

Empirical Analysis of the Relationship between the Number of SMEs and Employment Rate Based on VAR Model—— Taking Chongqing as an example

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Abstract

This paper establishes a VAR model of the number and employment rate of SMEs by using the data of the number of SMEs in Chongqing, the number of employed people in Chongqing, and the total population of Chongqing in 2003-2017, using generalized impulse response and variance decomposition for SMEs. An empirical analysis of the dynamic relationship between the indicators of quantity and employment rate. The conclusion shows that there is a long-term co-integration relationship between the number of SMEs in Chongqing and the employment ratio in Chongqing, and with the increase in the number of SMEs, the employment rate has increased, but it is not significant in the short term. On this basis, it proposes countermeasures to improve the employment rate.

Keywords

Number of SMEs; employment rate; VAR model.

1. Introduction

As a country with a large population, China's employment pressure is always a problem. With the increasing number of graduates every year, the employment pressure is getting more and more serious, and whether the employment problem can be handled is related to China's future development. In recent years, as the party and the state continue to support, encourage, and guide the development of the non-public economy, the status of small and medium-sized enterprises in China's economy has been rising, and has become an important force driving national economic growth. SMEs have also become the backbone of attracting labor and creating jobs. As a municipality directly under the central government, Chongqing has attracted a large amount of investment in recent years. In 2017, 127,000 small and medium-sized enterprises were established, which was the same as that of the previous year. The number of registered households at the end of the year was 727,000, accounting for more than 99% of the total number of enterprises in the city. Yan Zhongwu (1981) Liu Guanxue (1995) pointed out that compared with large enterprises, SMEs are mostly labor-intensive, contain more labor, and have a low organic composition of capital. They can provide more employment opportunities with the same capital [1] [2]. Li Hongwei (2016) pointed out that both domestic and foreign, small and medium-sized enterprises have become the carrier of employment, and at the same time played a corresponding slowing effect on social unemployment pressure [3]. Yang Xiaoli (2016) shows that among large enterprises and small and medium-sized enterprises of the same scale and investment, small and medium-sized enterprises are more employable, and small and medium-sized enterprises can provide more jobs than large enterprises [4]. This paper uses VAR model to analyze the dynamic influence relationship between the number of SMEs in Chongqing and the employment rate, and proposes countermeasures for relevant conclusions.

2. Model and data

In this paper, the vector autoregressive model proposed by Sims in 1980 is the main research method, referred to as VAR model. Select data on the number of SMEs in Chongqing, the number of employed people in Chongqing, and the total population in Chongqing in 2003-2017. Establish a VAR model

for the number and employment rate of SMEs. All data sources are from the China Economic and Social Development Statistics Database. Chongqing Statistical Information Network. In order to eliminate the possible heteroscedastic influence and obtained a smooth time series, all the data are processed by logarithm and difference. The variable definition is shown in Table 1. And the employment rate in the text is defined as the ratio of the number of employed persons divided by the total number of people.

Table 1. variable definition table

Variable short name	Variable definitions	Variable short name	Variable definitions
SMEs	The number of small and medium-size enterprises	SMEs1st	Number of SMEs after logarithm and first-order difference
SMEs2rd	Number of SMEs after logarithm and second-order difference	SMEs3rd	Number of SMEs after logarithm and third-order difference
ER	employment rate	ER1st	Employment ratio after taking logarithm and first-order difference
ER2nd	Employment ratio after taking logarithm and second-order difference	ER3rd	Employment ratio after taking logarithm and third-order difference

3. Empirical analysis

3.1 Unit root test

The smoothness of the data or the co-integration between the variables is the basis for establishing the VAR model. If the data is stable, the VAR model can be directly used. If the data is not stable, the data needs to be smoothed by the logarithmic difference method. Therefore, the unit root test is performed on the time series data first, and the test results are shown in Table 2. It can be seen that the two variables tend to be stable in the same order when taking the third-order difference after the logarithm.

