

Study on China's Homemaking Service Credit Optimization in Perspective of Game Theory

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Abstract: In recent years, the homemaking service industry in China has developed rapidly, with a market size of trillions RMB. However, conflicts and poor trust between homemaking service provider (companies and practitioners) and consumers remain prominent. Credit issues have become the main bottleneck for the high-quality development of the homemaking service industry. These credit issues are mainly caused by factors such as intermediary enterprise model, low capability and bad service quality for practitioners, information asymmetry, lack of industry credit system, etc. This article uses game theory to analyze the integrity mechanism in the homemaking service industry and proposes a targeted optimization method for the credit system of homemaking service. The case study shows that the enterprise's credit has decreased, and its production and operation have fallen into difficulties due to the dishonest operation during the game between the enterprise and consumer. Through game theory analysis, it can be found that information disclosure mechanisms and reward and punishment mechanisms play an important role in optimizing the credit of homemaking services. Cooperative games help build stable trust relationships and improve service quality.

Keywords: Homemaking service, Game theory, Credit.

1. Introduction

The homemaking service industry, as an indispensable part of social life, provides people with various convenient life services. However, with the development and growth of the industry, trust risks have gradually emerged. Considering the opening of consumer's personal property and private space to practitioners in the process of homemaking service, it would be important for consumers to choose a reliable, honest, and safe and quality homemaking service companies. Homemaking service is a huge industry in China, with a large number of employees and enterprises. In 2021, the size of China's homemaking service industry reached 1014.9 billion RMB, which enters the trillion-level market. In 2023, the industry size reached 1164.1 billion RMB. The number of homemaking service practitioners and enterprises was 37.6 million and 1.2434 million in 2021 [1,2]. Despite the rapid development of China's homemaking service industry, there is a prominent contradiction between homemaking service companies and consumers in term of no guarantee for service quality and poor industry credit. Strengthening and optimizing the credit system of the homemaking service industry is of great significance and a big role in alleviating the contradiction between consumers and service providers and promoting high-quality development of the homemaking service industry.

The lack of credit in China's homemaking service industry is particularly prominent. It is occasionally reported that homemaking service staff conceal true information, steal consumer's money and property, injury to the elderly, children, illness, and disability [3]. Homemaking service enterprises mislead consumers through unfair competition, price gouging, false advertising, etc. These cases bring harm on the safety of people's lives and property, seriously disrupt the order of the homemaking service market, and have adverse effects on the healthy development of the homemaking service industry. It is pointed out in the Report on the High-Quality Development Index of China's Home Service Industry (2022) that indicators such as the proportion of annual new market entities to current survival, the number of dishonest cases per 10000 market entities, and the readymade company index are not very optimistic. The overall index of high-quality development of the homemaking service industry is not high. And the classification index of development strength, development vitality, and innovation momentum is running at a low level [4]. From the current situation of China's homemaking service industry, the main reasons for the lack of credit system would be as follows.

1.1. No control and supervision on homemaking service practitioners due to enterprise's intermediary model

Although the number of homemaking service enterprises is surprising, most enterprises are small, scattered and weak. The number of enterprises operating in a chain, branded, networked, and large-scale manner is severely insufficient, and their market share is relatively low. More than 95% entities are small and medium-sized enterprises and individual businesses. More importantly, most homemaking service enterprises in China operate in an intermediary mode [5-7]. Intermediary homemaking service enterprises refer to a business model in which homemaking service personnel establish labor relations with employers through homemaking service intermediary companies, rather than labor relations. In this mode, homemaking service personnel are usually not formal employees of the company but provide services as temporary workers or freelancers. The intermediary company is mainly responsible for introducing homemaking service personnel to employers and collecting certain intermediary fees from them. The characteristics of this model are low market entry barriers, generally small enterprise scale. For example, some intermediary homemaking service enterprises can operate with just one table and two staff, lacking necessary control and supervision on practitioners. According to the survey, 41.8% and 37.6% consumers believe that homemaking service companies have no effective management and no standardized service respectively. Problems such as lack of standardization, inability to find and dissatisfaction to service are becoming huge obstacles to industry development.

