

Analysis of Factors Influencing Fiscal Revenue in Hebei Province

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Abstract: Fiscal revenue is the core financial guarantee that enables local governments to perform public service functions and promote high-quality economic and social development. Hebei Province, as a major economic province in northern China, is at a critical stage of industrial transformation and upgrading and the deepening of coordinated development in the Beijing-Tianjin-Hebei region. Identifying the core influencing factors of fiscal revenue is of significant practical importance for stabilizing local fiscal operations and assisting in the construction of a "strong economic province and beautiful Hebei". This paper selects time series data from the "Hebei Statistical Yearbook" for the years 2008-2022, takes public budget revenue as the explained variable, and selects regional gross domestic product, foreign trade import and export volume, retail sales of consumer goods, number of employed persons, and per capita disposable income as explanatory variables to construct a multiple linear regression model for empirical analysis. Addressing the issues of some variable coefficient signs not conforming to economic theory and insufficient significance in the initial regression, the model is optimized through logarithmic transformation. Subsequently, economic, statistical, and econometric tests are completed sequentially, verifying that the model has no issues with multicollinearity, heteroscedasticity, or autocorrelation. The empirical results show that the number of employed persons and per capita disposable income have a significant strong positive impact on Hebei Province's fiscal revenue, retail sales of consumer goods have a certain positive effect, while the impacts of regional gross domestic product and foreign trade import and export volume are not significant. Considering the actual economic development of Hebei Province, this paper proposes targeted countermeasures and suggestions from three dimensions: enhancing employment capacity, increasing residents' income, and optimizing the economic structure, providing empirical reference and decision-making basis for Hebei Province to achieve sustainable growth in fiscal revenue and promote the improvement of economic development quality.

Keywords: Hebei Province Fiscal Revenue; Influencing Factors; Multiple Linear Regression Model; Empirical Analysis; Public Budget Revenue.

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1. Introduction

In the new stage of China's economy shifting towards high-quality development, the adjustment of regional economic structure continues to deepen, and the growth logic and influence mechanism of local fiscal revenue are undergoing profound changes[1]. Fiscal revenue is the core material foundation for local governments to perform public services, implement macroeconomic regulation, and ensure people's livelihood[2]. Adequate local fiscal revenue is the foundation for the government to provide public services, maintain operations, and promote economic development[3]. The stability and sustainability of its growth are directly related to the stable development of the

regional economy and society[4]. Precisely identifying the core influencing factors of fiscal revenue has become an important topic in regional economic research[5].

Hebei Province, as an important economic province in the north, is a key carrier of the Beijing-Tianjin-Hebei coordinated development strategy[6]. Currently, it is in a crucial stage of transforming traditional industries and cultivating emerging industries[7]. The fiscal revenue has achieved steady growth[8]. During this period, its economic growth has even outperformed that of Beijing and Tianjin[9]. However, it shows periodic fluctuations due to factors such as industrial structure adjustment and external market fluctuations[10]. Traditional indicators such as regional GDP and foreign trade have distinct regional

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characteristics in their impact effects. It is urgent to clarify its mechanism through empirical research[11].

The stable growth of fiscal revenue serves as the core guarantee for local governments to fulfill their public service functions and promote the high-quality development of the economy and society[12]. In recent years, research on the influencing factors of fiscal revenue has become increasingly diverse. Scholars from different regions and perspectives have conducted in-depth discussions using various measurement methods, providing a solid theoretical and empirical foundation for understanding the growth mechanism of fiscal revenue[13].

This study takes Hebei Province as the object to explore the impact effects of regional economic indicators on local fiscal revenue[14]. Based on statistical data from 2008 to 2022, a multiple linear regression model is constructed for empirical analysis to clarify the impact paths and intensity of various indicators on fiscal revenue, aiming to provide practical ideas for Hebei Province to optimize fiscal revenue growth paths and enhance the synergy between economy and finance, and also to provide an empirical basis for related research in northern provinces[15].

This paper mainly adopts research methods combining empirical analysis, statistical testing, and econometric analysis. The full text is divided into six chapters: Chapter 1 elaborates on the research background, significance, and overall research framework; Chapter 2 defines core concepts such as fiscal revenue, public budget revenue, and multiple linear regression model; Chapter 3 raises research questions and explains data sources and sample selection; Chapter 4 completes variable selection and analysis, and constructs a multiple linear regression model for parameter estimation; Chapter 5 conducts a comprehensive test of the model from the dimensions of economics, statistics, and econometrics, analyzing the specific impact effects of each variable on fiscal revenue; Chapter 6, combined with the empirical research conclusions, proposes targeted countermeasures and suggestions for the sustainable growth of Hebei Province's fiscal revenue from three dimensions: enhancing employment capacity, increasing residents' income, and optimizing the economic structure.

