MARKET STUDY ON COMPETITION AND REGULATORY ISSUES RELATED TO THE TAXI AND CAB AGGREGATOR INDUSTRY: WITH SPECIAL REFERENCE TO SURGE PRICING IN THE INDIAN CONTEXT

KEY FINDINGS AND RECOMMENDATIONS

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Study Partner

Shri Ram College of Commerce (SRCC) University of Delhi, with Prof. Simrit Kaur as the Principal Investigator

Competition Commission of India

9th Floor, Office Block - 1, Kidwai Nagar (East), New Delhi - 110023, India

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Disclaimer:

This "Report on the Market Study on Competition and Regulatory Issues related to the Taxi and Cab Aggregator Industry in the Indian Context", including the information contained herein, is for general purposes only and is based on broad trends and views that have emerged from the surveys and stakeholder consultations. The report relies on econometric analysis of drivers' and riders' surveys, controlled experiment, and stakeholder consultation. It is assumed that the information provided by these stakeholders during the course of the market study is complete, accurate, and not misleading. The views expressed are not binding on the Commission for any legal purpose.

Section I: Introduction

1.1. Introduction

The arrival of innovative app-based ride services, generically referred to as cab aggregators (CAs), has led to the emergence of new regulatory and competition concerns.

In India, the onset of CAs in the taxi industry began in 2010, with companies such as TaxiForSure and Ola Cabs. This competition intensified further with the arrival of US-based CA Uber in 2013. Using digital technology platforms, these companies offer ride services to passengers on request by a tap on a smartphone app. CAs often do not own cars but sign-up private drivers willing to provide rides to paying passengers, passing the request to them via their platform. Contrary to traditional taxis, which are generally sought at a distance or from streets or taxi stands, such cabs come to the passenger's location on demand and drop the passenger at their precise location, guided by Global Positioning System (GPS). As such, they seem to provide greater convenience in their point-to-point transportation objective. As per newspaper reports,[1] to bring more cab drivers on-board during peak traffic, CAs impose 'surge pricing', which is a dynamic approach to fares charged from passengers. They are also alleged to follow below-cost pricing at times to gain market share. Their rapid growth has undoubtedly been innovative, disrupting the existing passenger transport ecosystem. However, questions relating to the regulatory regime persist.

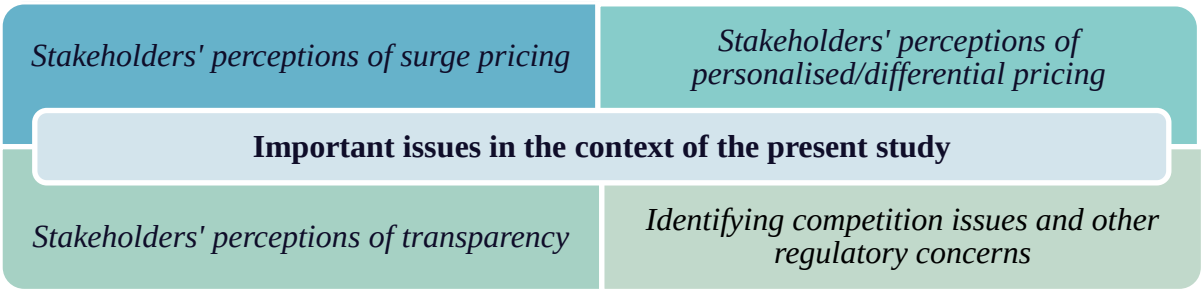
Authorities across the globe are revisiting the regulatory frameworks governing CAs. Often, CA companies do not follow local rules and regulations governing the transport sector as they consider themselves platforms offering technological solutions only. However, since these cabs also take passengers to their destinations for a metered fare and functionally satisfy the same end use, some degree of substitutability between them and erstwhile taxis may not be completely ruled out. The traditional taxi industry has been voicing its concerns over the lack of a level playing field between them and CAs, thereby seeking regulatory intervention. Further, surge pricing, which may be extremely high at times and not necessarily always justifiable, has proven to be a sensitive issue for consumers across the globe (including India), forcing authorities to regulate surge pricing.

[1] Decoding the Economics Behind Surge Pricing and How It Benefits Taxi Apps, Nitin Lahoti (22.12.2018) https://mytaxipulse.com/blog/how-surge-pricing-works-in-taxi-apps.html.

1.2. Objectives of the Study

The objective of this study was to answer the following questions: a) Whether personalised pricing in the cab industry exists and, if so, does it necessitate regulatory intervention, or can consumers' satisfaction on account of availability of technology-backed cab services counter-balance the potential damage associated with dynamic pricing? b) What are consumers'/riders' perceptions about surge pricing? Whether surge pricing is necessarily a rent-seeking behaviour and, if so, does it require any regulatory intervention? c) Are there concerns related to transparency regarding their pricing structure and fare calculation? If yes, identifying broad areas for bringing transparency. To meet these objectives, the following competition and regulatory issues (synoptically presented in Figure 1) pertaining to online CAs have been addressed in the present study.

Figure 1: Issues addressed in the study



1.3. Literature Review

In the CA industry, surge pricing is arguably adopted to clear the market when demand spikes. According to a few studies, surge did lead to an increase in the supply of drivers, clearing markets more efficiently. While this mechanism may increase allocative efficiency through optimal utilization of resources, there are various apprehensions, duly supported by literature. Additionally, personalized pricing affects the way surplus is distributed among different agents, potentially leaving some individuals worse off (Shiller, 2014; Bourreau and Streel, 2018; Jiao, 2018). Studies also reveal that the surge pricing mechanism is opaque, non-transparent, personalized, and unpredictable. Moreover, surge price calculation remains based on non-public data (Chen et al., 2015; Sainato, 2019), leading to non-desirable information asymmetries. In Chicago, Uber fares for passengers were found to not match the fares displayed on the drivers' app. Empirical evidence goes against the assumed supremacy of algorithms and suggests regulatory actions to normalize prices (Ittoo and Petit, 2017; McSweeny and O'Dea, 2017; OECD, 2017; Kenji, 2018; Capobianco and Gonzaga, 2017). Ezrachi and Stucke (2017) and Li and Xi (2018) asserted that artificial intelligence can foster anti-competitive collusion

in four scenarios, namely, messenger, hub-and-spokes, predictable agent and digital eye. Calvano et al. (2018) found that conditional pricing may lead to consumer poaching. The use of artificial neural networks can make the detection of anti-competitive pricing patterns even more difficult, and a possible solution to alleviate the detection problem lies in authorities harnessing the power of the technology themselves (Beneke and Mackenrodt, 2019). In the CA industry as well, algorithmic collusions are a possibility**.**

Section II: Methodology

The study extensively reviewed existing literature and, based on insights derived from the same, primary data was collected from riders and drivers through formal questionnaires and informal interactions. Stakeholder consultations, including with traditional taxi operators, transport department officials, industry experts and CAs were also conducted to understand regulatory gaps and provide policy recommendations, if any.

2.1. Sample Survey of Riders and Drivers

Primary data was collected from four cities (two Tier-I and two Tier-II cities). The cities from which data was collected is provided in Table 1.

Table 1: Data collection from four cities

Nature of City	Sample Cities	States/UTs
Tier I City	Delhi	Union Territory
	Mumbai	Maharashtra
Tier II City	Jaipur	Rajasthan
	Indore	Madhya Pradesh

The study team chose a multi-city model to conduct surveys in view of the peculiar features of the taxi transportation industry in India, which is quite unique and diverse compared to other countries. The taxi industry is divided into the organized and unorganized sectors, with a further classification into the pre-aggregator and post-aggregator era. Despite the fact that, in the present study, the issue pertains to surge pricing adopted by cab aggregators, the modalities and justifications for the same are expected to remain specific to a geographic region. This is because the availability of intra-city public transportation alternatives is expected to impact the multiplier associated with surge pricing. Cities with poor transportation infrastructure and even

poorer public transport system are often a case in point, where elite and middle-income group households avoid using public transport. India, with its rapid income growth in recent years, has seen a surge in middle-income families whose demand for non-public transportation has increased phenomenally. With lack of good quality public transportation, cross-price elasticity is expected to be low, thereby granting greater power to cab aggregators for self-manipulated/artificial surge pricing. As such, data was collected from four cities, two of which are Tier I metropolitan cities and the other two are Tier II cities.

Surveys were conducted of riders and drivers to understand their perceptions regarding pricing, convenience and other qualitative as well as quantitative parameters encapsulating their overall experience with CAs. Since any regulatory intervention in CAs' pricing or operations will have a direct impact on their availability to riders and drivers, understanding this perception was found to be relevant.

For selecting the riders, the study adopted a two-way cluster sampling, which is a sampling method that involves separating the population into clusters, then selecting random samples from each cluster. The sample size was decided keeping in mind the purpose of the study in light of the sufficiency standards as provided in existing literature. The survey was conducted with over 500 riders on various quantitative as well as qualitative parameters in each of the four cities, thus totalling 2000 riders. More than 70 percent of the total responses were collected offline. The survey data was collected by way of a detailed questionnaire, which was pre-tested. The data was collected from five distinct groups of about 100 respondents each, segregated on the basis of nature of occupation. The five occupation categories from which data was collected are:

i. Executives/Professionals
ii. Businessmen
iii. Students
iv. Young Academicians
v. Homemakers and Dependents

As regards drivers, a survey of 50 drivers in each of the four cities was considered appropriate due to the expected homogeneity in driver response, thus totalling 200 drivers. All questionnaires filled by drivers were in person, which also allowed time and space for informal

interactions to understand the overall scenario, which could not be captured in questionnaires. The convenience sampling technique was adopted for data collection from drivers.

