Analysis of the Influence of Chinese Government's Green Behavior on Residents' Consumption

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Abstract

With the rapid economic development, China's environmental problems are becoming more and more serious, and it is urgent to transition to green economic development. As a responsible major country, China is making vigorous efforts to strike a balance between economy and ecology. This paper will use a quantitative analysis method to explore the relationship between the government's green behavior and residents' consumption. It will use Eviews to establish a mathematical model and carry out linear regression. The government's green behavior can promote residents' environmental awareness and further improve residents' green consumption. It is hoped that this study can provide some reference for the government to regulate the market and guide consumers to improve the awareness of environmental protection consumption.

Keywords: green consumption; measurement model; government intervention; residents' consumption; green credit

1. INTRODUCTION

Since the reform and opening up, with the rapid economic development, China's ecological environment problems are becoming more and more prominent, environmental pollution and energy consumption are serious, and the development of the green economy is the general trend. In response to this phenomenon, the Chinese government has made many plans to balance the relationship between economic development and ecology. The report of the 19th National Congress of the Communist Party of China pointed out that "China's economy has changed from a high-speed growth stage to a high-quality development stage". We must accelerate the green transformation of the traditional economic development model at the expense of the environment. The fifth Plenary Session of the 19th CPC Central Committee also explicitly called for the in-depth implementation of the sustainable development strategy, promoting a comprehensive green transformation of economic and social development, and building modernization in which man and nature coexist in harmony. Many signs show that residents' green consumption is increasing under the government's strong advocacy.

Many studies on the influencing factors of green consumption have mentioned the factors of government behavior. For example, Hou Haiqing and Yin Li [1] believed that the government would intervene and drive consumers' green consumption behavior by issuing relevant economic incentive policies and regulations, carrying out publicity and education activities, and improving infrastructure construction. The economic incentive mechanism provides monetary capital incentives to consumers in the form of subsidies and consumption vouchers to encourage them to actively choose green products and services. Chen Kai [2] believes that green development is an inevitable requirement of ecological civilization construction and the only way to achieve sustainable development. Green consumption is of great significance to green development. Moreover, he elaborated on the government's responsibility and intervention strategies for building a green consumption model from the aspects of promoting government green procurement to play an exemplary role, providing a long-term guarantee mechanism for the green model and promoting green consumption through targeted poverty alleviation. Zhang Ming [3] also believes that reasonable

economic incentive policies of the government can improve residents' willingness to green consumption. However, most of the current green consumption-related articles study the influencing factors of residents' green consumption behavior from a qualitative perspective, lacking quantitative analysis.

This paper will study the impact of the government's green behavior on residents' consumption, mainly using Eviews (Econometrics Views, a time series software package used to process time-series data) to conduct linear regression (a statistical analysis method that uses regression analysis in mathematical statistics to determine the interdependent quantitative relationship between two or more variables) and hypothesis testing to explore the relationship between residents' green consumption and government's green behavior. This paper selects the total amount of green credit of six state-owned banks to represent the green behavior of the Chinese government. As for residents' consumption, this paper will discuss the changes in residents' green consumption and select the representative green transportation consumption, that is, the sales of new energy vehicles in recent years. In this way, the macroscopic factors are specified to the microscopic measurable variables, and the relationship between the two can be observed more directly.

The government's green behavior can promote residents' environmental awareness. With the improvement of consumers' environmental awareness, they tend to buy green products to achieve sustainable development of the society. Because green consumption (green consumption includes not only green products, but also the recycling of materials, the effective use of energy, and the protection of living environment and species ecology) is a kind of consumption value that reflects more attention to the value of social and environmental benefits, it further reflects the improvement of people's consumption quality and level and reflects the progress of human society. Therefore, exploring green consumption can provide some reference for the government to regulate the market and guide consumers to improve the awareness of environmental protection consumption, and has significant practical significance in the critical period of the current economic and social transformation and development.

2. RELATED WORKS

First of all, for the analysis of the impact on residents' consumption, this paper refers to the analysis method of Wu Xu [4] in The Analysis of Influencing Factors and Current Situation of Chinese Residents' Consumption Level. Wu Xu used a data analysis software, Eviews, to establish a model of the existing data and perform linear regression to analyze the factors affecting residents' consumption level.

Furthermore, it is the study of residents' consumption behavior under green behavior. Gong Siyu [5], Research on the Impact Mechanism of Corporate Environmental Behavior on Consumer Response from the Perspective of Green Marketing Obtained data through questionnaire survey and in-depth interview and analyzed that enterprises' substantive Green behaviors are in line with consumers' expectations on enterprises' undertaking environmental and social responsibilities, and are more likely to improve consumers' attitude toward enterprises, purchasing intention of products and willingness to spread word of mouth. Wu Xian [6] in Research on the Influence of the Harmony between Human and Nature on Environmentally Friendly Consumption Behavior in the Area of Yangtze River Economic Belt studies the influence of the relationship between man and nature on consumption Behavior and finds that the equal relationship between man and nature has a positive impact on consumption. Wang Guomeng and Li Jianxin [7] studied the relationship between residents' psychology and green consumption. It is found that there is a significant positive correlation between environmental values, environmental attitudes, and green purchasing behavior, and environmental values have a significant positive impact on environmental attitudes and green purchasing behavior.

