From Transitional Labor to Excessive Labor: A Study on the Labor Dilemma of Delivery Riders in the Food Delivery War

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Abstract. In the context of food delivery war, algorithm control and platform competition lead to excessive labor with high intensity and low autonomy for riders. Based on 484 questionnaires and in-depth interviews, qualitative, statistical and machine learning methods were used comprehensively. The results show that 66.1% of the riders have severe/extreme overwork, and the pressure of the riders in the special delivery and core urban areas is greater. Platform competition prolongs working hours by decreasing unit price (mediating effect 43.1%); The algorithm control aggravated excessive labor through two paths: the intensification of fines (38.5%) and the decrease of autonomy (21.7%). It is necessary to strengthen labor protection, standardize platform competition, clarify algorithm supervision, pay attention to the differentiated needs of riders with different employment modes, and build harmonious labor relations.

Keywords: platform economy; Overwork; Takeout wars; Political economy

1 Introduction

In the summer of 2025, the food delivery industry broke out in a "war" with nearly 80 billion yuan of subsidies. Platform capital uses algorithms to build a closed loop of "human-data-algorithm-system-human," shifting the cost of competition to workers. The platform takes surplus value by virtue of data assets, forcing riders to fall into the dilemma of 'excess labor' from 'transitional labor' defined by Sun Ping (2024)."[1]

1.1 Theoretical Basis and Research Hypotheses

Duality of labor and excess labor: concrete labor reflects intensity, abstract labor is measured by duration. [2]concrete labor is represented by intensity, while abstract labor is represented by duration.

H1a/H1b: takeout wars significantly positively affect the labor time and intensity of riders.

P. S. Borah et al. (eds.), *Proceedings of the 2026 6th International Conference on Enterprise Management and Economic Development (ICEMED 2026)*, Advances in Economics, Business and Management Research 394,
https://doi.org/10.2991/978-94-6239-719-4_33

Algorithm control mechanism: Kellogg. (2020) proposed that the algorithm can achieve all-round control through three mechanisms: direction, evaluation and discipline.[3]

H2/H3: algorithmic technology control and high-intensity platform competition significantly aggravate excess labor.

Mediating transmission under neoliberalism: Telford and Briggs (2022) emphasize that the contemporary workplace forces workers to be on the edge of physiological limits.[4] The dual strategy of "high subsidy" and "unit price squeeze" shifts market pressure to the bottom.

H4: Competition leads to lower unit price → increased income pressure → longer duration.

H5a: Algorithmic control leads to reinforcement of the fine mechanism → reduction of the rest time.

H5b: Algorithm control leads to strengthening of data monitoring → decline of autonomy → loss of rest decision.

Evolution of structural distress:

H6: The original flexible and free "transitional labor" attribute of rider occupation is structurally transformed into the dilemma of "excessive labor" under compulsory force.

1.2 Research Methods

Qualitative research: The maximum difference method is used to select the interview objects, and dozens of riders are interviewed, covering different areas such as core urban areas, emerging development zones, inner suburban main urban areas and outer suburban cities and counties, taking into account employment modes such as special delivery, fun running and crowdsourcing.Three levels of grounded theory coding were used to extract themes

Quantitative research: 484 valid questionnaires were collected (α=0.827). The reliability and validity are good (α=0.827, KMO=0.792, $p<0.001$). The normal residual (P-P chart) ensures that the regression is reliable. The income and pressure model is significant (R^2=0.326/0.389, $p\leq0.001$), and the mediation model VIF<2. Machine learning (logistic regression, random forest, GBDT+ 50fold cross validation) predicted severe overlabor, with logistic regression recall rate of 90.9% and importance of "change in order pressure" feature of 52.0%.

2 Result Analysis and Interview are Mutually Verified

2.1 Overall Verification of Labor Duality (H1, H2, H3)

The data showed a significant feature of "cost reduction and pressure increase" (Table 1) : 41% of the riders' monthly income decreased, and 45.1% faced the reduction of delivery unit price; 64% perceived increased pressure to receive orders, and nearly 52% saw an increase in fines. 66.1 percent of the total sample is severely or extremely overworked.

Interview with unit price squeeze: Master Li of the high-tech Zone Taobao Second Send confirmed this trend, pointing out that the unit price "dropped from 3 yuan to 2.5 yuan per order".

Table 1. Descriptive Statistics of Key Variables.