The following statistical and econometric tools were adopted to analyze the data so collected from the four cities:

i. Cross Tabulations

ii. Analysis of Variance (ANOVA)

iii. Ordered Multinomial Logit Regressions

iv. Factor Analysis, Structural Equation Modelling and Path Analysis

2.2. Controlled Real Time Experiment

A controlled experiment was conducted at Shri Ram College of Commerce (SRCC), University of Delhi, on 5th November 2019 to gauge the pricing patterns of two major Indian CAs, viz., CA1 and CA2. A total of 68 participants were requested to book a cab on alternate platforms (with the same original location, time and destination). The only differentiating factor was the platform (CA1/CA2) through which the booking was made. Thereafter, data was collated and analyzed to see if any common threads of pricing emerged.

The controlled experiment was essentially undertaken with the following twin objectives:

- To provide a comparative analysis of CA1 and CA2 cab fares; and
- To assess the existence of personalised pricing, if any.

It needs to be mentioned that, while the experiment was pre-planned, the Delhi government imposed the odd-even scheme during the period. CAs were not imposing dynamic pricing during this time,[2] as restrictions on the usage of private vehicles increased the demand for cabs. To that extent, it does not capture the scenario that would exist with unrestricted surge pricing.

2.3. Stakeholder Consultation

The study team engaged in formal interactions with various stakeholder groups such as traditional taxi operators, industry experts, transport department officials, big data experts and major CA players in India with the aim of gaining an overall sense of the issues surrounding

[2] https://economictimes.indiatimes.com/small-biz/startups/newsbuzz/Ola-uber-to-deactivate-surge-pricing-during-odd-even-scheme-in-delhi/articleshow/71862650.cms?from=mdr

the radio cab industry, such as prevailing regulations, better understand the practices of CAs, the purpose of proposed regulatory interventions by transport authorities, etc.

Section III: Rider-Based Findings on Surge Pricing

The study team carried out an extensive primary survey to examine riders' perceptions towards various pricing strategies adopted by CAs, including surge pricing, algorithmic pricing, dynamic pricing, etc. For an overall understanding of diverse conditions that exist in different regional territories, the data was collected from four cities, Delhi and Mumbai (Tier I) and Jaipur and Indore (Tier II). Empirical analysis using econometric as well as non-econometric tools was undertaken to understand the relation between the perception towards higher surge price charged by app-based cab service providers and several important variables. In order to gauge consumer perception to surge pricing, the responses provided by the respondents were analysed under the following four categories:

- Cab prices are normal
- Surge price up to 50 percent
- Surge price between 50 to 100 percent
- Surge prices more than 100 percent

The main findings are:[3]

3.1. Perception Towards Surge and Number of Rides

Table 2: Perception towards surge and number of rides

Perception Towards Surge	**< 10 Rides**	**10–20 Rides**	**> 20 Rides**	**Overall Average**
Normal	60.80	34.81	31.52	52.34
Up to 50 percent	32.37	55.31	19.39	36.31
50–100 percent	4.90	6.91	40.61	8.60
More than 100 percent	1.93	2.96	8.48	2.75

[3] All results in the tables provided in this section are in percentage terms, unless specified otherwise.

In the study, respondents taking over 20 rides a month have been classified as Most Frequent Users, between 10 and 20 rides per month as Less Frequent Users and less than 10 rides as Least Frequent Users. Specifically, respondents perceiving a surge of between 50 to 100 percent was the maximum amongst the Most Frequent User category of CA services (at over 40 percent, compared to only 5 percent for Less and Least Frequent Users). Alternatively, respondents perceiving normal pricing most times was highest at about 60 percent for Least Frequent Users and about 30 percent for the Most Frequent Users. The econometric analysis corroborates the findings. Results indicate that the perception towards paying higher surge is higher for those who take greater number of rides in the pooled sample. City-specific findings indicate that, for Mumbai and Indore, the perception of higher surge is highest for Most Frequent Users. However, Delhi and Jaipur do not exhibit such a relationship.

3.2. Perception Towards Surge and Distance Travelled

Table 3: Perception towards surge and distance travelled

Perception Towards Surge	< 5 Kms	5–10 Kms	10–20 Kms	20–40 Kms	> 40 Kms	Total
Normal	52.08	54.45	49.33	56.05	53.33	52.25
Up to 50 percent higher	27.6	33.95	39.52	39.01	44.44	36.46
50–100 percent higher	12.5	8.24	9.81	3.14	2.22	8.56
More than 100 percent higher	7.81	3.36	1.34	1.79	0	2.72

No conclusive pattern has been found for the perception towards surge pricing and the distance travelled by the respondents. For instance, while on the one hand, the largest number of respondents who perceived a price surge of up to 50 percent were travelling for more than 40 kms, on the other hand, the largest number of respondents with a perception of surge pricing of more than 50 percent were travelling less than 5 kms. Econometric findings also indicate that, in general, the perception towards surge and distance travelled is not very strong. Tier I cities of Delhi and Mumbai also exhibit a pattern similar to that of the pooled sample, with riders travelling larger distances exhibiting lower ordered log odds of perception towards paying higher surge prices. However, in Jaipur, the charged fare surged more with distance. This finding holds importance since Jaipur is a tourist destination.

3.3. Perception Towards Surge and Type of Ride

Table 4: Perception towards surge and type of ride

Perception Towards Surge	Go-together	Cost-effective	Luxury	Total
Normal	46.89	53.26	54.78	52.39
Up to 50 percent	39.56	35.98	31.3	36.22
50–100 percent	10.99	8.14	8.7	8.61
More than 100%	2.56	2.62	5.22	2.78

The findings indicate no substantial differences between the type of ride and perception towards surge (though for each category of surge, respondents using 'go-together' services perceive being charged a surge the most often). The econometric analysis also indicates that the pooled and city-specific results show that, compared to the base category, i.e., go-together rides, people who travel in luxury cabs are less likely to perceive being charged surge prices. This is true for the pooled sample as well as for individual cities except Jaipur. However, the impact of the type of ride from the pooled sample is not statistically significant.

3.4. Perception Towards Surge and Mode of Payment

Table 5: Perception towards surge and mode of payment

Perception Towards Surge	Cash	Card	E-wallet/Others	Overall
Normal	57.70	48.37	43.52	52.63
Up to 50 percent	34.41	38.21	39.49	36.29
50–100 percent	6.46	7.72	13.38	8.48
More than 100%	1.43	5.69	3.61	2.60

Across all categories of perception towards surge in general, the percentage of riders having a perception of being charged surge pricing is more in case of digital mode of payment than the conventional payment method, i.e., cash. For instance, while about 58 percent of cash users perceive prices to be normal, the corresponding figure is about 45 percent for non-cash payment modes. Additionally, while about 6 percent of the respondents report a perceived price surge of more than 100 percent paid by card, the corresponding figure is about 1 percent for cash payments. The econometric analysis corroborates the findings that, when compared to the base category of cash, ordered log odds of perceiving higher surge by people who pay by e-wallets is significantly larger in the pooled sample in Mumbai and Jaipur.

3.5. Surge and Route-Based Pricing

The presence of surge is found to be indicative of the route-based pricing strategy adopted by CAs, since it has been observed that the more frequently a rider uses a particular route, the greater is the perception of being charged a higher surge. This is true for the pooled sample as well as for individual cities except Mumbai. The statistical results also indicate that the perception of riders towards being charged surge prices is reported to be higher for people who travel on the same route more than six times.

3.6. City-Specific Category-Wise Rider Perception Towards Surge

Table 6: City-specific rider perception towards surge

	Business	**Homemaker**	**Professional**	**Student**	**Young Academicians**	**Total**
Normal						
Delhi	56.84	57.89	51.02	43.75	41.24	50.10
Mumbai	35.48	57.39	53.85	38.89	41.18	44.57
Jaipur	45.74	55.79	68.57	64.91	44.44	57.08
Indore	76.74	63.49	71.58	50.94	50.00	64.34
Up to 50 %						
Delhi	37.89	35.79	42.86	46.88	47.42	42.20
Mumbai	43.23	26.09	29.23	46.30	35.29	37.39
Jaipur	46.81	36.84	29.52	30.70	45.83	37.08

Indore	16.28	33.33	13.68	43.4	21.88	24.83
50–100%						
Delhi	2.11	5.26	5.10	9.38	9.28	6.24
Mumbai	10.32	12.17	16.92	12.04	17.65	12.39
Jaipur	7.45	6.32	0.95	2.63	6.94	4.58
Indore	4.65	1.59	8.42	1.89	25.00	6.99
More than 100%						
Delhi	3.16	1.05	1.02	0	2.06	1.46
Mumbai	10.97	4.35	0	2.78	5.88	5.65
Jaipur	0	1.05	0.95	1.75	2.78	1.25
Indore	2.33	1.59	6.32	3.77	3.13	3.85

- *For normal prices:* In general, maximum respondents perceived cab prices to be normal most of the times across the four cities. However, within cities, cab prices in Tier II cities are perceived to be 'normal' more often than in Tier I cities. Amongst the four cities, this perception was highest in Indore (64 percent), followed by Jaipur (57 percent). Delhi and Mumbai followed thereafter (50 percent and 45 percent, respectively). Within Tier I cities, perception towards surge is higher in Mumbai compared to Delhi. Within Tier II cities, the perception towards the existence of surge is higher in Jaipur compared to Indore. Based on the respondents' sub-category, no clear trends emerge.
- *Surge up to 50 percent*: While the maximum percentage of respondents perceived cab prices to be normal most of the times across the cities, this was followed by a perception that prices were up to 50 percent higher than normal. Overall, respondents who perceived up to 50 percent higher prices was highest in Delhi (42 percent), followed by Mumbai and Jaipur (both at 37 percent). In Indore, only 24 percent of the respondents believed that they were charged prices more than 50 percent. Overall, cab prices in Tier II cities are perceived to be better than in Tier I cities with respect to prices being up to 50 percent higher. Within Tier II cities, while perception towards pricing remains more favorable in Indore across categories, vis-à-vis Jaipur, this is not the case for the

category students. Here, Jaipur ranks better. Further, no clear trend emerges between Tier I cities.

