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Original Paper

From Meter to Algorithm: An Empirical Analysis of Fare Estimation Discrepancies on Ride-Hailing Platforms

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Abstract

The traditional taxi industry experienced profound disruption as a result of the rise of ride-hailing apps in recent years. Taxi services and ride-hailing apps both rely on platforms to obtain orders, but they differ in the way they calculate fares and structure commissions. This study argues that when trip fares exceed a certain level, platforms have an incentive to adjust the relationship between estimated fares and final paid fares in order to maximize platform commissions. Two researchers were sent on paired trips between fixed origins and destinations in order to test this proposition. According to statistical analysis results, the estimated fare for ridesharing was 2.6% lower than that for a taxi. The estimated fares exceeded actual paid fares by 5.4% for taxi. A ride-hailing trip's actual fares were 4.2% higher than a taxi trip's actual fares. These differences are statistically significant. The estimated fares and the actual fares paid for ride-hailing trips were not significantly different. The results of this study contribute to the literature on two-sided platforms and provide new empirical evidence on information asymmetry and platform governance in the urban passenger transportation market.

Keywords

Online Marketplace, Ride-Hailing, Information Asymmetry, Price Discrimination, Field Experiment

1. Introduction

In recent years, ride-hailing platforms have emerged and brought significant disruption to the traditional taxi industry. The Chinese government is now offering taxi and ride-hailing services through app-based booking systems in many Chinese cities. Traditional taxis have also been forced to use ride-hailing applications to obtain orders, with these apps serving as a primary gateway for traffic flow. It is estimated that there are approximately 70,000 legally compliant ride-hailing vehicles registered in Shanghai as of 2025, but the actual number of active vehicles exceeds 140,000 [1]. As of 2025, the taxi fleet has contracted to 30,000 vehicles, down from a peak of 50,000 in 2014 [2].

It is common practice for traditional taxis to use meter-based fare calculation, which can be accessed by the public. A ride-hailing service, on the other hand, estimates fares based on the trajectory of the vehicle. Both taxis and ride-hailing vehicles require the platform to estimate the fare before the passenger boards, based on the passenger's start and end points (hereinafter referred to as E1 and T1, respectively), then calculate the actual fare upon arrival at the destination (hereinafter referred to as E2 and T2). The platform calculates the fare based on the trajectory of travel in the case of ride-hailing vehicles, while in the case of taxis, the driver manually enters the amount displayed on the meter. Among the four prices, only T2 cannot be altered by the platform.

An app-based ride-hailing service or a conventional taxi service can be assigned an order by a ride-hailing platform, but the commissions that the two services charge differ significantly. In the Shanghai market, assigning an order to a taxi results in a commission of CNY 5 at most, whereas assigning that same order to a ride-hailing vehicle can result in a proportional commission of up to 30% [3,4][1]. The financial incentive to allocate orders to ride-hailing vehicles increases when fares above CNY 16.7 are calculated from a commission-revenue perspective. Therefore, the first research question is: *Do ride-hailing platforms adjust the relationship between estimated fares and final paid fares to steer passengers toward choosing ride-hail services instead of taxis?*

It is believed that ride-hailing platforms can adopt at least two strategies in order to maximize their profits. To begin with, the platform may display a lower estimated price for ride-hailing vehicles than for taxis for a given order (with a fixed origin and destination). Taxis are less likely to be used by passengers due to this. Furthermore, if a passenger decides to take a taxi instead of a ride-hailing vehicle, the actual fare paid upon arrival may be lower than the fare charged by the ride-hailing company. Due to the fact that passengers can only compare two prices (E1 and E2 if they choose a ride-hailing service, and T1 and T2 if they choose a taxi), comparing E2 and T2 can be difficult. There may be passengers who notice that E2 is often higher than E1 (or that T2 is often lower than T1), but this may merely be an artifact of the algorithmic estimations used to derive E1, E2, and T1 (and are therefore subject to errors in the estimation process). Due to the influence of complex factors like traffic conditions, driving routes, and the number of red lights encountered, it is difficult to attribute these price discrepancies to systematic bias caused by the platform's algorithms. However, there is very little empirical evidence based on scientific research methods regarding the specific approaches ride-hailing platforms use to maximize their commission revenue. Therefore, this paper proposes the second research question: *How do ride-hailing platforms*

[1] For cruising taxis, online hailing service fees are charged on a tiered basis: billing begins after 3 km, increases stepwise, and is capped at CNY 5 per trip. For app-based ride-hail services, following the national regulatory reforms implemented in April 2026, the nationwide cap on aggregate commissions for ride-hail platforms was revised to 27%. For analytical convenience, and without loss of generality with respect to my main conclusions, I model the taxi commission as a fixed CNY 5 per trip (independent of the total fare) and assume a 30% proportional commission for ride-hail services throughout the paper.

adjust estimated and actual prices to maximize their commissions?

