Analyzing the impact of monopoly industry on labor force based on an economic model which is profit maximization - Take takeaway platform monopoly as an example

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Abstract. In this era of rapid Internet advancement, the platform economy is getting bigger and bigger and moving towards monopoly. Under the control of capital, firms maximize their profits by undermining the interests of workers. This paper uses theoretical and data analysis to explore the business strategies that companies choose to maximize their profits and the impact on labor under the monopoly of companies. We concluded that the take-out platforms are centered on "more work, more pay". By studying the benefit distribution model and scheme of the platform, we analyze the impact of the take-out platform on the riders while maximizing their own revenue. Microeconomics is used as a basis to analyze the negative impact of companies in monopolistic markets on the labor market and the labor force in the market that is monopolized by buyers. The government needs to improve the management terms and anti-monopoly is also very important to control and sanction the behavior of takeaway platforms to bring more protection to the rights of riders.

Keywords: Monopoly market, Profit maximization, Profit distribution, Takeaway Riders, Profit of labour.

1. Introduction

In recent years, the platform economy based on Internet information technology has seen a spurt in development, and the monopolistic behavior of platforms has become the focus of government policies, and the "*Decision on Amending the Anti-Monopoly Law of the People's Republic of China"* promulgated in China on August 1, 2022, helped regulate the behavior of platform economy practitioners and curb the disorderly expansion of capital. *"The China Sharing Economy Development Report (2022)"* states that online take-out revenue accounted for 21.4% of national restaurant industry revenue in 2021, a 4.5% year-on-year increase [1]. The fast-growing takeaway economy has become an important part of the platform economy. Meanwhile, the number of takeaway riders in the industry is increasing day by day, with more than 4.7 million riders earning income through the Meituan platform alone in 2020, and the Chinese takeaway market is expected to expand further with demand for delivery workers exceeding 30 million [2]. Therefore, studying the impact of the expanding take-out platform economy on the workforce has important practical implications for the development of the entire industry.

The entrance of capital is often profit-seeking, and enterprises aim at maximizing profits in everything they invest in [3]. In the pursuit of maximizing profits, the scale of the industry has been expanding, and the control of production costs and changes in the benefit distribution system have caused different degrees of impact on the labor force within the industry while maximizing profits, and even address common wealth.2021, the Meituan take-out platform was fined 3.442 billion yuan for monopolizing the implementation of "two choices " was fined 3.442 billion yuan. Under the control of the takeaway platform, riders can only choose a separate takeaway platform to take orders, and therefore often work less efficiently because they cannot get enough orders, which in turn leads to lower revenue. In order to get more profit and to be more competitive and thus attract more businesses to the takeaway platform, the potential and speed of the riders are tapped to the maximum

and the delivery time of the riders is constantly shortened. This paper chooses to analyze the impact of the takeaway platform on the workforce in the pursuit of profit maximization and the impact of the monopolistic behavior of Meituan, Elemo for the whole industry on its riders in two aspects accordingly.

This paper is divided into four main parts, introduction is the first part, followed by literature review, research discussion, and conclusion in that order. In the literature review, different literature related to the topic is referenced and analyzed, and personal opinions are added. The research discussion section is divided into theoretical studies and data studies for discussion and research, and finally, the conclusion.