- *Surge beyond 50 percent:* The perception of riders towards being charged prices 50–100 percent higher than normal is the highest in Mumbai. Respondents who perceive that they are charged prices more than 100 percent higher than normal is also highest in Mumbai compared to other cities.
- *Econometric findings* also indicate that the perception of surge is significantly lower in both Indore and Jaipur, vis-à-vis the base category of Delhi. Further, the perception to surge in Mumbai is not significantly different from the reference category of Delhi. The above analysis points towards inter-city variation in perception towards surge as reported by riders.
- The above analysis points towards inter-city variation in perception towards surge as reported by riders. This points to diversity across cities, indicating the justification towards the richness of multi-city sampling.
- In relation to the sub-category of respondents, the homemaker and professional have lower perception towards paying surge compared to students. Young academicians have significantly larger ordered log odds ratio of perception towards paying higher surge, as indicated by their significant and positive ordered log odds ratio. In Jaipur, respondents from the business category exhibit higher perception towards the incidence of price surge, while in Indore, the same category exhibits a lower perception towards the incidence of higher prices. Homemakers in Mumbai and Indore as well as professionals in Indore have significant and negative ordered log odds ratio, reflecting lower perception towards the incidence of higher prices.

3.7. City-Specific Next Best Alternative Mode of Transport in Case of Surge

Table 7: City-specific next best alternative mode of transport in case of surge

Mode of Transport/City	**Delhi**	**Mumbai**	**Jaipur**	**Indore**
Surge by 10 percent				
Continue with app-based cabs	49.39	58.51	41.53	49.45
Own vehicle	18.37	10.43	27.27	21.82
Traditional taxi	4.29	4.89	7.23	6.35
Bus	1.22	8.09	7.44	4.97

Auto	8.16	12.77	13.22	12.98
Train/Metro	18.57	5.32	3.31	4.42
Surge by 40 percent				
Continue with app-based cabs	8.51	18.81	16.39	20.40
Own vehicle	27.66	18.14	40.55	29.02
Traditional taxi	6.17	11.28	10.08	14.94
Bus	4.26	10.18	12.39	8.05
Auto	16.81	27.21	17.65	24.43
Train/Metro	36.60	14.38	2.94	3.16

- *When cab prices are perceived to go up by 10 percent higher than normal, a very small percentage of respondents move to traditional taxis.* The next best option perceived by respondents is their 'own vehicles', which are generally not considered to be posing sufficient competitive constraints in the product substitutability analysis.
- *When cab prices are perceived to go up by 40 percent higher than normal*, riders across cities respond differently. While most riders in Delhi prefer train/metro as the next best alternate mode of transport, riders in Mumbai prefer using autos instead of cabs. However, in Tier II cities, use of own vehicles has been found to be the next best preferred alternative mode of transport.

3.8. Fare Comparison

Based on the statistical analysis, the findings indicate that riders who compare fares have a higher but non-significant perception of being charged a higher surge, except in Delhi and Jaipur, where the perception towards payment of higher surge was negative.

3.9. Algorithmic Pricing

Close to 70 percent of the respondents thought that fares by a cab service provider can be affected by the fares of other cab service providers. Additionally, a little over 60 percent of respondents were aware that fares for app-based cabs were calculated by computer software. However, when it came to being informed about how base fares were calculated, only a third

of the respondents answered in the affirmative. Also, close to 50 percent of the respondents were aware that it was possible for CAs to charge different prices from same riders. Further, on the basis of one-way ANOVA test, it can be concluded that the awareness of riders with respect to surge pricing and algorithmic pricing collusion in Tier I cities is significantly higher than the awareness of riders in Tier II cities on these aspects.

3.10. Factor Analysis, Path Analysis and SEM

Econometric tools were applied to evaluate riders' willingness to pay a surge based on the analysis of riders' perceptions towards several aspects related to the CA industry.[4] A total of 26 questions covered these aspects, wherein riders were asked to rate these statements on a scale of 1–5, where 1 represents strong disagreement, 2 represents moderate disagreement, 3 represents neutral, 4 represents moderate agreement and 5 represents strong agreement. Detailed analysis and observation are not reproduced herein for the sake of brevity. The major findings are provided below.

3.10.1. Major Findings of Path Analysis

- Path analysis represents the regression values between the variables. The study team carried out path analysis for all sampled cities. The results show that *drivers' behaviour*, *economic factors* and *convenience* have a significant impact on riders' acceptance towards surge prices. It is also evident that convenience is considered more significant in Delhi and Jaipur compared to other variables such as drivers' behaviour and economic factors. However, in Mumbai, drivers' behaviour is the most significant, while in Indore, economic factor is the most significant.
- The results further suggest that the variable *convenience* has the highest impact on riders' acceptance/perception toward surge pricing, followed by *drivers' behaviour* and *economic factors*. The findings show that convenience provided to riders by app-based cabs makes them less sensitive towards surge pricing adopted by CAs. It is evident from the analysis that the unavailability of alternate public transport is duly addressed through constructs such as *convenience* in Delhi and Jaipur, *drivers' behaviour* in Mumbai and *economic factors* in Indore. The difference in the cities may

[4] The index alpha (α) is evaluated by Cronbach's α coefficient. We have extracted factors pertaining to: convenience, driver behaviour and economic factors from items pertaining to statements from (a) to (o). Further, perception towards surge pricing and algorithmic collusion has been captured through items (p) to (z) of question number 21 of the questionnaire.

exist due to availability/non-availability of varied forms of public transport and their current status.

Table 8: City-specific findings of path analysis

	Delhi	Mumbai	Jaipur	Indore
Surge convenience	0.287***	0.11***	0.835***	0.030
Surge driver's behaviour	0.213***	0.43	0.537**	0.012
Surge economical	0.107*	0.20	0.370*	0.079

Source: Estimates based on survey data collected.

Notes: *, **, *** represent significance level of 10%, 5%, and 1%

3.11. Conclusion and Implications

The pooled as well as city-specific results of the analysis indicates that perception towards surge pricing by CAs varies across cities. In case their perception is justified, CAs' differential pricing policies across Tier I and Tier II cities may be on account of factors such as city-specific availability of alternate modes of travel and general awareness of riders towards pricing policies adopted by CAs. The results based on path analysis indicate that, despite app-based cabs being expensive at times, people pay a perceived 'surge' keeping in view aspects such as 'convenience' and 'driver's behaviour'.

Findings based on rider survey

- Perception towards paying higher surge is more for those who take greater number of rides in the pooled sample.
- No conclusive pattern has been found for perception towards surge pricing and the distance travelled by the respondents.
- No substantial difference between type of ride and perception towards surge (though for each category of surge, respondents using 'go-together' services perceive being charged surge most often).
- Percentage of riders having a perception of being charged surge pricing is more in case of digital mode of payment than the conventional payment method, i.e., cash.
- The more frequently a rider uses a particular route, greater is the perception of being charged a higher surge.

- Inter-city variation in perception towards surge was observed by riders.
- Based on respondents' occupational sub-category, no clear trends emerged.
- Riders who compare fares have higher perception of being charged a surge in Mumbai and Indore.
- Awareness of riders with respect to surge pricing in Tier I cities is significantly higher than awareness of riders in Tier II cities on these aspects.
- *Drivers' behaviour*, *economic factors* and *convenience* have a significant impact on riders' acceptance/perception toward surge prices, but inter-city variation exists vis-à-vis the priority cited by riders amongst these factors [i.e., convenience in Delhi and Jaipur, *drivers' behaviour* in Mumbai and *economic factors* in Indore].

Section IV: Driver-Based Findings on Surge Pricing

Examining drivers' perception towards surge pricing, differential pricing and their insights regarding complex algorithms used for fare computation was found to be relevant to grasp the functioning and policy making of CAs. This section presents the results of analysed data collected by the study team from drivers in the four sample cities of Delhi and Mumbai (Tier-I) and Jaipur and Indore (Tier-II). The main findings are as under:

4.1. Drivers' driving pattern and earning during the ride

A majority of drivers in both Tier I and Tier II cities drive all days of the week as well as weekends (except for Delhi). In Delhi, most drivers drive on all days of the week, followed by other drivers driving randomly on selected days. The largest proportion of drivers in all cities preferred driving in the mornings, followed by the afternoon. Jaipur had the largest number of respondent drivers who were flexible about their driving hours (28 percent). Moreover, most drivers reported making 10–15 trips in a day on weekdays in all cities. The second largest category was of drivers making more than 15 trips in Mumbai and Jaipur and of less than 10 trips in Delhi and Indore. On weekends, a majority of respondent drivers in Delhi and Jaipur informed that they made less than 10 trips. Interestingly, in Mumbai, the majority reported making more than 15 trips on weekends. The majority of drivers in Indore reported that they made 10–15 trips on both weekdays and weekends. In addition to this, the non-statistical analysis also revealed that drivers in Delhi (59 percent), Jaipur (40 percent) and Indore (50 percent) reported that their average daily earnings without incentives were less than

₹1,500/-. In Mumbai, the majority of drivers (45 percent) reported that they earned ₹2,000/- to ₹3,000/- per day on an average without any incentives. An overwhelming number of driver respondents from all the cities informed that the number of times they receive incentives from the CA is less than 10 per month. Results also indicate that, in the pooled sample, the incomes of 56 percent of the drivers had increased post working with the CAs. However, city-wise results are mixed. For instance, in Delhi and Jaipur, a larger proportion of respondents informed that their incomes had not increased post joining app-based CA platforms. However, in Mumbai and Indore, more driver respondents (61 percent and 74 percent, respectively) stated that their incomes had increased post joining the app-based cab services.

