

The ESG index evaluation system for idol economy is constructed based on the two levels of companies and individuals and the correlation is verified

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Abstract. This paper logically analyzes that the ESG evaluation results of film and television companies will affect the stock price performance of companies in the idol economy industry. On this basis, it further demonstrates the necessity of ESG evaluation system from the perspectives of the company and the company's product idol, and establishes evaluation indicators. On the one hand, from the perspective of idol companies, with the panel data of 7 companies from 2017 to 2020 as samples, the ridge regression model is constructed from two dimensions of qualitative and quantitative indicators, conventional evaluation direction and public opinion direction, to empirically verify the impact of ESG on ROE of idol economic companies. On the other hand, idol is taken as the research object, VAR model is established through data analysis, and SVM model is used to predict, demonstrating the effectiveness of establishing ESG evaluation system for idol products.

Keywords: ESG; Idol economy; Ridge regression model; VAR; SVM.

1. Introduction

Since the concept of ESG was first proposed by the United Nations Environment Programme in 2004, more and more companies, investors, regulators and securities exchanges around the world have begun and continued to increase their ESG layout. At present, ESG investment in most developed countries has been developed for many years and is currently in a mature stage. Therefore, it is necessary to establish and improve the basic system of the ESG market and clarify the standards for defining ESG. The idol economy refers to an economic model that obtains the brand value of idols through fans' emotions, and then obtains benefits. The healthy development of the idol economy industry has an important impact on the shaping of the values of the new generation of youth^[1].

This article innovatively establishes an ESG evaluation system unique to the idol economy, and divides the idol economy into two parts, idol economy companies and idol individuals. Due to the complexity and particularity of the idol economy itself, the existing mature ESG index systems for evaluating energy and high-tech industrial enterprises are not fully applicable to the evaluation of the idol economy, and many detailed evaluation indicators are not in the idol economy^[2]. within the assessment range. Therefore, combined with the unique characteristics of the idol economy, this paper will establish indicators from the characteristics of the idol economy and test the rationality of the indicators through model construction and correlation analysis.

2. Analysis of the correlation between ESG and the idol economy as a whole

2.1 Research Background

The idol itself, as a commodity, can directly bring economic benefits to the brokerage company. At the same time, the business model of the brokerage company also lays the foundation for idol products to be recognized by the public. The video platform and the brokerage company belong to a mutually beneficial and win-win relationship, and the two need to cooperate with each other to maximize benefits. Video platforms provide idols with a platform for activities. On the one hand, they can play the value of idols and at the same time make profits from them^[3].

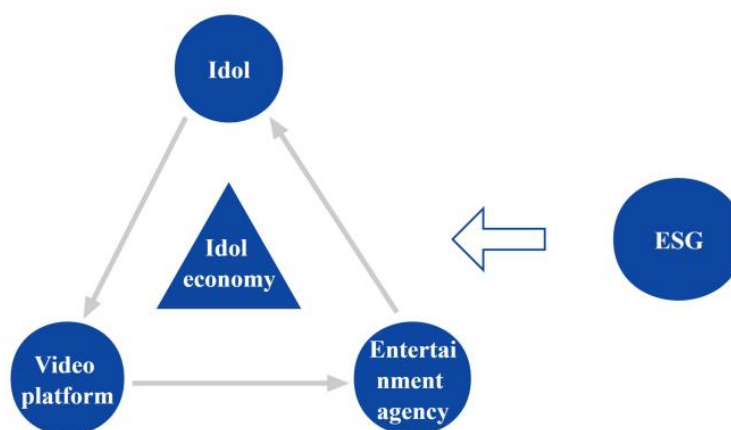


Figure 1 Schematic diagram of the role of ESG in the development of the idol economy industry

Therefore, the three parts of the idol economy are closely related, and their ESG scores also affect each other. As an idol as a commodity, a higher ESG score can reduce the probability of the idol's personality collapsing, thereby reducing the risk of a decline in the economic company's revenue^[4]. Brokerage companies always pay attention to environmental, social and corporate governance performance, which will bring good reputation to themselves, reduce corporate risks, and provide guarantees for video platforms. The video platform does not forget its own ESG responsibility, builds an environment-friendly and socially friendly enterprise, and continuously innovates the corporate governance structure, which will provide a better platform and world for idols. Therefore, ESG plays an important role in many aspects, not only injecting great vitality into the development of the idol economy, but also reducing the risks of the idol economy, indicating a new trend in the development of the idol economy^[5].

