Research on the Risk Rating and Risk Control Measures on E-commerce Credit based on Nash Game Analysis

Xiaoyan Zhang

Qingdao University of Technology, Shandong Qingdao, 266300, China.

Keywords: Risk Control, E-commerce, Nash Game Analysis, Risk Rating, Literature Analysis.

Abstract. This paper analyzes on the risk rating and risk control measures on E-commerce credit based on the Nash game analysis. Based on game theory, as both parties is always looking for the optimal strategy from the perspective of their own, thus forming the Nash equilibrium as the main body of the existence of opportunistic behavior, if in a bad credit environment, market supervision mechanism is not sound, a trader with an unreliable but can get extra income. E-commerce model is traditionally divided into B2B, B2C and the C2C three kinds. Look from the current development situation, B2B and C2C development relatively well in the two sort of modes. Under this condition, this paper proposes the new perspective on the related issues and proposes the evaluation model for the E-commerce credit that will promote and enhance the crediting system.

Introduction

C2C e-commerce credit evaluation system, it is to point to both parties in a transaction is completed, during the validity period of evaluation, according to the transaction object based on the transaction of the evaluation of each other, form the credit information feedback, and will be a user to get all of the evaluation in a certain way to rally for the user's credit and credit records, to reflect the user's credit status, reference for other users to make trading decisions. A complete e-commerce activity involves many aspects of credit system, including suppliers, manufacturers, banks, authentication institutions, insurance companies, e-commerce, logistics distribution center and customer mutual credit guarantee. As for concerning the drawbacks of the current algorithm, we can summarize it as follows.

- The design of the credit rating is not fine. Existing credit rating and evaluation of a successful deal, only good, poor, in the three.
- Credit evaluation no time factor are introduced. Existing evaluation can't distinguish the credit status of trade credit history and the present, because of the credit status of each person is a dynamic change.
- The evaluation of credit evaluation rate is not high. Now every platform of credit evaluation is based on basic voluntary principle, many are not buyers give high praise, but after validity evaluation to the system default given high praise.

Electronic commerce calls for honesty, more need to establish a perfect credit system. If there is no a set of perfect credit guarantee system, online e-commerce may be some fraud in the wrong hands. It is the lack of good faith, the virtual world have severely hampered the development of the electronic commerce. To deal with the challenges, in this paper, we conduct research on the risk rating and risk control measures on E-commerce credit based on the Nash game analysis.

The Proposed Methodology

E-commerce and the Credit System. Famous economist David Friedman once suggested that the source of online trading controversial, there are two: one is the time difference, and the second is anonymity. The purpose of this article is through the study of that C2C mode of the existing credit supervision system, points out the defects of existing, and proposes the corresponding improvement measures. Electronic commerce is gradually being accepted and used. But, as a result of online trading does not actually contact on both sides, will appear on the goods and payment for goods

delivery one time, the time gap has brought the possibility of online fraud, users of network transaction security concerns, which directly affect the consumers to online transactions and therefore, as an important foundation of the market economy credit also has a significant influence on the development of the electronic commerce. C2C websites at home and abroad to the construction of the credit evaluation system is in constant efforts to explore. Now run the credit evaluation system should be said that the development of e-commerce has played a vital role.

Fig. 1 The E-commerce and the Credit System Architecture

Nash Game Theory. The core of the Nash equilibrium is the same as expected, and only meet consensus, game when the participants strategy combinations may be the Nash equilibrium. Game should not only reflect people's rational demand of solutions, and that can predict the result of the problem, that is to say, game solution of the problem is this player strategy combination, it is by each player from their respective space strategy choice of the optimal strategy, the strategy combination as a gambling problem's solution, is the consensus to players for the game, any player to violate the game problem solution alone, can increase interest, namely the strategy combination makes players did not change strategy interests drive alone. The figure two shows the principles.
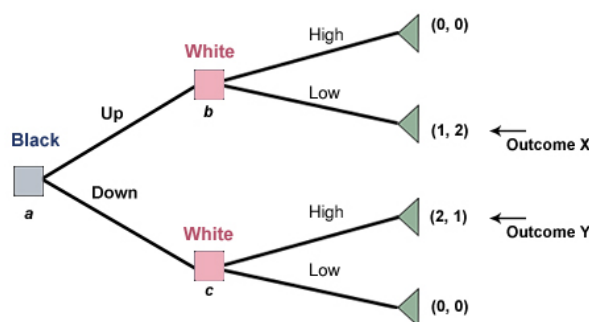

Fig. 2 The Demonstration of the Nash Game

Participants to non-cooperative game theory focuses on how to carry out the strategy choice, under the hypothesis of complete rationality, participants in any change to the world that make the optimal reaction, if there is a balance, as they always choose equilibrium strategies, but when dealing with multiple equilibrium, because the participants speculated that the other person's behavior is expected, so it is difficult to make a choice between multiple Nash equilibrium as shown in the formula one.

$$v_i^M (S-i) = \max_{s_i \in S_i} v_i (s_i, s-i) \tag{1}$$

First time participants involved in ORA type, is decided by their own preferences. The previously attended ORA type is determined by the average income of their previous participants. Therefore, ORA participants in the short term will not change their type. Two aspects by above knowable, ORA participants in a game, only according to the game of their profit maximization decision-making, at the same time at the end of the game will not immediately change their type. And under this basis, we have the following conclusion and result for the general suppose. The risk neutral (linear utility function) under the assumption of that also concluded that the mixed strategy Nash equilibrium and opportunism tendency of the basic participants that also incompatible. The Nash equilibrium for each participant (game) is not only advances the most optimal, and as long as he holds risk neutral attitude on opportunity cost that is the optimum utility.

