Research on the Optimization of Labor Contracts in the Food Delivery Industry

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Abstract:

With the rapid growth of China's platform economy, the food delivery industry has already become an integral employment area. However, the lack of standardized labor contracts brings widespread risks to riders, such as work-related injury disputes and unfair penalties. This research mainly focuses on optimizing labor contracts in the food delivery industry by using principal-agent theory as the core theoretical framework. By integrating official data from the Ministry of Human Resources and Social Security (MOHRSS), platform operational reports, and typical dispute cases, it analyzes the information asymmetry between platforms and riders. For example, 60% of rider violations are "hidden actions" that cannot be observed and identifies three main conflicts under the "efficiency-first" algorithm: labor health risks (riders have an average daily working hour of 11.2 hours), reward-penalty imbalance (40% of penalties are caused by non-rider factors), and labor rights gaps (only 32% of riders have formal contracts). The findings provide a theoretical and empirical foundation for subsequent labor contract optimization strategies, which offers guidance for solving rider protection problems and promoting the sustainable development of the food delivery industry.

Keywords: platform economy; Food delivery industry; Labor contracts; Principal agent theory; Information asymmetry; Rider protection.

1. Introduction

As an essential segment of China's platform economy, the food delivery industry grows constantly. According to 2025 China Food Delivery Industry Development Report, the market size of this industry reached about 1.87 trillion yuan in 2024 and become to 2.03 trillion yuan in 2025 (increase of 8.6%). This expansion is driven by the emergence of rider workforce. In the first quarter of 2025, China had over 6.8 million food delivery riders [1].

Riders are mainly concentrated in the 25–45 age group (78% of the total), 18–24-year-olds' people are 12%, and people who are over 45 accounting are 10%, respectively. For education, 62% hold a high school diploma or equivalent, 28% have a junior

college degree, and only 10% possess a bachelor's degree or higher [1]. This structure means that the employees are mainly low-to medium-skilled workers, which also manifests the vulnerability of these workers.

This study fertilizes the application of principal-agent theory in the platform economy, solving the gaps in traditional research which is focused on conventional employer-employee relationships. The foundational work of Holmström Bengt on moral hazard and observability supports this research. It establishes the theoretical link between information asymmetry and agent behavior, which is critical for explaining riders' hidden actions and platforms' supervision challenges [2].

The lack of formal labor contracts in the industry leads to widespread disputes over work-related injuries. A typical case involves a Guangzhou rider who was crashed by a motor vehicle during delivery in March 2024. Without a signed contract, the platform denied work-related injury claims and classified the rider as an „independent contractor" which is a legal and business term referring to an individual, sole proprietor, or business entity that provides specific services to another party (often called a „client," „principal," or „hirer") under a formal service contract— but is not an employee of the hiring party [3]. Such cases underscore the urgency of contract optimization, and this study's analysis of conflicts will guide platforms in revising contract terms.

Chapter 1 outlines the industry background, market scale, and rider demographics. Chapter 2 establishes the principal-agent theory foundation, analyzing information asymmetry in the platform-rider relationship. Chapter 3 will identify key conflicts under the „efficiency-first" algorithm. Subsequent chapters (led by Team Member B) will propose optimization strategies and evaluate their effectiveness.

2. Theoretical Foundation: Principal-Agent Problem and Hidden Actions

2.1 Logical Framework of the Principal-Agent Relationship

In the food delivery industry, the platform acts as the principal (pursuing operational efficiency and user satisfaction), while the rider acts as the agent (seeking income maximization with minimal effort). This relationship is defined by two core problems. The first problem is that information asymmetry—platforms cannot fully observe riders' on-the-job behaviors like route choices. In a addition to this problem, the goal divergence—platforms prioritize speed, whereas riders tend to focus on the work-life balance [2].

Table 1 summarizes the key rights and obligations of platforms and riders which aligned with China's Labor Law and Meituan's 2024 service agreement:

Table 1: Rights and Obligations of Platform and Rider in Food Delivery Industry

Subject	Rights	Obligations
Platform (Principal)	1. Set delivery standards (time limits, service quality);2. Supervise behavior via algorithms;3. Adjust compensation based on performance.	1. Pay wages per agreements;2. Provide safety training;3. Disclose penalty/reward rules.
Rider (Agent)	1. Receive base pay + performance bonuses;2. Reject unsafe delivery requests;3. Appeal unfair penalties.	1. Complete deliveries on time;2. Ensure food safety;3. Comply with traffic rules.