In order to address the above research questions, this study designed a natural experiment. Two researchers (one of whom is the author of this paper) selected off-peak weekday hours (9:00 AM to 5:00 PM) and simultaneously used a mainstream ride-hailing application to request rides from location A to location B. Among the researchers, one requested only ride-hailing vehicles, while the other requested only traditional taxi cabs. As soon as a driver accepted the order, the researchers recorded the estimated fare displayed on the app (E1 or T1). At the destination, the actual fare paid (E2 or T2) was recorded. Furthermore, during the rides, the two researchers used a pre-designed questionnaire to interview the drivers regarding relevant topics (including years of driving experience, monthly vehicle rental costs, net income, etc.) for subsequent analysis.

Since the two researchers' origin, destination, travel route, and arrival time at the destination were virtually identical, paired t-tests were used to analyze the data, which yielded several interesting findings. In line with expectations, the estimated fare for ride-hailing vehicles was 2.6% lower than that for taxis (E1 < T1). Second, the estimated fare for taxis was 5.4% higher than the actual fare paid (T1 > T2). Third, the actual fare paid for ride-hailing vehicles was 4.2% higher than that for taxis (E2 > T2). All of the above results were statistically significant. Lastly, it is important to point out that there was no significant difference between estimated and actual fares for ride-hailing vehicles (E1 = E2).

Based on the empirical results, it is possible that the platform's pricing algorithms are systematically biased in favor of ride-hailing services in order to increase its profitability. It is important to note that, despite not purposefully reducing the estimated fare for ride-hailing vehicles (relative to the actual fare), the platform intentionally inflates the estimated fare for taxis (relative to the actual fare), which leads to passengers believing that ride-hailing services are cheaper when they request a ride. As a result, ride-hailing services channel users toward their vehicles, placing taxis at a competitive disadvantage vis-à-vis ride-hailing services. In reality, ride-hailing services charge a higher fare than taxis, indicating that they are not actually more economical. As a result, the platform takes full advantage of information asymmetry to make ride-hailing seem more affordable at the point of ride request, thus attracting more passengers to use the service. The platform maximizes its commission income for ride-hailing services compared to taxis because of the higher commission rate.

In addition, survey evidence from affected taxi drivers explains why they tolerate this allocation. Our sample of taxi drivers has a greater average experience of ten years compared to ride-hailing drivers, and many of them are close to retirement age; they exhibit a lower willingness or capacity to adopt new technologies. Even though they recognize that switching to app-based driving could result in more orders, they are often unwilling or unable to invest the additional time and effort required, and, as a result, they accept lower incomes. From the perspective of ROI (Return on Investment), ride-hailing drivers spend more time and effort and, accordingly, earn more, while taxi drivers maintain a lower effort-income balance that is in line with their abilities. Taxi companies lack effective competitive strategies and capabilities in the face of competition from ride-hailing platforms, and the decline of the traditional taxi

industry seems to have become irreversible.

This study has some theoretical and practical implications. Theoretically, I demonstrate how ride-hailing platforms exploit informational asymmetries by steering passengers toward the booking option that is more profitable for the platform. The platform is specifically responsible for increasing the allocation of orders to app-based ride-hailing drivers through the systematic inflation of taxis' displayed (estimated) fares relative to their actual fares, thereby increasing its commission revenue. Platforms can influence consumers' choices in two-sided markets with subtle, information-based strategies. Previous research has focused on explicit mechanisms such as differential pricing and advertising. In this study, I demonstrate that platforms can limit order flow to incumbent taxi drivers by using informational advantages. These empirical findings enrich the literature on platform governance and information asymmetry by demonstrating how allocation incentives translate into differential treatment of seller groups as a result of allocation incentives.

Practically, the results have important policy and managerial implications. In relation to taxis and ride-hailing services, the study provides regulators with direct evidence that can be used to inform rules that aim to ensure the non-discriminatory treatment of taxis and ride-hailing services - an area previously difficult to enforce due to the lack of empirical evidences. The findings suggest that taxi firms need to invest in driver training (especially for younger or more tech-savvy recruits), vehicle renewal, and service quality improvements, or reposition themselves as higher-end mobility services. In the absence of such adjustments, low-end taxi operators will face increasing risk as platforms centralize the allocation of orders. Consumers should be aware that taxis will continue to be an important transport option, and that posted fares are not necessarily associated with higher out-of-pocket expenses. In certain circumstances, it may be economically beneficial to take a taxi.

This paper is organized into six sections. Section 2 discusses the background of the taxi industry and the impact of ride-hailing platforms on traditional taxi services. In section 3, four research hypotheses are presented based on the theories of two-sided platforms and information asymmetry. The research design and data analysis methods employed in this study are described in Section 4. In Section 5, we present the main empirical findings, including descriptive statistical analyses, hypothesis testing results, robustness checks, and questionnaire survey results. I discuss the theoretical contributions, practical implications, and research limitations of this study in Section 6. The conclusions of the paper are summarized in Section 7.