2. literature Review

2.1. Profit Maximization

Most of the discussions on profit maximization of take-out platforms are based on the study of profit distribution among platforms, Kwak et al. (2019) proposed that profit distribution among participants in the platform economy is the primary problem faced by such platforms, and the stable operation of the entire industrial market depends on the reasonable distribution of profits among participants [4]. Zheng et al. (2021) introduced the concept of relative deprivation sense to analyze the profit distribution among participants by building a Swarm simulation platform to simulate the operation of take-out platforms [5]. He (2022) explored the labor-employment relationship between take-out platforms and riders and suggested that the group of take-out riders face high risks in their work without social insurance protection [6]. Zheng (2022) exemplified the main labor employment models of take-out platforms and elaborated on the relationship between the platform and the labor force under different models and the production methods under different models, while later comparing the difference in earnings of riders under different models and giving suggestions for improvement in these cases [7]. In "*Games, Rights Distribution and Technology*", Chen. (2020) discusses a study on the management strategy of platform companies, taking the rider management of a takeaway as an example, and finds that the "rules of the game" set by the takeaway platform, such as time-limited piece rate wages, delivery bonus and punishment rules The study found that the "rules of the game" set by the takeaway platform, such as time-limited wages, delivery rewards and penalties, and the recognition of performance feedback on boarding, led riders to actively engage in competition and competition [8]. Some scholars also focus on labor compensation protection, and Yan (2020) takes riders' labor earnings as the starting point, pointing out that riders' earnings are "inflated", but their hourly earnings are barely maintained at the minimum wage standard, and in addition, take-out platforms also exploit loopholes in laws and labor employment practices to exploit labor's entitlement to social security. The authors argue that we should go beyond the traditional security mechanism and introduce a corresponding labor security system in the context of the new platform monopoly [9]. Academics have analyzed the profit distribution and labor employment patterns of takeaway platforms to study the actions taken by the platforms to maximize profits.

2.2. Monopoly

On the issue of monopoly of take-out platforms, some scholars have analyzed and studied the monopolistic behavior of big data in the platform economy. Li (2021) and others proposed and analyzed the behavior and mechanism of monopoly of platform economy by take-out platforms through big data, pointing out that take-out platforms get the dominant position in the market through data collection and then use their position to carry out initial monopoly[10]. Zou and Wang (2022) suggest that take-out platforms create the illusion of rider autonomy through strategies such as "decentralized control" under the unicorn mode of operation, but in fact overdraw rider labor and destroy rider labor rights[11]. Other scholars have also proposed to analyze the impact of monopolistic behavior from the perspective of the long-term development of the platform economy. For example, Zhao (2021) analyzed the formation causes and impacts of monopoly in the platform

economy and pointed out that the platform economy should regulate data resources in its development so as to promote the development of digital industry[12]. In the anti-monopoly rules of Internet platforms –Liang (2022) mentioned that but while the platform economy brings many conveniences, the unique inherent properties of Internet platforms make some Internet platforms constructed with the help of first-mover advantages have become highly concentrated and have gradually become monopolistic in their respective fields[13]. Yin (2022) studied the operation methods and strategies of takeaway platforms and concluded that the takeaway platforms have exercised monopoly by taking huge commissions and coercing merchants to "choose one or the other", and thus pointed out that the monopoly violations of takeaway platforms in China are not sufficiently regulated and punished[14].

Throughout the research results on takeaway platform economy, most of them are based on the operation and distribution methods of the platform economy, the reasons for the monopoly behavior of the takeaway platform and the impact on the development of the platform economy, but there are fewer studies on the impact on labor force and labor market. Therefore, this paper analyzes and researches the impact on labor force in the market under the monopoly situation of the takeaway platform based on microeconomics.

3. Research proofs

Takeaway platforms are currently in an oligopoly market, with two major companies, Meituan and Hungry, occupying the entire market share. In such a situation, the takeaway platforms will seek to maximize profits by expanding the scale of the industry, compressing production costs, and changing profit distribution rules. The impact of these actions on the labor market will be discussed below.

3.1. Theoretical Analyses

3.1.1 The Impact of Monopolistic Industries on Labor in The Profit Maximization Process

In modern microeconomics, profit maximization is intuitively expressed by reaching producer equilibrium. The firm's MC (Marginal Cost) = MR (Marginal Revenue), therefor monopolies, in the pursuit of profit maximization, are bound to control MC to make the firm reach producer equilibrium. The main way to reduce marginal cost is manifested in the commodity market by controlling sales volume, and in the labor market by adjusting its own marginal cost by controlling labor cost.