1.2. Low capability and bad service quality for homemaking service practitioners

Due to practitioners' varied capability and professional skills, it is very difficult to guarantee service quality. In China, homemaking service practitioners are mostly migrant workers, urban laid-off workers, retired workers, and unemployed individuals. Due to differences in age, education, experience, and the knowledge and skills of homemaking service management that each person has, their service capability and quality varies greatly, and the service quality is very uneven. Meanwhile, there is currently a lack of unified training standards and certification systems for homemaking service practitioners in China, which results in different training quality and professional skills for each homemaking service personnel. Most importantly, due to lack of long-term cooperation between employers and homemaking service personnel, the job mobility of homemaking service personnel is relatively high, which may lead to unstable service quality.

1.3. Dishonesty risks brought by information asymmetry

There is a common situation of information asymmetry between consumers and homemaking service practitioners. Consumers may find it difficult to obtain accurate and comprehensive information about homemaking service enterprises, and may not fully understand their company background, service quality, and employee training, which leads to uncertainty in their choices. Meanwhile, it is also difficult for homemaking service enterprises to accurately evaluate the real needs and payment ability of consumers, which would result in integrity risks when signing contracts.

1.4. Lack of industry credit system

Due to the fact that most homemaking service practitioners in China do not have personal credit records, employers and even some homemaking service companies find it difficult to check whether the practitioners have any negative records in their previous work. Moreover, some experts admit that the certificates of many practitioners in the current market do not have legitimacy and can be purchased without training for a little money. Due to the current lack of a unified credit inquiry system for homemaking service workers, intermediaries and employers are unable to predetermine whether practitioners have any records of misconduct and verify the authenticity of their relevant documents, which may pose hidden dangers for future homemaking services.

2. Establishment and analysis of game theory model for homemaking service credit system

2.1. Market entities analysis in the homemaking service credit game

The application of game theory in the homemaking service market helps to understand and predict the behavior of market entities, promote the healthy development of the market, and provide theoretical support for policy formulation and corporate strategy [8-11]. The main entities in the homemaking service market include homemaking service personnel, homemaking service companies (including intermediary companies and employee-based companies), employers, and relevant regulatory agencies. There are complex game relationships between these market entities:

1. Homemaking service personnel and homemaking service companies: Homemaking service personnel usually rely on homemaking service companies to obtain job opportunities, while homemaking service companies require homemaking service personnel to provide services. There may be a game between homemaking service personnel and the company in terms of profit distribution, work arrangements, training opportunities, and other aspects.

2. Homemaking service companies and employers: Homemaking service companies need to meet the needs of employers to obtain business, while employers hope to obtain high-quality and reasonably priced services. There may be a game between the two parties regarding the quality, price, and service period of homemaking services.

3. Homemaking service personnel and employers: Homemaking service personnel hope to obtain stable work and reasonable compensation, while employers expect to receive satisfactory service. Both parties may engage in a game regarding the performance, compensation, and working conditions of homemaking service personnel.

4. Competition between homemaking service companies: Different homemaking service companies may compete for market share in terms of service quality, price, brand influence, etc.

5. Regulatory agencies and the homemaking service market: Regulatory agencies need to develop industry standards and norms to ensure the healthy development of the market. Homemaking service companies need to comply with these regulations, while regulatory agencies need to balance the relationship between market development and regulation.

2.2. Analysis of game model for homemaking service credit

To analyze the credit issues in homemaking services, a simplified game model can be constructed. Assuming that consumers and homemaking service practitioners have two strategies respectively: consumers can choose "trust" or "distrust", and homemaking service practitioners can choose "high-quality service" or "low-quality service". By constructing a payment matrix, it is possible to analyze the gains and losses of each entity under different strategy combinations.

