Research on Revenue Distribution Mechanism of Supply Chain based on Joint Utility Model

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Abstract. The thesis starts with the theoretical connotation of revenue distribution in supply chain, which lays the theoretical support for the model construction and realization mechanism, then takes the joint utility model as the basic research method and establishes two-stage closed-loop profit distribution model of supply chain, which composed of suppliers and manufacturers. This paper also analyzes the value range of relevant parameters and the revenue change of all parties in the supply chain. Through the research, the feasibility of applying the joint utility model to the revenue distribution model of two-stage closed-loop supply chain is verified. The purpose of this paper is to propose the method and model of cooperative benefit distribution in supply chain, which is to make distribution of cooperative interests between enterprises fairer and more reasonable. Also, it can strengthen the cooperative relationship between supply chain members.

Keywords: Supply chain; Revenue distribution; Joint utility.

1. Foreword

As we all know, the members of the supply chain alliance are independent economic individuals and seek to maximize their interests. The purpose is to obtain more benefits than enterprises do business independently under certain risks and opportunities. Relationships among members are both cooperation and competition. At the same time, the establishment of supply chain alliances will also form a new revenue distribution pattern. However, in this kind of competitive relationship, if there is a phenomenon that the distribution share of members is inconsistent with their own position in the supply chain and the efficiency of work, or any member attempt to monopoly interests will lead to a reduction in overall interests. It also results in a decrease in the efficiency of logistics operations and it is difficult to reduce logistics costs. The use of revenue distribution for solving those problems are the most direct and effective method. Therefore,revenue distribution is the key point for the coordinated development of logistics supply chain.

The relevant literature on the current supply chain revenue distribution mechanism is based on qualitative analysis. First, analyze the connotation source of supply chain, the integrated composition model of revenue distribution and the key elements of discriminating the impact mechanism, and then improve revenue distribution mechanism. There are also a small number of scholars who use the Shabley value, game theory and other mathematical model interest distribution issues as the research techniques. Among them, regarding the revenue distribution model, Gerard P. Cachon, Martin A. Lariviere, and Ilaria Giannoccaro explored the revenue sharing contract adopted by the general supply chain based on the revenue sharing mechanism. The revenue is determined by the purchase volume and price of the retailer [1]. In addition to improving the efficiency of the system, the contract can also increase the total profit of the chain. Weihua Liu, Xuan Zhao, Runze Wu used the fair entropy function ("one-to-one" model) to analyze the revenue sharing contract. They designed a secondary supply chain closed loop, which is suitable for the maximum benefit contract of integrator and providers who offer logistics service [2]. After describing the connotation and characteristics of the port logistics service supply chain, Xiaomeng Wei proposed the principle of revenue distribution [3].

In order to coordinate supply chain cooperation, improve operational efficiency and overall performance, the key point is to promote the rational establishment of revenue distribution mechanism. For the supply chain for producers and retailers, Lye and Bergen assume they are in a fast-responding condition, when retailers will be profitable, producers will not have any return. That will have influence in the level of service provided by producers to retailers, and the probability of market's uncertainty will increase. That phenomenon doesn't maximize the performance and effectiveness of the supply chain. All of that is the result of unreasonable distribution mechanisms [4]. After delving into the issue of the distribution of benefits among the companies involved in the chain, Weng pointed out that only by adopting a special cooperation mechanism and sharing information on production and marketing can each member make the most rational and most favorable decision [5]. Jie Wan and Minqiang Li made relevant research from the perspective of the influence of the bullwhip effect [6]. In addition, Yuzhi Shen and Hongliang Wang found that the differences in the size of the status and the uncertainties caused by incomplete information in the supply chain alliance are widespread [7].

In terms of research methods, as the first person to use the quantitative method to study the revenue distribution mechanism, Lloyd Shapley's multi-player-based revenue distribution formula model is still widely used in economic activities. It refers to the scheme of optimal benefit allocation (cost allocation) according to the contribution function V corresponding to a given different cooperation mode S in a large alliance N [8]. Dongchuan Sun and Fei Ye mainly use the Nash model to help mediate the benefit distribution of dynamic supply chain alliances [9]. For the agricultural product logistics supply chain, Xiaowei Lin used the analytic hierarchy process to establish a related revenue distribution model [10]. Zhigang Song, through the evolutionary game model, considers the value of customers, and discusses the problems existing in the mechanism of revenue distribution of logistics service supply chain in China [11]. Chaozhong Hu takes the supply chain contract as the starting point and relies on the Stackelberg model to study whether the members participating in the logistics supply chain collaboration have the optimal income decision under the non-cooperative relationship and the cooperative relationship [12].