2. Definition of Related Concepts

2.1 Fiscal Revenue

Fiscal revenue refers to all the monetary funds that the government collects from the national economic operation through legal forms and channels, such as taxation and non-taxation, with the political power granted by the state, the ownership of public resources, and the management authority[16]. It is the core material foundation for the government to carry out various economic and social construction activities and is also an important macroeconomic indicator for measuring a country or region's fiscal strength, economic development quality, and government regulatory capacity.

The collection of fiscal revenue has a distinct public attribute. Among them, tax revenue, as the core component, demonstrates the characteristics of compulsion, gratuitousness, and fixity. Non-tax revenue, state capital operation income are obtained through the government's public management authority or resource ownership[17]. Their fundamental purpose is to make up for

market failures, provide public products and services, ensure people's livelihood and the stability and development of regional economic society. The fiscal revenue system they constitute is an important factor in improving the country's governance capacity.

2.2 Public Budget Revenue

Public budget revenue, also known as general public budget revenue, is the core component of narrow fiscal revenue and the core financial resource that local governments can independently plan and allocate [18]. It refers to the total amount of fiscal funds raised by all levels of government to fulfill their statutory functions such as public services, social management, and social security, by leveraging the political power and public management authority granted by the state, through legal channels such as taxation and non-tax revenue, and included in the local general public budget management. Its revenue and expenditure management strictly follows the "Budget Law of the People's Republic of China", and after the tax-sharing system reform, local finances have faced pressure. The local general public budget is the core carrier and component of local autonomous financial resources [19].

As the main source of funds for local governments to ensure public expenditures, public budget revenue is different from other types of fiscal funds such as government funds and state capital operation budget revenue. It has the characteristics of high autonomy in use, clear accounting standards, and close connection with social security. Its scale, growth stability, and structural rationality directly determine the public service supply capacity, infrastructure construction level, and macro-control implementation effect of local governments, and is also the core quantitative indicator for measuring a region's fiscal strength and economic development quality.

2.3 Public Budget Revenue

The multiple linear regression model is a basic empirical model in econometrics for analyzing the linear dependence between a single explained variable and multiple explanatory variables, and is also one of the most widely used statistical methods in multi-factor quantitative analysis[20]. Centered on linear regression theory, this model quantifies the direction, degree, and significance level of the impact of multiple explanatory variables on the explained variable through parameter estimation and statistical testing of sample data, thereby revealing the intrinsic quantitative relationship between variables, providing a scientific quantitative basis for the analysis, interpretation, and prediction of economic phenomena. Its theoretical core revolves around linear dependence, clearly defining the statistical connotations of the constant term, regression coefficients, and random disturbance term, laying a solid theoretical foundation for the precise interpretation of the meaning of each parameter.

The basic expression of the multiple linear regression model is:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki} + \mu_i (i = 1, 2, \dots, n).$$

The meanings of the core symbols are:

Y_i = Explained variable,

X_{ki} = k-th explanatory variable,

β_0 = Constant term,

β_k = Regression coefficient of each explanatory variable,

μ_i = Random disturbance term,

n = Number of samples.

The simplified expression combined with this study is:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \mu_i$$

Corresponding to the study on Hebei Province's fiscal revenue, Y is public budget revenue, and X_1 to X_5 are sequentially regional gross domestic product, foreign trade import and export volume, retail sales of consumer goods, number of employed persons, and per capita disposable income.

3. Problem Presentation and Data Collection

3.1 Problem Presentation

Fiscal revenue serves as the core financial guarantee for the government to fulfill its public management functions, provide public services for the people, and implement macroeconomic regulation. It is an important economic indicator reflecting a country's economic development level and a crucial financial guarantee and prerequisite for the salary payment and normal operation of government agencies and public institutions, as well as the development of various economic undertakings. The stability and sustainability of its growth directly affect the stability and prosperity of regional development and are an important material foundation for promoting high-quality regional economic development. As an important economic province in northern China and a core carrier of the Beijing-Tianjin-Hebei coordinated development strategy, Hebei Province has maintained a steady growth trend in public budget revenue in recent years. However, influenced by multiple factors such as deep structural adjustment of the industrial system, fluctuations in external market

environment, and changes in the consumption market, the growth of fiscal revenue shows periodic fluctuations. The impact effects of traditional economic indicators such as regional GDP, foreign economic trade import and export volume, retail sales volume, employment personnel number, and per capita disposable income on fiscal revenue also exhibit distinct regional characteristics that are in line with local development realities.