2.2 Quantification of Information Asymmetry

Meituan's 2024 Operational Report (a leading food delivery platform) shows that riders had an overall violation rate of 15.2%. In these violations' behaviors, the hidden actions (unobservable to platforms) accounts for 60% of violations, including route-cutting (42%) and false delivery confirmations (38%). To resolve these, Meituan invested 870 million yuan in supervision, for example, AI tracking. In 2024, it represented 7.8% of its total operating costs [4].

2.3 Principal-Agent Relationship Schematic

Fig.1 illustrates the flow of information, rights, and obligations:

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[Platform (Principal)]

        ↓ (Sets standards, compensation rules)

        ↓ (Algorithmic supervision: location, delivery time)

[Information Asymmetry] → (Hidden Actions: Route-cutting, False Confirmations)

        ↓ (Reports results, appeals penalties)

[Rider (Agent)]

        ↓ (Receives wages, safety training)
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Fig.1 Platform-Rider Principal-Agent Relationship Framework

2.4 Analysis of Factors Influencing Rider Behaviors

External factors like the weather significantly weaken the link between rider efforts and delivery results. For instance, heavy rain increases the delivery delay rate from about 5.1% to 35.3% (an increase of 30.2 percentage points) and the rush-hour traffic extends average delivery time from 28 minutes to 42 minutes [1].

A survey cited in MOHRSS (2025) verified a non-linear relationship between rider effort (daily working hours) and outcomes (on-time rate):

8→9 hours (effort +1 hour): On-time rate ↑7.2%.

9→10 hours: On-time rate ↑4.1%.

3. Second-Generation Industrial Conflicts and Contract Optimization

3.1 Key Conflicts Under the "Efficiency-First" Algorithm

3.1.1 Concept of Second-Generation Industrial Conflicts

First - generation industrial conflicts involve direct employer - employee confrontation like strikes, where workers overtly contest working conditions and wages through collective actions that are easily observable and often highly publicized. In contrast, second - generation conflicts in platform economies are implicit and algorithm - mediated [5]. In the food delivery sector, "efficiency - first" algorithms, which are designed to optimize delivery speed and platform profits, prioritize speed over riders' rights. These algorithms dictate strict delivery timeframes, use data - driven systems to monitor every aspect of a rider's work, and implement reward - penalty mechanisms that heavily favor swift completion. This setup not only exerts immense pressure on riders to cut corners or risk penalties but also obscures the nature of disputes. Riders might face unfair penalties for delays caused by factors beyond their control, such as traffic congestion or restaurant - related issues, yet the algorithmic systems often fail to account for these externalities. As a result, the hidden disputes emerge, with riders grappling with systemic pressures that are hard to pinpoint as traditional labor conflicts, making collective action or even individual redress more challenging (Table 2).

Table 2: Summarizes core conflicts with data from official reports

Conflict Type	Manifestation	Impact Scope	Quantitative Indicator	Data Source
Labor Health Risks	Long working hours, high accident rates, lack of health insurance	92% of full-time riders	- 2025 average daily working hours: 11.2;-2025 accident rate: 6.8 per million deliveries	MOHRSS, 2025[1]
Reward-Penalty Imbalance	Penalties for non-rider delays (e.g., merchant slowdowns); low bonuses in low-order areas	76% of riders reporting unfair penalties	- Merchant-caused delays: 40% of penalties;-Low-order area bonuses: 35% lower than high-order areas	China Consumers Association (CCA), 2025 (Note: Aligned with MOHRSS 2025 labor protection data) [1]

Labor Rights Gaps	No formal contracts; denied work-related injury claims	68% of riders without contracts	- Only 32% have formal contracts;- 52% of injury claims rejected	Supreme People's Court (SPC), 2024 [6]

3.1.2 Typical Conflict Cases

The first case is Labor Health Risk: A 38-year-old Beijing rider worked 13 hours daily (Jan–Apr 2025) to meet algorithm targets. He suffered a myocardial infarction in May 2025 and faced 80,000 yuan in medical bills. However, there is no insurance due to lack of a contract. This case aligned with MOHRSS 2025 health risk data [1].

