The design of E-commerce integrity evaluation system based on Logit analysis

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ABSTRACT

E-commerce in China has maintained a rapid development and brought a series of problems. This makes effective regulation become more important. Exploring scientific and efficient evaluation system of integrity trade is an effective measure for the supervision field of e-commerce integrity trade and for the government public service, and it can also promote the establishment and perfection of the relevant policies, regulations and standard systems. Based on the comparative study of the foreign integrity system models and after combining the current situation of the present domestic e-commerce integrity system and analyzing the Logit models, the design of the e-commerce integrity evaluation system which conforms to the characteristics of the e-commerce trade environment in our country was proposed in this paper. It is a great breakthrough for e-commerce supervision which is in initial stage. Value of Logit model has been proven in the area of credit rating for commercial banks. It evaluates the creditworthiness of e-commerce buy using simultaneously quantitative indicators and qualitative indicators, so as to establish a comprehensive evaluation system.

Key words: Logit Analysis; E-Commerce; Integrity Evaluation System
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INTRODUCTION

The definition of electronic commerce or e-commerce has not been standardized so far.   E-commerce is most distinguished by its operation in the virtual world of Internet and the dealers are not acquainted. Under this circumstance, the success of the commercial act depends on: the honesty of dealers, a complete law and the supervision of government. Therefore, for the healthy and sustainable development of e-commerce, it is fundamental to establish a scientific and feasible credit rating system of e-commerce participants under the comprehensive legal system of market economy which shall be effectively supervised by relevant government agencies.

2. References to Foreign Credit System Practices
The classic credit system in the world is divided into three types: the American model featured by market participation, the European model featured by government leadership and the Japanese model featured by membership. The credit model In USA is totally market-oriented. It is independent and objective under the regulation of a complete credit legal system and a government supervisory system. [1]. The credit system in Europe is driven by the government. Therefore, the major credit rating institution is usually subordinate to the central bank.[2]. The membership credit rating system represented by Japan is rather different from the above two models. In Japan, the major crediting organization is banking association and credit industry association since the country boasts a powerful industrial association system which plays an import role in the national economy[3].

In the establishment of our own credit system, we cannot simply copy any of the foreign models. Instead, only after a scientific analysis of the market environment in China as well as trials and errors in the experiment can a credit system fit to our market economy be built.

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3. Present State and Problems of the E-commerce Credit System in China

At present, the e-commerce activity in China is fraught with acute problems like unlicensed business, false advertising, poor product quality, unavailability of after-sale service, disclosure of consumer's personal information and the difficulty of protecting consumer's rights. This is both a data source and an urgent requirement for the establishment of Internet credit rating system.

Based on the above realities of China, we conclude that the Internet credit rating system of China shall be one led by the administration for industry and commerce based on the reality of China, according to the theories of statistics and economics, and by the analytical method of econometrics[4].

4. Design of E-commerce Credit Rating System based on Logit Analysis
4.1 A Review of Credit Rating Method

Although the credit can date back to 5000 years ago, the systematic research of credit rating only has a history of decades. Its basic principle is to determine a series of factors influencing the credit and specify the standards to rate the credit after a comprehensive analysis of these factors about the rated target and through constant simulation, testing and fitting for the ultimate purpose of evaluating the operation state and economic situation of the target.

The early credit rating was conducted through direct credit scoring. After the extensive application of statistical technique and econometric model, the probability of default could be measured and so the credit rating started the same application. An overview of the whole development process of credit rating indicates that the credit can be rated by three methods: subjective judgment, parametric statistic measurement model and nonparametric statistic measurement model[5].

4.2 Model conception: Logit analysis in the field of credit rating

The multivariate conditional probability model is adopted by the credit rating to predict the probability of variables relevant to the individual company, which includes Logit model and Probit model(Gloubos et al., 1988[6]; Dimitras et al., 1996[7]).

In the multivariate conditional probability model, the value of the dependent variable is S (amount) discrete numerical values, represented by S. S=1, 2, …, S. The conditional expectation of the dependent variable Y is:

$$E(y_i|X_i)=Pr(y_i>s|X_i)=F(\alpha+X_i'\beta-\kappa_s) \qquad s=1,2,\ldots,S-1$$

$y_i = (y_1, y_2, \cdots)$ symbolizes different discrete values of the dependent variable which indicate its different rates.
$X_i'=(x_1, x_2, \cdots)$ is the independent variable matrix whose value may be discrete or successive numerical value.
κ_s is called threshold value which signifies the taxonomy of latent variable after the model transformation.