Currently, Hebei Province is in a crucial stage of transforming traditional industries and cultivating emerging industries. Clarifying the specific impact paths of various economic indicators on fiscal revenue, accurately identifying the core driving factors and internal mechanisms of fiscal revenue growth, have become the key to solving various problems in the local fiscal revenue increase process and consolidating the foundation of fiscal development. Therefore, this paper selects five core economic indicators, namely regional GDP, foreign economic trade import and export volume, retail sales volume, employment personnel number, and per capita disposable income, to conduct an empirical analysis of their impact directions and intensity on the fiscal revenue of Hebei Province. The aim is to precisely locate the key influencing factors of fiscal revenue, clarify the internal correlations between each factor and fiscal revenue, and provide solid and powerful decision-making basis for optimizing the fiscal revenue increase path, stabilizing fiscal operation, and achieving the goal of "economic powerhouse and beautiful Hebei" in the new era.

3.2 Data Collection

The data in this paper comes from the "Hebei Statistical Yearbook", selecting statistical data from 2008 to 2022 as samples for research.

Table 1. Hebei Province Fiscal Revenue Statistics Table

Year	Public Budget Revenue (100 million yuan)	Regional Gross Domestic Product (100 million yuan)	Foreign Trade Import and Export Volume (100 million yuan)	Retail Sales of Consumer Goods (100 million yuan)	Number of Employed Persons (10,000 persons)	Per Capita Disposable Income (yuan)
2008	947.59	14200.1	2701.69	637.19	3725.66	8365.4
2009	1067.12	15306.9	2020.09	707.18	3792.49	9266.9
2010	1331.85	18003.6	2857.38	839.1	4135	10427.5
2011	1737.77	21384.7	3487.93	1054.29	4087	12058.6
2012	2084.28	23077.5	3192.54	1100.51	4063	13646.7
2013	2295.62	24259.6	3409.23	1107.09	4032	15189.6
2014	2446.62	252089	3678.52	1145.31	3978	16647.4
2015	2649.18	26398.4	3194.45	989.01	3927	18118.1
2016	2849.87	28474.1	3078.23	939.75	3871	19725.4
2017	3233.83	30640.8	3378.81	1237.07	3795	21484.1
2018	3513.86	32494.6	3553.16	996.33	3739	23445.7
2019	3738.99	34978.6	4002.08	959.54	3702	25664.7
2020	3826.46	36013.8	4456.77	815.04	3671	27135.9
2021	4167.62	40397.1	5338.16	841.4	3643	29383
2022	4056.3	42370.4	5418.91	996.4	3580	30867

4. Variable Selection, Analysis, and Model Specification

4.1 Variable Selection and Analysis

4.1.1 Variable Selection

By observing the development trend of Hebei Province's fiscal revenue, it can be found that in recent years, the scale of fiscal revenue in Hebei Province has continued to climb. From 2008 to 2022, the general public budget revenue increased significantly from 94.759 billion yuan to 405.63 billion yuan. Among them, the growth rate fluctuated in some years due to factors such as the macroeconomic situation and policy adjustments, but the overall growth trend remained unchanged. This is closely related to the development of the province's employment rate, retail sales of consumer goods, foreign trade, and other aspects. Therefore, this paper selects Hebei Province's public budget revenue as the explained variable because it can well reflect the development status of Hebei Province's fiscal revenue; and selects regional GDP, foreign trade import and export volume, retail sales of consumer goods, number of employed persons, and per capita disposable income as explanatory variables.

4.1.2 Variable Analysis

(1) Regional Gross Domestic Product

Regional Gross Domestic Product is a core macro indicator measuring regional economic development. It refers to the total value of final products and services created by production activities of all permanent units in a region within a certain accounting period. It comprehensively reflects the overall scale, production capacity, and development level of the regional economy and is an important basis for judging the regional economic operation situation. Steady growth of regional GDP will drive an increase in corporate profits and residents' income, thereby promoting the expansion of fiscal revenue sources such as taxes, forming a positive linkage between economic growth and fiscal revenue increase. Based on this, this paper assumes a positive correlation between regional GDP and fiscal revenue in Hebei Province.