2.2 An Empirical Analysis of ESG and Idol Company Development Based on Ridge Regression

2.2.1. Empirical question

1. Data standardization

In order to eliminate the influence of the dimensions of different data indicators and facilitate subsequent data analysis, this paper adopts the min-max standardization method to standardize the data of non-0-1 indicators in the data.

2. Data dimensionality reduction

This part needs to reduce the dimensionality of the three types of indicators E, S, and G.

(1) Collinearity diagnosis based on multiple linear regression

Based on the least squares method, multiple linear regression was performed on the E index, and the multiple linear relationship between the indexes was tested by the VIF value.

From the analysis of the results of the F test, the P value is 0.1456, which is not significant at the level, and the model is invalid. For variable collinearity performance, variables E_11, E_12, E_1, E_10, E_13, E_9, E_2, E_8, E_6, E_7, E_5, and the VIF value is greater than 10, indicating that the indicators have a collinear relationship.

(2) Index screening based on ridge regression

In order to solve the multicollinear relationship between the indicators, the following ridge regression analysis method is used to eliminate unreasonable indicators. Through the ridge trace diagram, determine the minimum K value when the standardized regression coefficients of each independent variable tend to be stable. The indicators are screened by analyzing the significance of the indicators under the k value and whether the direction of the regression coefficients of the indicators conforms to the actual situation^[6].

In this paper, the variance expansion factor method is used. When the residual sum of squared value is small, the minimum K value obtained when the standardization coefficient of each E index tends to be stable is 0.097. At $k = 0.097$, ridge regression is performed on all E metrics.

Through multiple ridge regressions and using the variance expansion factor method, this paper determines the minimum K value of 0.05 when the standardization coefficient of each E index tends to be stable. When $k=0.05$, ridge regression is performed on the E-index that meets the conditions. The results show the goodness of fit of the model. Considering that ROE is explained by the three categories of indicators E, S, and G, it can be considered that the E indicator has the power to explain the ROE value of enterprises. The ridge regression prediction results of some E indicators are shown in Figure 2.

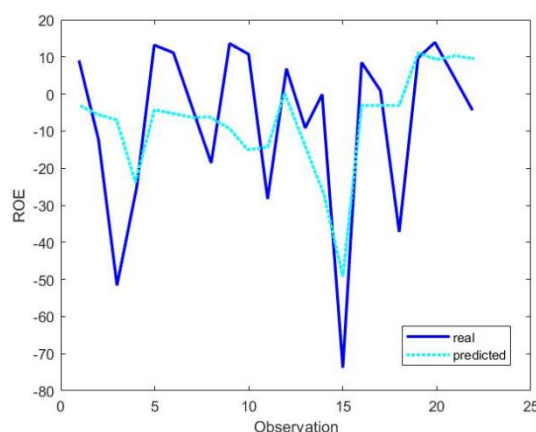


Figure 2 Ridge regression prediction goodness map for some E indicators.

(3) Preprocessing results

According to the above analysis, the eligible indicators are E_8, E_11, E_12, E_13, S_2, S_7, S_8, S_9, G_2, G_3, G_5. The following is a multiple linear regression for the above qualified indicators to study the fit of the indicators to the ROE of the enterprise.

2.2.2 Model prediction

1. Multiple linear regression model

Through calculation, for variable collinearity performance, the VIF values of indicators E_9, E_11, E_13, S_7, S_9, and G_5 are greater than 10, and there is a collinear relationship. This may be because there is a certain correlation between the three categories of indicators E, S, and G. In order to solve the multicollinear relationship between the three categories of indicators E, S, and G, the following uses the ridge regression analysis method to study.

2. Ridge regression research

Similar to the method of screening indicators by ridge regression above, ridge regression analysis is performed on the indicators. And according to the variance expansion factor method, this paper determines the minimum K value of 0.168 when the standardization coefficient of the above indicators tends to be stable, and performs ridge regression on the above indicators.

The goodness of fit $R^2 = 0.625$ of the ridge regression model was calculated, and the model showed good performance and basically met the requirements. Figure 3 shows the prediction goodness of ESG indicator ridge regression.

