# Analysis of Innovation Model of Logistic Financial Business Based on Game Theory

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*Author's contribution*

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**Opinion Article**

## ABSTRACT

With the development of modern logistics, logistics and financial services have a huge space for development and market potential, it can be further benefit financial institutions, logistic companies, finance companies tripartite. Therefore, how to innovate logistic finance business model is the key question facing the front of the logistic enterprises and financial institutions. Using game theory to analyze the financial institutions for Small and medium enterprises in logistic finance game there are four combinations of the different stages of the existence of different characteristics, a combination of the chosen are not the same.

*Keywords: Game theory; logistic business; innovation model.*

## 1. INTRODUCTION

At present, both the logistics and financial services on the theoretical research and practical application of logistics financial services are in the exploratory stage. In theory, it is more focused on the traditional mode of research, lack of innovation and research services model. In

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practice, primarily by drawing on some of the more mature foreign service model to begin to get involved in logistics and financial services, it is currently true for China's logistic business service model which is still relatively small.

Logistic finance in the country about the theory to a certain degree of development, clearly the main functions of finance, settlement, risk control, summed up the alternative procurement, credit guarantee, pledge of warehouse receipts, buyer's credit, credit guarantees and other financing services and reverse mode. However, generally speaking, logistics finance has not formed a complete theoretical system, existing theories are still in practice and experiencing the beginning stage, and the theoretical analysis is still relatively fragmented.

## 2. RESEARCH STATUS OF LOGISTIC FINANCIAL BUSINESS

Logistical theory and financial operations abroad carried out earlier, it is also more abundant research, including, Friedman [1], Albert, Raymand [2], Eisenstadt [3] and Dunham (1949) summed up the logistics, such as inventory finance pledge financing and accounts receivable financing business in foreign countries in the development of the legal environment, business models, storage methods, monitoring methods and processes. Barnett and Biederman on financial status and development trend of logistics were related research.

Guerrisi [4] technology development and transfer of funds by examining the supply chain, logistic and distribution, which the current cash flow management has not and the rapid development of logistics technology to match. Especially in the area of electronic commerce, the transfer of funds has become obstacle to development, and therefore proposed electronic money transfer will be based on the way. The Internet is widely used in global trade chain.

Leora Klapper [5] on the supply chain of SMEs using incentives and function of inventory financing models were analyzed. Gonzalo Guillen [6], who studied the production and corporate financing plans in one of the short-term supply chain management, made a reasonable supply chain management model which can affect the company's operations and financial intermediation, thereby increasing overall revenue.

In summary, in the country about the logistic finance theory to a certain degree of development, clearly the main functions of finance, settlement, risk control, summed up the alternative procurement, credit guarantee, pledge of warehouse receipts, buyer's credit, financing and credit reverse guarantee service model [7]. However, generally speaking, logistics finance has not formed a complete theoretical system, existing theories existing theories are still in practice and experiencing the beginning stage, and the theoretical analysis is still relatively fragmented [8].

## 3. ANALYSIS OF LOGISTICS FINANCE BUSINESS FOR SME BASED ON GAME

Game Theory (gametheory), is a balanced decision-making and direct interactive problem with this decision when making group decision of behavior research [9]. From the point of view of this article, a subject, which like a financial institution affected by apolicy choice selection of third-party logistics companies, affect the decision-making problems and balance problems when third-party logistics companies have chosen [10].

### 3.1 Hypothesis

From the perspective of commercial banks, we due to the normal operation of commercial banks should be lending, and loans but two options: one is to a single large business loans; the second is to lend to SMEs.

Assuming a single large corporate loan interest income of 10, loan losses for 3, monitoring costs to 1, a gain of $10 - (3 + 1) = 6$;

Assuming a single SME loan interest income was 4, loan losses for 2 monitoring costs for 2, a gain of $4 - (2 + 2) = 0$.

Obviously, these two programs come from, to the interests of big business loan banks and other financial institutions; and SME can not loan to banks in the interests.

### 3.2 Game Combination

If the logistics of SMEs in financial services, due to the participation of third-party logistics companies, banks and other financial institutions do not need to apply for loans to SMEs to

conduct a comprehensive review in advance, does not require the use of loans to SMEs which were full supervision, assuming monitoring costs reduced by half, while loan losses borne by the bank has changed, the bank does not need to fully assume loan losses. If the bear only one quarter, the SME lending income was 4 - (0.5 + l) = 2.5. In this gaming case, if the logistical companies are to participate, the commercial banks have the following four options to issue loans to SMEs. In Game and logistics companies to participate, the commercial banks to issue loans to SMEs has the following several options:

(1) Loans, assume all risk and monitoring costs, earnings for the 0
(2) Loans without risk and monitoring costs, earnings were 4.
(3) Loans bear quarter and half the risk monitoring costs, revenue was 2.5.
(4) Loans, half bear all risks associated with monitoring costs, earnings were 1.

Logistics and financial services business logistics determine the proportion of SMEs financial service revenue, logistics and financial services to its premium income minus income equal to the risk of loss and supervision costs and. Assuming logistics enterprises as rational economic man, only care about their own interests, while total financial assumptions logistics service fee income for four, all risk of loss of 2, monitoring costs for two, but several options have the following correspondence:

(1) Loans, no risk and monitoring costs, earnings were 4.
(2) Loans, assume all risk and monitoring costs, earnings were 4 a-(2 + 2) = 0.
(3) Loans bear half and three-quarters of risk monitoring costs, earnings were 4 a- (l.5 + l) = 1.5.
(4) Loans, bear half the risk, earnings were 4 - 1 = 3.

Based on the above commercial bank and logistics companies options, the game between banks and third-party logistics companies, Final Selection of Gaming Outcomes: (0,4), (4,0), (2.5,1.5), (l, 3).

### 3.3 Selected Combination

The first combination of bank earnings is zero, the bank certainly would not choose; second income portfolio TPL is zero, they also do not choose; it can be seen, the first and second combination in combination were inferior choice for commercial banks, logistics companies, does not meet the win-win principle, thus rounding; The third, fourth combination is more in line with the interests of both choice and also meet the Nash equilibrium conditions, both sides can get some income from lending to SMEs and the provision of financial services in logistics. In the third combination, the proceeds of commercial banks get higher logistics enterprises. The fourth income portfolio of logistics enterprises is higher than commercial banks. Therefore, the third combination is the best choice for commercial banks, the fourth combination is the next best choice; logistics enterprises, fourth combination is the best choice, and the third is the second-best choice combination. Ultimately, in the end choose depends on what kind of a combination of both games.

## 4. CONCLUSION

From the current development of logistics financial point of view, as a result of cooperation between commercial banks and logistics companies, the banks often in the driving position, so we see are generally third combination. Commercial bank lending to SMEs only take a small risk, most of the risk by the Bank distributed to the logistics business, but earnings of commercial banks get really far more than logistics companies, that combination is the third commercial bank between logistics companies and a reasonable choice at this stage of the game. However, in the long run, as well as between the growth of the logistics business of commercial banks increased competition, these programs will change, to change the starting point is that the ratio of commercial banks and logistics business risk and monitoring costs shared between. Different proportional share to commercial banks and logistics companies bring different benefits. To form a stable and cooperative relations, in addition to improving risk control and supervision mechanism, the risk allocation mechanism and monitoring costs are also a top priority. This also gives both the financial institution or the logistics enterprises to develop the logistics financial business model innovation most direct power.

### COMPETING INTERESTS

Author has declared that no competing interests exist.

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*Peer-review history:*
*The peer review history for this paper can be accessed here:*
*http://sciencedomain.org/review-history/10452*

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