Variable	Mean	SD	% Reporting Increase/Decrease
Monthly Income Change	3.12	1.15	41% Decrease
Delivery Pressure	4.05	0.90	64% Increase
Fine Amount Change	3.87	1.07	52% Increase
Unit Price Change	2.76	1.68	45% Decrease
Overwork Composite Score	3.36	0.92	66.1% Severe/Extreme

Group heterogeneity of digital control: For example, the black box of digital control revealed by Chen Long (2020), special delivery riders face more mandatory arrangements. [5]A rider on Chunxi Road who runs both crowdsourcing and special delivery described the constraints: "Special delivery requires 8 hours to be valid online... You must return to the designated area within 10 minutes, otherwise it will be invalid." Statistics show that the control intensity perceived by the dedicated delivery riders is significantly higher than that of crowdsourcing (4.52 vs 3.28, p=0.005). In addition, the penalty increase rate of riders who worked more than 12 hours per day was 2.6 times that of those who worked less than 6 hours per day (p=0.035), supporting the fatigue violation mechanism.

2.2 Verification of Intermediary Mechanism of Surplus Value Theory (H4, H5)

The stepwise regression method verifies three intermediary paths (a total of 103.3%), revealing that while technological progress improves efficiency, it inversely intensifies exploitation.

Mechanism 1: unit price squeeze path (intermediary accounts for 43.1%). Competitive pressure forces riders to delay by lowering the unit price. Huaixi rider recalled: "They took a lot of money for user welfare... It used to be 50 yuan for three kilometers, but now it's 4 yuan. For long distances, 2 yuan per kilometer was normal, but now it may be 1.5 or 1.3 yuan."

Mechanism 2: strengthening path of fine mechanism (intermediary accounts for 38.5%). Comprehensive algorithmic monitoring reduces downtime. The rider of Qingyang District felt helpless to unreasonable deduction: "Just been deducted 5 yuan that I falsely reported... Before the milk tea came out, I went to get something else. When I came back, I reported that the food was slow. The platform said that it did not detect my waiting track there."

Mechanism 3: the path of loss of autonomy (mediation accounts for 21.7%). The algorithm "legitimacy crisis" proposed by Wiener (2023) appears here, and frequently changing rules destroy system trust. [6]Master Qiu, a Meituan Changrunning rider in Zhonghe Street in the High-tech Zone, deeply felt the consequences of the rule change: "More riders enter the field, single volume is dispersed, unit price is reduced... There's less visible income."

2.3 Structural Alienation from "Transition" to "Excess" (H6)

The comprehensive verification of interview data and questionnaire data shows that riders generally value flexibility and freedom when they initially choose this occupation, that is, the attribute of "transitional labor." Rider Labour in the platform economy is embedded in an accelerating cycle of "superfluidity". Chen and Sun (2021) reflected that the riders seemed to freely navigate the city, but they were actually in a situation of "mobility for a living" : the algorithm forced workers into a "non-stop" cycle by constantly lowering the unit price and increasing the density of dispatching units. Under this mechanism, the career flexibility originally pursued by riders is alienated into a movement away from the "heart" -that is, in the process of high mobility, workers gradually lose the perception of the meaning of labor and the control of their productivity, and finally fall into the dilemma of excessive labor structurally.Its internal logical evolution and the specific structural transformation mechanism are shown in the figure 1 below:

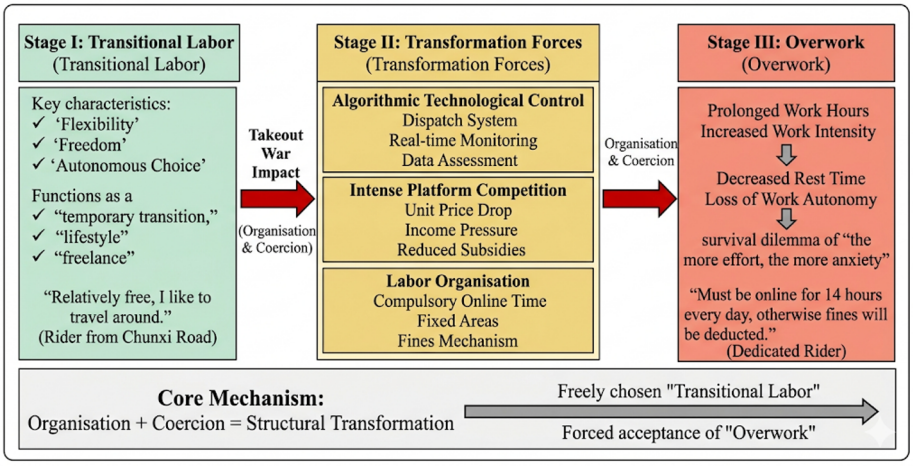

Fig. 1. Transition from "Transitional Labor" to "Overwork": Structural Transformation Mechanism.