2. Influencing Factors and Existing Contradictions of Revenue Distribution

A certain understanding of the factors affecting the operation of the supply chain is conducive to discovering the main contradictions to be solved by the revenue distribution mechanism, and making the research on the follow-up revenue distribution mechanism more targeted. In the supply chain, the private information of each member causes the asymmetry of information to a certain extent. The asymmetry of this information has two manifestations: the first is exogenous asymmetric information. It refers to the inherent characteristics of the members involved in the supply chain cooperation, such as the uniqueness of the core technology of the enterprise, work efficiency, teamwork, cost, etc. [18], which exists with the birth of the enterprise. In other words, it already existed before the cooperation. This kind of information is represented by the efficiency coefficient and cost coefficient in the formula; the second type is endogenous asymmetric information, which is an opportunity behavior, which means that in the interest community, the cost or production task is less than it should be. The share of the commitment is a kind of behavior of "taking the benefits of others and making ends meet". It is exactly the opposite of the first category, which is the case after supply chain cooperation. This type of information is expressed in the formula by the level of effort of the members. These two types of asymmetric information cause an unreasonable phenomenon of revenue distribution. Therefore, the relationship between the operational efficiency of each member and the cost of input, effort level and distribution share, as well as the impact of this connection on members, are issues that need to be resolved in the supply chain revenue distribution mechanism.

By combing the supply chain revenue distribution characteristics model, influencing factors and contradictions, it lays a theoretical foundation for the research of revenue distribution mechanism. At the same time, through studying relevant literatures at home and abroad, it is found that the distribution of common interests in the supply chain has been gradually brought to the forefront, indicating that this problem is critical and valuable.

3. Research on Methods based on Joint Utility Model

3.1 Research Strategy

There are many members in the supply chain, which are divided into core enterprises and node enterprises. They are the mainstays of interests. They all want to make favorable decisions through the market conditions they face, and maximize the benefits. The decision-making problems between enterprises will be affected by each other. Undoubtedly it is a huge competition. This involves the category of game theory, so this paper proposes a research strategy based on game theory for the joint utility model.

Game theory refers to the decision-making and decision-making equilibrium problems that are made when the behaviors of decision-makers interact with each other [18]. It is like when we make decisions in our lives, we often think about each other's strategies and actions. And just the others will think about the same problem, and the decisions we make will affect the decision of the other party. Game theory can be divided into cooperative games and non-cooperative games [18]. The main point of distinguishing between cooperative game and non-cooperative game is that when people's decision-making behaviors interact with each other, whether there is a binding contract between decision-makers as a guarantee implementation, such as a check-match game, two or two contestants can unite and pave the way. And this kind of joint contractual external force guarantees the implementation, then this kind of game is the performance of the cooperative game. If the joint lacks the protection of external forces, the participants ignore the cooperation and only want to block the way of others, then this is not In the cooperative game, the outcome of the game is the failure of both parties. Cooperative games focus on overall rationality, emphasizing fairness and efficiency; non-cooperative games focus on individual rationality, emphasizing the optimal individual decision-making, and the result may be inefficient or efficient [19]. Cooperative game generally refers to how people can reasonably allocate common income in collaboration, which belongs to the category of revenue distribution. However, non-cooperative game refers to how decision makers make decisions to maximize their own profits when it comes to interest-related problems.

Based on the cooperative game, the research on the supply chain revenue distribution mechanism is roughly divided into two steps. First of all, in the case of mutual recognition, all members work together to design a revenue distribution plan that most members can accept (that is, to clarify the revenue distribution coefficient), which is a cooperative game; next, each member based on the actual situation of investment scale, technical level, etc. It is a non-cooperative game to clarify the level of effort that you have coped with so that you can maximize your own profits. Based on the above, two points to be paid attention to in the distribution of supply chain revenue are: what is the reasonable revenue distribution plan in the supply chain; in addition, how members choose the optimal action strategy under the established allocation plan, that is, determine their own efforts.