Table 2. Unit Root Test

variable name	ADF value	1% significant level	5% significant level	10% significant level	Stationarity
SMEs	3.701790	-4.004425	-3.098896	-2.690439	Unstable
SMEs1st	-2.775950	-4.057910	-3.119910	-2.701103	Unstable
SMEs2nd	-3.754074	-4.200056	-3.175352	-2.728985	stable
SMEs3rd	-5.230893	-4.297073	-3.212696	-2.747676	stable
ER	-1.927061	-4.057910	-3.119910	-2.701103	Unstable
ER1st	-2.092122	-4.057910	-3.119910	-2.701103	Unstable
ER2nd	-2.848171	-4.121990	-3.144920	-2.713751	Unstable
ER3rd	-4.634799	-4.420595	-3.259808	-2.771129	stable

3.2 Determine the optimal lag order

The VAR model is established for the stationary time series SMEs3rd and ER3rd. In the lag model, the Akachi and Schwarz information criteria are used to select the optimal lag order, and the saliency test of the t-statistic is combined to obtain the best lag order is 3.

3.3 Johansen cointegration test

The reason for the Johansen cointegration test is to avoid the phenomenon of “pseudo-regression” and to test whether there is a long-term cointegration relationship between the two variables. The test

results are shown in Table 3. It can be seen that there is at least one cointegration relationship between the variable SMEs3rd and ER3rd when the confidence level is 0.05, that is, there is a long-term correlation between the two.

Table 3. Johansen Cointegration Test Results

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.944813	38.57166	15.49471	0.0000
At most 1 *	0.617160	9.601379	3.841466	0.0019

3.4 AR root test

If the reciprocal of all the root models of the VAR model is less than one, that is, they fall within the unit circle, the model is stable. As can be seen from Figure 1, all the blue points fall within the unit circle, so the AR root test passes and the VAR model is stable.

Inverse Roots of AR Characteristic Polynomial

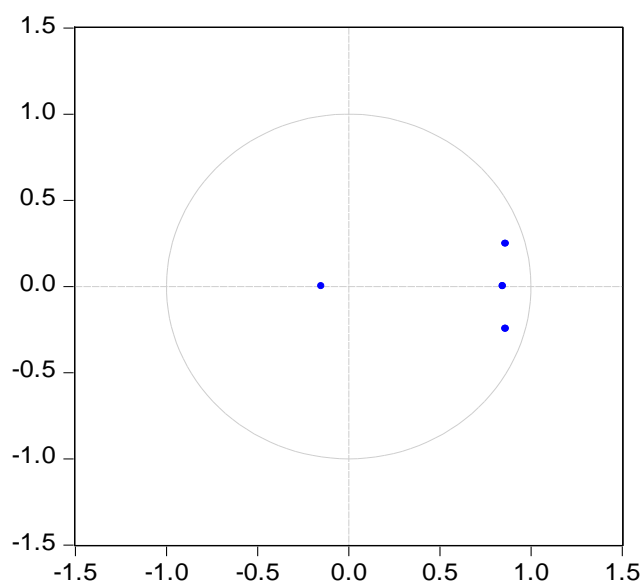


Figure 1. AR root model reciprocal test chart

3.5 Granger causality test

In order to verify whether there is a short-term correlation between variables, the Granger causality test of the variables SMEs3rd and ER3rd, the probability P value of the test results is greater than 0.05, so the variable SMEs is not the Granger cause of the variable ER, that is, there is not a short-term Relevant relationship. In the above, it is verified that there is a long-term cointegration relationship between the two variables, indicating that the number of SMEs has little effect on the employment ratio in the short term, and there is a correlation in the long run. Because SMEs need to develop for a certain number of years, and most of the jobs are provided by well-developed SMEs.

3.6 Impulse response analysis

Using impulse response analysis, we can analyze the dynamic correlation of variables and their own in time. In this paper, the lag order is selected for 30 periods. The analysis results are shown in Figure 2. It can be seen that the response value reaches the maximum value in the fifth period, and the response value gradually becomes stable during the subsequent reflection period. Which shows that, on the whole, the number of SMEs has a certain role in promoting the employment rate and can provide more jobs.

