

A Study on the Relationship between the Health Level of Shanghai Residents and Regional Economic Development

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Abstract: This article is based on panel data from 16 districts in Shanghai from 2012 to 2021, and uses an econometric model to study the relationship between residents' health level and regional economic development. The results showed that the health level of Shanghai residents has a positive effect on regional economic development, which is still valid after stability testing. Salary incentives, environmental quality, and medical technology levels can all play a promoting role in regional economic development.

Keywords: Residents' health level; Regional economic development; Environmental quality

1. Introduction

With the continuous enrichment of material life and the increasing demand for a better life, the public's demand for health is also increasing. Health is crucial for people's survival and development, as it relates to the quality of life of the general public and the state of national economic development. Only by having a good level of health can one improve personal abilities and better serve regional economic development. On the basis of existing research, this article uses econometric models to deeply analyze the relationship between the health level of Shanghai residents and regional economic development. It objectively explains the positive relationship between the health level of residents in 16 districts under Shanghai and regional economic development.

2. Model Design

2.1 Econometric model construction

In order to analyze the relationship between the health level of Shanghai residents and regional economic development, this paper constructs the following econometric model:

$$red_{it} = a_0 + a_1 health_{it} + a_2 salary_{it} + a_3 environment_{it} + a_4 medical_{it} + \mu_{it}$$

Where, i represents the 16 districts under the jurisdiction of Shanghai, t represents the year, μ_{it} is the error term. $salary_{it}$, $environment_{it}$, $medical_{it}$ are the control variables and a_0 represents the constant term.

2.2 Variable selection

2.2.1 Explained variables

The explained variable of this paper is the level of regional economic development (red_{it}). Based on the study of Sun Yanfang et al. (2023)^[1], this paper selects 6 indicators from the 3 aspects of coordination, openness and sharing to establish the evaluation index system of regional economic development. The specific contents are shown in Table 1. Then, the correlation coefficient empowerment method is used to objectively empower the relevant indicators, and the economic development level of 16 districts under the jurisdiction of Shanghai is obtained.

Table 1: Evaluation index system of regional economic development

System	Metrics	How metrics are calculated	Indicator direction
Coordination	Industrial structure	Total value of tertiary industry/total value of secondary industry	Positive
	Disposable income level of urban and rural residents	Per capita disposable income of urban residents/per capita disposable income of rural residents	Negative Negative
Openness	Foreign trade dependence	Total imports and exports /GDP	Positive
	Foreign direct investment	Total foreign investment /GDP	Positive
Shareability	Per capita disposable income	Disposable income of residents/total number of people in the area	Positive
	Number of medical beds per capita	Number of hospital beds/total number of people in the district	Positive

2.2.2 Explanatory variables

The explanatory variable in this paper is the residents' health level ($health_{it}$), which is calculated based on the principle of maximum data accessibility by weighted summations of mortality, incidence of class A and B infectious diseases, and average annual number of residents' consultations.

2.2.3 Control variables

In this paper, the following parameters are selected as control variables: salary incentive ($salary_{it}$), which is measured by the regional average wage level, calculated as the ratio of total wage to average population; Environmental quality ($environment_{it}$), the calculation method is the weighted sum of total industrial waste gas emissions, total industrial carbon dioxide emissions, total industrial smoke and dust emissions and solid waste production; Medical technology level ($medical_{it}$), calculated by the weighted sum[2] of the number of medical personnel, beds and hospitals per 1,000 population.