There are also many studies on green consumption in China. For example, Hou Haiqing and Yin Li's [1] review of the factors influencing green consumption behavior and Tiao Bian's [8] A Review on Green Consumption both studied the concept and influencing factors of Green Consumption. Hou Haiqing and Yin Li found green consumption research needs to be combined with local culture and other external factors and consumer oneself is analyzed, and Tiao Bian sorted out and summarized the issues related to green consumption according to the existing domestic and foreign pieces of literature on green consumption, and found that most of the current studies remain superficial without in-depth empirical analysis.

At present, all kinds of consumption of Chinese residents gradually tend to be green. In analysis on Change Tendency of Food Consumption in China, Duan Lei [9] pointed out that green food consumption is increasing in China and healthy food has become the main trend of food consumption.

Most relevant studies only focus on qualitative analysis. This paper will use quantitative analysis methods such as linear regression to study the impact of the Chinese government's green behavior on residents' consumption. The proportion of green credit is selected to represent the government's green behavior, and the relationship between this indicator and residents' transportation consumption is studied.

3.METHOD

3.1.Selecting Variables

Although there are many variables to choose from, this paper selects the total green credit of six state-owned banks as the variable of government green behavior and the sales volume of new energy vehicles as the variable of residents' green consumption.

Green credit policy is a brand-new credit policy jointly put forward by the State Environmental Protection Administration, the people's Bank of China, and the CBRC on July 12, 2007, to curb the blind expansion of high energy consumption and high pollution industries, that is, when the banking sector carries out credit business, it will incorporate environmental information into the loan review mechanism to encourage green production Consumption and enterprises with good environmental records, on the other hand, punish enterprises that do not comply with national industrial policies and have environmental violations [10]. Therefore, the total amount of green credit of state-owned banks can represent the investment of national green behavior.

In terms of residents' consumption, this paper only studies the changes in residents' transportation consumption and selects representative sales volume of new energy vehicles as a variable. New energy vehicles are also an industry that the Chinese government has been supporting this year.

Using Eviews for linear regression analysis, this paper takes the total green credit as the independent variable (X) and the sales volume of new energy vehicles as the dependent variable (Y) to explore whether there is a positive correlation between the two.

3.2.Data Sources

The data relating to green credit comes from the sustainable development report or social responsibility report of each bank. The data of new energy vehicle sales come from China Automobile Industry Association.

TABLE I   DATA

Total Green Credit (100 million Yuan)	Sales volume of new energy vehicles (10,000 units)
2561.65	0.24
7992.11	0.52
10573.76	0.7
12704.74	0.8
14100.85	1.3
18840.06	1.8
22555.65	7.5
28040.53	33.1
32208.91	50.7
35647.75	77.7
41534.9	124.7
50268.63	120.5
62683.4	136.7

3.3.Data Processing

3.3.1.Model Establishment

First, observe the scatter diagram (Figure 1) of the two groups of data. It is obvious that there is a strong correlation between the two.

Therefore, the mathematical form of the variable is confirmed as:
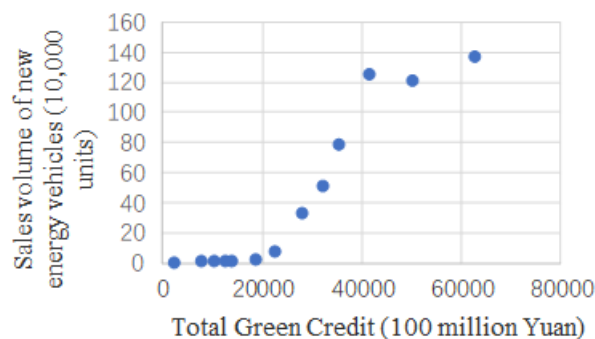
$$Y = \beta 0 + \beta 1 X + \mu \qquad (1)$$

Figure 1.Scatter diagram

3.3.2.Correlation Test

By observing the correlation coefficient of these two groups of data, it is clear that they are positively correlated.