4.2. Drivers' Responses on Declining Ride Requests

Table 9: Drivers' responses on declining ride requests

Reason	**Delhi (%)**	**Mumbai (%)**	**Jaipur (%)**	**Indore (%)**
I have already earned my earnings from the day	6	17	11	31
The route is not suitable to me	67	63	58	33
Fares are not acceptable to me for that ride	21	11	29	26
There are chances of traffic jam on the route	6	9	2	10

The results from the analysis indicates that in both Tier I and Tier II cities, the major reason for drivers declining the ride request is that the route is not suitable to them. The next most frequent reason for drivers in Delhi, Jaipur and Mumbai to decline a ride is that fares are not acceptable to them for that ride. However, in Indore, the second most common reason provided by drivers to reject rides is that they already earned for the day.

4.3. Surge Price Incentivizes Drivers to Increase Supply of their Services

Drivers were asked to respond to whether surge price incentivizes them under certain specific circumstances. The results can be found in the table below..

Table 10: Surge price incentivizes drivers to increase supply of their services

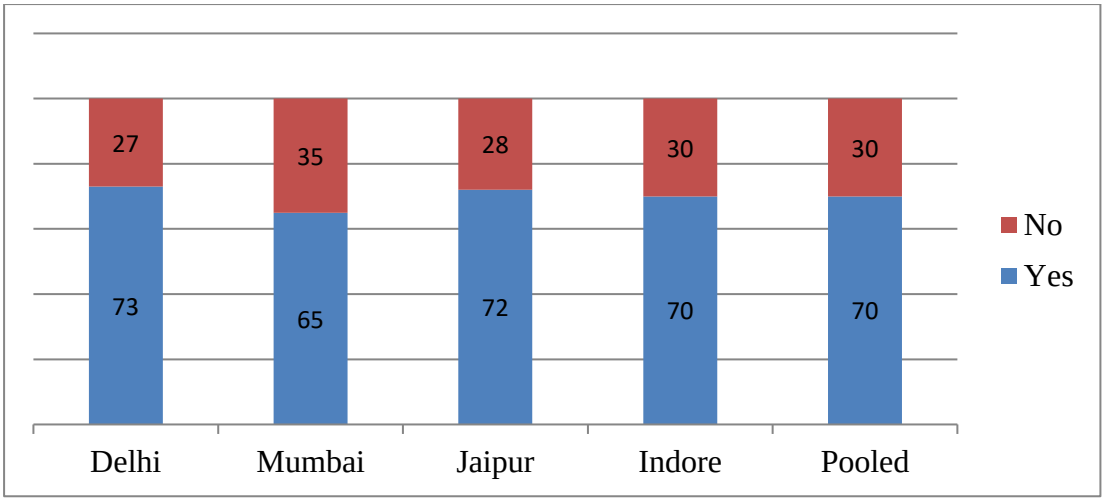
	Delhi (in numbers)	Mumbai (in numbers)	Jaipur (in numbers)	Indore (in numbers)
Weather is not good	41	44	44	49
It is leisure time	36	40	41	43
When there are family commitments	28	29	38	27
It is late night	16	21	14	35
Target income already earned	19	27	15	33

The findings indicate that surge does induce drivers to supply more of their services, especially when the surge is during bad weather; when drivers are enjoying free/leisure time; and when they would otherwise have attended to family commitments. However, findings also reveal that surge prices are less effective in inducing drivers to supply their services when it is late night or when the target income for the day has been achieved.

During informal interaction with drivers, it was found that even higher surges being offered to drivers was not an incentive if the geographical area was 6 to 7 kilometres away, as it would lead to idle traveling (increased dead kms). Resultantly, the expenses incurred while going to the surge area practically negated the associated benefits of surge. Hence, the drivers preferred not to travel to the surge area. This stance was reinforced if heavy traffic was anticipated on the route. The drivers also felt that there was a probability that surge prices may disappear by the time they reached the location.

4.4. Perception Regarding Possibility of Differential Pricing by CAs

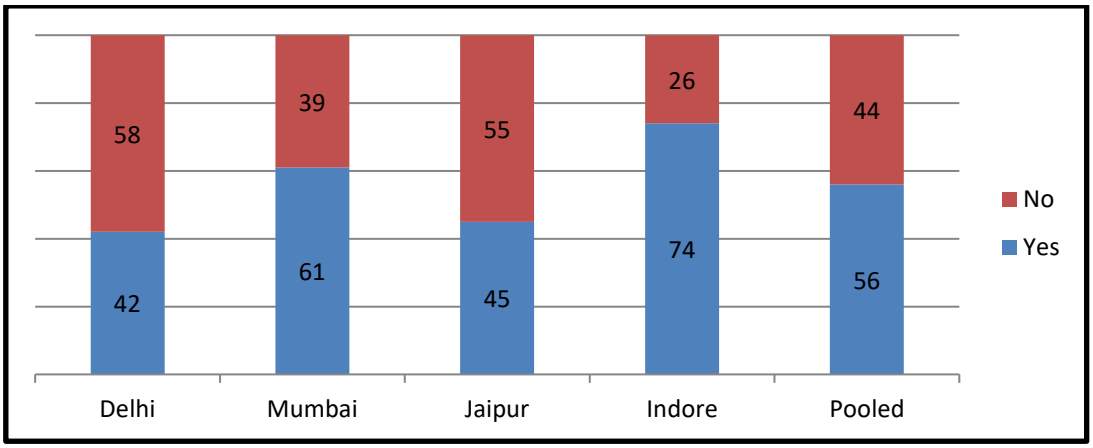
Figure 2: Perception regarding possibility of differential pricing by CAs



Regarding perception of drivers on whether app-based cabs can charge different prices from different riders for the same services, about 70 percent of the drivers responded in the affirmative. City-wise, this was the highest for Delhi, at 73 percent, and the least for Mumbai at 65 percent. Based on interactions with the drivers, it was also perceived by the rider that when they pay for the ride through an online payment method, i.e., by credit/debit card or e-wallet, there is a discrepancy between the fares shown on the drivers' app and those shown on the riders' app.

4.5. Drivers' Observations on their Earnings Post Joining CAs and Profitability of Trips

Figure 3: ***Drivers' responses regarding increase in income after joining CAs (in percent)***



Results indicate that, in the pooled sample, the incomes of 56 percent of the drivers had increased post working with the CAs. However, city-wise results are mixed. For instance, in Delhi and Jaipur, a larger proportion of respondents informed that their incomes had not increased post joining app-based CA platforms. However, in Mumbai and Indore, more driver respondents (61 percent and 74 percent, respectively) stated that their incomes had increased

post joining the app-based cab services.

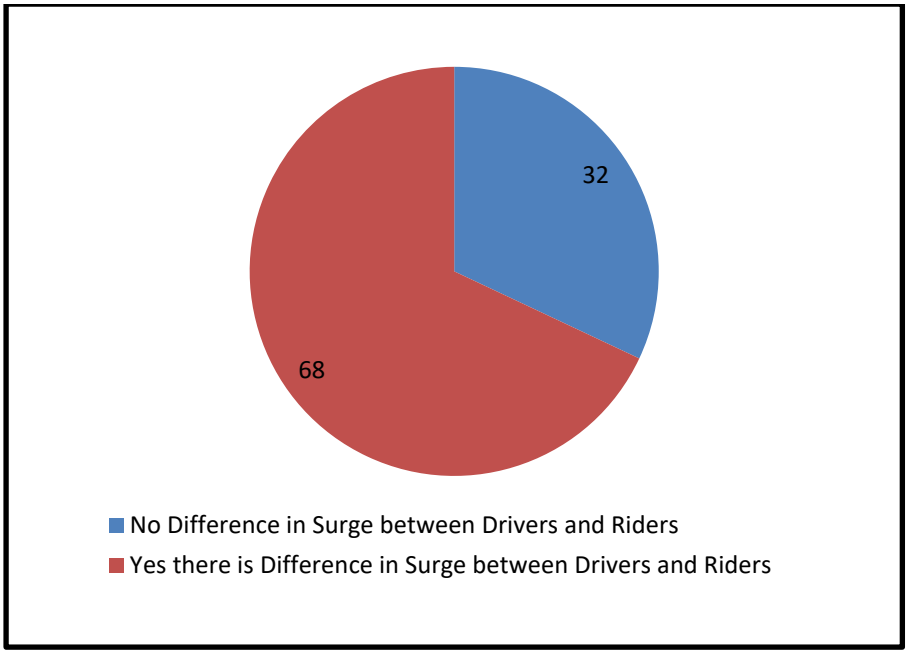
On being asked if all trips were profitable, it was informed that not all trips are profitable, indicating, amongst others, the following two possibilities emerging from the inputs received from the drivers during the survey: *First*, CAs may be keeping a substantially higher proportion of the fare charged from the rider as their commission; and *second*, the price charged from the rider may be low, indicating penetration pricing to capture markets.