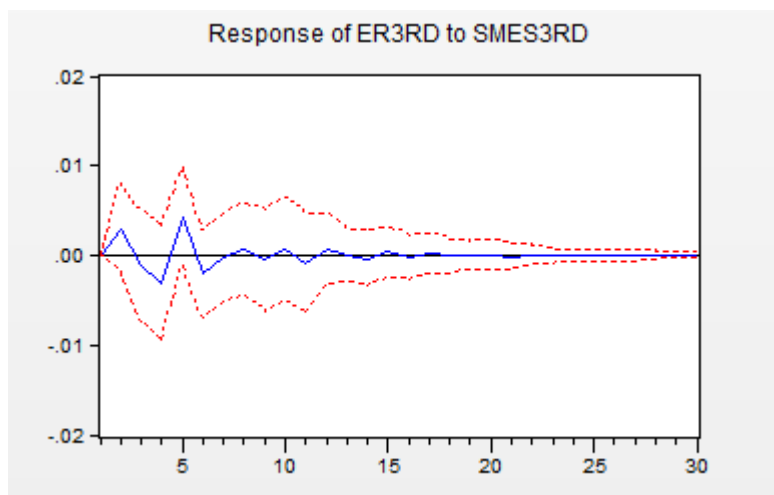


Figure 2. Impulse response function analysis result

3.7 Variance decomposition

The variance decomposition based on the VAR model is to evaluate the importance of each structural impact on the changes of endogenous variables, and then evaluate the importance of different structural impacts. It can be seen from Figure 3 that the number of SMEs has a certain role in promoting the employment rate. After the fifth period, the contribution rate of SMEs to the employment rate fluctuates around 15%.

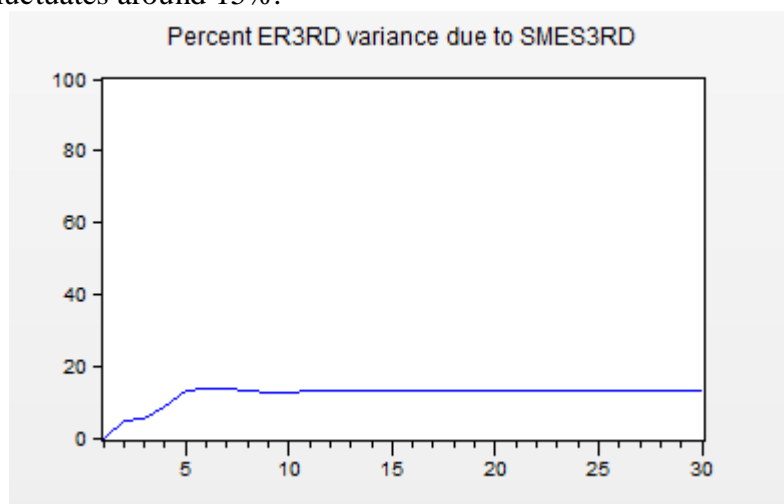


Figure 3 Variance decomposition result

4. Research conclusions and recommendations

4.1 Conclusion

The empirical results of the dynamic relationship between the number of small and medium-sized enterprises and the employment rate in Chongqing indicate that the increase in the number of small and medium-sized enterprises in Chongqing affects the employment rate, and the change in the employment ratio also affects the number of small and medium-sized enterprises to a certain extent, and there is a long-term association. Entire relationship. Based on the above analysis, more SMEs should be established on a sound basis to promote the healthy and stable development of SMEs and ease employment pressure.

4.2 Policy suggestion

First of all, the financing problem is widespread in the development of China's SMEs. We should quickly improve China's banking system, establish more township bank lending financial institutions, and provide support for SMEs financing. It is also possible to draw on the P2P financing model first proposed by the UK, but it is necessary to strictly carry out the qualification management work,

formulate the access conditions, set up relevant regulatory agencies, improve the relevant legal system, and access the credit information system through the P2P-funded SMEs. Bank credit system.

Second, reduce taxes, reduce tax rates, and implement and improve tax incentives. The tax policy should be implemented on the basis of appropriate principles and economic principles, and it is necessary to control the total amount of tax incentives while highlighting the need to make preferential points according to the development characteristics of existing SMEs [5]. Tax reduction can be achieved by directly reducing the tax reduction or exemption, or indirectly reducing the tax cost, deduction, accelerated depreciation, and deferred tax payment. Reducing taxes or reducing tax rates to reduce corporate burdens and increase corporate cash flow will help enterprises expand production scale, achieve transformation and upgrading, provide more jobs, and increase employment ratios.

Finally, in terms of the social service system, it is necessary to start from the service needs of SMEs and combine government guidance with market leadership. While ensuring the public service, social and public nature of the public service system, we must also ensure the quality of service and service level. In some high-cost social services, we can appropriately collect fees and try our best to solve the problems encountered by SMEs. Strive to solve the problems encountered by SMEs and create a good development environment for them, which creates a good development environment and exerts its backbone to absorb the labor force.

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Research on the Effective Supply of SMEs Service in Chongqing.

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