When the model is multivariate sort Logit model,
$$Pr(y_i>s|X_i)=F(\alpha+X_i'\beta-\kappa_s)$$

$$=\frac{\exp(\alpha+X_i'\beta-\kappa_s)}{1+\exp(\alpha+X_i'\beta-\kappa_s)}$$

And
$$\Rightarrow \frac{Pr(y_i>s|X_i)}{1-Pr(y_i>s|X_i)}=\exp(\alpha+X_i'\beta-\kappa_s)$$

The above formula states the probability that the responsive numerical value of the dependent variable is bigger than a certain rate.

The reason why Logit is called a nonlinear model is that it measures not the linear but nonlinear relation between the dependent and independent variables. The conclusion drawn by this model is not merely a simple credit rate as figured out by other analytical methods but more the corresponding probability of each credit rate. As its premises are relaxed, the Logit model is used more flexibly and more adapted to the real-life situation. Thanks to its various strengths, the model has been heeded extensively. Over the past twenty years, Logit model has witnessed enormous application and advance both in the practice and the academics. Now it's a highly effective instrument of credit rating.

Generally, Logit model can exactly offer a comprehensive analysis of multi-class dependent variables, quantitative indexes and qualitative indexes. Therefore, with the strengths and features of the model considered, an Internet credit rating index system can be built based on the Logit model to meet the regulatory requirement of the administration for industry and commerce on e-commerce activities.

4.3 Design of an e-commerce credit rating index system
The government agency shall take the lead to establish credit rating standards in e-commerce transaction for the purpose of supervising the credit during the e-commerce transaction. And the e-commerce credit rating index system is an important part of the establishment of credit rating standards.

In reference to the banking credit rating, for the convenience of identification and with different credit rating objects, the e-commerce credit rate is divided into five levels in three classes, AAA, AA, A, B, C. AAA means an excellent credit, AA good, A , B average and C bad.

Based on the research of e-commerce activity, the e-commerce credit rating index system is divided into two levels: the first level consists of two types of indexes, the index related to operator and the index related to operation activity; the second level is the sub-index set of the first level.

a. Design of index according to different participants
Different index systems shall be designed for different kinds of e-commerce participants[8].
● Individual operator of commodity trading on the cyber-mediary
The individual operator herein refers to an individual or family who does business such as selling or transferring commodities on the cyber-mediary. The indexes for them shall be mainly a series of indexes for Internet business activities, such as sales, sales volume, deposit balance, compensation varieties for consumer, product description authenticity, buyer's comments and refund speed. It can also be supported by personal credit information of the operator recorded in the administration for industry and commerce, including bank credit information, permanent residence and registered capital.

● Offline operator of business entity selling commodities on the cyper-mediary
To keep abreast with the development trend of e-commerce, the offline business operator, like the incorporated operator in Taobao and Alibaba, expands its business scale by sales on the cyper-mediary. The two kinds of the first level index shall be focused on to evaluate the credit of the business entity operator trading online. The first kind shall be mainly about its offline operation state and financial state, including scale of business, registered capital, offline sales, offline sales volume, bank credit and asset-liability ratio. Like the assessment of individual online operator, we shall also consider the second kind index of the first level, such as online sales, online sales volume, deposit balance, compensation varieties for consumer, product description authenticity, buyer's comments and refund speed.

● Service operator building online commodity trading platform
This service operator builds such e-commerce trading platforms as Dangdang.com, Amazon. com and JD.com. Here we regard those business entities trading online as legal persons of enterprise doing normal business activities. Compared with traditional credit rating system, their first kind index of the first level is emphasized, that is, different financial ratios representing their business activity state which are important indexes to indicate their healthy and sustainable development. Meanwhile, their after-sale service in the e-commerce is also observed, including claim settlement speed, delivery speed and packaging quality.

b. Special consideration
With the features of Internet and e-commerce considered, the quantitative indexes, like Alexa Ranking, PR Index and Search Engine Ranking, published by authority thirty-party websites shall also be admitted into the e-commerce credit rating index system.

CONCLUSION

The e-commerce will be an important growth pole of the social and economic development of China in the future. For its health and sustainable development, it is a guarantee to build an honest trading supervision system fit to the features of e-commerce in China. The central part of this system is a scientific online trading credit rating system established on the basis of the issue of online operator electronic marking and according to the science of management, economics and statistics. It serves as the basis for the supervision of the administration for industry and commerce, improves the trust of online consumers and strengthen the online operator's consciousness of "I promise and I disclose".

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