Research on the Factors Influencing the Income Level of Urban Residents in Guangzhou

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Abstract. High-quality development is a new requirement for China's economic development in the new era. This paper selects the ownership structure, urbanization level and openness as the influencing factors of urban residents' income level in Guangzhou, and uses vector autoregressive model (VAR) to empirically analyze the mutual values between Guangzhou City's 1998-2017 variables and urban residents' income levels. The results show that the two-way causal relationship between urban residents' income level and urbanization is the most significant. The change of ownership structure has the highest contribution to the fluctuation of urban residents' income level, and on this basis, relevant policy recommendations are put forward.

1. Introduction

High-quality development is a new requirement put forward by the party's 19th National Congress on China's economic development. Improving the income level of residents and establishing a revenue growth mechanism in line with economic development is not only a realistic demand for improving people's lives, improving social security, and cultivating new kinetic energy for economic development, but also an inevitable requirement for high-quality economic development. The theory of income distribution in classical economics mainly includes Adam Smith's factor distribution theory, Marshall's equilibrium price distribution theory, and Clark's marginal productivity distribution theory. The existing research results show that the main factors affecting the income level of residents are economic development level, employment level, industrial structure, labor quality, urbanization level, and social security system. This paper selects the ownership structure, urbanization level and openness as the influencing factors of urban residents' income level in Guangzhou, and uses VAR model to empirically analyze the relationship between the three changes and the income level of urban residents, and improve the income of residents and achieve high-quality development for Guangzhou.

2. Selection of variables

The ownership structure of this paper is divided by the amount of fixed assets investment of the state-owned economy in Guangzhou divided by the total investment in fixed assets. The urban population is divided by the total population as the representative variable of the urbanization level, and the total value of imports and exports is divided by the gross domestic product as the representative variable of the openness. After natural logarithm processing of each variable, urban residents' income level, ownership structure, urbanization level, and openness are represented by CSSR, SYZJG, GZCZH, and KFD respectively. The selected variable data are from the Guangzhou Statistical Yearbook, the time span is 1998-2017.
3. An Empirical Analysis of the Factors Affecting the Income Level of Urban Residents in Guangzhou

3.1. Test sequence stationarity (unit root test)

In this paper, the ADF test is used to test the stationarity of the time series. The test results are shown in Table 1:

| Variable | t value | Threshold 1% | Threshold 5% | Threshold 10% | Conclusion  |
|----------|---------|--------------|--------------|---------------|-------------|
| CSSR     | -2.0893 | -4.5325      | -3.6736      | -3.2773       | Non-stable  |
| SYZJG    | 1.2414  | -2.6924      | -1.9602      | -1.6071       | Non-stable  |
| GZCZH    | -0.8009 | -4.5325      | -3.6736      | -3.2773       | Non-stable  |
| KFD      | -1.7153 | -4.5325      | -3.6736      | -3.2773       | Non-stable  |

| Variable first order difference | t value | Threshold 1% | Threshold 5% | Threshold 10% | Conclusion  |
|---------------------------------|---------|--------------|--------------|---------------|-------------|
| △CSSR                           | -3.8445 | -4.5715      | -3.6908      | -3.2869       | I(1)        |
| △SYZJG                          | -3.2811 | -2.6998      | -1.9614      | -1.6066       | I(1)        |
| △GZCZH                          | -3.7573 | -4.5715      | -3.6908      | -3.2869       | I(1)        |
| △KFD                            | -4.1048 | -4.5715      | -3.6908      | -3.2869       | I(1)        |

The results show that the original time series are non-stationary and are all first-order single-order sequences, and the VAR model can be established.

3.2. Johansen cointegration test

Although many economic variables are non-stationary, there may be a long-term stable relationship between them, namely the cointegration relationship. The Johansen cointegration test is a test method based on a vector autoregressive model and is commonly used for cointegration tests on multivariables. The Johansen cointegration test results are shown in Table 2:

| Hypothesized No.of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|--------------------------|------------|-----------------|---------------------|---------|
| None*                    | 0.853282   | 48.42610        | 40.17493            | 0.0060  |
| At most 1                | 0.352249   | 11.96054        | 24.27596            | 0.7087  |
| At most 2                | 0.174512   | 3.709806        | 12.32090            | 0.7523  |
| At most 3                | 0.003467   | 0.065979        | 4.129906            | 0.8332  |

The results show that there is at least one cointegration relationship between CSSR, SYZJG, GZCZH and KFD. The cointegration (error correction term) equation of the normalization coefficient obtained after cointegration test is:

\[ ecm_t = CSSR_t - 5.2907 GZCZH_t + 3.6285 SYZJG_t - 0.2685 KFD_t \]

3.3. VAR model construction

In order to study the long-term equilibrium and short-term relationship between urban residents' income (CSSR) and ownership structure (SYZJG), urbanization level (GZCZH), and openness (KFD) in Guangzhou, analyze the comprehensive dynamic response between economic variables and establish an unstructured VAR model consisting of these four endogenous variables. The specific form is:

\[ y_t = \sum_{i=1}^{p} A_i y_{t-i} + \epsilon_t \]
\[ Y_t = (CSSR_t, SYZJG_t, GZCZH_t, KFD_t)^T \]

The best lag order of the VAR model is usually determined by two methods: AIC and SC information criterion test; LR (likelihood ratio) test. The specific results of each test method are shown in Table 3:

| P  | AIC   | SC   | LogL  |
|----|-------|------|-------|
| 1  | -9.4761 | -8.4819 | 110.0229 |
| 2  | -9.4781 | -7.6974 | 121.3032 |
| 3  | -19.6061* | -17.0575* | 218.6525* |

According to the calculation results, the optimal lag order P=3 of the VAR model is determined, the third-order lag VAR model is constructed and the stability test is performed. The results show that the absolute value of the reciprocal of the modulus of all eigenvalues is less than 1, that is, within the unit circle, as shown in Figure 1, indicating that the model is stable.