2. Background

2.1 Taxi Industry

In urban areas, taxis are as common as metros and buses. Comparatively, taxi services offer advantages such as easy street hailing access, door-to-door pickup and delivery, and generally shorter travel times. However, it is also the most expensive among the three public transportation options. From the 1990s to 2010, the cruise-taxi industry enjoyed a golden era. Only vehicles that possess taxi licenses were

permitted to operate commercially in China, as the number and type of taxi licenses were strictly regulated. In order for one to become a taxi driver, he or she must not only possess a driver's license, but also pass a number of exams that are rigorous in nature. A taxi driver was considered to be a respectable occupation in the past as a result of the relatively high earnings. However, the situation is no longer the same as it was a few decades ago.

Currently, most Chinese cities have numerous cruise-taxi companies that operate in the area. The city of Shanghai, for example, has four large taxi companies (e.g., Qiangsheng, Dazhong, Jinjiang, and Haibo), as well as dozens of smaller taxi companies. Taxi drivers usually only serve the city in which they are located, and each city has its own taxi brand. The number of taxi companies operating in China is approximately 8,000 [5]. The resulting market structure is highly fragmented, with each firm holds a small share of the market. Moreover, taxi fares are not determined by the competitive forces of the market, but rather by the meter-based, regulated pricing system, which results in relatively high travel costs for passengers.

2.2 Emergence of Online Car-Hailing Platform

In September 2012, Didi launched its ride-hailing platform, heralding the era of platform-mediated ride-hailing services which have become more and more common in recent years. The ride-hailing platforms follow a platform business model in contrast to traditional taxi companies, exhibiting the characteristics of a typical two-sided market [6, 7]. The ride-hailing platforms do not own or purchase vehicles. Owners of commercial vehicles, rental companies, fleet operators, and individuals supply ride-hailing vehicles. Initially, the platform primarily entered the market by enticing taxi drivers to download and install the ride-hailing app at airports and train stations, while simultaneously offering substantial ride subsidies to both taxi drivers and passengers. When the majority of taxi drivers and passengers downloaded and installed the ride-hailing app, these subsidies were gradually phased out as soon as the vast majority of taxi drivers and passengers decided to use it.

In the literature, the people who provide the service are usually referred to as "sellers" (drivers) in the context of online platform. The second type of players are "buyers" (passengers), who are the end users of the service. In essence, the ride-hailing platform serves as an intermediary for individuals and companies to transact with each other. Passengers can request rides on the platform and nearby drivers will be notified. Once the trip is completed, the taxi or ride-hailing driver receives the fare paid by the passenger. Commission fees are then deducted by the ride-hailing platform from the fare [8]. Taxis are subject to a maximum commission of 5 CNY per order. In the case of ride-hailing vehicles, the Chinese government stipulates that a proportionate commission is permitted, but it shall not exceed 30% of the order amount[2].

In the early stages of Didi's development, many of its drivers were licensed taxi drivers, and the platform

[2] Following the national regulatory reforms implemented in April 2026, the nationwide cap on aggregate commissions for ride-hail platforms was revised to 27%.

relied on its existing fleet of cruising taxis to provide services. In the subsequent years, app-based ridesharing vehicles without taxi operating licenses began to emerge. Ride-hailing vehicles, in contrast to taxis, do not accept street hails. Private cars without proper licensing joined platforms during the early development phase (2014-2016). Since they were not subject to the statutory quota on cruising taxi licenses, their entry barriers were substantially lower than those for licensed taxis. In spite of the introduction of a dual licensing regime, there continued to be a large amount of unlicensed capacity, which effectively reduced entry barriers. Today, the number of active ride-hailing vehicles (including unlicensed drivers) on platforms significantly exceeds that of cruising taxis.

In the past, China hosted several ride-hailing platforms (e.g., Didi, Kuaidi), but consolidation and increased competition led to Didi's dominance. According to industry monitors, Didi now accounts for over 70% of the Chinese ridesharing market [9]. Despite the fact that many cities still have multiple taxi companies, their drivers increasingly obtain orders through these platforms. Thus, the market has been transformed from being historically fragmented and regulated by meters to being dominated by a small number of ridesharing platforms with a more market-based pricing system. Taxis continue to operate according to their meters, while ride-hailing platforms are increasingly using algorithms to estimate fares based on vehicle GPS data and route information.

2.3 Motivation for Price Information Adjustment for Platforms

Due to its status as a for-profit organization, the platform aims to maximize its commercial profits. A commission rate of 30% at maximum is charged for ride-hailing vehicles. Therefore, when the order amount equals CNY 16.7, the platform's profit is indifferent between assigning the order to a ride-hailing vehicle or a taxi. For orders exceeding CNY 16.7, the commission from assigning the order to a ride-hailing vehicle exceeds that charged by taxis.

In Shanghai, for example, the base fare for a standard taxi (excluding the Volkswagen Touran model) is CNY 14 for the first 3 kilometers, and CNY 2.7 per kilometer thereafter. For a trip of 4 kilometers, the taxi fare is 14 + (4 - 3) * 2.7 = CNY 16.7. In cases of traffic congestion, prolonged waiting at red lights, or nighttime travel, the distance that can be covered for CNY 16.7 is even shorter. Due to the fact that many taxi trips exceed 4 kilometers, ride-hailing platforms can earn a higher commission by assigning orders to ride-hailing vehicles rather than taxis. Thus, this study posits that, under conditions of sufficient capacity, such as during non-peak hours, ride-hailing platforms tend to allocate orders to ride-hailing vehicles rather than to taxis.