3.2 Basic Model Building

The basic model for establishing a supply chain revenue distribution mechanism is as follows. First, assume that each supply chain member is a rational person and a risk neutral, and the supply chain consists of N members.

$$R = f(\beta\alpha), \quad \beta\alpha = (\beta_1\alpha_1, \beta_2\alpha_2, \ldots, \beta_n\alpha_n)$$
$$C_i = g(\gamma_i\alpha_i)$$
$$P_i = \lambda_i R + R_{io} - C_i(\gamma_i\alpha_i)$$
$$\sum_{i=1}^{n} \lambda_i = 1$$

Symbol Description:

R	Is the total return of the supply chain under synergy, with monotonous changes in the level of member effort;
U	a joint utility function representing member i;
ρ_i	Is the weighting factor of member i;
α_i	Is the level of effort of members;
$\beta_i(\beta_i > 0)$	Is the efficiency coefficient of member i;
γ_i	Is the cost factor of member i, together with the efficiency coefficient, reflects the member's comprehensive ability;
λ_i	Is the revenue distribution coefficient of member i;
P_i	Is the net benefit of the participation of member i;
R_{io}	Is a fixed transfer payment obtained by member i;
C_i	Is the cost of the member i collaboration, increasing monotonically;
C	Is the total cost paid by all the collaborative members;

The joint utility function $U = \sum_{i=1}^{n} \rho_i \ln(\lambda_i R + R_{io} - C_i(\gamma_i \alpha_i))$, if all the participating members get the corresponding revenue according to the share, maximize the U value, namely:

$$U = \max \sum_{i=1}^{n} \rho_i \ln(\lambda_i R + R_{io} - C_i \gamma_i \alpha_i)) \tag{1}$$

s.t.

$$\begin{aligned} &\lambda_i f(\beta\alpha^*) + R_{io} - C_i(\gamma_i \alpha_i^*) \geq \overline{P_i} \\ &\lambda_i f(\beta\alpha^*) + R_{io} - C_i(\gamma_i \alpha_i^*) \geq \lambda_i f(\beta\alpha) + C_i(\gamma_i \alpha_i) \end{aligned} \tag{2}$$

ρ_i indicates the member i 's trading ability; $\alpha^* = (\alpha_1, \alpha_2, \ldots, \alpha_i^*, \ldots, \alpha_n)$ is the bottom line for member i's payment. Equation (1)(2) is the constraint condition, and (1) indicates that the member i 's participation in cooperation is not less than the maximum expected utility that can be obtained without participating in cooperation. (2) indicates that when $\alpha^* > \alpha$, members will choose at that time.

Next, we see how the members determine their own level of effort in the case when the revenue distribution coefficient has been determined. For taking partial derivative of α_i , the action level of the member i to choose not to cooperate and the level of effort in the Nash equilibrium state can be obtained.

$$\frac{\partial P_i}{\partial \alpha_i} = \lambda_i \frac{\partial f(\beta\alpha)}{\partial \alpha_i} - \frac{\partial g(\gamma_i \alpha_i)}{\partial \alpha_i} = 0 \qquad i = 1,2,\ldots,n$$

$$\alpha_i^* = \arg\ \max(\lambda_i R + R_{io} - C_i(\gamma_i \alpha_i)) \qquad i = 1,2,\ldots,n$$

Then we go back to the first step and then determine the optimal revenue distribution coefficient. The distribution coefficient in turn determines the degree of effort of the members. Such repeated games can maximize the joint utility of the entire supply chain.

$$\frac{\partial U}{\partial \lambda_{\mathrm{j}}}=\sum_{\mathrm{i}=1}^{\mathrm{n}}\frac{\rho_{\mathrm{i}}}{P_{\mathrm{i}}}\frac{\partial P_{\mathrm{i}}}{\partial \lambda_{\mathrm{j}}} \qquad \mathrm{i}=1,2,\ldots,n$$

$$\lambda_{\mathrm{i}}^{*}=\arg\ \max\sum\rho_{\mathrm{i}}\ln\left(\lambda_{i}R+R_{io}-C_{i}\right) \qquad \mathrm{i}=1,2,\ldots,n$$

3.3 Model Analysis - Taking a Secondary Supply Chain as an Example

Suppose there is a single secondary supply chain of one supplier and one distributor. The supplier provides a single product to the distributor and the distributor sells to the market.