Through informal interactions, it was also learned that, initially, when the CAs had entered the Indian taxi market, they encouraged drivers to join their digital platforms by offering substantial incentives, besides offering a share in ride income. Enthused, the drivers started buying their own vehicles. However, over time, there has been a sharp decline in such incentives. In fact, drivers who were earlier earning incomes as high as ₹1 lakh per month reported a sharp decline. Further, the target rides which the drivers have to complete in order to gain incentives has also increased over the years. While initially, the cab drivers were offered incentives on completing 40 rides in a week, they now have to complete 50–60 rides in a week for the incentive. Sometimes, drivers are not even able to earn enough to pay interest obligations on loans taken for the purchase of vehicles. Several banks have reportedly addressed this issue by not sanctioning further loans to buy vehicles.

The drivers were also asked whether all the trips undertaken in a day are profitable. All reported that not all trips are profitable. Rather, some of these are also at a loss. Given that the drivers are price takers, they sometimes have to accept non-profitable trips. Further, the drivers cannot act freely while accepting or rejecting a trip, since no information is shared with them regarding the trip's destination. Hence, even if drivers are aware of a specific event or traffic congestion on a particular route, they cannot reject the trip without first accepting the ride. Furthermore, cancellation of trips more than a pre-specified number of times can lead to permanent blocking of the driver's account.

4.6. Perception Regarding Information Asymmetry

Figure 4: Perception of drivers toward surge shown to riders and drivers being different



From the analysis, it was derived that 32 percent drivers perceive that there is no difference in surge being shown to drivers and riders. However, 68 percent drivers perceive that there is a difference in surge between drivers and riders. In several cases, it was also observed that information asymmetries between CAs, drivers and riders existed. Some of these are as follows:

- Trip destination: Even if drivers are aware of traffic congestion on a particular route, they cannot reject the trip without first accepting the ride, since no information is shared with them regarding the trip's destination. Furthermore, cancellation of trips more than a pre-specified number of times can lead to permanent blocking of the driver's account.
- Knowledge of cancellation price: When drivers were asked if they possess knowledge of how much fee the CAs charge from a rider when he cancels the ride, 77 percent of the drivers responded in the affirmative. The highest awareness was in Jaipur, with 84 percent of drivers knowing the cancellation charges.
- When asked if there is a possibility that different prices are being charged from different riders for the same services, 69 percent of the drivers replied in the affirmative.
- Calculation of base fares: Most of the drivers across cities remain unaware of how base fares are calculated. This proportion of drivers' ignorance was as high as 80 percent for Delhi drivers and 75 percent for Mumbai drivers. However, 70.5 percent of the total drivers across the cities of Delhi, Mumbai, Jaipur and Indore were aware that

computers, based on algorithms, calculate fares for app-based cabs.

- There is a perception regarding discrepancy in fares between what is shown on the drivers' and riders' apps. This difference is perceived to be highest for rides in which non-cash payment methods are used, i.e., when riders pay for their rides using debit/credit cards/wallet money.
- Commissions charged from drivers are not symmetric, even when drivers belong to the same city. Drivers stated that, despite stating 25 percent as commission charges, app-based CAs sometimes charged more than 30 percent.[5] In addition, it was informed that when the rider makes payment by cash, the percentage of CA's commission is largely uniform, but when a payment is made using the online mode, drivers often remain unaware of the platform's commission. This has been found to be the primary reason for drivers' preference for cash over online payment methods.
- During the survey, the drivers said that, several times, riders might get a ride on a price which is 'higher than normal', but the ride is shown as a normal price ride to drivers.
- It was also reported by drivers that it is quite common that they are often led to a location where the app shows a surge in place, but they do not get surged rides even when they are available in a surged area. Drivers also shared their perception that the online aggregators offer most of the surged rides to drivers who drive cabs owned by the CAs. This reflects how algorithms might be at play while disseminating rides to drivers.
- When asked about whether they think that fares for one cab service can be affected by the fares for other cab services, 66% of them reverted in the affirmative.

4.7. Perception of Drivers for Surge

Drivers who drive on all days are more likely to have the perception of similar surge prices for drivers and riders compared to the base category of weekday drivers. Additionally, drivers who have knowledge about algorithms used by CAs have a significant perception that drivers and riders face similar surge prices. However, compared to drivers who drive in the morning, drivers with flexible driving hours have a lower perception of similar surge prices for drivers and riders. Further analysis revealed drivers' perceptions regarding the similarity/difference in surge being charged to riders and the surge shown to the drivers, that is summed up below.:

- There is no significant difference among cities regarding drivers' perceptions about

[5] This is based on informal interaction with the drivers.

surge being the same for riders and drivers all the time. Drivers in Mumbai versus those in Delhi have a lower perception of the surge for drivers and riders being the same.

- Econometric analysis shows that drivers' perceptions about the difference in the surge being charged from riders and paid to drivers does not significantly change with the number of rides taken by such driver. However, when the perception of drivers who are taking 10–15 rides is compared with drivers who are taking more than 15 rides, it shows that drivers in the former category have a lower perception for the same surge being charged from both drivers and riders.
- Drivers who drive on all days are more likely to have the perception of similar surge prices for drivers and riders compared to drivers who drive on weekdays only. Drivers who drive on random days and those who drive on weekends have the opposite perceptions. This reflects that drivers driving during weekends have a higher perception that the price surges offered to drivers and those charged from riders differ, while drivers who drive on random days have a lower perception of differential price surge between riders and drivers compared to the base category.
- Compared to morning drivers, the ones with flexible driving hours have a lower perception regarding similar surge prices for drivers and riders. However, drivers who drive in the afternoon and night have a higher (though non-significant) perception regarding similar surge prices for drivers and riders.
- Drivers who are aware of prices being determined through algorithms used by CAs have a stronger significant belief that drivers and riders face similar surge prices.

Findings from the drivers' survey:

- The major reason for drivers declining a ride request is that the route is not suitable to them.
- Surge does induce drivers to supply more of their services, especially when surge is during bad weather; however, surge prices are less effective in inducing drivers to supply their services when it is late night or when target income for the day has already been achieved.
- Drivers perceived that CAs can charge different prices from different riders for the

same service.

- Drivers perceived that their income had increased post working with the CAs. However, all trips are not profitable.
- Most drivers across the cities remain unaware of how base fares are calculated.
- Drivers who are aware of prices being determined through algorithms used by CAs have a stronger significant belief that drivers and riders face similar surge prices.
- Drivers (even those who work for both cab aggregators) perceive that there is a difference in surge being shown to drivers and riders.
- Drivers who drive on all days are more likely to have a perception of similar surge prices for drivers and riders compared to drivers who drive on weekdays only. However, drivers who take rides on flexible hours have a perception that similar surge is not charged for drivers and riders.
- Number of rides does not change drivers' perceptions about the difference in the surge being charged from riders and that paid to drivers.

4.9. Conclusion

Findings from the drivers' survey in four cities reveal that, for the majority of cab drivers, the emergence of CAs has led to an increase in their incomes as well as increase in the number of working hours. However, the incentive structure as provided by surge pricing is not transparent. In addition, the commission percentage is not declared or defined. There is, in fact, suspicion on the part of the cab drivers regarding the proportion of commission, especially in cases where riders pay through modes other than cash. Furthermore, several drivers also remained unaware of the calculation of 'base fares'. It is thus important to provide greater transparency in terms of fare calculation. Findings do indicate that a surge induces drivers to supply more of their services, especially when the surge is during bad weather; when drivers are enjoying free/leisure time; and when they otherwise would have attended to family commitments**.** However, 68% drivers perceive that there is a difference in the surge charged to the riders and that offered to the driver, indicating information asymmetries between CAs, drivers and riders as regards the surge multiplier/component. Based on the logit model analysis, findings reveal that the factors which significantly influence drivers' perception regarding surge differential (as shown to riders and drivers) include parameters such as the time of day that the drivers provide cab rides; days of the week when the driver provides rides; as well as drivers'

knowledge regarding algorithmic use for fare determination.

Section V: Controlled Experiment

A controlled experiment was conducted at Shri Ram College of Commerce (SRCC), University of Delhi, on 5th November 2019, with a sample of 68 respondents (with the same original location, time and destination) to derive basic inferences about the pricing pattern of two major Indian CAs, CA1 and CA2.

5.1. Objectives

(i) To analyze the pricing behavior of CAs

(ii) To assess the existence of personalised pricing

5.2. Methodology

(i) 68 respondents were segregated into four groups with both CA1 and CA2 apps installed on their phones:

   a) Group 1 (CA1 Go-together ride)
   b) Group 2 (CA2 Go-together ride)
   c) Group 3 (CA1 Cost-effective ride)
   d) Group 4 (CA2 Cost-effective ride)

(ii) Data was collected over six rounds. The first round (trial) of the controlled experiment was undertaken with ten initial subjects (respondents). Subsequently, erratic exogenous demand shocks were provided after 5 minutes in each additional round added after 5 minutes of the preceding controlled experiment round (viz., rounds two, three, four, five and six, respectively). Eventually, in the final, sixth round, all four groups proceeded to book their respective rides.

(iii) Period: During the odd-even scheme, when CAs had categorically declared to not impose dynamic pricing till operation of the scheme.