3. Hypotheses Development

There are four distinct fares for each category of vehicle when the origin and destination are fixed.

E1: the estimated fare shown to a passenger before boarding a ride-hail vehicle;

E2: the actual fare paid by a passenger after completing a ride-hail trip;

T1: the estimated fare shown to a passenger before boarding a traditional taxi;

T2: the actual fare paid by a passenger after completing a traditional taxi trip.

T2 is determined by the taxi meter, whereas the other three are estimated using platform-based methods. I now analyze the relationship between estimated and actual fares for the two types of vehicles. When a passenger uses a ride-hailing service, they observe E1 (the pre-trip estimate) and later pay E2 (the post-trip actual). Due to the platform's access to large-scale passenger data, it is able to maintain consistency between E1 and E2. Even so, from a profit maximization perspective, the platform has an incentive to raise E2 systematically since a higher actual fare results in a higher commission for the platform. Additionally, during a trip, route adjustments and traffic delays make it difficult for passengers to detect such systematic deviations. Accordingly, I propose:

H1: For ride-hail trips, the estimated fare is lower than the actual fare (E1 < E2).

When a passenger chooses to take a taxi, he will see two prices: T1 and T2. Among them, T2 is determined by the taxi meter and cannot be altered by ride-hailing platforms. In contrast, the platform can generate systematically higher estimated fares, which has at least three advantages. Firstly, when passengers discover that their actual fare is lower than their estimated price before boarding, they perceive that they have not been overcharged and are unlikely to attribute the underestimation to the platform. Secondly, raising the estimated price of taxis will increase the competitiveness of ride-hailing services, thus encouraging more passengers to use them. Finally, regardless of the actual fare paid by the passenger who has chosen a taxi, the platform's commission is capped at CNY 5. It follows that inflating the estimated taxi price does not affect the platform's revenue. Accordingly, this study proposes:

H2: For traditional taxi trips, the estimated fare is higher than the actual fare (T1 > T2).

Next, I examine the relationship between the estimated prices of the two types of vehicles. After opening the ride-hailing app and inputting the origin and destination, passengers are more likely to choose ride-hailing if the ride-hailing price is significantly lower than that of a taxi. Otherwise, they are likely to choose a taxi. In this regard, it is in the platform's interest to ensure that the estimated price for ride-hailing is lower than the estimated price for taxis. Thus, this study proposes:

H3: Based on estimated fares, ride-hail is cheaper than taxi service (E1 < T1).

In contrast to taxis, ride-hailing vehicles have significantly different commission models. When the ride-hailing vehicle has completed the trip, the commission is calculated on the basis of the actual fare paid by the passenger. In the case of a taxi ride, the commission is limited to CNY 5 per order. It is therefore in the platform's interest to increase the actual fare paid for ride-hailing. As a consequence, this study proposes:

H4: Based on actual fares, ride-hail is more expensive than taxi service (E2 > T2).

4. Research Method

4.1 Research Design

It is important to note that the design of this study rests on the observability of four prices (E1, T1, E2, and T2). In particular, the research setting is described as follows: (1) The study conditions were simplified by selecting off-peak daytime hours during weekdays, specifically between 9:00 AM and 5:00

PM[3]. (2) The origin and destination points were fixed, referred to as Point A and Point B respectively. In order for the ride-hailing commission to surpass taxis, the distance between Point A and Point B must be greater than 4 kilometers in order for the ride-hailing commission to gain a competitive advantage over taxis. In addition, round-trip rides between Point A and Point B were also conducted as a way to maximize the efficiency of data collection. There were two researchers (one of whom is the author of this paper) who simultaneously requested rides from Point A to Point B using a mainstream app. When the two researchers arrive at Point B at different times, the first researcher needs to wait until both of them are present before requesting a ride from Point B back to Point A. (3) The two researchers in this study use the same travel route whether traveling from Point A to Point B or from Point B to Point A in order to ensure maximum comparability of the four prices. (4) Ride-hailing vehicle selection: The ride-hailing app offers various types of ride-hailing services, including Express, Express Plus, Premier, and Luxury. A fixed price is charged by some types of vehicles (where the estimated price is the same as the actual price), while other types of vehicles charge a promotional price that is significantly lower than that charged by taxis. Both of these did not meet the study's requirements. On the ride-hailing app used in this study, the most suitable vehicle type for research is the Deluxe model, whose estimated price is closest to that of taxis, and whose vehicle age and model are most comparable to taxis. As a result, this vehicle type was selected as the primary subject of this study (hereinafter referred to as "ride-hailing vehicles").

