

DATA ANALYSIS OF COSMETIC SALES VOLUME BASED ON LINEAR REGRESSION MODEL

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ABSTRACT

Cosmetics, referring to all skin hair care products, its use is clean, the purpose of beautification and protection, to the people to pay attention to health, looks neat, and good for health. Based on the analysis of data, this paper studies the correlation between cosmetics sales and retail sales of consumer goods, and explains the factors that influence the sales of cosmetics.

Key words: *cosmetics sales, sales of social consumer goods, consumer psychology, female group.*

1. INTRODUCTION

In recent years, due to the steady growth of economy, people's basic material life satisfaction, more and more people pay attention to the quality of life, cosmetics sales is constantly improving, through the analysis of the cosmetics data, to study the status quo of sales and consumption of cosmetic industry in our country at present , the analysis of consumer behavior, puts forward relevant suggestions and summary, the sustainable development of cosmetics in China improve the reference .

2. LITERATURE REVIEW

In recent years, China has issued a series of policies to support the development of the cosmetics industry. Released in January 2012, the ministry of light industry "twelfth five-year" development planning and in October 2012, the national standardization management committee, the state administration of quality supervision, inspection and quarantine, state food and drug supervision and administration of taxation jointly issued the "on cosmetics fields to carry out the standardized career" twelfth five-year "planning >< opinions", in 2012 and flavors in China cosmetics industry association released the 12th five-year plan, which is referred to strengthen the development of the cosmetics industry, improve the safety of cosmetic products, promote the benign development of the cosmetics industry. With the rapid development of social economy, people not only pursuit of material life, also more and more attention to spiritual life, it is need to make a change on their own spirit, so cosmetics is indispensable to people. In recent years, more and more residents demand for cosmetics, cosmetics industry developed rapidly, many scholars on cosmetics industry sales data are analyzed, and research the influence factors of influence cosmetics sales. YuMingming (2016) using monadic linear regression model analyze the sales data of cosmetics in wechat business industry, YangLei(2015) discussed that cosmetics consumer behavior in Qingdao, this paper analyzes the influencing factors, to meet consumer demand, encourage and guide the consumer behavior is an important way of promoting the cosmetics industrys profit. Wanwei

(2013) analyzed the current situation and strategies of national cosmetics brands in modern economic information. This paper will analyze the sales figures of cosmetics from the total retail sales of consumer goods, and summarize the factors affecting the sales of cosmetics, and will use Eviews software to establish a one-dimensional regression model to analyze the data of cosmetics sales.

3. MODEL SETTING AND TEST ANALYSIS

3.1 .Variable selection

In order to analyze the Chinese cosmetics sales and the relationship between the total retail sales of social consumer goods, choose cosmetics sales (unit: RMB one hundred million) as the explained variable (X), total retail sales of social consumer goods (unit: one hundred million yuan) to be explained variable (Y).

3.2 . Selection of data

This paper selected the 2009 to 2016, 8 years of annual data, datas are selected from the national bureau of statistics data and forward-looking statistics library, through the establishment of the linear regression model, analysis explain the linear relationship between variables and interpreted and change rule, and mold inspection. The datas are shown in table 1 :

(Table.1) data on cosmetics sales and retail sales of social consumer goods

Particular year	Cosmetics sales (X: billion)	Total retail sales of consumer goods (Y: billion)
2009	740	133048.2
2010	889	158008
2011	1103	187205.8
2012	1340	214432.7
2013	1625	242842.8
2014	1825	271896.1
2015	2049	300930.8
2016	2222	332316.3

3.3. Regression analysis

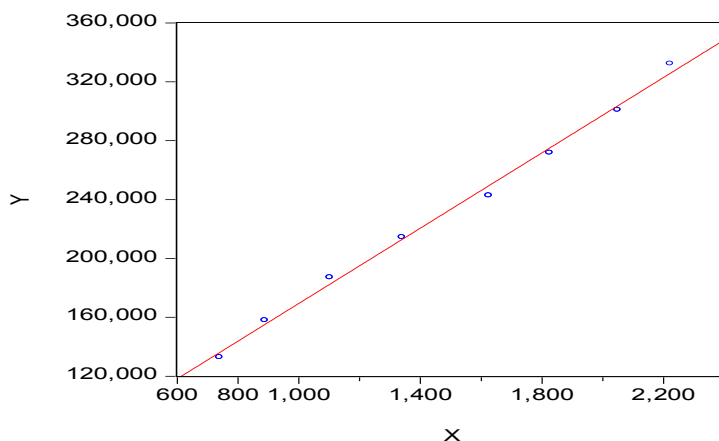


Figure. 1 scatter plot of cosmetic sales and total retail sales of social consumer goods

From the scatter plot, it can be seen that the number of cosmetics sales increases with the increase of the total retail sales of social consumer goods, which is approximate to the linear relationship. In order to analyze the regularity of the changes in the quantity of cosmetics sales and the total retail sales of social consumer goods, a simple linear regression model can be established.