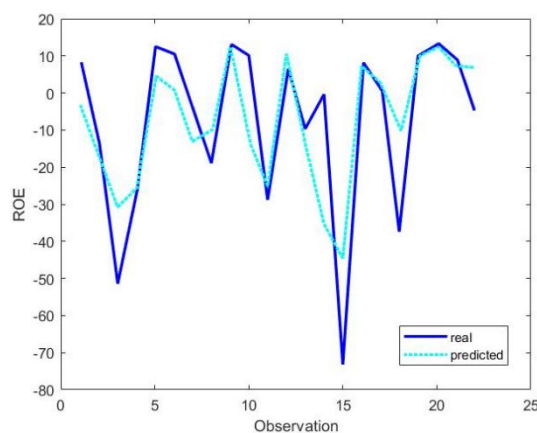


Figure 3 ESG Metrics Ridge Regression Prediction Goodness Plot

2.3 An empirical analysis of ESG and idol individuals based on VAR model and SVM model

2.3.1. Research on the Synchronization Correlation Between Internet Public Opinion and Stock Price

This section analyzes the correlation between online public opinion and the closing price, trading volume and total market value of Huayi Brothers stock market^[7]. In this paper, the spearman rank correlation coefficient, which does not make any assumptions about the index distribution, is selected. The calculation results are shown in the table.

Table 1. spearman rank correlation coefficient table

	Closing price	volume	The total market capitalization
Correlation coefficient	-0.245	0.215	0.245
Prob.	0.003	0.0116	0.003

The following conclusions can be drawn from the experimental results in the table: at the 5% significance level, the null hypothesis cannot be rejected. Online public opinion has a negative correlation with the closing price, and the negative correlation with the yield reaches -24.5%. This shows that the larger the public opinion index in negative news, the lower the stock price, and the sluggish investor sentiment. On the contrary, the smaller the online public opinion index, the higher the stock price, and the more enthusiastic investors are to invest.

2.3.2. Research on the lead and lag correlation between network public opinion and stock price

This section mainly analyzes the relationship between the closing price, transaction price, total market value and network public opinion of the stock market whether some indicators lead or lag. Still using the spearman rank correlation coefficient, which does not make any assumptions about the index distribution^[8].

It can be seen from the calculation that there is a significant correlation between online public opinion and closing price, trading volume, and total market value. Therefore, it can be concluded that (1) when the online public opinion is ahead of Huayi Brothers' trading volume by seven days, the two are significantly positively correlated, and the future stock market trading volume can be predicted through the online public opinion. (2) When the online public opinion lags the closing price of Huayi Brothers by seven days, the two have a significant negative correlation coefficient, indicating that the online public opinion will be reflected on the closing price in advance, and the stock price has a certain advance.

2.3.3. VAR model

This part will describe the public opinion from the information index, describe the company's stock market performance from the three dimensions of closing price, trading volume and total market value, and explore the impact of Fan Bingbing's tax evasion case on Huayi Brothers' stock price^[9].

1. Stationarity test

The ADF test was carried out on the information index and the relevant stock price information of Huayi Brothers,

The test results can be found that p are less than 5%, all reject the null hypothesis, all indicators are stable.

2. VAR lag period determination

In order to further examine the dynamic relationship between online public opinion and the closing price, trading volume and total market value of Huayi Brothers, a VAR model of the information index and the above three indicators was established respectively. In order to minimize AIC and SC, it can be determined that the lag orders of the three models are all lag 1. The specific results are shown in the following table:

Table 2. Information index and closing price VAR model lag order judgment table

Lag	0	1	2	3
LogL	-17.478	190.899	192.014	194.213
LR	NA	407.493	2.146	4.17
FPE	0.005	0	0	0
AIC	0.289	-2.739	-2.697	-2.67
SC	0.332	-2.61	-2.481	-2.369
HQ	0.306	-2.686	-2.609	-2.547

Table 3. Information index and trading volume VAR model lag order judgment table

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-16.737	NA	0.005	0.278	0.321	0.295
1	18.529	68.965*	0.003*	-0.186*	-0.056*	-0.133*
2	21.202	5.148	0.003	-0.166	0.049	-0.079
3	21.838	1.207	0.003	-0.116	0.185	0.006

Table 4. Information index and total market capitalization VAR model lag order judgment table

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-17.22	NA	0.005	0.285	0.328	0.302
1	187.642	400.620*	0.000*	-2.691*	-2.562*	-2.639*
2	188.777	2.184	0	-2.649	-2.433	-2.561
3	191.007	4.229	0	-2.622	-2.321	-2.5

3. Granger causality analysis and stability test

The Granger causality test was performed on the variables of the three vector autoregressive models respectively, and the specific test results are shown in the following table.

Table 5. Granger causality test results

H0	Prob.	Result
The closing price is not the Granger cause of the information index	0.1447	Refuse
The information index is not the Granger cause of closing prices	0.7168	Refuse
Volume is not the granger reason for consulting the index	0.1409	Refuse
Information index is not the granger cause of volume	0.7296	Refuse
Total market capitalization is not the granger reason for consulting the index	0.0022	Accept
The information index is not granger's reason for total market capitalization	0.0456	Accept

At a significant level of 5%, it can be seen from the table that there is a two-way Granger reason between the information index and the trading volume, that is, the change of the information index will drive the change of the stock market trading volume, which will then promote the change of the consulting index.