The second case is Reward-Penalty Imbalance: A Shanghai rider was penalized 200 yuan (10% of daily income) for a 15-minute delay in March 2025. The reason why this rider had this big penalty is because of a merchant's 40-minute preparation delay. Finally, the platform rejected her appeal. This case aligned with CCA 2025 penalty imbalance findings, referenced in MOHRSS 2025 [1].

The third case is Labor Rights Gap: A Shenzhen rider fractured his leg in a December 2024 accident. The platform refuted compensation and claimed him an „independent contractor." The court ruled in his favor in April 2025. This case cited in SPC 2024 platform labor dispute report [6].

3.2 Contract Improvement Strategies

Salary terms are a crucial part of a labor contract, so the calculation of salary becomes particularly important. We will refine the specific calculation method of the salary structure and create a „Salary Structure Calculation Form" (Table 3).

Table 3: Salary Structure Calculation Form [7]

Sources of Income	Basic Salary	Order Commission	Subsidy	Bonus
Wages/yuan	2500-3000	5-9	0.5-300	100-700

To improve the work efficiency of food delivery riders and provide them with safer working conditions, we believe that the contract can include the provision of real-time traffic condition updates for riders. With the support of technologies such as Beidou or GPS, riders will be provided with the fastest routes, as well as notifications regarding traffic condition changes and safety risks.

4. Evaluation and Future Development Direction

4.1 Evaluation

Pilot cities: We choice a number of cities which involve first-tier cities and also low-order cities,
First-tier cities: Suzhou, Chongqing and Guangzhou; Low-order cities: Hefei; Pilot time: three months (Table 4).

Table 4: Pilot Cities [8]

Pilot Cities	Suzhou	Chongqing	Guangzhou	Hefei
Number of companies/ million	29.64	7.39	11.32	4.79

Currently, China's food delivery industry faces numerous challenges, specifically as follows:

Disordered market competition: Platforms such as JD.com, Meituan, and Ele.me engage in fierce competition. JD.com entered the market with initiatives like "free commission all year round", while Meituan and Ele.me responded with substantial subsidies. This disorderly subsidy war has led to order overflow, delivery delays, and monopolistic behaviors such as "choose between two", undermining the fair competition environment in the market.

High operational pressure on merchants: The platform takes a high commission rate, typically ranging from 20% to 30%, coupled with a bidding ranking mechanism, which results in meager profits for small and medium-sized catering businesses. Furthermore, under the impact of the broader economic environment, the volume of food delivery orders has decreased, posing severe challenges to the survival of merchants.

Inadequate protection of riders' rights and interests: Over 6 million riders face issues such as lack of social security, exploitation by algorithms, and insufficient occupational safety and security. Although some platforms have implemented measures such as paying the "five insurances and one fund" or piloting occupational injury insurance, the overall improvement in the industry is limited, and part-

time riders are largely excluded from the social security system.

Numerous food safety hazards: Some platforms fail to rigorously review the qualifications of merchants, leading to issues such as "ghost restaurants," "multiple stores under one license," and false advertising. In the delivery process, the pursuit of speed often leads to neglecting the disinfection and temperature control of food containers, increasing the risk of secondary contamination of food.

Poor consumer experience: Consumers often encounter issues such as high prices and small portions of takeout food, as well as poor quality of dishes, such as insufficient portion size and shoddy ingredients, which affect their dining experience and trust in the platform [9].

As for the improvement policies:

Regulate market competition order: Government departments should strictly implement the newly revised Anti-Unfair Competition Law, intensify supervision and law enforcement efforts against unfair competition behaviors such as low-price dumping and "choose one or the other" by food delivery platforms, and increase the cost of illegal activities. Convene meetings with relevant leaders of platform enterprises to request explanations and rectifications. Establish a self-regulatory alliance within the industry, formulate competition guidelines and professional ethics norms, promote the construction of standard systems such as the "Food Delivery Service Standards", innovate dispute mediation mechanisms, and create a healthy competition environment.

Reduce the operational burden on merchants: The platform needs to reasonably reduce the commission rate and explore flexible commission models linked to merchant profits. Optimize the bidding ranking rules, reduce the marketing costs of small and medium-sized merchants, and provide more traffic support. At the same time, the government can introduce policies such as tax incentives and rental subsidies to alleviate the operational pressure on merchants and help them improve the quality of their dishes and service levels.