As a typical oligopoly industry, delivery platforms not only have pricing power in the commodity market, but also dominate the labor market. Delivery riders are in a buyer-monopolized labor market, with low labor demand elasticity and limited employment options. As mentioned above, in the process of maximizing profits, the platform will inevitably adjust the quantity and income of the labor force, including but not limited to lowering the minimum wage and reducing the number of laborers. These measures directly affect the income and standard of living of the labor force, while at the same time, the reduction in the number of labor force also represents an increase in the amount of labor per capita. Compared to the equilibrium labor market, there is serious income inequality in the monopoly market, with low satisfaction and relative deprivation of the labor force.

3.1.2 Mathematical Implications of The Profit Distribution Model for Takeaway Platforms

$$\pi(profit) = R(quantity * price) - C(veriable\ cost\ +\ fixed\ cost) \quad (1)$$

The platform as a monopoly industry has certain pricing power over the commodity market, thus the company's revenue increases as the market size increases and the number of orders Q increases. Under the influence of economy of scale, the fixed cost, such as platform construction and maintenance, user data collection and analysis, etc., gradually decreases, and the labor cost becomes the main part of the platform cost as a variable cost, which is negatively related to the company's profit.

3.2. Data Analysis

3.2.1 Takeaway Platform Employment Management System

Table 1. Hummingbird Distribution Management System

Base Price		Perfect Attendance Award		Late night order Subsidy		Overnight order Subsidy		Running order reward		Distance Bonus	
Conditions	Price	Conditions	Subsidy Policy	Conditions	Subsidy Policy	Conditions	Subsidy Policy	Conditions	Subsidy Policy	Conditions	Subsidy Policy
Effective attendance ⩽ 15 days	4￥/order	1. valid attendance days ⩾ 27 days. 2. Attendance is required on rainy days.	200￥	1.The effective number of days of attendance in a month ≥ 27 days, and bad weather must attend work. If the rider does not show up in bad weather, the overnight allowance policy will be cancelled for that month. 2. Non-night shift riders are allowed to work overtime to run night orders, but if there is sunny day attendance and bad weather non-attendance, all subsidized night policy for that month will be cancelled.	21:00- The next day 2:00 orders subsidized 1.5 ￥/ order.	1. obey the scheduling arrangement of the station manager. 2. be on line during the overnight shift.	Orders placed between 2:00-8:00 are calculated at 8￥ per order.	1. Valid days of attendance ⩾ 27 days. 2. User T timeout ⩽ 4.5%. 3. Top 2 sites. 4. Top 3 stations with more than 2000 units.	1.The first place prize is 200￥. 2. Second place Award 200 ￥. 3. third place prize is 200 ￥.	3.5km-4.5km	1￥/ order
16 days ⩽ Effective days of attendance ⩽ 21 days	4.3￥/ order										
22 days ⩽ Effective days of attendance ⩽ 26 days	4.5￥/ order									⩽4.5km	2￥/order
Valid attendance ⩾ 27 days	4.8￥/ order										
Supplementary clause: If you have been a veteran rider for more than one year and have valid attendance ⩾27 days, you will be subsidized 0.1 yuan more per single.											

The existing main employment models of takeaway platforms are divided into crowdsourcing model and proprietary model, among which the proprietary model is the main one. The profit distribution under the crowdsourcing model is based on the "t+2" model, i.e. for every order completed by the rider, the revenue can be distributed to the rider by the platform within a short period of time. Unlike crowdsourced riders, the platform may give additional rewards or subsidies to riders based on the completion of their work between payment days. Either way, the principle of "more work, more pay" applies. As a result of this principle, the rider's workload increases in order to earn more, while the takeaway platform's profits continue to stack up. The income reward system for takeaway riders listed in Table 1 visually demonstrates the positive relationship between riders' earnings and the number of orders and attendance, but the conditions for obtaining the reward are more demanding. From the perspective of the base price of labor, riders can only receive higher unit prices when their monthly effective attendance reaches 27 days or more, and attendance is required in bad weather conditions, which is a more stringent requirement for attendance than other industries. In terms of subsidy policy, all the subsidy policies are based on full attendance, and no corresponding employee care and subsidies are given for work under extreme weather conditions and other high-risk environments. Based on such a profit distribution method, riders need to put in a lot of time and effort if they want to get higher earnings, and even face the risk of overwork. As a result, "extra-long standby" has become the norm for delivery riders, and long hours of fatigue lead to worrisome physical and mental health conditions for riders.