Risk Rating Principles. Credit rating to the market passed the rating object of credit quality and change of signal, can alleviate the information. Issuers paying model based model, get the credit rating agency decision rules then introduce the regulation, the analysis of the effect of regulation on rating quality and social welfare. The main conclusions of this paper is, by strengthening supervision, can improve the quality rating, the issuer to pay mode, the asymmetric regulation is superior to the symmetry, but regulation will lead to the credit rating agency, that information production costs and supervision costs, improve the quality rating regulators need to weigh the benefits and costs, taking the optimal regulatory measures. The principles of the risk ranking can be shown as follows.

- Indicators reflect the specific project of basic credit rating factor, general with index said. The choice of indicators must be able to fully reflect the content of the rating. Through several major indicators to measure, one the one hand can make the enterprise credit is fully revealed.
- Weight is to point to the importance of each index in the rating index system. The credit rating of each index in the index system of credit rating can't be equal view, some indicators occupies an important position, play a decisive role to the enterprise credit rating.
- To credit conditions are divided into different levels, this is about to designate different levels of the standard of each index, in order to reference.

Credit rating system in the capital market to measure credit risk and guide investment financing plays an important role, in revealing and prevents credit risks, lower transaction costs, and assists the government in financial regulation, etc., play an important role. Joint venture and cooperation with famous international credit rating agency that help domestic rating firms directly to absorb the most advanced capital market credit risk analysis and management of the core technology, and the rapid increase of domestic credit rating risk analysis, and the management level, with the process of the internationalization and standardization of our country's credit ratings.

- Because our country market system preliminary established, credit environment needs further improvement, in order to avoid vicious competition, the credit rating agency is necessary in the primary stage of the development of that the credit rating industry development pattern dominated by the government.
- Must strengthen to build and perfect the relevant laws and regulations, the introduction of new management measures at the same time, to deal with some obsolete, not adapt to the market economy and the development of the industry or amend laws in time to be abolished.
- Credit rating agencies belong to market intermediary organizations, in order to strengthen the guidance and supervision of the basic credit rating work and management and to the long-term development of the credit rating industry foundation and effective management, credit rating industry association shall establish self-discipline.

Business Risk Control Countermeasures. Most interest is not steady are protected by law, and therefore difficult to profit that in general usage. Because of failing to the stability of the protection by law, interest is usually not obvious appearance, if we want tort liability of the damage, will cause a lot of risks. In the mode of protection, the others compulsory rules set by the law mainly by specific rules, and three ways to protect the interests of the legal principles and to protect the interests of the different ways, the relevant legal consequences. Through legal principles to protect the interests of the criterion otherwise, because of the ambiguity of general legal principles, in this type of damage

interests, the infringement behavior person should bear the responsibility, how to exist a lot of uncertainty and the damages may induce a variety of the risks. Shows, the form of interest are complex, different interests compensation problems of each are not identical, said its damages may induce risks in that general, expression is not accurate, so need to typed analysis of interests, according to the type characteristics to analyze the risk of damage compensation may induce, only has the practical significance. Therefore we propose the following perspectives to serve as the countermeasures.

- Management means. Technology management means relative to the complicated place lies in its more to the people rather than to the content, but there are still many scholars put forward the related solutions. We should departure from the system of risk aversion, optimize the organizational structure of enterprise: first, establish and perfect a set of investment risk prevention mechanism; Secondly to strengthen the whole process of risk management, the establishment of financial information system, efforts to defuse the risk.
- Legal means. Legal means can be said to be more direct means, can effectively control the legal issues involved in the electronic commerce.
- Technical means. Technology means computer security technology, software and hardware technology, and so on, control technology in process of e-commerce transactions. Technology including data encryption technology, perfect the identity authentication technology, which uses a variety of tools and methods to clear up the network of all kinds of weakness

Summary

This paper analyzes on the risk rating and risk control measures on E-commerce credit based on the Nash game analysis. From a different perspective, the electronic commerce the reason of the breach can vary. But whether it is from the perspective of "the stranger" society, or according to the analysis of the characteristics of the network transaction itself the ultimate hidden behind a common meaning, the nature of that information asymmetry, this is one of the root cause of the lack of credit. Under this angle, this paper proposes the new understanding of the issues that will be innovative.

Acknowledgement

References

[1] D'Amato, Egidio, et al. "A Hierarchical MultiModal Hybrid Stackelberg–Nash GA for a Leader with Multiple Followers Game." Dynamics of Information Systems: Mathematical Foundations. Springer New York, 2012. 267-280.

[2] Léon, Enric Roca, et al. "Concurrent Aerodynamic Optimization of Rotor Blades Using a Nash Game Method." Journal of the American Helicopter Society 61.2 (2016): 1-13.

[3] Bi, Chujian, et al. "SAR image restoration and change detection based on game theory." Intelligent Computing and Internet of Things (ICIT), 2014 International Conference on. IEEE, 2015.

[4] Papavassilopoulos, George P., Hisham Abou-Kandil, and Marc Jungers. "A nash game with long-term and short-term players." Decision and Control (CDC), 2013 IEEE 52nd Annual Conference on. IEEE, 2013.

[5] Kulkarni, Ankur A., and Uday V. Shanbhag. "On the consistency of leaders' conjectures in hierarchical games." Decision and Control (CDC), 2013 IEEE 52nd Annual Conference on. IEEE, 2013.