Assuming that the probability of consumers purchasing homemaking services is P_1 , and the probability of not purchasing is $1-P_1$; The probability of honest operation among homemaking workers is P_2 , and the probability of dishonesty is $1-P_2$; E is the value of homemaking services (expressed in price), d_1 is the cost of providing homemaking services for homemaking workers when operating with integrity, and d_2 corresponds to the cost of homemaking workers when operating with dishonesty (usually $d_2 < d_1$). In actual market transactions, due to various constraints, homemaking service practitioners who do not comply with credit will be punished accordingly, such as customer churn, fines, etc. These costs are represented by n , and thus the income matrix table of the game between the two parties in homemaking service transactions is obtained (Table 1).

Table 1: Game matrix of homemaking service trading parties

Consumer	Homemaking service practitioners		
		honest	dishonesty($1-P_2$)
	purchasing(P_1)	$e, e-d_1$	$-e, e-d_2-n$
	Not-purchasing($1-P_1$)	$-d_1$	$0, -d_2$

Assuming that U_1 is the expected return for consumers and U_2 is the expected return for homemaking service workers, then.

$$U_1 = P_1[eP_2 + (-e)(1-P_2)] = eP_1(2P_2 - 1)$$

$$U_2 = P_2[P_1(1-d_1) + (1-P_1)(-d_1)] + (1-P_2)[P_1(e-d_2-n) + (1-P_1)(-d_2)] = P_2(d_2 - d_1 + nP_1) + (e-n)P_1 - d_2$$

When homemaking service practitioners and consumers make choices with different probabilities, their expected returns also vary. Both buyers and sellers of services will make the choice to maximize their expected returns.

For consumers, when $2P_2 - 1 < 0$, i.e. $P_2 < 0.5$, then $P_1 = 0$, U_1 reaches its maximum value, which is 0; When $2P_2 - 1 = 0$, i.e. $P_2 = 0.5$,

So when $0 \leq P_1 \leq 1$, U_1 reaches its maximum value, which is 0.

When $2P_2 - 1 > 0$, i.e. $P_2 > 0.5$, then when $P_1 = 1$, U_1 reaches its maximum value, which is $-d_1P_2 + eP_1 - d_2 + nP_1P_2 + d_2P_2$.

For homemaking service workers, when $d_2 - d_1 + nP_1 < 0$, i.e. $P_1 < (d_1 - d_2)/n$,

So when $P_2 = 0$, U_2 reaches its maximum value, which is $(e-n)P_1 - d_2$; When $d_2 - d_1 + nP_1 = 0$, i.e. $P_1 = (d_1 - d_2)/n$, then when $0 \leq P_2 \leq 1$, U_2 reaches its maximum value, which is $(e-n)P_1 - d_2$; When $d_2 - d_1 + nP_1 > 0$, i.e. $P_1 > (d_1 - d_2)/n$, then when $P_2 = 1$, U_2 reaches its maximum value, which is $(e-n)P_1 - d_2$.

3. Application of game theory in homemaking service credit optimization

The Guiding Opinions on Establishing a Credit System for the Homemaking Service Industry issued by the Ministry of Commerce and the National Development and Reform Commission mentions that in order to standardize the development of the homemaking service industry, it is necessary to establish a complete set of credit records for homemaking service staff and enterprises, to solve the problem of credit deficiency, protect consumer rights, and create an honest and trustworthy environment for the development of the homemaking service industry. In addition, the construction

of a credit system for homemaking services also includes a disciplinary mechanism for dishonest enterprises and service personnel.

3.1. Design of Information Disclosure Mechanism

To reduce information asymmetry, effective information disclosure mechanisms can be designed. For example, establishing credit records for homemaking service practitioners, recording their service history and customer evaluations for customer reference.

3.2. Design of reward and punishment mechanisms

By designing a reasonable reward and punishment mechanism, employees can be incentivized to provide high-quality services. For example, rewarding high-quality service practitioners and punishing low-quality service practitioners.

3.3. Cooperative game and trust building

Through cooperative games, trust building can be promoted between customers and homemaking service practitioners. The strategy selection of cooperative games will help to form stable cooperative relationships and improve overall service quality.

