Research on the Long - Term Equilibrium of Consumer Finance Development and Fiscal Expenditure of Education

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Abstract. With transformation of the national economic and improvement of the economic conditions of the residents, consumer finance has gradually become the emerging products under the boom of "Internet +", and it is closely related to the national economy, education, science and technology development. This paper explores whether there is a long-term equilibrium between the development of consumer finance and the national education, and selects the time series of 2006-2016. The results show that the development of consumer finance has a positive impact on the fiscal expenditure of education, and the effect is significant. According to the conclusion of the study, this paper puts forward some suggestions to promote the development of consumer finance, so as to promote the improvement of the overall education level of the country.

Introduction

The development of consumer finance in China started after the financial crisis. For the effective demand of residents, the network consumption model caused by the booming "Internet +" has greatly changed the traditional knowledge of residents and the "savings" conservative concept of consumption. "Advance" type of consumption patterns is gradually to be popular, many consumption patterns different from Bank credit card have emerged, which greatly improved the lacking demand situation of financial market [1, 2]. The increasing popularity of the concept of consumption has made the consumer financial market flourished. However, compared with the western developed countries, China's national consumption rate is still at a low level, and the promotion of economic development needs to be strengthened. Many domestic scholars have also explored the development of China's consumer finance. Yang Haihong proposed that the imperfect legal system and the shortcomings of the credit lacking greatly hindered the development of China's consumer finance [3]. Zhu Hongmei said that, there is a great room for the development of China's consumer finance, consumption potential of the residents remains to be further excavated [4].

During the development and reform process of China, fiscal expenditure of education occupies an important development status. Fiscal expenditure of education is an important part of the state financial expenditure, is long-term power for social and economic development, but also an important indicator of national comprehensive national strength. At the same time, the externalities of education are the key attributes worthy of our attention. On the other hand, it
plays an important role in the country and the long-term stability of the society. Based on the consumption effect of education, Rosen, Atkinson and other research scholars looked it as a product with privatization by public supply. It is found that the sectoral spillover of educational factors has a strong correlation with provincial economic growth.

In the current socio-economic environment, the level of fiscal expenditure of education is an important means to adjust national education. The development of fiscal expenditure of education is the effective means to improve national human capital quality and expand the national human capital scale. The economic value added generated by educational investment is also the most significant. The optimization and upgrading of human resources can effectively enhance the level of residents’ consumption. Scientifically measuring the endogenous relationship between consumption finance and fiscal expenditure of education, and systematically accounting the efficiency of consumption finance and fiscal expenditure of education, which has important theoretical and practical significance in the current market background.

In this paper, we use the time series to study the long-term relationship between the development of consumer finance and the expenditure of fiscal education. We aim to find the endogenous mechanism of the two factors, and find the balanced development of the two, in order to ensure the stability of the national economic environment and that of the economy.

**Literature Review**

Jacob Mincer, a well-known foreign scholar, established a mathematical economic model to explore the endogenous relationship between income and education, and found that the improvement of individual education had a positive effect on income growth, while the consumption preference and consumption levels determined by the steady income expectations. Agnew, Guiso, etc., argue that personal consumption choices are largely limited to the extent of their education. By analyzing the relevant data of multinationals, Bacchetta and Gerlach found that the growth of consumer loans and the development of consumer finance showed a trend of simultaneous change, and the combined effect of both reflected the change of the whole consumption, and there was a close relationship between them. Seligman also mentioned in the study that the development of the national economy is linked closely to the development of consumer finance in the economic market.

Around the consumer finance, there has been a certain theoretical and practical basis. Based on the probit model and field investigation in Sichuan province, Ruan Xiaoli and Zhong Zetan found that the education period of the residents has had a significant impact on their personal consumption loans. Guo Xinhua and He Yafei analyzed the relevant data from 1997 to 2008, and found that there is a balanced relationship between consumption and economy.

From the above analysis, we can see that, the academic community has formed a certain theoretical basis about consumer finance and fiscal expenditure of education, but there are no definite research results in terms of the specific impact between the two and the endogenous relationship.