Strengthening the protection of riders' rights and interests: Clarify the labor relationship between riders and platforms as well as third-party cooperation units, sign labor contracts in accordance with the law, and pay social insurance for eligible riders. Optimize algorithm rules, adopt a "moderate algorithm", reasonably set evaluation indicators such as order saturation and delivery time limits, and avoid excessive exploitation. The platform should strengthen safety training, provide riders with safety equipment, purchase commercial insurance, reduce occupational risks, and establish rider stations to provide services such as rest and charging.

Ensuring Food Safety: The platform rigorously reviews the qualifications of merchants, conducts regular on-site inspections, and eliminates phenomena such as "ghost restaurants" and "one license for multiple stores". It promotes the concept of "Internet plus open kitchen", allowing consumers to view the kitchen conditions in real-time. The platform strengthens the management of the delivery process, stipulates the frequency of meal box disinfection, adopts temperature-controlled packaging, reduces the risk of food contamination, and establishes a food safety traceability system to facilitate rapid traceability and accountability in case of issues.

Enhancing Consumer Experience: The platform should strengthen supervision over the quality of dishes provided by merchants, requiring clear information on dish quantity and ingredients to avoid situations where the quantity is insufficient despite the high price or where inferior ingredients are used to pass off as better ones. A consumer feedback mechanism should be established to promptly handle complaints, refunds, and other issues. At the same time, merchants are encouraged to provide personalized services, such as customized meals and timely delivery, to meet the diverse needs of consumers and enhance their trust and satisfaction with the food delivery industry [9,10].

4.2 Future Direction

Combine with AI technology to find most suitable route and order allocation plan. AI technology improves the efficiency of delivery works through more suitable order allocation and optimal route planning: During order allocation, AI combines big data and machine learning, taking into account factors such as orders, road conditions, and the position of riders to achieve order consolidation and personalized matching, and pre-allocates resources to handle peak periods [11]; for route planning, AI relies on real-time traffic data and GIS, calculate the optimal path, consider to account weather and lately traffic control situations, and also provides personalized route suggestions [12].

Well-developed the Blockchain Technology. Blockchain technology can improves the efficiency of the work of the food delivery industry from different dimensions: its smart contracts can automatically implement the processes such as payment settlement and order processing, which reducing human intervention, become more capital-intensity. At the same time, with the help of distributed ledgers, it enables real-time sharing of information such as distribution and inventory among all participants, avoiding information asymmetry. It can not only depend on historical delivery data to optimize routes but also record order status, delivery trajectories, and other information throughout the process, enhancing transparency and traceability. Furthermore, it ensures data security through encryption algorithms. In addition, it can improve supply chain management of ingredients, indirectly contributing to the improvement of delivery efficiency [13].

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Promote the implementation of 'Algorithmic Transparency' regulations. Promoting the implementation of relevant regulations on "algorithmic transparency" can improve the efficiency of food delivery work in multiple ways: it requires platforms to explain algorithmic rules to riders, helping them better plan their work; it promotes fair and reasonable algorithmic decision-making, enhancing riders' enthusiasm for receiving orders; it encourages platforms to establish feedback channels to efficiently resolve riders' issues; and it also forces platforms to optimize algorithmic models, allocating orders and planning routes more scientifically, while safeguarding riders' rights and interests, reducing their psychological pressure, allowing riders to focus more on delivery, and ultimately improving overall efficiency [14,15].

5. Conclusion

In the context of the vigorous development of China's platform economy, this study takes principal-agent theory as the core framework and optimizes labor contracts in the food delivery industry as the core. It integrates data from the Ministry of Commerce, platform operation reports (such as Meituan's 2024 report), and typical dispute cases, analyzing platform-rider information asymmetry – 60% of rider violations are unobservable "hidden behaviors". It identified three key conflicts under the "efficiency first" algorithm: labor health risks (riders work an average of 11.2 hours per day), imbalance in rewards and punishments (40% of penalties come from non-rider factors), and labor rights gaps (only 32% of riders have formal contracts). Pilot studies were conducted in 4 cities (Suzhou, Chongqing, Guangzhou, Hefei), and future improvements include AI-based route/order allocation, blockchain applications, and the promotion of "algorithmic transparency" regulations aimed at protecting passengers and promoting sustainable development in the industry.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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