5.3. Parameters Used in Controlled Experiment

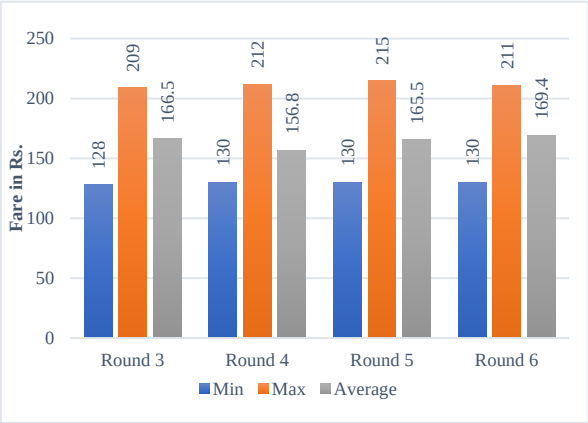
1. Frequency distribution of subjects based on operating system and gender
2. Actual cab fare analysis at a point of time
3. Actual cab fare analysis over a period of time
4. Base fare analysis
5. Rider rating and cab fares

6. App-switching and cab fare analysis

5.4. Findings Based on Controlled Experiment

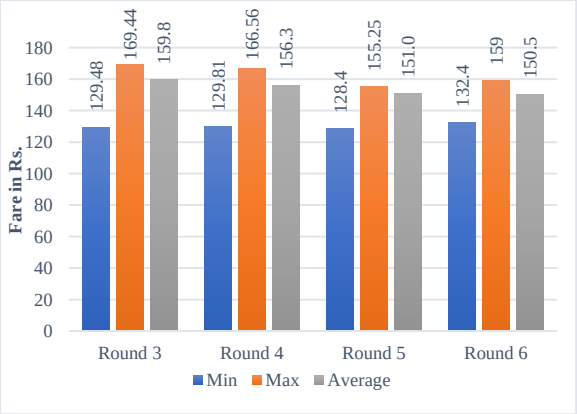
5.4.1. Did Prices Surge?

Figure 5: Comparison of fares over time: CA1 users



Source: Based on data collected during controlled experiment

Figure 6: Comparison of fares over time: CA2 users



Source: Based on data collected during controlled experiment

Based on Figures 5 and 6, the following findings emerge pertaining to price variations over time across CA types:

- The minimum fare charged to users of CA1 remains stable over time with the addition of subjects, while the maximum fare charged is different. With increase in subjects from Round 3 to Round 6, symbolizing added demand at each time point, the average fare

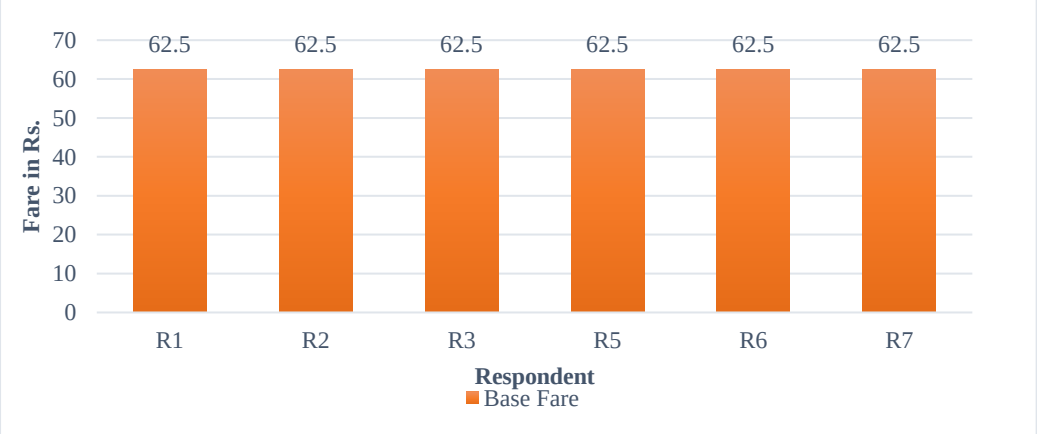
charged does not remain constant.

- For CA2 users, minimum fare charged across the rounds varies with the influx of demand (i.e., Round 6 with exogenous shock of all 68 subjects). Strikingly, the maximum fare charged declines over time. A similar trend is followed in the average fare charged across different CA2 users over time. For instance, the average fare charged in Round 6 (of ₹150.5) is almost ₹9 less than Round 3.

Based on the above analysis, the study team found that the prices increased in successive rounds. With the increase in the demand of rides with similar destinations in the subsequent rounds of the experiment, there was an increase in the prices charged by the cab aggregators. With increase in demand, CA1 kept the minimum price the same, but there was increase in the average price and maximum price charged by CA1. However, with the increase in demand with every round, CA2 increased the minimum fare to match the high demand level, but the changes in the maximum and average price with the increase in demand was not uniform.

5.4.2. Does Personalized Pricing Exist

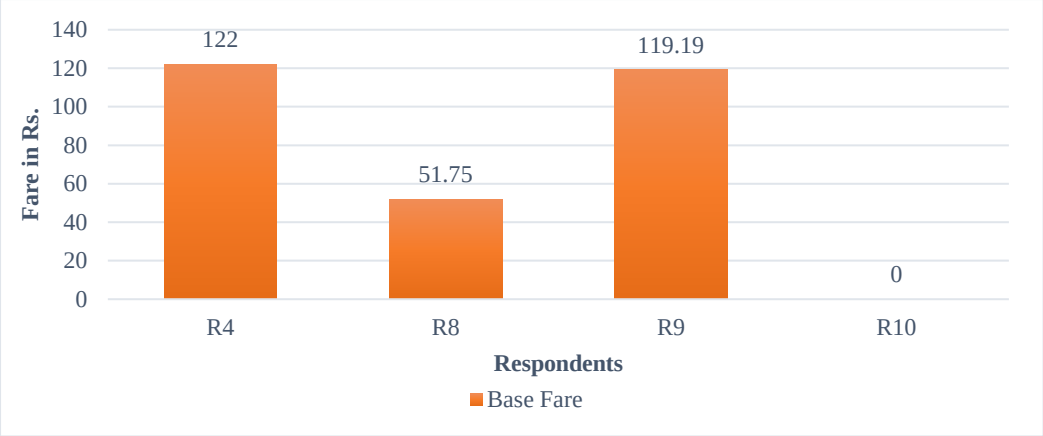
Figure 7: Base fare (in ₹) for respondents using CA2



Note: R1, R2 and R3 are CA2 Cost-effective riders and R5, R6 and R7 are CA2 Go-together riders

***S**ource: Based on data collected during controlled experiment*

Figure 8: Base fare (in ₹) for respondents using CA1

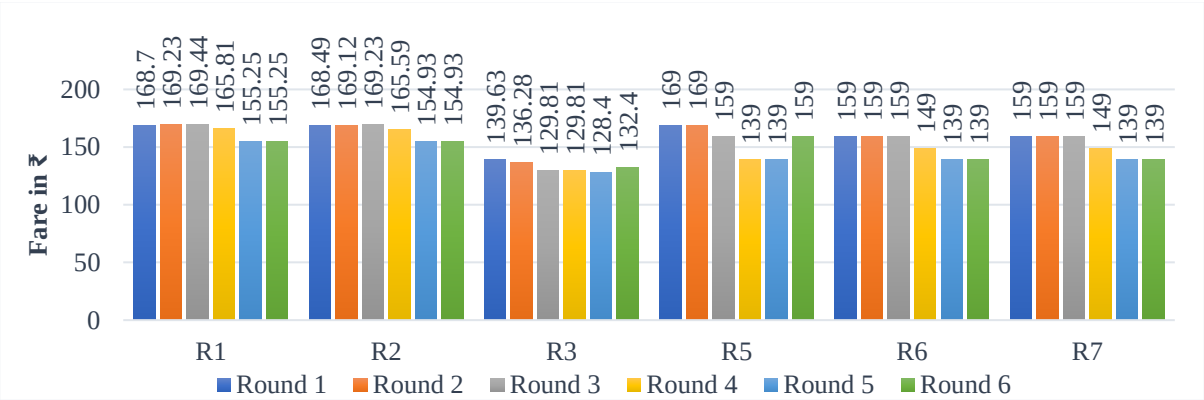


Note: R8 and R10 are CA1 Cost-effective riders and R4 and R9 are CA1 Go-together riders.

**0 indicates missing value arising due to technical error faced by the respondent.*

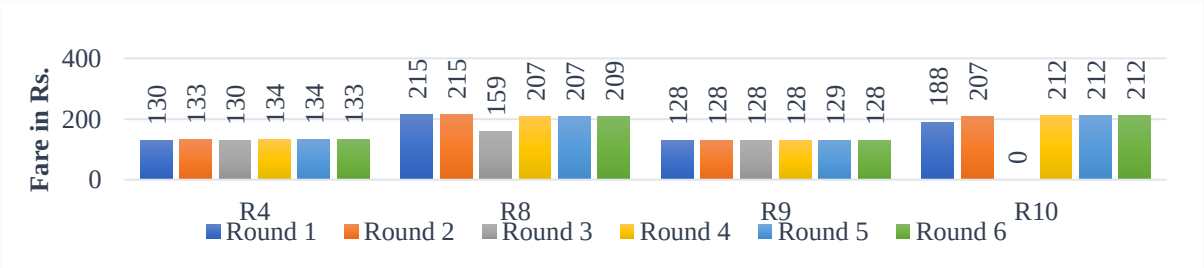
Source: Based on data collected during controlled experiment

Figure 9: Trends in actual fare variations across different rounds: CA2 riders



Note: R1, R2 and R3 are CA2 Cost-effective riders and R5, R6 and R7 are CA2 Go-together riders.

