

Analysis of the Relationship between Economic Growth and High-speed Mileage in China

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Abstract: The data from the National Bureau of Statistics of China and the high-speed highway mileage from 2000 to 2016 are quoted and analyzed using the VAR model from the perspective of metrology time series analysis. Among them, stationary test, unit root test, and impulse response are used. Analysis, variance decomposition analysis, etc. A series of conclusions about economic and high-speed mileage have been drawn: The development of economic development and high-speed mileage is very stable. In the long run, economic development has led to the construction of high-speed mileage. The construction of high-speed mileage affects the economic development.

Keywords: high-speed mileage; economic development; VAR model.

INTRODUCTION

Economic development and the degree of laying of high-speed miles are intertwined with each other. Economic development affects the development of high-speed mileage. The development of high-speed mileage drives the economic development. With the rapid economic development, China's transportation industry has also grown rapidly. The nationwide popularity of many national highways can take up to 40 years to complete. In just over 20 years, China has become one of the best in the world.

The construction of expressways plays an important role in the growth of our country's economy. It also brings many conveniences to our lives and integrates into the lives of ordinary people. In 2016, the national highway investment grade road mileage ratio reached 90%. Many scholars have done a lot of research on the mileage of China's economy and highways, so I have developed a keen interest in the study of the economy and highways.

The economic attributes of high-speed mileage

Attribute refers to the indispensable nature of things. The expressway has the following socio-economic traits [1]: quasi-public goods characteristics, externalities, capital-intensive, etc, and what is more important is that the highway has monopoly and basic national economy.

Natural monopoly refers to

Natural monopoly means referring to the production of a product or a service. Monopoly When operating, it has the lowest total cost for the whole society. There is only one freeway connecting the two places. This makes the highway a rare resource. And centralized in the hands of the government, citizens cannot and are not suitable for competition. The

government provides services for the entire market and naturally forms a monopoly.

The basic nature of the national economy

The economic base refers to the sum of the dominant relations of production in certain societies. Highways play a decisive role in the transportation infrastructure, support the lifeline of the national economic system, and ensure the operation of social and economic systems. As a major modern transportation channel, the expressway has made great contributions to the realization of social and economic development, and the highway has a strong integration with economic development.

The link between economic development and high-speed mileage [2]:

The construction of a highway will drive the surrounding related industries, the tourism industry around the high speed, the catering industry, etc., increase the number of employed people and increase China's gross national product. A high-speed construction requires billions of dollars or more in funds, and any company cannot afford such a large economic pressure. Therefore, only the government can come forward and after the completion of the construction, the tolls will be used to recover the

investment funds for a long period of time contribution. In the period of 2000-2016, China's GDP was from 100280.10 to 743585.50, which has more than doubled in 16 years. The mileage of high-speed roads ranges from 1.63 to 15.35 from 2000 to 2016, which has more than nine times. It can be seen that there is a certain correlation between economic development and the development of expressways. How relevant is the case? China Science and Technology Press The relationship between the national high-speed public network and economic and social development makes such an interpretation [3]: The highway network is a basic and strategic important infrastructure for the national economy and people's livelihood. Therefore, it is necessary to further consider the link between the national economy and the expressway and jointly study the coordination between the two and the process of sustainable development. The following uses empirical analysis to study the relationship between the two.

Empirical research

Research on the coefficient of correlation between the gross domestic product (GDP) and the high-speed highway mileage (LM) (10,000 km) [4].

Using the annual data for the year 2000-2016 to test the correlation between GDP and high-speed highway mileage, it was found that there was a positive correlation between the two, with a correlation coefficient of 0.994020.

Data stability test

Because VAR is modeled, the data needs to be built on the stability, so take the logarithm of GDP and road mileage (lm), and then make a first-order difference and a second-order difference for the logarithm. The logarithm and the first-order difference are not stable, and the P-value corresponding to the second-order difference is close to 0, so we will use the data of the second-order difference to establish the VAR model [5].