It consists of two members (A is a supplier, B is a distributor) supply chain coordination, A and B are rational people, and the risk is neutral, then:

$$R=f\left(\beta\alpha\right),\quad \beta\alpha=\left(\beta_{1}\alpha_{1},\quad \beta_{2}\alpha_{2}\right)$$

$$C_{\mathrm{i}}=g\left(\gamma_{\mathrm{i}}\alpha_{\mathrm{i}}\right)\ \mathrm{i}=1,2$$

$$\text{Assume}\quad R=\frac{1}{2}\left(\beta_{1}\alpha_{1}+\beta_{2}\alpha_{2}\right)^{2}+\left(\beta_{1}\alpha_{1}+\beta_{2}\alpha_{2}\right);C_{\mathrm{i}}\left(\gamma_{\mathrm{i}}\alpha_{\mathrm{i}}\right)=\frac{1}{2}\left(\gamma_{\mathrm{i}}\alpha_{\mathrm{i}}\right)^{2}\quad ;\mathrm{i}=1,2$$

$$P_{1}=\lambda_{1}R+R_{\mathrm{o}}-C_{1}\left(\gamma_{1}\alpha_{1}\right)=\lambda_{1}\left[\frac{1}{2}\left(\beta_{1}\alpha_{1}+\beta_{2}\alpha_{2}\right)^{2}+\left(\beta_{1}\alpha_{1}+\beta_{2}\alpha_{2}\right)\right]+R_{o}-\frac{1}{2}\left(\gamma_{1}\alpha_{1}\right)^{2}$$

$$P_{2}=\lambda_{2}R-R_{o}-C_{2}\left(\gamma_{2}\alpha_{2}\right)=\lambda_{2}\left[\frac{1}{2}\left(\beta_{1}\alpha_{1}+\beta_{2}\alpha_{2}\right)^{2}+\left(\beta_{1}\alpha_{1}+\beta_{2}\alpha_{2}\right)\right]-R_{0}-\frac{1}{2}\left(\gamma_{2}\alpha_{2}\right)^{2}$$

$$\lambda_{1}+\lambda_{2}=1$$

The final level of effort is determined:

$$\frac{\partial P_{1}}{\partial \alpha_{1}}=\lambda_{1}\frac{\partial f\left(\beta\alpha\right)}{\partial \alpha_{1}}-\frac{\partial g\left(\gamma_{1}\alpha_{1}\right)}{\partial \alpha_{1}}=\lambda_{1}\left[\beta_{1}\left(\beta_{1}\alpha_{1}+\beta_{2}\alpha_{2}\right)+\beta_{1}\right]-\gamma_{1}^{2}\alpha_{1}=0$$

$$\frac{\partial P_{2}}{\partial \alpha_{2}}=\lambda_{2}\frac{\partial f\left(\beta\alpha\right)}{\partial \alpha_{2}}-\frac{\partial g\left(\gamma_{2}\alpha_{2}\right)}{\partial \alpha_{2}}=\lambda_{2}\left[\beta_{2}\left(\beta_{1}\alpha_{1}+\beta_{2}\alpha_{2}\right)+\beta_{2}\right]-\gamma_{2}^{2}\alpha_{2}=0$$

$$\alpha_{1}^{*}=\frac{\lambda_{1}\beta_{1}\gamma_{2}^{2}}{\gamma_{1}^{2}\gamma_{2}^{2}-\lambda_{1}\beta_{1}^{2}\gamma_{2}^{2}-\lambda_{2}\beta_{2}^{2}\gamma_{1}^{2}},\ \alpha_{2}^{*}=\frac{\lambda_{2}\beta_{2}\gamma_{1}^{2}}{\gamma_{1}^{2}\gamma_{2}^{2}-\lambda_{1}\beta_{1}^{2}\gamma_{2}^{2}-\lambda_{2}\beta_{2}^{2}\gamma_{1}^{2}}$$

$$\frac{\alpha_{1}^{*}}{\alpha_{2}^{*}}=\frac{\lambda_{1}\beta_{1}\gamma_{2}^{2}}{\lambda_{2}\beta_{2}\gamma_{1}^{2}}$$