According to the protocol described above, two researchers collected data in July 2026. For each travel direction (A→B and B→A) they obtained 18 observations, yielding 36 observations in total. A structured questionnaire was administered to each driver during the trips. Appendix 1 contains detailed data collection procedures and a survey instrument.

4.2 Econometric Method

Due to the fact that the data collection in this study was conducted in a paired manner (traveling from Point A to Point B, or from Point B to Point A), a paired-sample t-test is an appropriate method for analyzing the data. Compared to the independent-sample t-test, the paired-sample t-test is better at controlling for other factors that are difficult to control directly (e.g., traffic conditions, waiting time at traffic lights, etc.). In addition, paired-sample t-tests are more likely to detect true effects given the same sample size as independent-sample t-tests [10].

The sample size required for a paired sample t test is primarily determined by the magnitude of the effect. With $\alpha = 0.05$ (two-tailed, corresponding to 95% confidence) and 80% power, a large effect (Cohen's $d = 0.8$) will require approximately 15 pairs of observations. Alternatively, with $\alpha = 0.10$ (two-tailed) and 80% power, about 18 paired observations will be required to detect a medium effect (Cohen's $d = 0.4$). Thus, with 18 paired observations, I am able to detect a large effect with 95% confidence or a medium effect with 90% confidence.

[3] Weekday morning peak hours: 07:00–09:00; weekday evening peak hours: 17:00–19:00.

5. Empirical Findings

5.1 Descriptive Statistics

The descriptive statistics are presented in Table 1. Taxi drivers exhibit substantially greater driving experience than ride-hail drivers (on average about ten years or more) and several taxi drivers reported being “near retirement” (around age 60), indicating marked aging in the taxi workforce. The fares paid to car rental companies are approximately 4.8% higher for taxis than for ride hail vehicles, which is a modest difference. Commission rates for ride hail drivers range from 20% to 29%, with a mean of approximately 24%; taxi commissions are capped at CNY 5 per trip, and therefore are not reported. There is an average of 398 taxi orders per month compared to 483 ride hail orders per month (about 21.2% higher for ride hail), indicating a competitive disadvantage for taxi services. Taxi drivers reported net incomes (after vehicle costs, insurance, etc.) of 7,544 CNY per month, while ride-hailing drivers reported net incomes of 10,250 CNY per month (a 35.9% difference), indicating that ride-hailing drivers receive both more orders and higher revenue per order than taxi drivers. There is an average trip duration of 18.7 minutes for ride hail and 17.3 minutes for taxis. Finally, with respect to estimated and actual fares, the ride-hail estimated fare is CNY 32.3 (actual CNY 32.7), while the taxi estimated fare is CNY 33.2 (actual CNY 31.3). Thus, ride-hail vehicles’ estimated and actual fares are closely aligned, whereas taxi's exhibit a large disparity between estimated and paid fares.

Table 1. Descriptive Statistics

	Ride-hailing				**Taxi**			
	N	Mean	Min	Max	N	Mean	Min	Max
Driving experience (Years)	16	4.8	2	8	16	14.7	2.5	35
Vehicle rental fee (CNY)	12	6000	5000	6500	17	6295	4500	9000
Commission rate	16	24%	20%	29%	18	-	-	-
Monthly # of orders	16	483.0	390	780	15	398.0	225	650
Net income (CNY)	16	10250	5000	15000	17	7544	1000	11000
Ride duration (Minutes)	18	18.7	14.0	27.0	18	17.3	11.0	28.0
Estimated fare (CNY)	18	32.3	30.4	37.7	18	33.2	31.0	37.7
Actual fare (CNY)	18	32.7	29.5	38.1	18	31.3	26.0	36.0

Note. Some sample sizes in the table are below 18 because some drivers did not respond to the relevant questions.

5.2 Results of Hypotheses Testing

Figure 1 shows the results of the tests on the four hypotheses proposed earlier. First, there was no significant difference between the estimated price and the actual fare paid for ride-hailing vehicles ($p = 0.62$); therefore, hypothesis 1 was not supported. Second, the actual fare paid for taxis was 5.4% lower

than the estimated fare ($p < 0.01$), which supports Hypothesis 2. The estimated price for taxis was 2.6% higher than that for ride-hailing vehicles ($p < 0.01$), supporting Hypothesis 3. Finally, the actual fare paid for taxis was 4.0% lower than that for ride-hailing vehicles ($p < 0.1$), lending support to Hypothesis 4.