3.2.2 Changes in Platform Revenue and Labor Force Revenue

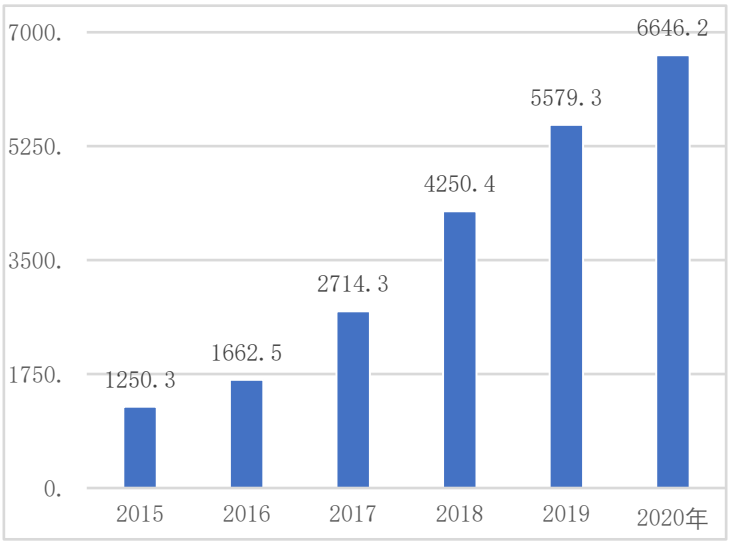


Figure 1. Market size statistics of China's online takeaway industry, 2015-2020 (billion ￥)

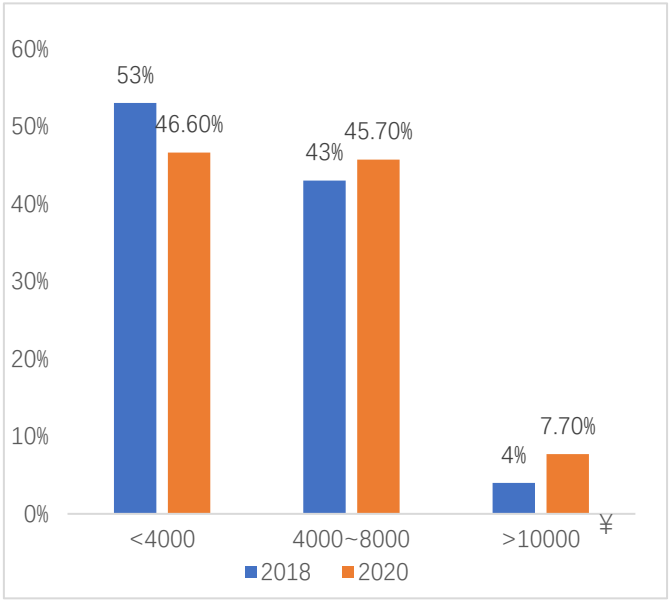


Figure 2. Distribution of monthly work income of Meituan riders

Data from *Meituan's 2018 Meals on Wheels Employment Report* argues for the relationship, with 43% of riders earning between 4,000 and 8,000 yuan per month, compared to 45.7% in *The First Half of 2020 Takeaway Rider Employment Report*, a mere 2.7% year-over-year improvement. According to statistics from the industry information network (CHYXX), the revenue of China's online takeaway platform was 425.04 billion Yuan in 2018, which was boosted to 664.62 billion Yuan in 2020, a huge increase of 56.4% year-on-year. Comparing and analyzing the two sets of data, the takeaway platform does not take into account the growth of labor income in the process of continuously improving profits, and the expansion of the whole industry scale does not bring substantial gains to riders.