$$Y_t = \beta_1 + \beta_2 X_t + u_t \tag{1}$$

4 .PARAMETER ESTIMATION

It is assumed that the proposed model and its random perturbation items satisfy the classical assumptions, and the parameters can be estimated by OLS method. In this paper, Eviews software is used to estimate the parameters, and the regression results are as follows:

The results of parameter estimation and test are written as:

$$\hat{Y}_t = 41470.78 + 127.950 X_t \tag{2}$$

$$t = (7.830782) (37.67878)$$

$$R^2 = 0.99579$$

The significance test of slope coefficient shows that the total sales volume of cosmetics has a significant impact on the total retail sales of consumer goods. Estimated parameters $\hat{\beta}_1 = 41470.78, \hat{\beta}_2 = 127.950$, It shows that the sales of cosmetics increased by 100 million yuan, and the average retail sales of social consumer goods increased by 12 billion 795 million yuan, which was in line with the expected positive significance. That is, the increase in cosmetics sales will lead to the increase of the total retail sales of social consumer goods. Figure 2 below is the figure for estimating the regression results of the parameters:

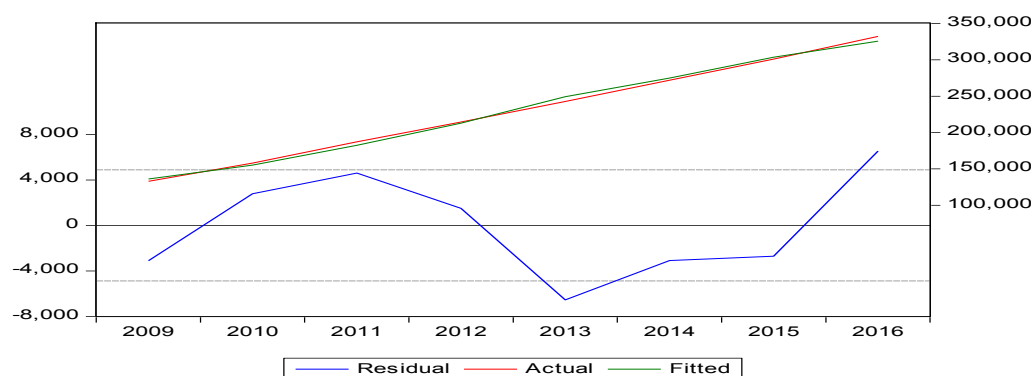


Figure .2 the remaining term, the actual value, the figure of the fitting value

The measure of goodness of fit: the decisive factor of this case . It shows that the model built on the model is well fitted to the sample data, that is, the explanation variable "cosmetics sales" explains most of the differences in the "total

retail sales of social consumer goods" by the explanatory variable.

5. CONCLUSION

Through the collection and analysis of existing data, master the current consumption status of the cosmetics industry . Through the regression analysis of the model, the factors affecting the cosmetics sales are preliminarily identified:

Firstly,with the development of national economy in China, and people life level unceasing enhancement, the cosmetics, as a kind of can give people confidence of consumer goods, demand and supply are constantly improve, personal disposable income is rising, the residents' consumption concept in matures, more and more pay attention to the quality of life and individual instrument, and these will promote the sale of cosmetics industry, for the cosmetics industry sales provides a wider range of opportunities.

Secondly,cosmetics consumption more focus on women in our country, women account for the significant role in the consumer groups, women more satisfy the pursuit of spiritual life, the demand for cosmetics is in pursuit of beauty and youth more, depending on the female age, occupation, different stages have different consumption psychology .

6. SUGGESTIONS

Based on the empirical analysis given above, the total sales of cosmetics can increase the total retail sales of social consumer goods. In order to increase the total sales of cosmetics, the following aspects can be considered:

Firstly,the product strategy should attach importance to product quality, emphasize scientific research, improve product safety, enrich product structure, meet different consumer demands, and improve the development of enterprises.

Secondly,different target markets, different areas, different prices, formulate corresponding price according to different consumer groups, the consumers with higher income tend to be more high-end cosmetics, low and middle income consumers tend to prices are appropriate and suitable quality products, for the right price to satisfy customers from all walks of life.at present, China's cosmetics sales channels have shop counters, store, Internet sales, supermarket and so on, different channels have different methods of sales, the high-end cosmetics should be more inclined to shop sales, and the Internet marketing channel should pay more attention to the real thing.

REFERENCES :

1. CHINA INDUSTRIAL INFORMATION NETWORK,.,2016-2022, China's cosmetics market supply and demand forecast and Investment Strategy Research Report [R].2016
2. LUO Xiaotong. Analyzing the marketing strategy of cosmetics market from the perspective of consumer psychology.[N]. modern marketing.2017 (phase 15).
3. PANG Hao. Econometrics (Third Edition) [M]..Beijing: Science Press, 2014:48-55.
4. WAN Wei, He Yi Yun. Current situation and strategy analysis of national cosmetic brands in China [J]. modern economic information, 2013
5. YANG Lei. Analysis of influencing factors on consumer behavior of Chinese made cosmetics [A].2015.6.1