**Modeling and Data Sources**

**Modeling**

This paper adopts the annual consumption of loans (unit: billion) as a proxy
for consumer finance variables, recorded as Spe; selected annual financial education funding as a proxy for fiscal expenditure of education, recorded as Edu. As the selected data are large, in order to facilitate the calculation and eliminate of the heteroscedasticity problem between the data, this paper calculate logarithm of the two sets of data. According to the characteristics and attributes of the selected data, this paper will establish a time series autoregressive model between two variables. The general expression of the model is:

Model 1: $\ln(\text{Spe})_t = \beta \ln(\text{Spe})_{t-1} + \mu_t$

Model 2: $\ln(\text{Edu})_t = \alpha \ln(\text{Edu})_{t-1} + \mu_t$

Established a linear regression model between the above two variables, the relationship is as follows:

Model 3: $\ln(\text{Spe})_t = c + \alpha \ln(\text{Edu})_t + U_t$

Data Sources

Based on the current situation of the development of China's consumer finance, this paper chooses the relevant data from 2006 to 2016. The data of consumer loans is derived from the website of the People’s Bank of China. The data of annual financial education funding is derived from the website of the National Bureau of Statistics, and related scattered data has been initially calculated.

Empirical Test

Unit Root Test

This paper chooses the statistical data from 2006 to 2016. In view of the basic attributes of the data selected in this paper, it is time series, before the analysis, there must be stationary test. If the "stationary test" step is omitted, the "spurious-regression" phenomenon may occur as a result of the stationary time series and subsequent regression analysis, leading to erroneous conclusions. Test the smoothness of the time series commonly used unit root test, the most commonly test method of unit root test is the ADF test.

Two groups of time series (Spe)$_t$ and (Edu)$_t$ are tested by unit root test using model $\Delta Y_t = \beta Y_{t-1} + \mu_t$, where the variable $Y_t$ is only a reference and does not belong to the research variable. The test assumptions are:

H0: $\rho = 0$, ($Y_t$ is non-stationary)

H1: $\rho < 0$, ($Y_t$ is smooth)

According to the above assumptions, if the detection value of the ADF is greater than the critical value of the given confidence intervals, it can be judged that $Y_t$ is non-stationary and vice versa. If it is found that the null hypothesis cannot be rejected in the study, it is necessary to further test the smoothness of $\Delta Y_t$, and then test until the test result is "smooth". To improve the reliability of the findings, this paper uses 95% confidence interval to determine the results.

ADF analysis of $\ln(\text{Spe})$ shows that the ADF value is -2.017 and is greater than the criticality of 1%, 5% and 10% of the significance level. Thus, it is judged that $\ln(\text{Spe})$ is a non-stationary series, so there must be the unit root test on the difference sequence of $\ln(\text{Spe})$. $\Delta \ln(\text{Spe})$ has an ADF detection value of -3.317, which is greater than the critical value of a given 95% confidence interval, it can be inferred that $\Delta \ln(\text{Spe})$ is not smooth and that the second order difference sequence of $\ln(\text{Spe})$ should be test. The ADF value of $\Delta^2 \ln(\text{Spe})$ is -4.491, which is less than the critical value of -2.006. The null hypothesis is rejected, that is, $\ln(\text{Spe})$ is a second order monotonic sequence.
Similarly, the ADF test on Ln(Edu) shows that, the test value is 6.138, greater than the significance level of 1%, 5% and 10% of the critical value, thus to determine Ln(Edu) is the non-stationary sequence, and needs further test on difference sequence of Ln(Edu). The detection value of ΔLn(Edu) is -0.937, which is greater than the critical value of the given 95% confidence interval, ΔLn(Edu) is not smooth, and the second order difference sequence of Ln(Edu) needs to be tested for unit root. The ADF detection value of Δ²Ln(Edu) is -3.567, less than the critical value of -2.006, and the null hypothesis is rejected, that is, Ln(Edu) is a second order monotonic sequence.