Figure 10: Trends in actual fare variations across different rounds: CA1 riders



Note: R8 and R10 are CA1 Cost-effective riders and R4 and R9 are CA1 Go-together riders.

In Figures 7 and 8, the base prices charged for Cost-effective riders and Go-together riders has been compared. Figure 7 indicates that CA2 charges a similar base price from both types of riders, whereas Figure 8 denotes that CA1 charges different base prices from Cost-effective

riders and Go-together riders. Moreover, it also shows that CA1 also charges distinct base fares from all Go-together riders.

Figures 9 and 10 show the difference in fares charged for cost-effective rides and go-together rides by CA2 and CA1, respectively. CA2 and CA1 both charge different fares from cost-effective riders and go-together riders. However, CA2 also charges varied fares in each round from both types of riders. The analysis also shows that fares vary across rounds for a particular individual (based on demand and supply dynamics) as well as for different individuals in a particular round (personalized pricing). However, the variations are not substantial for Economy and Share riders. For Respondent 9 (a primary CA1 Share rider), the cab fares remained constant for all six rounds.

Since prices varied across riders despite booking a cab at the same location and time and for the same destination, it indicates that personalized pricing exists. Additionally, there was a difference in prices across as well as between Cost-effective riders and Go-together riders of CA1 and CA2.

Further, an analysis of price variations (interquartile range) across CA1 and CA2 for Share and Economy rides in Round 6 (incorporating the entire sample of subjects, i.e., 68 respondents) suggests that, though the variation within different aggregators is low, the average price is higher for CA1 Economy compared to all other types of rides. Median prices showed larger variations within CA1 compared to CA2. A deviation of almost ₹80 was evident within CA1 for Shared and Economy rides compared to CA2, where the deviation was less than ₹10. Irrespective of the aggregator, Economy rides saw wider price deviations across respondents than the Shared ride service, which was visible through the presence of outliers.

An analysis was also undertaken to assess the correlation between rider ratings and cab fares, based on Round 6 (Table 6.3). Round 6 was taken into consideration as it incorporated the entire sample of subjects (68 respondents). Our findings suggest that, across all four groups, CA1 Economy (- 0.37), CA1 Share (-0.32), CA2 Economy (-0.03) and CA2 Share (-0.11), there exists a negative correlation between price and rider rating. However, the strength of the relationship is stronger in case of CA1 compared to CA2. The finding adds to the idea of the existence of personalized pricing, as rider rating is individual specific.

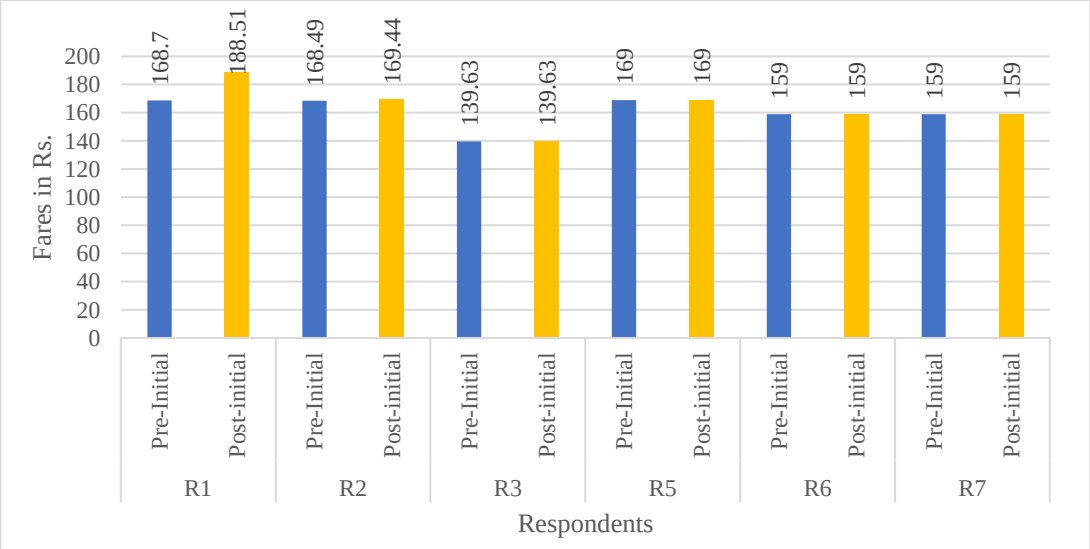
Table 11: Correlation between rider ratings and prices across CA1 and CA2

CA1 Share		
	Price	*Rider Rating*
Price	1	
Rider Rating	-0.32481	1
CA1 Economy		
	Price	*Rider Rating*
Price	1	
Rider Rating	-0.37251	1

CA2 Share		
	Price	*Rider Rating*
Price	1	
Rider Rating	-0.10963	1
CA2 Economy		
	Price	*Rider Rating*
Price	1	
Rider Rating	-0.02955	1

5.4.3. Are CAs' pricing strategies inter-dependent/collusive

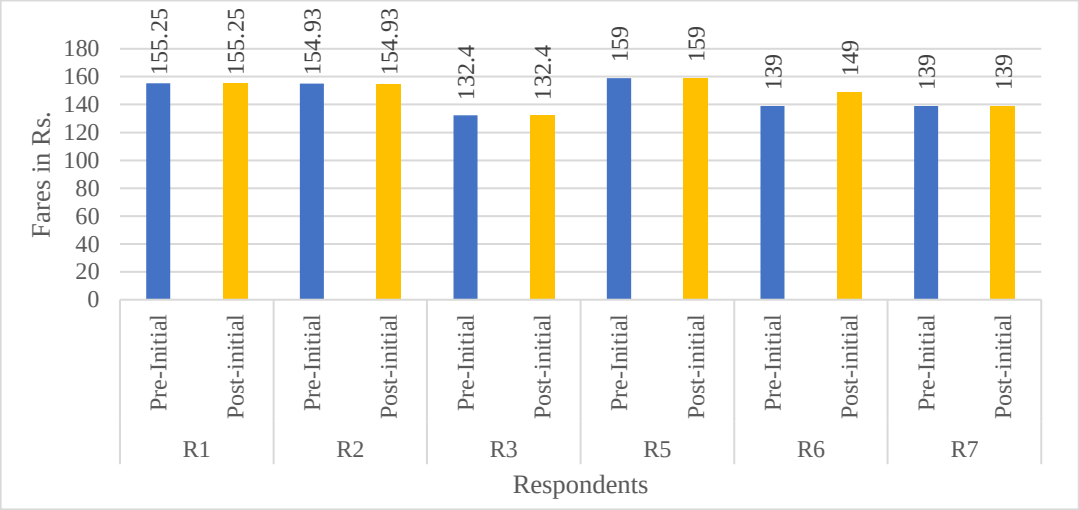
Figure 11: Impact of app-switching on fares: Round 1 (CA2)



Note: R1, R2 and R3 are CA2 Cost-effective riders and R5, R6 and R7 are CA2 Go-together riders.

Source: Based on data collected during controlled experiment.

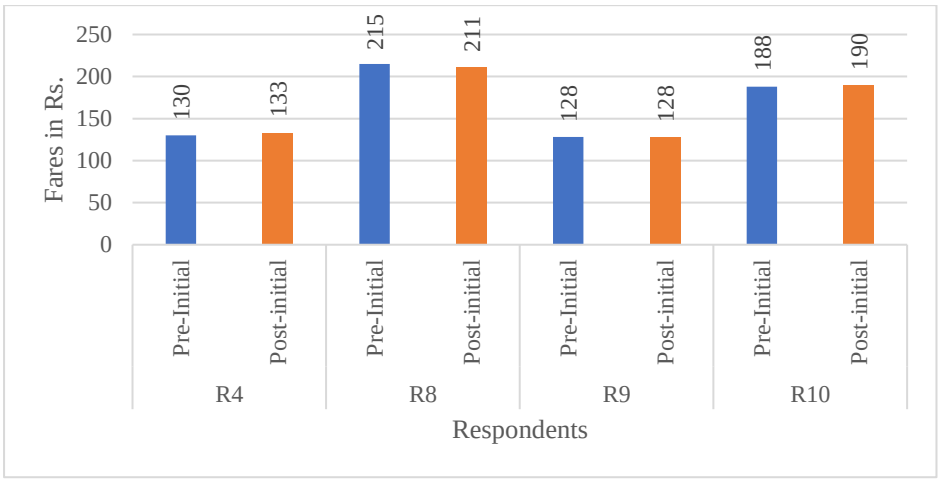
Figure 12: Impact of app-switching on fares: Round 6 (CA2)



Note: R1, R2 and R3 are CA2 Cost-effective riders and R5, R6 and R7 are CA2 Go-together riders

Source: Based upon data collected during controlled experiment

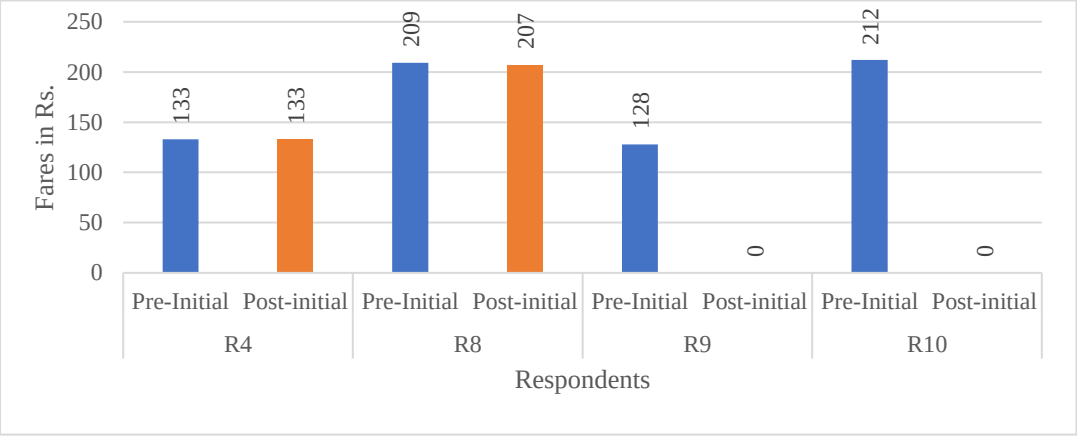
Figure 13: Impact of app-switching on fares: Round 1 (CA1)



Note: R8 and R10 are CA1 Cost-effective riders and R4 and R9 are CA1 Go-together riders

Source: Based on data collected during controlled experiment

Figure 14: Impact of app-switching on fares: Round 6 (CA1)



Note: R8 and R10 are CA1 Cost-effective riders and R4 and R9 are CA1 Go-together riders.