(2) Foreign Trade Import and Export Volume

Foreign trade import and export volume is a key indicator reflecting the degree of regional opening-up, international market competitiveness, and the closeness of foreign economic ties. It covers the two dimensions of total imports and exports of goods and services in the region. An increase in export volume represents the recognition and competitiveness of regional products in the international market, which can drive the development of local industries, increase corporate revenue and employment opportunities, and create conditions for the accumulation of fiscal revenue; import volume reflects the region's demand for external high-quality resources and products, which can make up for local industrial shortcomings, drive the development of related industrial supporting facilities, and activate the potential of the domestic consumer market. The overall development of import and export trade will enhance regional economic vitality. Therefore, this paper

assumes a positive correlation between foreign trade import and export volume and fiscal revenue in Hebei Province.

(3) Retail Sales of Consumer Goods

Retail sales of consumer goods refers to the total revenue achieved by retail enterprises through selling goods to residents and social groups via various transaction methods such as offline stores and online platforms. It directly reflects the activity level of the regional consumer market, residents' consumption capacity, and consumption scale, and is an important indicator measuring the development status of the domestic demand market. The growth of retail sales of consumer goods implies enhanced consumer willingness and a prosperous consumer market, which can drive the development of related industries such as commerce, circulation, and services, promote the increase in revenue of market entities, thereby increasing tax revenues related to value-added tax and income tax, and driving fiscal revenue growth. Therefore, this paper assumes a positive correlation between retail sales of consumer goods and fiscal revenue in Hebei Province.

(4) Number of Employed Persons

The number of employed individuals refers to the total number of people within a region who are of legal working age, possess the ability to work, engage in certain social labor and receive labor remuneration or business income. It is a core indicator reflecting the employment situation in the region and the efficiency of the utilization of labor resources. A higher number of employed individuals indicates that the labor resources in the region are fully utilized, more residents can obtain stable income through labor, which is beneficial for enhancing the overall consumption capacity of residents, maintaining social stability, and also promoting the expansion of enterprise production scale, driving economic development. Moreover, an increase in the employment scale will directly increase sources of fiscal revenue such as personal income tax and related taxes for enterprises. Therefore, this article assumes that the number of employed individuals has a positive correlation with the fiscal revenue of Hebei Province.

(5) Per Capita Disposable Income

Per capita disposable income refers to the average income that resident households can freely dispose of within a certain period. Specifically, it is the balance after deducting relevant taxes and fees and transfer expenditures from total household income. It is a core indicator measuring residents' living standards and consumption capacity, directly reflecting residents' actual wealth status. An increase in per capita disposable income allows residents to have more funds for consumption, savings, and investment. On one hand, it can directly drive growth in the consumer market and promote the development of related industries; on the other hand, increased savings and investment will promote the development of the financial market and the real economy, thereby driving fiscal revenue growth through channels such as taxes and industrial value-added. Based on this, this paper assumes a positive correlation between per capita disposable income and fiscal revenue in Hebei Province.

Table 2. Influencing Factors of Hebei Province's Fiscal Revenue

Explained Variable	Explanatory Variable	Unit
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	Regional Gross Domestic Product X_1	100 million yuan
	Foreign Trade Import and Export Volume X_2	100 million yuan
Public Budget Revenue (100 million yuan)	Retail Sales of Consumer Goods X_3	100 million yuan
	Number of Employed Persons X_4	10,000 persons
	Per Capita Disposable Income X_5	Yuan

4.2 Model Specification and Parameter Estimation

First, construct a multiple linear regression model for the total tourism revenue of Guiyang City:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \mu_i \text{ (Equation 1)}$$

In Equation 1, β_0 is the constant term, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are the coefficients of the variables; i is the number of samples, $i = 1, 2, \dots, n$; μ_i is the random disturbance term.

This paper uses Eviews software to perform ordinary least squares regression on X_1, X_2, X_3, X_4, X_5 , and obtains the following results:

$$Y_i = -2047.147 + 1.76E-05X_1 - 0.139936X_2 + 0.463068X_3 + 0.432065X_4 + 0.165468X_5$$

$$(-1.472147) (0.028061) (-1.720964) (1.493561) (1.126944) (11.90871)$$

$$R^2 = 0.991530 \quad \bar{R}^2 = 0.986825 \quad F = 210.7233 \text{ (Equation 3.2)}$$