This shows that the optimal effort level of members is directly proportional to their revenue distribution coefficient and operational efficiency coefficient, and inversely proportional to the square of the cost coefficient. Next, we should determine the optimal partition coefficient, first find out λ_{i} and R_{o} in the U and then on the partial guide:

$$\frac{\partial \alpha_{2}^{*}}{\partial \lambda_{1}}=\frac{-\beta_{2}\gamma_{1}^{2}\left(\gamma_{1}^{2}\gamma_{2}^{2}-\beta_{1}^{2}\gamma_{2}^{2}\right)}{\left(\gamma_{1}^{2}\gamma_{2}^{2}-\lambda_{1}\beta_{1}\gamma_{2}^{2}-\lambda_{2}\beta_{2}^{2}\gamma_{1}^{2}\right)^{2}}$$

$$\frac{\partial U}{\partial \lambda_{1}}=\frac{\left(1-\lambda_{1}\right)\gamma_{1}^{2}\alpha_{1}^{*}\beta_{1}\gamma_{2}^{2}\left(\gamma_{1}^{2}\gamma_{2}^{2}-\beta_{2}^{2}\gamma_{1}^{2}\right)}{\lambda_{1}\left(\gamma_{1}^{2}\gamma_{2}^{2}-\lambda_{1}\beta_{1}\gamma_{2}^{2}-\lambda_{2}\beta_{2}^{2}\lambda_{1}^{2}\right)^{2}}-\frac{\gamma_{1}^{4}\alpha_{1}^{*}\beta_{2}^{2}\left(\gamma_{1}^{2}\gamma_{2}^{2}-\beta_{1}^{2}\gamma_{2}^{2}\right)}{\beta_{1}\left(\gamma_{1}^{2}\gamma_{2}^{2}-\lambda_{1}\beta_{1}\gamma_{2}^{2}-\lambda_{2}\beta_{2}^{2}\gamma_{1}^{2}\right)^{2}}=0$$

$$\lambda_{1}^{*}=\frac{\beta_{1}^{2}\left(\gamma_{2}^{2}-\beta_{2}^{2}\right)}{\beta_{1}^{2}\left(\gamma_{2}^{2}-\beta_{2}^{2}\right)+\beta_{2}^{2}\left(\gamma_{1}^{2}-\beta_{1}^{2}\right)};\lambda_{2}^{*}=1-\lambda_{1}^{*}=\frac{\beta_{2}^{2}\left(\gamma_{1}^{2}-\beta_{1}^{2}\right)}{\beta_{1}^{2}\left(\gamma_{2}^{2}-\beta_{2}^{2}\right)+\beta_{2}^{2}\left(\gamma_{1}^{2}-\beta_{1}^{2}\right)}$$

$$\frac{\partial U}{\partial \lambda_1} = \frac{\rho_1}{P_1}\frac{\partial P_1}{\partial \lambda_1} + \frac{\rho_2}{P_2}\frac{\partial P_2}{\partial \lambda_1} = 0$$

$$\frac{\partial U}{\partial R_O} = \frac{\rho_1}{P_1} - \frac{\rho_2}{P_2} = 0$$

$$\frac{\partial U}{\partial \lambda_1} = \frac{\rho_1}{P_1}\frac{\partial P_1}{\partial \lambda_1} + \frac{\rho_2}{P_2}\frac{\partial P_2}{\partial \lambda_1} = \frac{\partial P_1}{\partial \lambda_1} + \frac{\partial P_2}{\partial \lambda_1} = \left(\frac{\partial P_1}{\partial \alpha_1^*}\frac{\partial \alpha_1^*}{\partial \lambda_1} + \frac{\partial P_1}{\partial \alpha_2^*}\frac{\partial \alpha_2^*}{\partial \lambda_1}\right) + \left(\frac{\partial P_2}{\partial \alpha_1^*}\frac{\partial \alpha_1^*}{\partial \lambda_1} + \frac{\partial P_2}{\partial \alpha_2^*}\frac{\partial \alpha_2^*}{\partial \lambda_1}\right) = 0$$