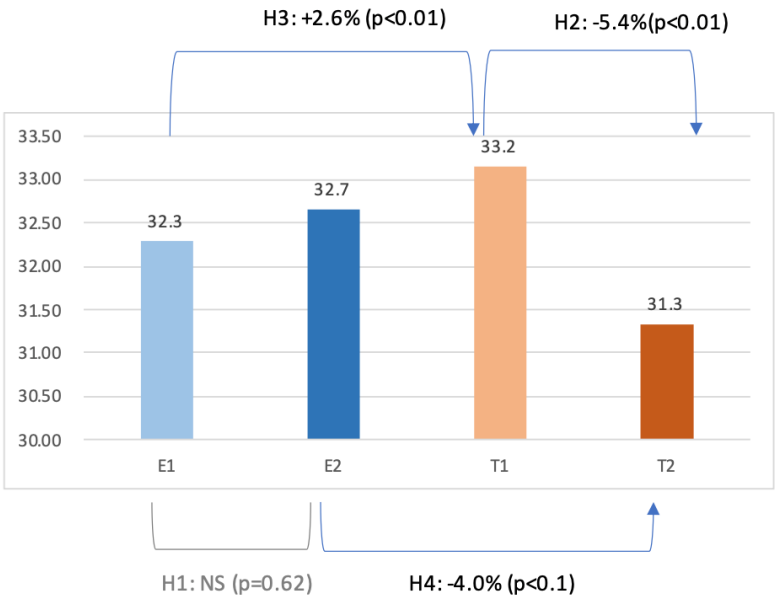


Figure 1. Results of Hypothesis Tests

5.3 Robustness Checks

In spite of the fact that the distance from A to B and from B to A are very similar, the difference in travel direction may cause differences in the waiting time at red lights and the travel time of the vehicles, resulting in differences in the average fare paid. According to statistical results, the average fare from A to B is CNY 31.0, while the fare from B to A is CNY 33.0, with the latter being 6.5% more expensive than the former. Consequently, it appears that pooling the two sets of samples for data analysis may affect the results. In order to address this issue, the present study separated the 18 samples from A to B (9 pairs of ride data) from the 18 samples from B to A (9 pairs of ride data) and conducted paired-sample t-tests separately for each pair of samples. Figure 2 illustrates the results.

As shown in Figure 2(a), although the statistical test result for H1 (E1 > E2) was significant ($p<0.01$), the sign was opposite to that expected. As shown in Figure 2(b), the estimate for Hypothesis 1 exhibited the hypothesized sign but did not reach statistical significance. As a whole, H1 did not receive empirical support.

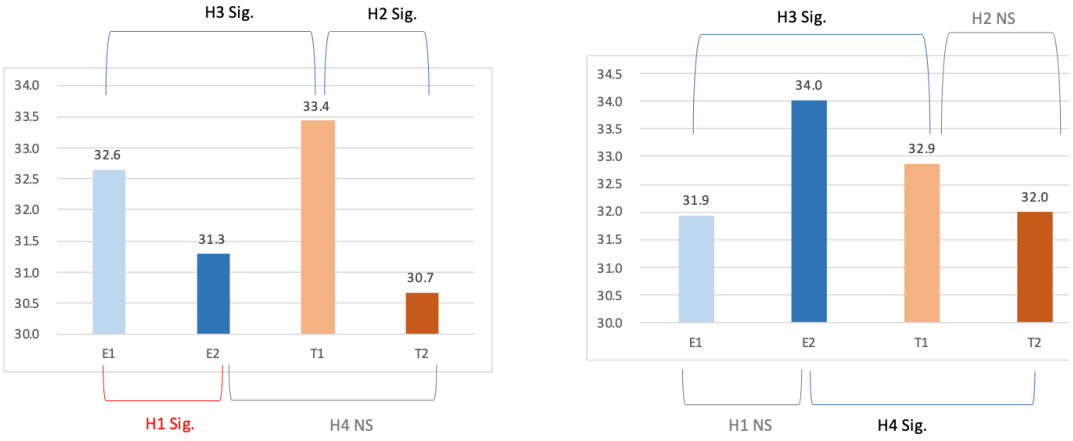
As shown in Figure 2(a), the test result for H2 (T1 > T2) was significant ($p < 0.01$), with the sign consistent with the expected direction. The test result for H2 was not significant ($p = 0.30$), which may be related to the small sample size as shown in Figure 2(b). Therefore, hypothesis 2 was partially supported.

As shown in Figure 2(a), the test result for H3 (E1 < T1) was significant ($p < 0.01$), with the sign

consistent with the expected direction. As shown in Figure 2(b), the test result for H3 was also significant ($p < 0.01$). The statistical results from both sets of data fully support Hypothesis 3.

According to Figure 2(a), despite the sign being consistent with the expected direction, the test result for H4 (E2 > T2) was not significant ($p = 0.52$). As shown in Figure 2(b), the test result for H4 was significant ($p < 0.1$). Accordingly, Hypothesis 4 was partially supported by the data.

Overall, although both subgroups had small sample sizes, they partially supported or supported most of the hypotheses proposed in this paper (hypotheses 2, 3, and 4).