Table 3. Initial Regression of the Original Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2047.147	1390.561	-1.472174	0.1751
X1	1.76E-05	0.000627	0.028061	0.9782
X2	-0.139936	0.081312	-1.720964	0.1194
X3	0.463068	0.310043	1.493561	0.1695
X4	0.432065	0.383395	1.126944	0.2889
X5	0.165468	0.013895	11.90871	0
R-squared	0.991530	Mean dependent var		2663.131
Adjusted R-squared	0.986825	S.D. dependent var		1083.502
S.E. of regression	124.3670	Akaike info criterion		12.77353
Sum squared resid	139204.4	Schwarz criterion		13.05675
Log likelihood	-89.80144	Hannan-Quinn criter.		12.77051
F-statistic	210.7233	Durbin-Watson stat		1.712531
Prob(F-statistic)	0.000000			

By observing the preliminary regression results in Table 3, it can be found that the model's coefficient of determination and adjusted coefficient of determination are both close to 1, indicating that the model fits the sample data well overall; the F-statistic reaches 210.7233, and its corresponding probability is 0.0000, far below the 5% significance level, indicating that the overall linear relationship of the regression equation is significantly established. However, from the variable regression results, the coefficient of X_1 is only 1.76E-05, some explanatory variables did not pass the t-test at the 5% significance level, and the coefficient of X_2 is negative, inconsistent with theoretical expectations. It can be seen that the initial model still has obvious defects and urgently needs further adjustment and optimization.

Combined with the analysis of the correlation coefficient matrix in Table 4, the correlation between most explanatory variables is low, indicating that the model basically does not have a serious multicollinearity problem. However, the correlation coefficient between X_2 and X_5 is as high as 0.877397, indicating a strong linear correlation between the two. To reduce the interference of this problem on the model estimation results and improve the effectiveness of parameter estimation, this paper will logarithmically transform the explained variable Y and all explanatory variables X_1, X_2, X_3, X_4, X_5 , then regress again, and use this as the adjusted research model.

$$\ln Y_i = -14.13361 - 0.008246 \ln X_1 - 0.055450 \ln X_3 + 1.129593 \ln X_4 + 1.197007 \ln X_5$$

$$(-3.644880) \quad (-0.399678) \quad (-0.640620) \quad (1.929785) \quad (2.322343) \quad (16.56620)$$

$$R^2 = 0.995216 \quad \overline{R}^2 = 0.992558 \quad F = 374.4380 \quad (\text{Equation 3.3})$$

Table 4. Correlation Coefficient Matrix (Original Variables)

	X1	X2	X3	X4	X5
X1	1	0.161239	0.352227	0.105938	0.067204
X2	0.161239	1	0.173598	-0.541207	0.877397
X3	0.352227	0.173598	1	0.35525	0.195638
X4	0.105938	-0.541207	0.35525	1	-0.697472
X5	0.067204	0.877397	0.195638	-0.697472	1

Table 5. Results of the Original Model after Logarithmic Transformation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-14.13361	3.877661	-3.64488	0.0054
LN1	-0.008246	0.020632	-0.399678	0.6987
LN2	-0.05545	0.086557	-0.64062	0.5377
LN3	0.212363	0.110045	1.929785	0.0857
LN4	1.129583	0.486398	2.322343	0.0453
LN5	1.197007	0.072256	16.5662	0.0000
R-squared	0.995216	Mean dependent var		7.791136
Adjusted R-squared	0.992558	S.D. dependent var		0.4882594
S.E. of regression	0.041632	Akaike info criterion		-3.230712
Sum squared resid	0.015599	Schwarz criterion		-2.947492
Log likelihood	30.23034	Hannan-Quinn criter.		-3.233729
F-statistic	374.4380	Durbin-Watson stat		1.518650
Prob(F-statistic)	0.000000			

5. Model Testing

5.1 Economic Significance Test

From the analysis of the coefficient results of the preliminary model regression, it can be seen that the coefficients of retail sales of consumer goods β_3 , number of employed persons β_4 , and per capita disposable income β_5 are all greater than 0. Judging from basic economic theory, retail sales of consumer goods, number of employed persons, and per capita disposable income are all positively correlated with the total fiscal revenue of Hebei Province. This regression result is consistent with economic significance and conforms to the basic logic of economic operation. However, the coefficient of regional GDP β_2 is less than 0, which contradicts the conclusion in economic theory that regional GDP should be positively correlated with fiscal revenue, showing a situation inconsistent with economic significance. To eliminate interference from potential problems such as model specification and variable correlation, and to ensure the authenticity, reliability, and scientificity of the empirical analysis results, it is necessary to conduct further systematic tests at the

economic, statistical, and econometric levels on the model to optimize it and draw accurate conclusions.