Table-1:

| Variable | ADF test value | Critical values of each significantlevel | | | Corresponding P value | Result |
|----------|----------------|--|-----------|-----------|-----------------------|------------|
| | | 1% | 5% | 10% | | |
| GDP | 3.508688 | -3.920350 | -3.065585 | -2.673459 | 1.0000 | not stable |
| lm | 3.927449 | -4.057901 | -3.119910 | -2.701103 | 1.0000 | not stable |
| lngdp | -3.532112 | -4.057910 | -3.119910 | -2.701103 | 0.0248 | stable |
| lnlm | -2.652138 | -3.920350 | -3.065585 | -2.673459 | 0.1037 | not stable |
| dlnlmgdp | -1.879777 | -3.959148 | -3.081002 | -2.681330 | 0.3317 | not stable |
| dlnlm | -2.670126 | -3.959148 | -3.081002 | -2.681330 | 0.1019 | not stable |
| d2gdp | -4.775594 | -4.057910 | -3.119910 | -2.701103 | 0.0030 | stable |
| d2lm | -5.951800 | -4.004425 | -3.098896 | -2.690439 | 0.0004 | stable |

Selection of Model Lag Order

Determination of lag order: Using EViews to establish VAR (1) to VAR (5) for d2gdp and d2lm, the results show that AIC, SC, and HQ all point to a

fifth-order lag order. According to the "majority principle", VAR (5) should be selected Follow-up analysis.

Table-2:

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|-----|-----------|----------|-----------|------------|------------|------------|
| 0 | -127.6960 | NA* | 59790128 | 23.58110 | 23.65344 | 23.53550 |
| 1 | -124.1636 | 5.138131 | 66897567 | 23.66610 | 23.88314 | 23.52930 |
| 2 | -123.5695 | 0.648057 | 1.39e+08 | 24.28537 | 24.64709 | 24.05735 |
| 3 | -115.0992 | 6.160218 | 85116570 | 23.47259 | 23.97900 | 23.15336 |
| 4 | -95.71916 | 7.047296 | 12396190* | 20.67621 | 21.32731 | 20.26578 |
| 5 | 554.9939 | 0.000000 | NA | -96.90799* | -96.11220* | -97.40962* |

Inspection Unit Root

The VAR model stability test requires that all roots fall within a circle with a radius of 1, and this

model results found that all four roots fall within the unit circle, indicating that GDP and LM passed the stationarity test.

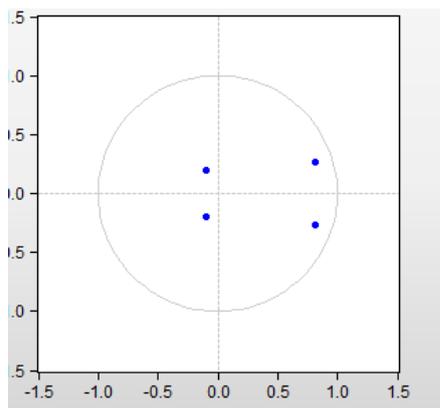


Fig-1:

Impulse response analysis

Impulse response analysis can capture the extent and trend of the impact of one variable impact on another. The impact of d2gdp on d2lm impact and d2lm and d2gdp will be analyzed. The results show that economic development has a stable impact on

high-speed mileage and a long lag period. High-speed mileage has always had a positive impact on economic development, and the lag period is also very long. It shows that economic development and high-speed mileage are influential and have a long impact period.

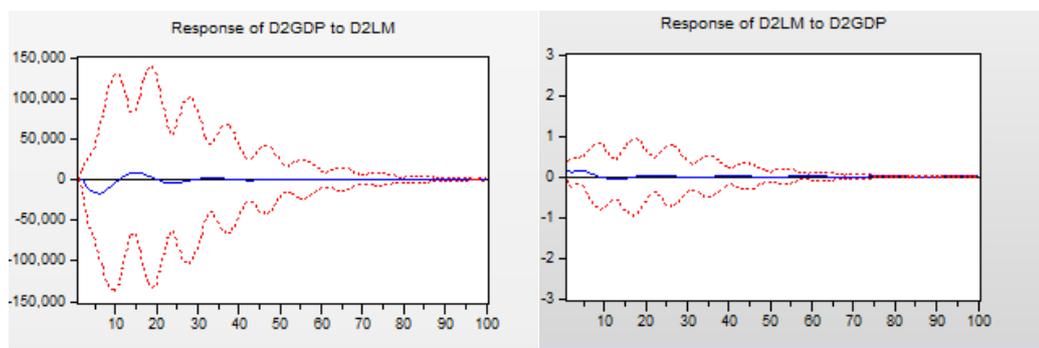


Fig-2:

Variance decomposition analysis

It can be seen from the following two tables that the variance contribution of different factors to GDP and LM over time. Table-3 shows that, from the factors that affect GDP, the impact of the first-phase high-speed mileage on GDP was only 8.7%, the seventh period reached 73%, and the fourth period stabilized at 77% to 78%. Table 4 shows that the main

factors affecting high-speed mileage are its own factors, from 100% of the first period to 91% of the 20th period. When the variance decomposition of high-speed mileage is performed, the SE (prediction error) is very large, and there is no Great economic significance. In general, high-speed mileage has a long-term impact on economic development, and the contribution rate is also high.

Table-3:

| Variance Decomposition of D2GDP: | | | |
|----------------------------------|----------|----------|----------|
| Period | S.E. | D2GDP | D2LM |
| 1 | 0.460115 | 91.22385 | 8.776146 |
| 2 | 0.617090 | 89.74065 | 10.25935 |
| 3 | 0.684782 | 77.37303 | 22.62697 |
| 4 | 0.717360 | 58.43229 | 41.56771 |
| 5 | 0.729312 | 42.62909 | 57.37091 |
| 6 | 0.737878 | 32.48541 | 67.51459 |
| 7 | 0.753456 | 26.70974 | 73.29026 |
| 8 | 0.778453 | 23.85508 | 76.14492 |
| 9 | 0.808746 | 22.94257 | 77.05743 |
| 10 | 0.837906 | 23.21213 | 76.78787 |
| 11 | 0.860864 | 23.95317 | 76.04683 |
| 12 | 0.875584 | 24.53429 | 75.46571 |
| 13 | 0.882989 | 24.58373 | 75.41627 |
| 14 | 0.885886 | 24.09955 | 75.90045 |
| 15 | 0.887518 | 23.33989 | 76.66011 |
| 16 | 0.890289 | 22.60729 | 77.39271 |
| 17 | 0.895096 | 22.10268 | 77.89732 |
| 18 | 0.901421 | 21.88796 | 78.11204 |
| 19 | 0.907979 | 21.91098 | 78.08902 |
| 20 | 0.913501 | 22.05430 | 77.94570 |

Table-4:

| Variance Decomposition of D2LM: | | | |
|---------------------------------|----------|----------|----------|
| Period | S.E. | D2GDP | D2LM |
| 1 | 14622.66 | 0.000000 | 100.0000 |
| 2 | 16449.52 | 0.036398 | 99.96360 |
| 3 | 20027.34 | 0.794885 | 99.20511 |
| 4 | 24731.83 | 2.209674 | 97.79033 |
| 5 | 29901.32 | 4.202560 | 95.79744 |
| 6 | 34591.98 | 6.274959 | 93.72504 |
| 7 | 38165.93 | 7.754712 | 92.24529 |
| 8 | 40477.39 | 8.326596 | 91.67340 |
| 9 | 41695.26 | 8.174612 | 91.82539 |
| 10 | 42194.36 | 7.718959 | 92.28104 |
| 11 | 42412.53 | 7.312729 | 92.68727 |
| 12 | 42705.33 | 7.138679 | 92.86132 |
| 13 | 43244.04 | 7.228279 | 92.77172 |
| 14 | 44002.80 | 7.507241 | 92.49276 |
| 15 | 44832.43 | 7.845735 | 92.15427 |
| 16 | 45565.32 | 8.116605 | 91.88339 |
| 17 | 46093.65 | 8.247728 | 91.75227 |
| 18 | 46397.66 | 8.241608 | 91.75839 |
| 19 | 46531.45 | 8.154613 | 91.84539 |
| 20 | 46584.90 | 8.057164 | 91.94284 |

SUMMARY

From the analysis of many data, the economic and highway mileage have a certain relationship. Our country should actively build a high-speed, not only to facilitate the lives of the people, but also make a great contribution to China's economic growth. The economic development also has a certain influence on the long-term construction of high-speed mileage. There are many other factors influencing the development of our country's economy. There are many other factors for the rapid economic development of our country. We should work hard to study and provide theory and data for the rapid development of our country's economy.

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