The Chunxi Road rider made it clear that he chose crowdsourcing because "it's more free, because I like to travel everywhere." A crowdsourcing rider in Wenjiang district also stressed "relatively free". However, this freedom is being systematically denied. The special delivery riders of Ele. me in Qingyang District pointed out that the platform

controlled the riders through the "order pressure" strategy: "Taobao and Ele. me began to press the order, that is, after the customer placed the order, the order would be pressed, and then unified and centralized, which is equivalent to the increase of the time for the customer to receive the meal... If he didn't send me, I wouldn't run alone. I would sit in one place for an hour at a time, just sitting there playing with my phone."

Table 2. Autonomy and Labor Outcomes Correlation.

Variable	Correlation with Autonomy	p-value
Working Hours	-0.347	<0.001
Overwork Score	-0.283	<0.001
Income Stability	0.156	0.004

The correlation test (Table 2) shows that work autonomy is significantly negatively correlated with working time ($r = -0.347$) and the score of overwork ($r = -0.283$).

The experience of a full-time Taobao flash sale rider (Master Liu) in Dayi County provides a positive case that when the platform rules are relatively reasonable, the rider can maintain a good working condition. "Reasonably, there will be no points or money deducted for overtime, and in a few cases there will be no penalty... I have never thought of not selling outside the store. It is more free and convenient to raise children." This proves from the opposite side that when the algorithm controls too much, the "excessive labor" attribute of riders will be alienated into "excessive labor".

This shows that with the intensification of platform data monitoring and algorithmic order dispatch, the autonomous decision-making power of riders has been systematically deprived, and the flexible choice originally used as "transition" has been structurally transformed into "excessive" forced labor.

3 Conclusions and Suggestions

Based on Marxist political economy, this study systematically analyzes the excessive labor dilemma of drivers under the background of takeout war by using qualitative interview, questionnaire survey and machine learning methods. The results show that the takeout war significantly prolongs the labor time and improves the labor intensity of the riders. Algorithm technology control and platform high intensity competition are the core causes of excessive labor; The "transitional labor" attribute of rider occupation has been structurally transformed into the dilemma of "excessive labor" in the process of labor organization and coercion.

The theoretical contributions of this study are as follows: first, it introduces Marx's labor theory of value and surplus theory of value into platform labor research, and constructs a dual analytical framework of "labor duality - excessive labor verification" and "technological progress - excessive labor paradox." Secondly, through the mediating effect model, this paper empirically reveals the differentiated path through which

high-intensity platform competition and algorithmic technology control affect overlabor. Thirdly, based on Sun Ping's critical extension of the concept of "transitional labor," this paper reveals how capital transforms workers' flexible choice into structural coercion, providing a new theoretical perspective for understanding labor alienation in the platform economy. Fourthly, through multi-layer and multi-mode in-depth interviews, the triangular mutual verification of quantitative data and qualitative narrative is realized, which makes the research conclusions more convincing and realistic.

At the policy level, it is necessary to carry forward the people-centered development concept and adhere to the organic combination of investment in materials and investment in people to alleviate the over-labor dilemma of riders. Strengthen legislation and law enforcement to protect workers' rights and interests, and effectively solve the practical contradiction between legal working hours and actual work "excessive"; Establish and improve the dynamic monitoring mechanism of workers' physical and mental health in related industries, effectively prevent and treat workers' physical and mental problems; Standardize the competition order of platform economy, clarify the supervision boundary of algorithm technology on workers, and build harmonious labor relations in socialist market economy. At the same time, attention should be paid to the differentiated needs of riders with different employment modes, stronger labor security should be provided for exclusive delivery riders, necessary flexibility space should be reserved for crowdsourcing riders, and new injustice should be avoided due to the "one-size-fits-all" policy.

References

1. SUN P. Transitional Labor: Takeaway Riders under Platform Economy [M]. Shanghai: East China Normal University Press, 2024.
2. MARX K. Capital: A Critique of Political Economy (Vol. 1) [M]. Beijing: People's Publishing House, 2004.
3. KELLOGG K C, VALENTINE M A, CHRISTIN A. Algorithms at work: The new contested terrain of control [J]. Academy of Management Annals, 2020, 14(1): 366-410. https://doi.org/10.5465/annals.2018.0174
4. TELFORD L, BRIGGS D. Targets and overwork: Neoliberalism and the maximisation of profitability from the workplace [J]. *Capital & Class*, 2022, 46(1): 59-76. https://doi.org/10.1177/03098168211022208
5. CHEN L. Labor order under "Digital Control": A study on the labor control of takeaway riders[J].Sociological Studies, 2020, 35(6): 113-135. https://doi.org/10.19934/j.cnki.shxyj.2020.06.005
6. WIENER M, CRAM W A, BENLIAN A. Algorithmic control and gig workers:a legitimacy perspective of Uber drivers [J]. European Journal of Information Systems, 2023, 32(3): 485–507.https://doi.org/10.1080/0960085X.2021.1927596