5.2 Statistical Significance Test

5.2.1 Goodness of Fit Test

According to the regression results of the logarithmic model in Table 6, the model's coefficient of determination $R^2 = 0.995216$, and the adjusted coefficient of determination also reaches 0.992558. Both indicators are very close to 1, indicating that the model fits the sample data extremely well and has strong explanatory power. It also shows that the changes in Hebei Province's fiscal revenue can be well explained by the five explanatory variables: regional GDP, foreign trade import and export volume, retail sales of consumer goods, number of employed persons, and per capita disposable income.

5.2.2 F-test

For the null hypothesis $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$, this paper selects a 5% significance level for the F-test. From the F-test critical value table,

the critical value $F(0.05)(5,10) = 3.326$ is obtained. The F-statistic obtained from the model regression is 374.4380, which is much larger than the critical value, and its corresponding probability is 0.0000, far below the 5% significance level. Therefore, the null hypothesis is rejected, indicating that the linear regression relationship of the model is significantly established, the explanatory variables jointly have a significant impact on the explained variable, and the model has a high degree of approximation to the population.

5.2.3 T-test

For $H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$, given a significance level of 5%, the critical value $t(0.025)(10) = 2.228$ is found in the T-test critical value table.

$\ln X_1 : |t| = 0.399678 < t$ -critical value 2.228, its probability is 0.6987 greater than the 5% significance level. Do not reject the null hypothesis, i.e., regional GDP cannot significantly explain Hebei Province's fiscal revenue.

$\ln X_2 : |t| = 0.640620 < t$ -critical value 2.228, its probability is 0.5377 greater than the 5% significance level. Do not reject the null hypothesis, i.e., foreign trade import and export volume cannot significantly explain Hebei Province's fiscal revenue.

$\ln X_3 : |t| = 1.929785 < t$ -critical value 2.228, its probability is 0.0857 less than the 5% significance level. Reject the null hypothesis, i.e., retail sales of consumer goods can significantly explain Hebei Province's fiscal revenue.

$\ln X_4 : |t| = 2.322343 > t$ -critical value 2.228, its probability is 0.0453 less than the 5% significance level. Reject the null hypothesis, i.e., number of employed persons can significantly explain Hebei Province's fiscal revenue.

$\ln X_5 : |t| = 16.56620 > t$ -critical value 2.228, its probability is 0.0000 less than the 5% significance level. Reject the null hypothesis, i.e., per capita disposable income can significantly explain Hebei Province's fiscal revenue.

5.3 Econometric Significance Test

5.3.1 Multicollinearity Test

Combining the results of the economic significance test and statistical significance test, the model's adjusted coefficient of determination R^2 is high, and the F-test is passed smoothly with a large F-statistic value. This indicates that the model fits the sample data well and the overall linear relationship has significant statistical significance. However, some explanatory variables did not pass the t-test at the 5% significance level, and the corresponding t-values are relatively small, indicating obvious statistical test defects. Therefore, it is necessary to suspect that there is a serious multicollinearity problem within the model. Further analysis combined with the correlation coefficient matrix in Table 6 shows that there is a high correlation between the logarithmically transformed explanatory variables X_1 , X_2 , X_4 , and X_5 . This result also confirms the conjecture that the model likely has serious multicollinearity.

Table 6. Correlation Coefficient Matrix (Original Variables)

	$\ln X_1$	$\ln X_2$	$\ln X_3$	$\ln X_4$	$\ln X_5$
$\ln X_1$	1.000000	0.490649	0.473579	-0.087110	0.468988
$\ln X_2$	0.490649	1.000000	0.317013	-0.472082	0.849792
$\ln X_3$	0.473579	0.317013	1.000000	0.353393	0.377208
$\ln X_4$	-0.087110	-0.472082	0.355250	1.000000	-0.597410
$\ln X_5$	0.468988	0.849792	0.377208	-0.597410	1.000000

To further verify the multicollinearity problem of the model, the variance inflation factor method is used for precise testing. From the test results in Table 7, it can be clearly seen that the Centered VIF values corresponding to each explanatory variable do

not exceed the critical value of 10. Based on this, it can be clearly determined that the regression model of this study does not have a serious multicollinearity problem, and the linear correlation interference between variables is within a reasonable range.

