Evaluation on Financing Factors of Infrastructure Construction of Transportation and Communications Industry in Kazakhstan

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Keywords: Kazakhstan; Transportation and Communications Infrastructure; Financing Influence Factors

Abstract. This paper uses grey relational analysis method to study the scale of foreign investment, fiscal revenue, stock trading volume and Kazakhstan domestic bank credit risk assessment of transportation and communication industry with the grey correlation degree of the financing growth rate of the industry. The study found that Kazakhstan transportation and communications infrastructure construction financing in the scale of foreign investment and stock trading volume is the major factor of four index. Therefore, on the one hand China could continue to maintain direct investment in Kazakhstan; on the other hand, China enterprises should further broaden to Kazakhstan investment, give full play to the role of capital market, reduce their investment risk and accelerate the west “going out” pace.

Introduction

Kazakhstan has a high degree of opening to the outside world, perfect legal system and high transparency. Kazakhstan has a large number of domestic demand for infrastructure construction, and much investment opportunities. In the Eurasian Economic Union, Kazakhstan's position is very important. According to the world bank 2016 Business Environment Report data showed that in the World Bank global assessment 189 economy, in Kazakhstan the overall ranking rose from 53 to 41, up 12 over last year. In Kazakhstan-2050 strategy, Kazakhstan will put forward the development of infrastructure construction, accelerating the national economy into the global environment, and in the domestic construction of a series of" infrastructure center "for remote areas or population rare area service, the implementation of the strategy of" going out ". Kazakhstan strategic goal of 2050 is grand, but in terms of capital, it is still large funding gap. For China it has important significance to promote economic globalization and regional economic development that actively participate in Kazakhstan infrastructure construction of transportation and communications industry. It has a positive practical significance to do further research and analysis of Kazakhstan transportation and communications infrastructure financing factors for China which can participate more effectively in Kazakhstan transportation and communications infrastructure construction.

Current Situation of Kazakhstan Transportation and Communications Infrastructure Financing

Since independence, Kazakhstan vigorously promote the reform of market economy system and actively implement policies to encourage foreign investment which investment laws and regulations continue to improve and the domestic investment environment is greatly improved. The construction of transportation and communications industry has been developing vigorously in Kazakhstan department, due to the limited data acquisition in this paper, only the main source of financing from 2011 to 2015 five years transportation and communications industry analysis. From table 1 we can see that the rapid increase in the scale of foreign investment is the important factor supporting the rapid growth of investment in transportation and communications industry .In 2008 due to the outbreak of the financial crisis, fiscal revenue growth slowed in Kazakhstan, Kazakhstan domestic banks for credit evaluation of transportation and communications has been reduced, resulting in investment in Kazakhstan transportation and communications industry funding is very limited.
Table 1. The main financing channels of Kazakhstan transportation and communications industry infrastructure construction.

<table>
<thead>
<tr>
<th>Year</th>
<th>Scale of foreign capital ($100 million)</th>
<th>Fiscal revenue ($100 million)</th>
<th>Stock trading volume ($100 million)</th>
<th>The credit risk assessment of the Bank to the transportation and communications industry</th>
<th>Transportation and communications infrastructure investment growth rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>2.2</td>
<td>295.35</td>
<td>11.28</td>
<td>3.05</td>
<td>2</td>
</tr>
<tr>
<td>2012</td>
<td>2.9</td>
<td>241.9</td>
<td>11.19</td>
<td>3.04</td>
<td>3.8</td>
</tr>
<tr>
<td>2013</td>
<td>3.6</td>
<td>419.5</td>
<td>11.75</td>
<td>2.99</td>
<td>3.9</td>
</tr>
<tr>
<td>2014</td>
<td>6.6</td>
<td>409</td>
<td>10.3</td>
<td>3.00</td>
<td>9.1</td>
</tr>
<tr>
<td>2015</td>
<td>6</td>
<td>312.5</td>
<td>47.37</td>
<td>2.91</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Source: http://www.nationalbank.kz

①This indicator reflects the Kazakhstan domestic bank if invest transportation and communication industry or not, thus it can affect its investment in the field, so as to analysis the impact factors of Kazakhstan transportation and communications industry infrastructure financing is also available.