At the same time, through the stability test of the VAR model, it can be found that the unit root modulus is less than 1, so the model is stable.

4. Analysis of Information Index to Volume Impulse Response Function

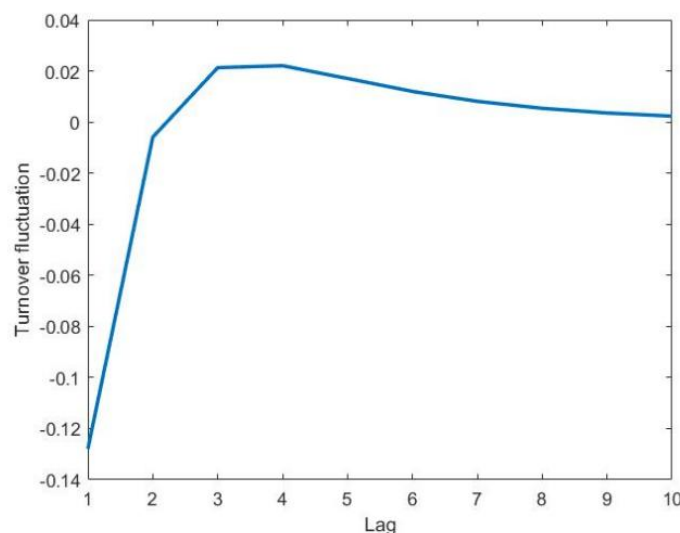


Figure 4 Analysis chart of information index to volume pulse function

It can be seen from the above figure that the information index had the greatest impact in the first period, decreased rapidly in the second period, reached the peak in the third and fourth periods, and finally became calm. This reflects that there is a certain lag in the impact of the information index on the trading volume, and this impact will gradually weaken over time.

5. Variance decomposition of information index to trading volume

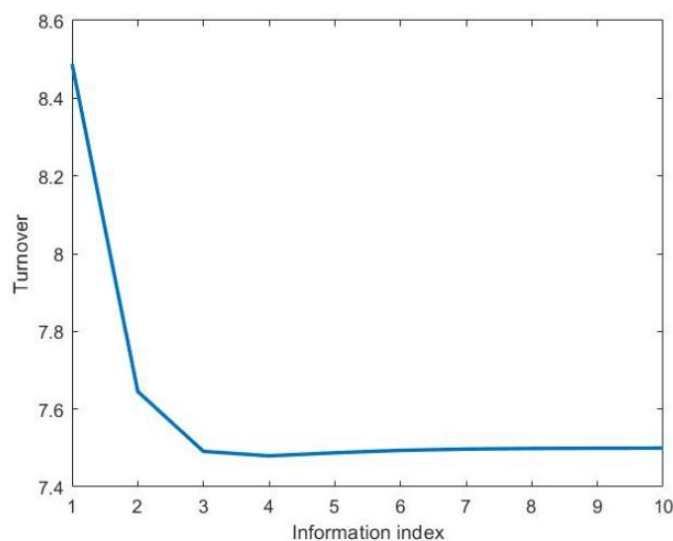


Figure 5 Information index to volume variance decomposition diagram

It can be seen from the above figure that the contribution of the information index to the trading volume has a greater impact in the first period, and then gradually declines. After the third period, the contribution curve basically remains unchanged.

2.3.4. SVM Huayi Brothers Volume Regression Model

1. Data set establishment and preprocessing

In this paper, the dependent variable is set as the trading volume of Huayi Brothers, and the independent variable is set as the public opinion index of the corresponding date, and the data is standardized by Z-score to construct the corresponding data set^[10].

Then this paper takes 75% of the samples as the training set and 25% of the samples as the test set for splitting. As can be seen from the figure below, the distribution of the data in the training set and the test set is roughly the same.