Table 7. Variance Inflation Factor Test

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	15.03625	130128.5	NA
$\ln X_1$	0.000426	394.5104	1.551618
$\ln X_2$	0.007492	4315.567	3.861447
$\ln X_3$	0.012110	4920.234	3.259382
$\ln X_4$	0.236583	139517.9	4.051934
$\ln X_5$	0.005221	4311.901	7.565286

5.3.2 Heteroscedasticity Test

The existence of heteroscedasticity will interfere with the effectiveness of regression parameter estimation and seriously affect the accuracy and reliability of the model regression results. This paper uses the ARCH method to test for heteroscedasticity in

the model. From the test results in Table 8, the $Obs \cdot R^2$ value is 0.67500, and its corresponding probability P -value is 0.7950, which is much greater than the 5% significance level. Therefore, the null hypothesis is not rejected, and it can be determined that the model does not have a heteroscedasticity problem.

Table 8. ARCH Test Output Results

F-statistic	0.058138	Prob. F(1,12)	0.8135
Obs*R-squared	0.67500	Prob. Chi-Square(1)	0.7950

5.3.3 Autocorrelation Test

The presence of autocorrelation can undermine the basic assumptions of the model, significantly reducing the effectiveness of parameter estimation and the credibility of the analysis results. Therefore, in this paper, the partial correlation test method is

adopted to test whether the model has the problem of autocorrelation. From the test results in Figure 1, it can be clearly seen that the values of all partial correlation coefficients do not exceed the two critical dotted lines on the left and right of the graph. Based on this, it can be determined that the model does not have the problem of autocorrelation.

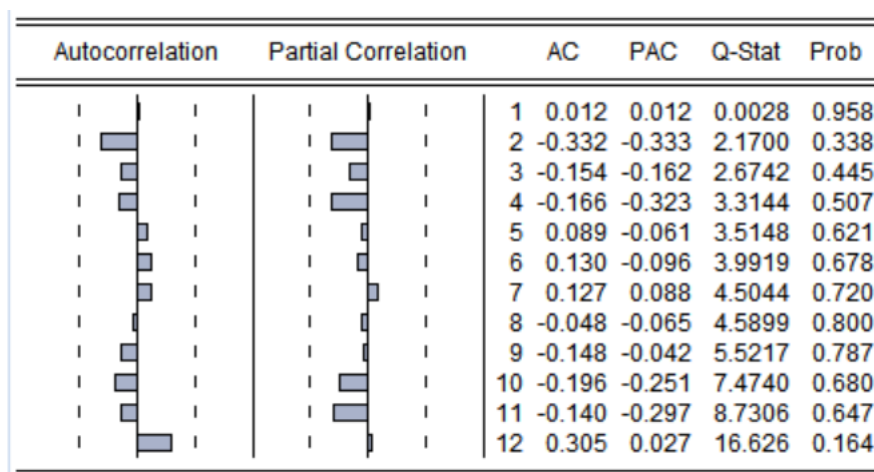


Figure 1. Results of Partial Correlation Test

5.4 Econometric Significance Test

Using time series data from 2008 to 2022, this paper constructed a multiple linear regression model. Through economic significance testing, statistical significance testing, and econometric significance testing of the model, the relationship

between Hebei Province's fiscal revenue Y and regional GDP X_1 , foreign trade import and export volume X_2 , retail sales of consumer goods X_3 , number of employed persons X_4 , and per capita disposable income X_5 is established. The final equation is:

$$\ln Y_t = -14.13361 - 0.008246 \ln X_1 - 0.0055450 \ln X_2 + 0.212363 \ln X_3 + 1.129593 \ln X_4 + 1.197007 \ln X_5 - 3.644880 \quad (-0.399678) \quad (-0.640620) \quad (1.929785) \quad (2.322343) \quad (16.56620)$$

$$R^2 = 0.995216 \quad \overline{R^2} = 0.992558 \quad F = 374.4380 \quad (\text{Equation 4.1})$$

At the 5% significance level, the specific impact effects of each explanatory variable on Hebei Province's fiscal revenue obtained through model empirical testing are as follows: For every 1% increase in regional GDP, Hebei Province's fiscal revenue decreases by an average of 0.008246%; for every 1% increase in foreign trade import and export volume, fiscal revenue decreases by an average of 0.055450%; for every 1% increase in retail sales of consumer goods, fiscal revenue increases by an average of 0.212363%; for every 1% increase in the number of employed persons, fiscal revenue increases by an average of 1.129593%; for

every 1% increase in per capita disposable income, fiscal revenue increases by an average of 1.197007%. From the perspective of impact magnitude and direction, both the number of employed persons and per capita disposable income show a significant strong positive impact on Hebei Province's fiscal revenue and are the core driving factors for fiscal revenue growth. Although retail sales of consumer goods have a positive impact, the effect is relatively limited. Regional GDP and foreign trade import and export volume show weak negative impacts. Overall, the impact degree of these

three types of indicators on Hebei Province's total fiscal revenue is relatively small.