Table 4-1 shows the unit root test results for the time series Ln(Spe) and Ln(Edu). According to the data in the table, the order of the time series Ln(Spe) and Ln(Edu) are the same, which are the second order monotonic sequence, which can be analyzed by co-integration test.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>ADF Detection Value</th>
<th>Confidemce Interval Critical Value</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ln(Spe)</td>
<td>7.905</td>
<td>-2.817 -1.982 -1.601</td>
<td>non-stationary</td>
</tr>
<tr>
<td>Ln(Edu)</td>
<td>6.138</td>
<td>-2.817 -1.982 -1.601</td>
<td>non-stationary</td>
</tr>
<tr>
<td>ΔLn(Spe)</td>
<td>-0.072</td>
<td>-2.886 -1.996 -1.599</td>
<td>non-stationary</td>
</tr>
<tr>
<td>ΔLn(Edu)</td>
<td>-0.937</td>
<td>-2.847 -1.988 -1.6</td>
<td>non-stationary</td>
</tr>
<tr>
<td>Δ²Ln(Spe)</td>
<td>-4.491</td>
<td>-2.937 -2.006 -1.598</td>
<td>smooth</td>
</tr>
<tr>
<td>Δ²Ln(Edu)</td>
<td>-3.567</td>
<td>-2.937 -2.006 -1.598</td>
<td>smooth</td>
</tr>
</tbody>
</table>

**Co-Integration Test**

Co-integration test is to verify the equilibrium relationship between the two variables. In the current study, the GLS test is usually used for testing. The concrete analysis step is divided into two steps: first, construct the co-integration model; second, unit root test for U_t in the model, if U_t is the stationary sequence, you can determine that, there is a long-term stable equilibrium relationship between Ln(Spe) and Ln(Edu). The co-integration model is:

Model 4: Ln(Spe)_t =c+βLn(Edu)_t +U_t

Using GLS to estimate the variable coefficients,

Ln(Spe)_t =-1.312+1.315Ln(Edu)_t +U_t

(-2.034)(19.606)

R²=0.977

Then use method of unit root test to test the smoothness of U_t in the co-integration model. The test results are as follows:

<table>
<thead>
<tr>
<th>ADF detection value</th>
<th>t-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
<td>-2.847</td>
</tr>
<tr>
<td>5%</td>
<td>-1.988</td>
</tr>
<tr>
<td>10%</td>
<td>-1.6</td>
</tr>
</tbody>
</table>

The unit root test value of the residual sequence U_t is -2.973, which is smaller
than the critical value of the given 95% confidence interval. Therefore, the residual sequence \( U_t \) is smooth, so that there is a long-term stable equilibrium relationship between the variables \( \ln(\text{Spe}) \) and \( \ln(\text{Edu}) \).

**Causality Test**

The above analysis can be used to determine the long-term stable equilibrium relationship between the variables \( \ln(\text{Spe}) \) and \( \ln(\text{Edu}) \), but because of the defects of the above test methods, it cannot be determined that the causal relationship between the two variables. In this paper, the Granger Method is used to analyze the causal variables between the two variables.

**Table 4-3. Granger test results for variables \( \ln(\text{Spe}) \) and \( \ln(\text{Edu}) \).**

<table>
<thead>
<tr>
<th>Null Hypothesis:</th>
<th>F-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \ln(\text{Edu}) ) does not Granger Cause ( \ln(\text{Spe}) )</td>
<td>0.09314</td>
<td>0.913</td>
</tr>
<tr>
<td>( \ln(\text{Spe}) ) does not Granger Cause ( \ln(\text{Edu}) )</td>
<td>18.0887</td>
<td>0.0099</td>
</tr>
</tbody>
</table>

Table 4-3 test results of data shows that, the probability of occurrence of “\( \ln(\text{Edu}) \) is not Granger of \( \ln(\text{Spe}) \)” is 0.913 and the probability of occurrence of “\( \ln(\text{Spe}) \) is not Granger of \( \ln(\text{Edu}) \)” is 0.0099 in the case where the significance level is 5%. That is, fiscal expenditure of education is not the Granger reason of the consumer loan, and the consumer loan is the Granger reason of fiscal expenditure of education. It shows that the scale of consumption loans has a positive effect on the growth of fiscal expenditure of education to a certain extent, so as to promote the overall education level of our country.