2.3 Data Sources

This paper takes Shanghai as the basic spatial unit and uses the panel data of 16 districts in Shanghai from 2012 to 2021 for empirical analysis. The data came from Shanghai Information Industry Yearbook, Shanghai Statistical Yearbook and Bulletin over the years and the website of the Ministry of Industry and Information Technology. The missing data were filled by linear interpolation method.[3-4]

3. Empirical Analysis

3.1 Panel regression analysis

Table 2: Panel regression estimation results

Explanatory variables	Fixed Effects 1	Fixed Effect 2	Fixed effect3	Fixed Effect 4
Health	0.246 ***	0.133	0.142 *	0.125 **
Salary		0.134 ***	0.478 ***	0.168 ***
Environment			0.035 *	0.045 **
Medical				0.044 **
Constant term	0.826 ***	0.793 ***	0.868 ***	1.321 ***
Number of observations	160	160	160	160

Note: *, **, *** indicates significant at the 10%, 5%, 1% level, respectively.

According to the regression results listed in Table 2, it can be found that residents' health level has a positive impact on regional economic development. From the perspective of control variables, when salary incentive, environmental quality and medical technology level increase by 1%, the development level of regional economic index increases by 0.168%, 0.045% and 0.044% respectively. From the analysis of the reasons, first, salary incentive can effectively mobilize the enthusiasm of employees,

help the steady development of enterprises, and thus improve the level of regional economic development; Second, a good environment can provide necessary human and material support for regional development, which is the basic condition for regional economic development; Third, the medical level determines the public health status, can promote the reproduction of regional labor force, and then enhance regional economic development[5-6].

3.2 Robustness test.

In order to ensure the robustness of the above research results, this paper selects the lagging term of each variable to replace the current term to carry out group regression, and the results are shown in the following table:

Table 3: Regression results of the first and second lagging terms of each explanatory variable

Explanatory variables	Current term	One-phase lag	Phase 2 Lag
Residents' health level	0.125 **	0.104 ***	0.075 **
Pay incentive level	0.168 ***	0.159 ***	0.155 ***
Environmental Quality	0.045 **	0.042 ***	0.031 **
Medical skill level	0.044 **	0.032 **	0.029 **
Constant term	1.321 ***	0.993 ***	1.259 ***
Number of Observations	160	160	160
Prob>F	0	0.00001	0

Note: *, **, *** means significant at the 10%, 5%, 1% level, respectively.

According to the results in Table 3, the lagging regression coefficient of residents' health level, per capita salary incentive level, environmental quality and medical technology level are all smaller than those of the current period, which indicates that residents' health, environmental quality, salary incentive and medical technology level not only affects the current regional economic development, but also have a lagging effect [7].

4. Conclusion and suggestions

Through empirical testing, it was found that the health level of Shanghai residents has a positive effect on regional economic development, and salary incentives, environmental quality, and medical technology levels can all promote regional economic development. Based on this, this article proposes the following suggestions:

Firstly, government should focus on accelerating economic development and increasing the construction of health resources. With the acceleration of industrialization and urbanization, there have been changes in the way Shanghai residents produce, live, and exercise. The level of economy and urbanization has a positive impact on the health of residents in a region. Over the past decade, there has been a strong positive correlation between the per capita GDP of Shanghai and the health level of its residents, and the impact of the economy on residents' health has been more profound. Government departments should also expand the coverage of basic medical care, improve the quality of insurance coverage, and strengthen the sharing of medical resources between districts and cities.

Secondly, government should apply multidimensional intervention on influencing factors of health. A good economic, social, and natural environment is a guarantee for improving residents' health. A higher level of economy, urbanization, and accessibility of health resources has a positive impact on the health of residents in a region. Meanwhile, Shanghai government should popularize environmental and health related knowledge to the public and enterprises, while continuously improving environmental quality, promote the construction of healthy cities and towns, and take effective measures to prevent and control environmental pollution related diseases.

Thirdly, government could formulate targeted health policies for the Shanghai region. Combining the regional characteristics of Shanghai, local government could enrich and improve the fitness system, and develop characteristic sports projects that are suitable for the regional characteristics of Shanghai, such as Tai Chi and fitness Qigong. It is also necessary to develop sports and fitness guidelines tailored to different regions, and develop integrated physical and medical health services that are suitable for each region.

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