4. Case study on homemaking service game

From the game between homemaking service enterprises and consumers, it can be seen that top homemaking service platforms, as shown in the reference [12], frequently engage in malicious incidents. Homemaking service personnel abuse consumers, exaggerate publicity, and service quality falls far short of user expectations, refusing refunds, and causing a large number of users to post online condemnations; The enterprise falsified information about their nannies and deceived employers, which attracted widespread social attention.

From the perspective of the game between homemaking enterprises and homemaking workers: According to the China Judgment Document Network, the enterprise has involved 69 types of dispute cases, mostly defendants, with labor disputes accounting for the majority. Disputes mainly focus on enterprise's arrears, withholding of nanny, cleaning, and monthly sister-in-law employee salaries, violent layoffs without compensation, and loss of corporate social responsibility.

From the game results, it can be seen that due to the dishonest operation of enterprises, their credit has decreased, and their production and operation have fallen into difficulties. From 2018 to Q1 2021, the enterprise suffered a huge loss of 1.965 billion RMB, while its operating revenue during the same period was only 1.917 billion RMB. Since Q2 2019, the average net loss rate of the enterprise has been nearly 90%, with a loss of 88.3 RMB per 100 RMB of operating revenue.

5. Conclusion and recommendations

Through game theory analysis, it can be found that information disclosure mechanisms and reward and punishment mechanisms play an important role in optimizing the credit of homemaking services. Cooperative games help build stable trust relationships and improve service quality. This study mainly adopts theoretical analysis methods, and in the future, more empirical research can be combined to further verify the practical effect of game theory in optimizing credit in homemaking services. At the same time, more credit optimization strategies can be explored to provide more comprehensive support for the healthy development of the homemaking service industry.

This study primarily employs theoretical analysis to explore these dynamics. However, to further substantiate the findings, future research should incorporate more empirical studies. Empirical

research would provide concrete evidence on the practical application and effectiveness of game theory in optimizing credit within the homemaking service industry. This combination of theoretical and empirical approaches would offer a more robust understanding of how game theory can be practically applied to real-world scenarios.

References

- [1] *Homemaking service industry: An AI media report reveals that home cleaning and homemaking services are important service scenarios* [N], Sina Finance, May 24, 2024
- [2] *Analysis of the 2023 Homemaking Service Industry: With the increasingly severe aging of China's society, the industry is developing rapidly.* [N], NetEase, July 12, 2023
- [3] Yang Junjian, *Main Problems and Countermeasures of Homemaking Service Quality in China* [J], *Economic Research Guide*, 2021 (04): 147-150
- [4] *"Report on the High Quality Development Index of China's Homemaking Service Industry (2022)"* [N], *Business Data Center of the Ministry of Commerce of the People's Republic of China*, March 25, 2022
- [5] *The homemaking service industry has shifted from an "intermediary system" to an "employee system"* [N], *China Economic Network*, January 11, 2024
- [6] Tan Min. *Why does the "good recipe" for homemaking service staff encounter "coldness"?* [N] *Zhengzhou Daily*, 2019-08-16
- [7] *The homemaking service industry is shifting towards an "employee system"* [N], *China Women's Network*, January 11, 2024
- [8] *Guiding Opinions of the Ministry of Commerce and the National Development and Reform Commission on Establishing a Credit System for the Homemaking Service Industry (Commercial Service Trade Letter [2019] No. 269)* [EB/OL], Chinese Government website, 2019-06-28
- [9] *Opinions of the General Office of the State Council on Promoting the Improvement and Expansion of the Homemaking Service Industry (State Council Document No. 30, 2019)* [EB/OL]. China Government Network, 2019-06-26
- [10] Li Hegui, Xie Guojin, Yang Hui, *Research on the Construction of Credit System for Small and Medium sized Enterprises from the Perspective of Game Theory* [J], *Credit Reporting*, 2011 (2): 69-72
- [11] Wang Fan. *Analysis of Integrity Issues in C2C E-commerce Transaction Models - Based on Game Theory Perspective* [J], *China Management Informatization*, 2014 (2): 109-110
- [12] *Report on China's Internet Homemaking Service Industry in 2021* [N], *Snowball*, August 5, 2021