TABLE II   CORRELATION COEFFICIENT

Correlation	X	Y
X	1	0.9435068853073537
Y	0.9435068853073537	1

3.3.3.Linear Regression

Regression analysis was conducted through Eviews, and the result was shown in Figure 2. The regression equation can be obtained as follows:

$$Y = -31.69352+0.002850X. \qquad (2)$$

And R-squared=0.890205 and Adjusted R-square=0.880224 are both higher than 0.8, indicating that

the actual value is very close to the fitted value curve, and the fitting effect of the equation is good.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-31.69352	9.426649	-3.362119	0.0063
X	0.002850	0.000302	9.443883	0.0000
R-squared	0.890205	Mean dependent var		42.78923
Adjusted R-squared	0.880224	S.D. dependent var		53.79074
S.E. of regression	18.61627	Akaike info criterion		8.826587
Sum squared resid	3812.219	Schwarz criterion		8.913502
Log likelihood	-55.37281	Hannan-Quinn criter.		8.808722
F-statistic	89.18693	Durbin-Watson stat		0.807673
Prob(F-statistic)	0.000001			

Figure 2.Regression estimation result

3.3.4.Heteroscedasticity Test

In this paper, white test is used to test the heteroscedasticity of the model, and the results are as follows:

Heteroskedasticity Test: White

F-statistic	0.174378	Prob. F(2,10)	0.8425
Obs*R-squared	0.438103	Prob. Chi-Square(2)	0.8033
Scaled explained SS	0.279541	Prob. Chi-Square(2)	0.8696

Figure 3.Heteroscedasticity test result

It can be seen from the figure that the P value is very large, so the null hypothesis (there is no heteroscedasticity in the model) is accepted, so there is no heteroscedasticity in the model.

3.3.5.Autocorrelation Test

Eviews is used to get the test graph (Figure 4). The autocorrelation coefficient and partial autocorrelation coefficient both fall inside the dotted line, so there is no autocorrelation.

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.503	0.503	4.1073	0.043
		2	0.001	-0.336	4.1073	0.128
		3	-0.196	-0.042	4.8561	0.183
		4	-0.380	-0.348	7.9904	0.092
		5	-0.427	-0.153	12.424	0.029
		6	-0.264	-0.103	14.368	0.026
		7	-0.116	-0.166	14.805	0.039
		8	-0.008	-0.126	14.807	0.063
		9	0.160	-0.002	16.050	0.066
		10	0.262	-0.008	20.497	0.025
		11	0.032	-0.369	20.598	0.038
		12	-0.066	-0.004	21.457	0.044

Figure 4.Autocorrelation test results

3.4.Data Analysis

The above data analysis shows that there is no problem with the regression equation, so (2) is the final confirmed model.

From the results of the final regression estimation, the estimated parameter $\beta_1=0.002850$ is positive. And the correlation coefficient =0.94. It can be seen from these two data that there is a significant positive correlation between the total amount of green credit and the sales of new energy vehicles. That is, the increase of green government behavior will increase the green consumption of residents.

4.DISCUSSION

Most of the existing relevant pieces of literature study the influencing factors of residents' green consumption from a qualitative perspective, lacking intuitive data analysis. In this paper, the linear regression method is adopted to discuss one of the influencing factors of residents' consumption -- government green behavior. Through the regression equation analysis, people can clearly and directly see the impact of the government's green behavior on residents' green consumption.

Through the data analysis of the method part, the regression equation (2) obtained can be drawn as the regression line (Figure 5) below, from which it can be concluded that the green behavior of the government can increase the green consumption of residents.
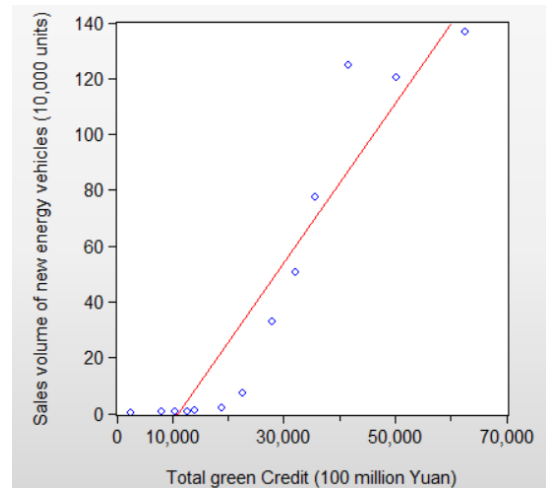

Figure 5.Regression line

Under the increasingly severe environmental problems, China, as a responsible major country, is bound to participate in the ranks of protecting the earth's ecology and saving energy, and the power of the people cannot be ignored. Combined with the conclusions of this paper, this requires the active guidance of the government to carry out a series of green behaviors. For example, in 2019, China required key cities to formally implement garbage classification, which caused huge repercussions. people began to pay attention to resource recycling. In the

process of consumption, attention is paid to the disposal of garbage, which does not cause environmental pollution. It is also a kind of green consumption.

Of course, the study has significant limitations. This paper only studies the green consumption of residents' transportation, without a comprehensive analysis of residents' consumption. In the future, we can further explore the relationship between residents' other consumption in normal life, such as food, and the government's green behavior.

5. CONCLUSION

This study found that government green behavior confirmation is able to rise residents' green consumption. This paper concretizes the macro variables and intuitively demonstrates the positive correlation between the government's green behavior and residents' green consumption through the method of linear regression. This conclusion provides research support for the government to develop more green behaviors to guide the public. The research on green consumption of residents is not only conducive to optimizing the industrial structure and promoting economic growth but also can better meet the ecological needs of people, so as to achieve sustainable consumption, achieve sustainable development, and fundamentally improve the quality of consumption.

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