### 3.4.2. Granger causality test

The causality test is to determine whether the lag term of one variable is included in the equation of another variable. The precondition for Granger causality test is that the variable is stationary or a variable non-stationary variable but there is a cointegration relationship, and the test is sensitive to the length of the lag period. The specific results of the Granger causality test are shown in Table 4:

| Variable | P value |
|----------|---------|
| CSSR→SYZJG | 0.0777*  |
| SYZJG→CSSR | 0.9478   |
| CSSR→GZCZH | 0.2400   |
| GZCZH→CSSR | 0.1254   |
| CSSR→KFD  | 0.0225** |
| KFD→CSSR  | 0.1574   |

Figure 1. AR root test chart
According to the test results, the conclusion can be drawn:

- **Urban Residents' Income Level and Ownership Structure**: There is a lagging two-way causal relationship between the income level of urban residents in Guangzhou and the ownership structure. The improvement of the income level of urban residents can promote the diversification of ownership structure in a short period of time. The diversification of ownership structure can promote the improvement of residents' income level in the long run. In reality, the income growth of private enterprises and foreign-funded enterprises is faster than that of state-owned enterprises.

- **Urban Residents' Income Level and Urbanization**: The two-way causal relationship between urban residents' income level and urbanization in Guangzhou is the most significant. At a significant level of 0.05, urban residents' income can drive urbanization in Guangzhou in both the short and long term, and urbanization can promote the income level of urban residents in the medium and long term.

- **Urban residents' income level and openness**: There is also a two-way causal relationship between the income level and openness of urban residents in Guangzhou. At a significant level of 0.05, the increase in the income level of urban residents can promote the opening up of Guangzhou in the short and medium term, and the increase in openness can increase the income level of urban residents in the medium and long term.

- **Openness and ownership structure**: In both the short-term and the long-term, there is a one-way causal relationship between the openness of Guangzhou and the ownership structure, that is, the increase in openness can promote the diversification of the ownership structure. As a coastal open city, foreign capital has become an important force in the market economy.

### 3.4.3. Variance decomposition

The variance decomposition can reflect the contribution of a single structural shock to the fluctuation trend of endogenous variables, and can also give the relative importance information of random interference terms. The results of the variance decomposition are shown in Table 5:

| Period | S.E.     | CSSR   | SYZJG  | GZCZH  | KFD    |
|--------|---------|--------|--------|--------|--------|
| 1      | 0.036546| 100.000| 0.00000| 0.00000| 0.00000|
| 2      | 0.039789| 99.8937| 0.01725| 0.00838| 0.080635|
| 3      | 0.042363| 93.4576| 5.88167| 0.007774| 0.652894|
| 4      | 0.053712| 90.6088| 8.899859| 0.024794| 0.466453|
| 5      | 0.071374| 91.4780| 7.123104| 0.021933| 1.376890|
| 6      | 0.081870| 88.2524| 8.126556| 0.024341| 3.596615|
| 7      | 0.092343| 80.5014| 11.65264| 0.026532| 7.819394|
| 8      | 0.106873| 76.3591| 13.83361| 0.025466| 9.781788|
| 9      | 0.115315| 71.8976| 17.06228| 0.023719| 11.01639|
| 10     | 0.120392| 67.0603| 20.51571| 0.023055| 12.40090|

**Note**: ** indicates rejection of the null hypothesis at a significance level of 0.05, * indicates rejection of the null hypothesis at a significance level of 0.1.
The above table gives the variance decomposition value of the ownership structure, urbanization level, and openness to the income of urban residents. It can be seen that: In the CSSR changes, 0~20.52% of the fluctuations can be explained by changes in ownership structure. 0~2.3% of fluctuations can be explained by changes in urbanization levels, and 0~12.4% of fluctuations can be explained by changes in openness. It can be seen that the impact of changes in ownership structure on the income of urban residents is greater than the impact of urbanization level and openness on economic growth, and there is a growing trend. The results of variance decomposition show that the ownership structure is an important factor affecting the income of urban residents, and the degree of openness has a significant impact on the income level of urban residents, and the impact of urbanization level is low.

4. Conclusion
Through the empirical analysis of the ownership structure, urbanization level, openness and income level of urban residents in Guangzhou, the following conclusions can be drawn:

4.1. Diversification of ownership structure is essential to improve the income level of urban residents
From the results of Granger causal analysis, there is a lagging two-way causal relationship between the ownership structure and the income level of urban residents. Guangzhou should pay attention to the important role played by private enterprises and foreign-funded economies in raising the income level of residents, and guarantee fair competition in various forms of ownership through policies.

4.2. Speed up the pace of urbanization
Generally speaking, the higher the level of urbanization is, the more perfect the software and hardware facilities of the country or region are; the better the basic conditions of economic development is, the more secure the income level of residents is. Guangzhou needs to accelerate the urbanization of remote suburbs and provide strong support for the sustainable growth of residents' income levels.

4.3. Continuously improve the level of opening up
Expanding the opening up can increase the demand for labor and promote the transformation and upgrading of the industrial structure, thus driving the income level of residents. As an open coastal city, Guangzhou needs to continuously improve the level of opening up to the outside world, high standards against international economic and trade standards, and share the dividends of opening up to the outside world.

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