$$\frac{\partial P_1}{\partial \alpha_1^*} = \lambda_1\left[\beta_1\left(\beta_1\alpha_1^* + \beta_2\alpha_2^*\right) + \beta_1\right] - \gamma_1^2\alpha_1^* = 0$$

$$\frac{\partial P_1}{\partial \alpha_2^*} = \lambda_1\left[\beta_2\left(\beta_1\alpha_1^* + \beta_2\alpha_2^*\right) + \beta_2\right] = \frac{\gamma_1^2\alpha_1^*\beta_2}{\beta_1}$$

$$\frac{\partial P_2}{\partial \alpha_1^*} = \lambda_2\left[\beta_1\left(\beta_1\alpha_1^* + \beta_2\alpha_2^*\right) + \beta_1\right] = \frac{(1-\lambda_1)\gamma_1^2\alpha_1^*}{\lambda}$$

$$\frac{\partial P_2}{\partial \alpha_2^*} = \lambda_2\left[\beta_2\left(\beta_1\alpha_1^* + \beta_2\alpha_2^*\right) + \beta_2\right] - \gamma_2^2\alpha_2^* = 0$$

$$\frac{\partial \alpha_1^*}{\partial \lambda_1} = \frac{\beta_1\gamma_2^2\left(\gamma_1^2\gamma_2^2 - \beta_2^2\gamma_1^2\right)}{\left(\gamma_1^2\gamma_2^2 - \lambda_1\beta_1\gamma_2^2 - \lambda_2\beta_2^2\gamma_1^2\right)^2}$$

Then analyze β、γ have what kind of influence on λ, given $\mathrm{u} = \frac{\beta_1}{\beta_2}$， $\beta_1 = \mathrm{u}\beta_2$, and input them in λ_1^*:

$$\lambda_1^* = \frac{\mathrm{u}^2\left(\gamma_2^2 - \beta_2^2\right)}{u^2\left(\gamma_2^2 - \beta_2^2\right) + \left(\gamma_1^2 - (u\beta_2)^2\right)}$$

Take partial derivative of the variable U:

$$\frac{\partial \lambda_1^*}{\partial \mathrm{u}} = \frac{2\mathrm{u}\gamma_1^2\left(\gamma_2^2 - \beta_2^2\right)}{\left[u^2\left(\gamma_2^2 - \beta_2^2\right) + \left(\gamma_1^2 - (u\beta_2)^2\right)\right]^2} > 0$$

This formula shows that more efficient members get more allocation than less efficient members. Similarly, presume $\mathrm{v} = \frac{\gamma_1}{\gamma_2}$, take partial derivative of the variable v:

$$\frac{\partial \lambda_1^*}{\partial \mathrm{v}} = \frac{-2\mathrm{v}\beta_1^2\beta_2^2\gamma_2^2\left(\gamma_2^2 - \beta_2^2\right)}{\left[\beta_1^2\left(\gamma_2^2 - \beta_2^2\right) + \beta_2^2\left(v^2\gamma_2^2 - \beta_1^2\right)\right]^2} < 0$$

This formula shows that members with high opportunity costs get less allocation.

This shows that high-efficiency members get a larger share of distribution, while members with low opportunity costs also get a higher share of distribution, which encourages members to save costs and improve work efficiency, thereby increasing the total output of the entire supply chain.

4. Conclusion

Due to differences in enterprise size and capital investment, the status power of each member in the supply chain is different, and the information distribution asymmetry in the supply chain is caused by technical problems or the asymmetry of information based on the confidentiality of the core technology of the enterprise. More or less problems, based on the analysis and description of the mechanism and influencing factors of supply chain synergy revenue distribution, after calculation and observation, the optimal effort level of each member of the chain is not only proportional to the revenue distribution coefficient and operational efficiency coefficient. It is also inversely proportional to the square of the cost factor; therefore, according to the joint utility model to establish the allocation mechanism, the members with high operational efficiency will receive a larger share of the revenue distribution than the members with lower efficiency, and at the same time, the members with higher opportunity cost will obtain The smaller the allocation share. This increases the overall efficiency and efficiency of the supply chain, and the optimal distribution coefficient at this time is λ_1^* and λ_2^* respectively.