Analysis on the Influencing Factors of the Infrastructure Financing of Kazakhstan Transportation and Communications Industry

Evaluation methods

This study adopts the gray correlation analysis method. This method is the degree of similarity or dissimilarity between the factors according to the development trend, which is "grey", as a kind of method to measure the relevancy between factors. Grey correlation analysis for the developing tendency of a system to provide a quantitative measure which is very suitable for dynamic process analysis. The specific calculation steps are as follows:

①Seek the initial value of the sequence.

\[ x'_i = \frac{x_i}{x_0}(1) = (x'_1(1), x'_2(2), \ldots, x'_n(n)), i=0,1,2,\ldots,m \]  

②The absolute value of the difference between the initial value of the \( x_0 \) and the \( x_i \) (or the mean image)

\[ \Delta_i(k) = |x'_0(k) - x'_i(k)|, \Delta_i = (\Delta_i(1), \Delta_i(2), \ldots, \Delta_i(n)), i=1,2,\ldots,m \]  

③The maximum and minimum value of \( \Delta_i(k) \)

\[ M = \max_{i=1,2,\ldots,m} \Delta_i(k), \quad m = \min_{i=1,2,\ldots,m} \Delta_i(k) \]  

④Calculating the correlation coefficient

\[ \gamma_{ai}(k) = \frac{m + E(k)}{4E(k) + m}, \quad \delta_{ai}(0,1), k=1,2,\ldots,n; i=1,2,\ldots,m \]  

⑤Calculate the average value of the correlation coefficient, that is the degree of correlation

\[ \gamma_{ai} = \frac{1}{n} \sum_{k=1}^{n} \gamma_{ai}(k), \quad i=1,2,\ldots,m \]

Index selection

The data of this study include 2011-2015 in Kazakhstan domestic scale of foreign investment, fiscal revenue, stock trading volume and Kazakhstan domestic bank credit risk assessment of transportation and communications industry. The four selected indicators to analyze the specific
influence factors of Kazakhstan transportation and communications industry infrastructure financing, because the financing sources mainly focus on these four aspects of specific data. As Table 1.

**Empirical analysis**

In Kazakhstan, transportation and communications infrastructure investment growth rate is for the system characteristic sequence, and the scale of foreign investment, fiscal revenue, stock trading volume and Kazakhstan domestic bank credit risk assessment of transportation and communications industry etc. as its sequence and gray correlation analysis. The Table 2 is the specific calculation results influence of Kazakhstan transportation and communications industry infrastructure financing factors.

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**Table 2. Analysis on the financing factors of infrastructure construction of Kazakhstan transportation and communications industry.**

<table>
<thead>
<tr>
<th>No.</th>
<th>Index</th>
<th>Grey relational degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The correlation degree between the scale of foreign capital and the investment growth rate of Kazakhstan transportation and communications infrastructure</td>
<td>0.854</td>
</tr>
<tr>
<td>2</td>
<td>The correlation degree between stock trading volume and the investment growth rate of Kazakhstan transportation and communications infrastructure</td>
<td>0.75</td>
</tr>
<tr>
<td>3</td>
<td>The correlation degree between fiscal revenue and investment growth rate of Kazakhstan transportation and communications infrastructure</td>
<td>0.561</td>
</tr>
<tr>
<td>4</td>
<td>The correlation degree between the credit risk assessment of the domestic banks and the investment growth rate of the Kazakhstan transportation and communications infrastructure</td>
<td>0.536</td>
</tr>
</tbody>
</table>

Through the above empirical results, we can see that in Kazakhstan transportation and communications infrastructure construction financing, the largest contribution is from foreign investment which its correlation degree is 0.854; the second is the stock trading volume which its correlation degree is 0.75; the correlation degree of financial income is 0.561; the correlation degree of the bank of Kazakhstan in the industry credit risk assessment is 0.536. This is further explained in Kazakhstan transportation and communications industry infrastructure, foreign investment has obvious effect, and which is very prominent role of investment promotion of Kazakhstan transportation and communications infrastructure.

**Conclusions**

For Kazakhstan, the development of its economy depends on the improvement of infrastructure, especially in improving the competitiveness and influence of regional construction, transportation and communications infrastructure is very important. And in the transportation and communications infrastructure, the source of funds is very important. China can smooth progress of "Belt and Road Initiative” strategy, it is necessary to achieve interoperability area between China and Kazakhstan especially in transportation and communications industry. From the significant correlation factors on the main financing of Kazakhstan transportation and communications industry infrastructure, we can say that there is a great theoretical and practical significance of the cooperation construction that China further effectively participate in Kazakhstan transportation and communications industry.

As China, on the one hand can continue to maintain the momentum of Kazakhstan direct investment, which is consistent with the Kazakhstan government long-term development planning to attract foreign investment; on the other hand, through empirical analysis found that the stock...
trading volume is also an important channel to support investment in Kazakhstan transportation and communications industry, that is to say, Chinese Enterprises can broaden the investment and give full play to the function of the capital market, the west can not only accelerate the pace of "going out", but also can effectively reduce the risk of investment and protect their own interests.

Acknowledgements

This work was financially supported by the Fund of the Key Research Center of Humanities and Social Sciences in the general Colleges and Universities of Xinjiang Uygur Autonomous Region (code:050115C02) and the Fund of the Xinjiang University of Finance and Economics Doctor graduate Student research innovation project (code:XJUFE2016K028).

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