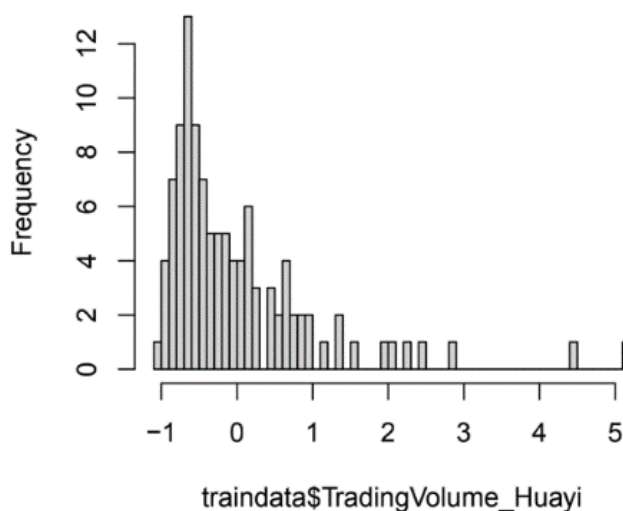


Figure 6 The basic situation of the training set data

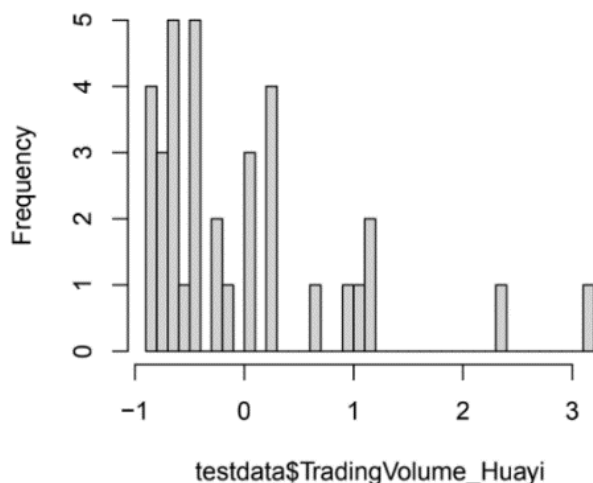


Figure 7 Test set data details

2. Establishment of regression model

The SVM Huayi Brothers trading volume regression model is established by using the above samples, in which the trading volume of Huayi Brothers is the target value, and the Baidu search index is the characteristic value. The samples are predicted through the training set, and the test results are obtained with the test set.

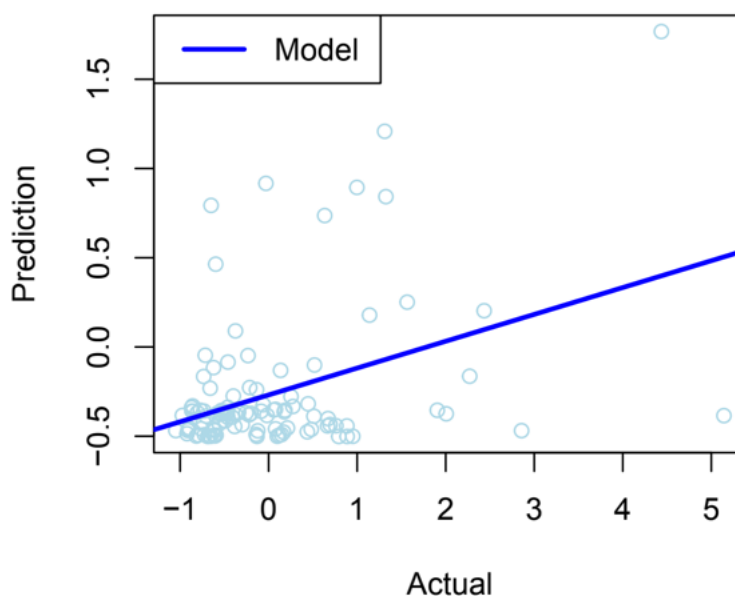


Figure 8 Training set prediction results

3. Model conclusion

The error index of the test set is obtained: , which shows that the accuracy of the prediction is acceptable, and the prediction of the trading volume of Huayi Brothers shares has greater reliability based on the size of the public opinion index. After deleting some extreme data, it is re-predicted. In most cases, the company's social reputation is good. When the search index is high, it means that the artist's exposure and traffic are high, which will bring benefits to the company, and the transaction volume will also increase accordingly, and some cases where the public opinion index is extremely high are The data in this article are mainly reflected in the exposure of tax evasion. The increase in negative news will actually lead to a sharp drop in transaction volume. When these data are included, the prediction results will be greatly affected.

3. Conclusion

On the basis of explaining the research background, current situation and mechanism of ESG, this paper takes the panel data of 7 companies from 2017 to 2020 as samples, and conducts empirical evidence from two dimensions of qualitative and quantitative indicators, conventional evaluation direction and public opinion direction. Research. The results show that, in terms of the environment, whether to sort and recycle garbage, the amount of wasted news, and the amount of news about ecological damage all have a significant impact on the company's ROE. On the social front, a company's track record of violations, the number of stories of infringement and discrimination are causally related to ROE. In terms of governance, the proportion of negative news, the number of disputes and hidden risks also significantly affect the company's ROE.

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