(a) From A to B (N=18) (b) From B to A (N=18)

Figure 2. Results in Subgroup Analyses

5.4 Results of Survey

Researchers asked drivers of both vehicle types whether they intended to switch professions (ride-hailing drivers to become taxi drivers, or taxi drivers to become ride-hailing drivers). There was a remarkable consistency in the drivers' responses: no. As for the reasons, some ride-hailing drivers stated that "taxi drivers cannot earn money," "taxi drivers rely on grabbing orders rather than dispatching, which increases uncertainty," and that "taxi driving does not offer a future." Taxi drivers stated that "they are used to it," that "they intend to retire soon and do not wish to change," and that "the commission for ride-hailing services is too high." There is only one female taxi driver among the taxi drivers surveyed, who stated that she was reluctant to change jobs because she needed to "take care of her family". In summary, although neither group of drivers desired to change jobs, the reasons for doing so differed considerably. Taxi drivers reported a lower willingness to transition from their current occupation, often citing familiarity with their current occupation, approaching retirement, or concerns about adapting to a new platform-based work environment. Ride-hailing drivers perceived their jobs as superior (more profitable, more guaranteed orders, etc.).

The majority of drivers in both groups answered affirmatively when researchers asked whether they would continue in their current occupation. The reasons ride-hailing drivers gave for wanting to continue

included: "as long as I can keep driving, I need to earn money," "my family needs cash," "there are no better job options," "I don't have enough education, so driving is all I can do," and "the income is decent." The few ride-hailing drivers who did not want to continue cited reasons such as "too exhausting" and "my body can't handle it anymore." Taxi drivers who wish to continue gave reasons such as "this is the only thing I know how to do," "I will retire soon," and "I am too old to do anything else." Only one taxi driver responded with uncertainty regarding whether to continue driving a taxi, stating, "I'm not sure; if business is bad, I won't drive."

In addition, some drivers provided additional information during the interviews, which is helpful in interpreting the results of this study. A taxi driver once conducted an experiment with several of his friends: they parked several cars at the same location, and used the same app to request a taxi, but the platform didn’t dispatch the order to any taxi. Another taxi driver believed that "the platform uses various means to create a perception among passengers that taxis are more expensive, though the price may not necessarily be higher." He gave an example: "There was one order crossing the Yangpu Bridge; a passenger was unable to receive a ride-hailing vehicle (normally CNY 50), but it turned out the taxi was actually cheaper (CNY 38). " Despite the fact that some drivers have not conducted formal and rigorous research on the platform's order dispatching methods and price display strategies, the above interview results suggest that some drivers are aware of these aspects of the platform.

6. Discussion

The statistical tests for the four hypotheses are summarized in Table 2. Overall, with the exception of Hypothesis 1, which was not supported, the remaining three hypotheses were supported empirically,.

Table 2. Key Findings

	Hypotheses	Findings
H1	For ride-hail trips, the estimated fare is lower than the actual fare (E1 < E2).	Not Supported
H2	For traditional taxi trips, the estimated fare is higher than the actual fare (T1 > T2).	Supported
H3	Based on estimated fares, ride-hail is cheaper than taxi service (E1 < T1).	Supported
H4	Based on actual fares, ride-hail is more expensive than taxi service (E2 > T2).	Supported

It may be that the relatively small sample size in this study accounts for the lack of support for Hypothesis 1. Furthermore, the study also suggests that platform algorithms are capable of predicting the actual fares of ride-hailing services without systematic bias in the prediction. In large Chinese cities, ride-hailing platforms processes hundreds of thousands of orders every day. As a result of combining geographic information systems with advanced predictive algorithms, it is not surprising that platforms are able to estimate ride-hailing prices accurately.

6.1 Theoretical Implications

There are a number of ways in which this study contributes to the literature on two-sided platforms and information asymmetry. To begin with, the study reveals how ride-hailing platforms use information asymmetry to guide passengers (buyers) to choose the mode of transportation that are most profitable. Typically, the price displayed for a product is the same as its actual price on an e-commerce platform. Otherwise, discrepancies would be easily detected by consumers. In the context of ride-hailing, platforms can increase their commission income by inflating the estimated taxi price (relative to the actual taxi price). The gap between estimated and actual prices has rarely been reported in the literature. Therefore, this study provides empirical evidence regarding the impact of information asymmetry in two-sided platform environments that are characterized by information asymmetry.

Second, this study examines how platform firms use information asymmetry to limit the number of orders a taxi driver (a seller) can receive, thereby maximizing the amount of commission that the firm can earn. On e-commerce platforms, anyone can access the platform and easily compare the displayed prices of the same product across different sellers. Consequently, e-commerce platforms tend to be relatively fair in their treatment of all sellers. According to the findings from this study, it is evident that ride-hailing platforms take advantage of the information asymmetry to their greatest advantage. In order to maximize platform commission revenue, they raise the estimated taxi fare (relative to that for ride-hailing vehicles) in order to maximize platform commission income. In this regard, this study provides new empirical evidence on information asymmetry and platform governance.

Finally, this study conducted a questionnaire survey of taxi and ride-hailing drivers in order to find out why drivers (sellers) anticipate the above findings while still being willing to accept them. Generally, taxi drivers have ten more years of driving experience than ride-hailing drivers, some of whom are approaching retirement age (60 years), and they exhibit weaker ability to learn new technologies. Although they are aware that switching to ride-hailing could potentially lead to higher incomes in the future, they accept the reality of lower incomes because of the high cost of transition or their unwillingness to invest additional time and effort. As a result, ride-hailing drivers invest more and earn more, while taxi drivers invest less and earn less. Every type of driver has a different “comfort zone” based on the circumstances and conditions under which they operate.