6. Model Countermeasures and Suggestions

6.1 Enhance Employment Capacity

Employment is the foundation of people's livelihood and also a core driving factor for the growth of fiscal revenue in Hebei Province. It plays a significant supporting role in stabilizing local fiscal operations and promoting economic and social development. The government should play a leading and guiding role in promoting employment and increasing the number of employed individuals. It should expand the scale of employment and improve the quality of employment through multiple measures. The government should introduce targeted and practical support policies to encourage various market entities to actively create job positions. Based on the number, quality, and employment of key groups absorbed by enterprises, different levels of tax reduction and exemption benefits should be given. At the same time, a special employment subsidy fund should be established to provide employment subsidies to enterprises that newly recruit employees according to standards, reducing the employment costs of enterprises and stimulating their enthusiasm for employment. While expanding employment positions, the improvement of the employment ability of workers is equally crucial. The government should increase financial investment in vocational skills training, integrate various training resources, and build diversified and market-oriented vocational skills training platforms. On the one hand, it should set forward-looking and practical training courses that closely follow market demands and industry trends, enabling workers to master professional skills that meet market demands. On the other hand, it should encourage social training institutions to participate in the construction of vocational skills training systems. Through government purchase of services and the provision of training subsidies, it can guide training institutions to improve training quality and provide more high-quality and more practical vocational skills training services for workers, achieving a double improvement in employment scale and quality.

6.2 Increase Residents' Income

The improvement of residents' income levels is an important starting point for promoting economic growth and driving the increase in fiscal revenue. It plays a crucial role in building a virtuous cycle of economic and fiscal revenue growth in Hebei Province. The government needs to make efforts from multiple dimensions to steadily raise the overall income level of residents. At the level of wage income, it is necessary to strengthen the supervision of the labor market, establish and improve a mechanism for normal wage growth and payment guarantee. Regularly issue wage guidelines based on regional economic development trends, price fluctuations, and enterprise operating efficiency, guiding enterprises to reasonably increase employee compensation and ensuring the basic income of workers. At the level of property income, continuously improve the local financial market system, further broaden residents' investment channels, while strengthening financial knowledge popularization and risk education, enhancing residents' financial literacy, guiding them to rationally participate in various financial investment activities, and increasing property income. The increase in residents' income can directly release consumption potential and enhance consumption

capacity, effectively stimulating domestic demand and activating market consumption vitality. This drives the growth of enterprise sales revenue and expansion of production scale, thereby creating more job opportunities and improving economic efficiency, forming a virtuous cycle where consumption promotes growth, and growth increases fiscal revenue. In addition, industrial upgrading is the fundamental support for the continuous improvement of per capita disposable income of residents. The government should increase policy and financial support for high-tech industries and strategic emerging industries, guide enterprises to increase research and development investment, promote industrial innovation and upgrading through technological innovation, and lay a solid foundation for the growth of residents' income from the industrial side.

6.3 Adjust Economic Structure

Although the empirical analysis results show that the direct impacts of regional GDP, foreign economic trade import and export volume, and retail sales volume on the fiscal revenue of Hebei Province are relatively small, this does not mean that these core economic indicators can be ignored. They still play an irreplaceable supporting role in promoting the high-quality development of regional economy, expanding the channels for fiscal revenue growth, and laying a long-term foundation for increasing fiscal revenue. Therefore, it is urgent to carry out systematic adjustments and optimizations of the economic structure to fully unleash their potential stimulating effect on fiscal revenue. In the core of industrial structure optimization and upgrading, the government needs to focus on the transformation of local traditional industries and continuously exert efforts. For Hebei Province's traditional advantageous industries, it is necessary to introduce special support policies, encourage enterprises to increase investment in technological transformation and innovation, promote enterprises to introduce advanced production processes and intelligent equipment, significantly improve production efficiency and reduce production costs, while strictly controlling energy consumption and pollutant emissions, achieving green and sustainable development. At the same time, actively guide enterprises to strengthen brand building and product quality improvement, extend the upstream and downstream industrial chains, and increase product value-added, constantly enhancing market core competitiveness, and promoting traditional industries to move towards the high-end of the industrial chain and value chain. Through the comprehensive improvement of the quality of industrial development, the overall quality and efficiency of the regional economy can be enhanced, and the development of industries and economic growth can be better transformed into fiscal revenue, laying a solid industrial foundation for the sustained and stable growth of fiscal revenue in Hebei Province.

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