**Impulse Response Function and Variance Decomposition**

![Figure 4-1.](image1)

![Figure 4-2.](image2)

In order to further analyze the long-term equilibrium relationship between consumption finance and fiscal expenditure of education, this paper will use the impulse response function to explore the influence mechanism between the two variables. A standard deviation shock is been given to the independent variable \( \ln(\text{Edu}) \) in the model, that we observe the response of \( \ln(\text{Spe}) \) to \( \ln(\text{Edu}) \). In this paper, the lag is 10, and the abscissa axis represent lag phase, and axis of ordinates represent the response of \( \ln(\text{Spe}) \). The results of Figure 4-1 show that
the impact of Ln(Edu) is significant during the early period, and reach a stable level in 8. In Figure 4-2, it shows the relative importance of the variables in the model described. According to the trend in the figure, the relative contribution rate of Ln(Edu) is about 10%, and the contribution rate of Ln(Spe) is about 90%.

Conclusion
Through the analysis of the model and data, this paper finds that there is a stable long-term equilibrium relationship between the development of consumer finance and fiscal expenditure of education. According to the impulse response function, the impulse response between the two variables is slightly positive and negative fluctuation before the 8th period of the lag. After 8, it is positive and tends to the stable level, that is, the development of China's consumption finance is positively related to the expenditure of China's financial education.

The analysis of the above results is due to the fact that the development experience of China's consumer finance has yet to be rich, and the mechanism has yet to be improved. The shortcomings of the development have not yet been properly handled. The development of financial market has further promoted the overall level of development of China's consumption finance, so as to led to the development of consumer finance spillover effect, and thus form a long-term stable and balanced relationship with fiscal expenditure of education. At the same time, the prosperity of the consumer finance market and the expansion of the scale can promote the development of national macro-economy. Based on the strategy of rejuvenating the country through science and education, the national economic development will also lead to the expansion of education expenditure’s scale. On the other hand, the demand for talent in the market forces residents to pay more attention to education, thus residents with limited income rely on Loans, education staging, credit card financial instruments to ease the pressure of education. Consumer finance has gradually become an important means for countries and individuals to ease the pressure of education.

Countermeasure and Suggestion

Improve the Social Security System and Credit System, Strengthen Financial Supervision, and Create A Safe "Green" Channel

Government's market economy policy and perfect personal credit system are the macro - guarantee of the healthy development of consumer financial market. Based on the development of Internet, consumer financial platform is also facing more and more challenges, consumer finance regulatory policy should be further clarified. In the perspective of government, improving the market access threshold and increasing the intensity of breach of contract. Non-governmental organizations should establish risk-control warning system to predict and prevent financial risks accurately. Individuals in consumer finance market should enhance personal consumption quality, to avoid the risk of consumer finance from the source. Based on a stable and healthy financial environment, the development of national education could be better.

Form an Effective Financial Value Chain in The Market, Improve The Financial Efficiency of the Market Liquidity

In the current market environment, consumer finance has penetrated into a number of vertically subdivided areas, more and more financial products came into being. Under the trend of the development of consumer finance, the
formation of "government - market - individual" financial value chain is an effective means to improve the efficiency of social value creation. From the point of government’s finance expenditure, the financial market forms a safe and effective circulation channel, and individuals apply for education loans through the credit platform of financial market, simplify the administrative examination and approval procedures, shorten the approval time, so as to improve the efficiency of capital flow from the process.

**Develop "Education Loans" Preferential Policies, Enhance the Enthusiasm of the Education**

After the approval of the individual application for education loans, the project should be given appropriate concessions. On the other hand, a certain percentage of the amount of loans could be to reduce the taxable income of individual income tax. For the individual who has outstanding performance in education process, there will be appropriate reward, let the development of consumer finance go hand in hand with the growth of national fiscal expenditure on education, and jointly promote China's economy steadily forward.

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**References**