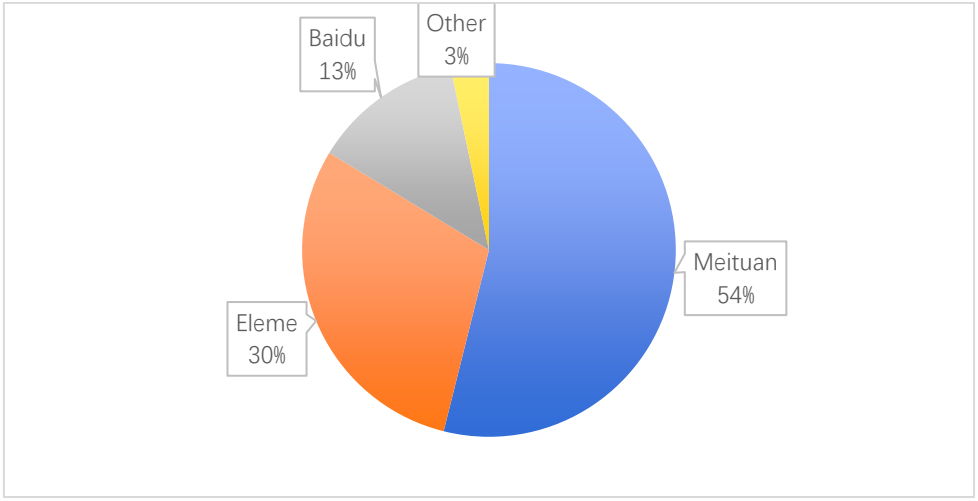


Figure 3. The most common takeaway platforms used by Chinese online takeaway users

Based on The 2017 China Netizen Online Takeaway Service Survey Report [15] released by DCCI, Meituan Takeaway has a 53.9% share of the Chinese takeaway market, while Eleme has a 29.8% share and Baidu Takeaway has a 13% share, and since Eleme acquired Baidu Takeaway in August 2017, Meituan and Eleme together account for 96.7% of the Chinese takeaway platform market. It can be seen that the takeaway platforms gradually form economies of scale and have increasing control power over the market. The labor market is in a buyer-monopolized labor market, and the takeaway platforms can decide the quantity of labor hired and the price of labor, based on which the takeaway platforms can maximize the company's profit by adjusting the quantity and compensation of labor to make the overall marginal cost and marginal revenue of the company reach a balanced state. As a disadvantaged group in the labor market, the rider does not profit from the whole profit distribution system.

At this point, the ratio between rider profit and platform profit becomes smaller and smaller, and the relative sense of exploitation of riders becomes larger and larger. The sense of relative deprivation is generated by the comparison of the contribution realization rate of one subject with the contribution realization rate of other subjects under the system conditions.

This paper focuses on the impact that a monopoly of take-out platforms under profit maximization would have on the labor market. From the above analysis, it can be seen that the platform's revenue will increase significantly and the rider's revenue will fluctuate slightly under the platform's profit maximization, but will generate a greater sense of relative exploitation, which will lead to a decrease in overall satisfaction.

4. Conclusions

While the entire takeaway platform economy is booming and market revenues are rising at a rapid pace, it is important for all sectors of society to pay attention to the payoffs and earnings of takeaway riders, a pillar group of the platform economy. Data analysis shows that riders have long been in a vulnerable position in the entire industrial operation process, even if the takeaway platform profits are rising, riders still face the problem of income generation difficulties. The major reason for this situation is that in recent years, the takeaway platform has been engaged in mergers and acquisitions, with large merchants gradually forming a monopoly through mergers and acquisitions and gaining more and more control over the commodity and labor markets, making the riders' living environment and income constantly compressed. At the same time, it is difficult to protect the rights and interests of riders in the labor process, so they cannot defend their rights and interests in the face of the harsh distribution system and high-intensity work pattern set by the platform. In response to these problems, the government should improve the corresponding laws and regulations to protect the basic social insurance rights of riders, and suppress and counteract monopolistic behavior in the takeaway market.

At the same time, a third-party organization should be introduced to examine and discuss whether the payroll system developed by the takeaway platform is reasonable, to help monitor and improve the distribution of benefits in the industry, and to ensure the reasonableness of income distribution.

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