6.2 Practical Implications

The findings of this study have practical implications for policymakers, taxi operators, as well as consumers. Traditionally, policymakers have paid a great deal of attention to the compliance of drivers as well as the safety of passengers. The lack of direct evidence, however, has made it difficult for platforms to effectively supervise their potentially discriminatory pricing practices. Based on the findings of this study, regulators should consider adopting measures to ensure that ridesharing platforms treat traditional taxi services and app-based ridesharing services equally in order to ensure transparency in fare practices and prevent platform-driven distortions of competition.

The traditional taxi industry should take a number of remedial measures in order to stop their decline in

competitiveness. It is important that companies invest in targeted training for their drivers (especially young or technologically savvy drivers), upgrade vehicle hygiene and overall service quality, and replace their fleet with more modern models. It may be necessary to reposition towards higher-end mobility services to differentiate from low-cost ride-hail services. Absent such adaptation, the decline of taxi drivers is likely to continue, and ridesharing may come to dominate the market.

For consumers, it is important to recognized that taxis remain one essential element of urban public transportation. The estimated fares do not always equate to higher out-of-pocket expenses for taxi drivers. Taking a taxi can be a cost-effective option in some cases.

6.3 Limitations and Future Research

It is important that future research addresses several limitations that were found in this study. There was a relatively small sample size collected in this study. Despite the fact that more than one hypothesis has been statistically validated, it will still be necessary to confirm the validity of the findings through more extensive experiments. A number of extensions are available, including: (1) supplementing ride-hailing data during the morning and evening peak hours; (2) increasing the number of origin-destination pairs in order to include a variety of short-, medium-, and long-distance trips; (3) incorporating ride-hailing locations such as city centers, suburbs, high and low pedestrian density areas, as well as commercial and residential areas; (4) extending the study to multiple cities, collecting a number of samples using similar methodologies in each city; (5) increasing the number of ride-hailing applications from one to several, in order to determine whether similar differential pricing practices exist across platforms of different scales; and (6) collecting data in different countries in order to compare pricing differences among ride-hailing platforms in varying national contexts.

7. Conclusion

In recent years, ride-hailing platforms have revolutionized the traditional taxi industry in a significant way. Due to the lack of street hailing, conventional taxis are relying mainly on platforms in order to obtain orders. Since commission schemes and fare calculation methods differ greatly between taxis and app-based ride hail services, platforms have an economic incentive to exploit information inefficiencies in order to allocate more orders to the higher-commission ride-hail option in order to maximize revenue. Because little direct empirical research has been done to examine how platforms may exploit information asymmetry to maximize profits, the mechanisms through which platforms may exploit information asymmetry remain largely unknown.

Based on the two-sided platform theory and the information asymmetry arguments, this study proposes four hypotheses regarding the relationship between estimated (predicted) fares and actual paid fares. I collected trip fare data and tested hypotheses using paired-sample t-tests. The results of the analysis were notable in a number of ways. It appears that the platform increases the estimated taxi fares relative to the ride-hailing fares, thereby encouraging passengers to use ride-hailing services more often. According to the observed trips, taxi fares are generally lower than the fares charged by ride-hailing services. On the

other hand, no significant difference was found between the estimated fares of platforms and the actual fares that were paid for ride-hailing services.

These results contribute to the literature on two-sided platforms and provide new empirical evidence bearing on theories of information asymmetry. Practically, policymakers, taxi operators, and consumers may find that platform design and information provision can have a significant impact on market allocation and distribution.

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Appendix 1. Questionnaire / Survey Instrument

I. Preparatory steps

(1) Ensure the trip is taken between 09:00 and 17:00.

(2) Enter the origin and destination into the ride-hailing app.

(3) Select vehicle type in the app: “Premium” (researcher 1) / “Taxi” (researcher 2).

(4) Check and confirm that the proposed route matches the predetermined route.

(5) Record the app’s estimated fare (T1/E1) and capture a screenshot.

II. Questionnaire / Data checklist

(1) Pick-up location (A / B):

(2) Driver gender:

(3) Vehicle license plate number:

(4) Departure time (record to the minute):

(5) App-estimated fare (E1/T1):

(6) How many years have you been driving for ride-hailing or taxi services? (include both ride-hail and taxi experience)

(7) How much do you pay monthly to the vehicle rental company?

(8) What is the commission rate (or fee) charged on an order by the car-hailing platform?

(9) Approximately how many orders do you complete per month?

(10) What is your approximate monthly net income (after platform commissions, rental fees, and other costs)?

(11) Are you considering changing your occupation to become a taxi driver / ride-hail driver? Why or why not?

(12) Do you intend to continue working as a ride-hail / taxi driver? Why or why not?

(13) Other important information provided by the driver:

III. Closing procedures

(14) Record arrival time (to the minute):

(15) Record the actual fare paid (E2/T2):

(16) Take screenshots of the actual arrival time and the actual fare (E2/T2).