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References

[1]. Gerard P. Cachon, Martin A. Lariviere, Ilaria Giannoccaro, Supply Chain Coordination with Revenue-Sharing Contracts: Strengths and Limitations, Management Science, 2005.

[2]. Weihua Liu, Xuan Zhao, Runze Wu, Revenue-Sharing Contract Models for Logistics Service Supply Chains with Mass Customization Service, Mathematical Problems in Engineering, 2015, Vol.2015.

[3]. Xiaomeng Wei, Preliminary Study on the Benefit Distribution of Port Logistics Supply Chain [J], Foreign Trade and Economics, 2012, (05): 67-69.

[4]. Lye A.V., Bergen M.E. Quick Response in manufacturer retailers' channels. Management Science, 1997, 43, 4:559- 570.

[5]. Weng Z. K. Channel coordination and quantity discounts, Management Science, 1995, 41,9: 1509-1522.

[6]. Jie Wan, Minqiang Li, Research on the Effect of Distribution Mechanism on Bullwhip Effect in Supply Chain [J]. Soft Science of China, 2003, (1).

[7]. Yuzhi Shen, Hongliang Wang, Research on Unequal Alliance Benefit Distribution Model under Uncertainty Environment [J]. Soft Science of China, 2003, (1).

[8]. Maschler M, Peleg B, Shapley L S., Geometric properties of the kernel, nucleolus and related solution concepts. Mathematics of Operations Research . 1979.

[9]. Dongchuan Sun, Fei Ye Research on Negotiation Model of Dynamic Alliance Interests [J]. Scientific Research Management, 2001, (3).

[10]. Xiaowei Lin, Hui Shu, Minglin Jiang, Research on Profit Distribution of Logistics Service Supply Chain of Postal Agricultural Products [J]. Journal of Qiqihar University (Philosophy and Social Sciences Edition), 2013, (06): 41-46.

[11]. Zhigang Song, Research on Interest Coordination Mechanism of Logistics Service Supply Chain from the Perspective of Customer Value [D]. Beijing Jiaotong University, 2016.

[12]. Chaozhong Hu, Research on Interest Decision-making of Logistics Service Supply Chain Based on Supply Chain Contract [D]. Anhui Engineering University, 2012.

[13]. Shihua Ma, Yong Lin, Supply Chain Management [M] Machinery Industry Press, 2006.

[14]. Xuecheng Wei and Wentao Li, decision-making reference for supply chain alliance benefit allocation research based on improved Shapley value method, 2010.23.

[15]. Liang Yu Li, Research on Supply Chain revenue Distribution Model Based on ANP, Guizhou University, 2009.

[16]. Xudong Lin, Shunquan Zhu, Research on revenue Distribution of Supply Chain Enterprises based on Game Model [J]. Value Engineering. 2004 (03)2004.

[17]. Yulong Qi, Peng Hu and Jude, based on the model of revenue distribution of supply chain contractors [J]. Journal of Xi'an Institute of Technology. 2003 (04).

[18]. Xiaosong He, Research on Supply Chain Coordination Mechanism Based on Mechanism Design Theory [D], Chongqing University, 2009.

[19]. Lixia Xu, Qi Xu, Xu Liu. Supply chain contract based on multi-manufacturer competitive game [J]. Industrial Engineering and Management, 2016, 21 (4): 67-73.

[20]. Weiying Zhang. Game Theory and Information Economics [M]. Shanghai: Shanghai People's Publishing House, 2004.

[21]. Panhong Zhao, Research on Influencing Factors and Distribution Patterns of Supply Chain Cooperation Based on Life Cycle, Jiangsu University of Science and Technology, 2012.

[22]. Guoping Cheng, Research on Synergy in Supply Chain Management, Tianjin University, 2004.

[23]. Shiyuan Zheng, Advances in Cooperative Game Theory: A Review of the Formation Mechanism and Stability of Alliances, Journal of Shanghai Maritime University, 2011,04.

[24]. Yanlin Jiang, Research on the Establishment and Coordination Management of Retailer-Supplier Partnership, Southwest Transportation University, 2005.