y represents the GDP of the Zhoushan Archipelago New Area., ΔX_1 、 ΔX_2 、 ΔX_3 are the logarithmic added values of the primary, secondary, and tertiary industries, respectively. α_1 、 α_2 、 α_3 are the model parameters representing the elasticities of the respective industries. A is the constant term. ε is the error term accounting for unexplained variation. Using SPSS 29 to analyze the above formula, you can estimate the regression coefficients and assess the statistical significance of each variable. The output typically includes:

$$\ln Y = 4.579 + 3.079 \ln \Delta X_1 + 2.019 \ln \Delta X_2 + 0.279 \ln \Delta X_3$$

P-value: (0.046) (0.0065) (0.035) (0.051)

Significance F=0.023 $R^2=0.676$ $R^2_{adj}=0.554$

The above results indicate that the growth of the primary, secondary, and tertiary industries in the Zhoushan Archipelago New Area positively impacts the growth of the regional gross domestic product (GDP). Although the current industrial structure of the Zhoushan Archipelago New Area is still dominated by the secondary industry, the analysis shows that each additional unit of the primary industry can increase the GDP by 3.079 units. This suggests that the primary industry plays a crucial role in boosting the GDP of the New Area.

(2) Infrastructure and Economic Growth in the New Area

The regression model can be expressed as:

$$\ln Y = A_1 + \beta_1 \ln MO + \beta_2 \ln P + \beta_3 \ln \text{Internet} + \delta$$

In the model, the dependent variable Y represents the GDP of the Zhoushan Archipelago New Area. MO, P, and Internet all represent infrastructure: MO indicates the state of infrastructure in the New Area, measured by the total highway mileage (unit: km^{-1}). P represents postal and telecommunications services, measured by their revenue (unit: ten thousand yuan). Internet represents network infrastructure, measured by the number of internet users (unit: hundred households). β_1 、 β_2 、 β_3 are the parameters to be estimated, while A_1 and δ represent the constant term and the error term, respectively. Using SPSS 29 to analyze the above equation, the results are as follows:

$$\ln Y = 1.81 + 0.233 \ln MO + 4.793 \ln P + 3.601 \ln \text{Internet}$$

P-value: (0.0096) (0.048) (0.018) (0.03)

Significance F=0.0296 $R^2=0.655$ $R^2_{adj}=0.526$

The above results indicate that infrastructure factors have a positive impact on the GDP of the New Area. Specifically, every additional unit of postal and telecommunications infrastructure or broadband network infrastructure leads to an increase of more than 3.5 units in GDP.

(3) Human Capital and Economic Growth in the New Area

The regression model can be expressed as:

$$\ln Y = A_2 + \gamma_1 \ln HC + \gamma_2 S + \epsilon$$

In the model, the dependent variable Y represents the GDP of the Zhoushan Archipelago New Area. HC represents the level of human capital, measured by the illiteracy rate among the labor force. S represents the number of students enrolled in regular secondary schools and is used as a dummy variable: $S = 0$ if the area is a remote island county with poor transportation, and $S = 1$ otherwise. γ_1, γ_2 are the parameters to be estimated, while A_2 and ϵ represent the constant term and the error term, respectively. This model uses data from the last three population censuses to reflect economic development over the past 20 years. Using SPSS 29 to analyze the above equation, the results are as follows:

$$\ln Y = 1.39 - 36.78 \ln HC + 4.62S + \epsilon$$

P-value: (0.053) (0.027) (0.0003)

Significance F=0.0007 $R^2=0.795$ $R^2_{adj}=0.749$

The illiteracy rate shows a significant negative correlation with the GDP of the New Area, confirming that changes in the illiteracy rate can lead to variations in the levels of economic and educational development (Li et al., 2012). Additionally, the research results indicate that areas on the mainland or islands with convenient transportation, where the economic situation is relatively better, experience an average increase of 46,200 yuan in regional GDP compared to islands with poor transportation.

4 Conclusions and Policy Recommendations

Based on the above empirical analysis, the following conclusions are drawn:

(1) Although the secondary industry still plays a dominant role in the New Area, the primary industry has a more significant impact on its economic development. For every additional yuan generated by the primary industry, the GDP of the New Area increases by 3.079 yuan. Therefore, it is essential to make good use of marine resources and develop marine farming and pastoral industries.

(2) Infrastructure development has a notable effect on the economic growth of the New Area, especially the improvement of infrastructure on remote islands.

(3) Human capital plays a critical role in the economic development of the Zhoushan Archipelago New Area. Emphasizing education, extending the average years of schooling for citizens, and reducing the illiteracy rate are key to driving economic growth.

(4) Locational advantages are also crucial for economic development. The development conditions of islands with poor transportation are relatively less optimistic.

Based on the above analysis, this study provides the following recommendations:

(1) The New Area should utilize marine resources efficiently to develop the primary industry while maintaining the growth of the secondary industry. It can also leverage its extensive coastline to promote the development of tourism and other tertiary industries.

(2) Increase investment in infrastructure, providing more convenient transportation and postal services for remote islands.

(3) Increasing investment in human capital is a vital approach to promoting the economic development of the New Area. Greater investment in science and education is needed to improve the quality of the labor force and achieve sustainable economic development.

(4) For remote island counties, their unique "archipelago" locational advantages can be utilized to develop tourism and other tertiary industries, alongside developing pelagic fisheries to balance the growth of the primary industry. Innovation should also be emphasized to drive economic development.

About the Author

Jiongling Wu, male, 2003-08, from Zhoushan, Zhejiang, China, an undergraduate student at the School of business of Shanghai Normal University Tianhua college, research Field is International Business, Economics.

References

- [1] Wang J., Zhang F., Li J. R., & others. (2019). Characteristics and issues of economic development in China's island counties. *Marine Bulletin*, 38 (3), 250–256.
- [2] Zhoushan Bureau of Statistics. (2023). *Zhoushan Statistical Yearbook* [M]. China Statistics Press.
- [3] Yu F. Y. (2006). Analysis of factors influencing county-level economic growth in Liaoning Province. *Bohai Economic Outlook*, (11), 2–3.
- [4] Zhang Z. G., & Tian S. (2010). Analysis of factors influencing economic development in the Pearl River Delta region: An empirical study based on panel data cointegration theory. *Reform and Strategy*, 26(5), 130–133, 175.
- [5] Li S., Mao J. X., & Hou L. Q. (2012). Empirical study on the relationship between the illiteracy rate and the levels of economic and educational development in China. *Guangxi Social Sciences*, (11), 179–182.