**0 means missing value, arising due to technical error faced by the respondent.*

Source: Based on data collected during controlled experiment.

App-switching allows for fare comparison across platforms and is indicative of a more informed rider. For the purpose of the controlled experiment, each subject had both CA1 and CA2 apps installed on their mobile phones, although each of them was the primary user of only one of the apps. For instance, in Round 1, out of the ten subjects, CA2 was the primary app for six users, while the remaining used CA1 as their primary (initial) app.

During each round of the experiment, subjects had to first check the fare on their primary app, then switch to the alternate app, then revert to their primary app to check if fare comparison with another platform made any difference to their primary app fare. Here, we discuss the impact of app-switching on fare for ten respondents (part of all the experiment rounds) for Round 1 (initial demand) and Round 6 (exogenous demand shocks given by increasing the number of subjects). Comparative data is presented in Figures 11 through 14. Key observations that emerge from the data collected are:

i. In the case of CA2, both in Round 1 and 6 (refer Figure 11 and 12), app-switching did not have any impact on the fares of CA2 Share riders. However, for CA2 Economy riders, fares either increased or remained the same post comparison of fare on the alternative app in Round 1 (initial demand), while in Round 6 (exogenous demand shock), app-switching did not have an impact on cab fares for the same set of subjects. This indicates that cab fares have an element of personalized pricing but also depend on the demand-supply dynamics of the market.
ii. With respect to CA1 (Figures 13 and 14), nothing conclusive can be inferred with regard to the impact of app-switching on cab fares since prices barely change.

In the study, any indication on pricing strategies being inter-dependent amongst CAs is not necessarily observed.

Findings based on controlled experiment:

- Prices were not uniform across riders in a particular round and across rounds. Personalized pricing exists.
- There was a difference in prices across as well as between Cost-effective riders and Go-together riders of CA1 and CA2.

Section VI: Stakeholder Consultation

Stakeholder consultation was carried out to (i) understand, from the perspective of traditional taxi operators and their union members, how the advent of CAs has changed the fundamentals of traditional taxi operations; (ii) comprehend the issues of surge pricing and transparency of algorithms by seeking the opinions of select industry professionals, including big data experts; (iii) understand the rationale for the introduction of the Motor Vehicle Aggregator Guidelines 2020 from the Ministry of Road Transport and Highways and understand the perspective of the Central and State Transport Authorities on associated issues of surge pricing, implementation of the Guidelines by the states and level playing field between traditional taxi industry players and CAs; and (iv) present the perspective and business practices of CAs primarily with respect to fare calculation, surge pricing, personalized pricing, use of algorithms and various facets of transparency.

Opinion of Traditional Taxi Operators and their Union Members

- ***Views regarding level playing field for traditional taxis and CAs in India***: Traditional taxi drivers and their union leaders are of the opinion that level playing field does not exist between services provided by traditional taxis and CAs. Easy accessibility to hire a cab through CAs gives them an unambiguous advantage that traditional taxis find difficult to compete with.

- ***Views on surge pricing***: Traditional taxi operators believe that CAs tend to exploit riders as there is no information about reasons for charging a surge. In fact, traditional taxi drivers are often unable to find normal rides at the same time that drivers working with CAs get surged rides. Union leaders also believe that CAs employ surge pricing and charge riders exorbitant prices without any substantial basis.

- ***Views on earnings of traditional taxi operators***: Traditional taxi operators believe that their incomes have been adversely impacted due to competition from CAs. Traditional

taxi operators believe that their earnings have fallen substantially, so much so that no new driver is willing to join traditional taxi services.

- ***Views on strategies that can enable the traditional taxi sector to combat competition***: Government support in the form of relaxation in licensing norms and some government sponsored agency acting as an aggregator on behalf of the traditional taxi operators are strategies suggested by traditional taxi operators and their union leaders for revitalizing the traditional taxi sector.

- ***Miscellaneous***: Traditional taxi operators and union leaders believe that there is collusion between CAs. Union leaders also report that CAs are currently operating at a loss and continue to offer deals and discounts to riders. They are funded by foreign capital and, as per newspaper reports, both CAs have common shareholders, facilitating collusion. CAs are trying to dominate the Indian market, similar to what has happened worldwide.

Opinions of Corporate Professionals and Big Data Experts

- ***View on surge pricing/personalized pricing strategies adopted by CAs***: They are of the view that there is manipulation/faulty projection of demand-supply situation, where drivers can develop artificial scarcity by switching off the application and users can try the app and check the availability at any given time, even without intention to actually travel at that point in time. Moreover, they were also of the view that CAs have succeeded in effectively eliminating similar businesses across several cities and certain locations within a city (say airport pick-up points). Notwithstanding the fact that such popularity is on account of the public's preference for travel by taxis operated by CAs, there is a possibility of exploitation. Corporate professionals also report that CAs often have arbitrary policies on payment to cab drivers and the daily/weekly targets which the drivers have to meet. Sometimes, payments made online are delayed and the targets set may be too high to achieve. They also reported that surge pricing is not necessarily bad. However, the environment in which CAs operate should be transparent and enable competition. In addition, there is an apparent lack of mechanism to address consumer complaints regarding practices such as revised updated pricing at the end of the cab ride without any justifiable explanation, which is detrimental to the consumer's interests. It is important to promote conditions that encourage a level playing field in the industry

and design pricing practices that are transparent keeping in mind the interest of all stakeholders. Based on this, they suggested that a price band based on factors such as 'distance to be travelled' may be introduced. However, it should not be based on factors such as 'geographical area' or 'timings of the day'. The regulatory authorities may revise the price band on a regular basis, say quarterly. Prices may vary within the price band, based on dynamic demand-supply conditions prevalent during the day.

- ***View on algorithms and their transparency***: According to industry experts, lack of transparency, withholding information on pricing algorithms by the CAs breeds mistrust amongst the riders as well as the cab drivers. In the present age of information and technology, though riders respect organizations that are transparent and ethical in their business practices, somehow, organizations (including CAs) have shied from the idea of transparency. As such, pricing strategies adopted by CAs appear to be a 'Black Box' for most stakeholders. Another grey area pertains to the lack of information on what passengers pay and drivers receive. This kind of asymmetric information has also been a major concern for cab drivers. According to industry experts, appropriate measures should therefore be adopted to ensure transparency. Additionally, they recommended that, based on rider and driver feedback, modifications in the pricing strategy should be encouraged. Further, it needs to be ensured that CAs do not take advantage of pricing based on locations (such as airport, bus stands and offices) or the 'kind/type' of users.
- ***View on big data analytics adopted by CAs***: With the advancement of technology and mobile phone devices, data relevant to rides and riders has seen an upsurge during the last few years. CAs have seized the opportunity to turn big data into a successful business venture using analytical tools in the back-end and a smartphone app for interface services in the front-end. Resultantly, data captured by CAs regarding usage pattern may be exploited for manipulating pricing through built-in algorithms. For instance, if the timing when a rider needs the service is known in advance and the potential monetary value of the ride is also known in advance (in this case the origin and destination), the CAs may adopt a pricing strategy which maximizes the monetary value of the trip and ignore pricing parameters such as demand and supply. Also, industry experts reported that a major concern is the safety of data collected, which includes not just personal details about GPS location, but information pertaining to the use of financial instruments as well (cash/card). Industry experts also expressed that the

users need to be made aware of the probability that their data may be used for alternate purposes as well, sometimes with added financial benefit to the CAs. They also articulated that the CAs should be asked to mandatorily conduct IT safety audits on a quarterly basis to be able to operate in this market. CAs should also be counselled to only engage in ethical practices and not resort to unlawful practices to gain traction.

Response of Cab Aggregators (CAs)

Some key insights about the actual business practices of the CAs that were shared during stakeholder consultation are as follows:

- ***Base Fare calculation***

  According to one of the CAs, the base fare is a flat fee charged on every ride. It is calculated on the basis of an estimation of distance travelled by the driver to reach a pickup location (generally referred to as dry run distance), actual drop location, component for pre-waiting time, etc. Therefore (dry run fare + wait time minutes x wait time charge + commission percentage), gives an estimated base fare. Base fare may be different from one city to another and may also vary based on current fuel prices, general cost inflation, etc. Further, the CA states that they do have a self-imposed price ceiling that keeps getting updated from time to time, based on changing economic conditions (increase in fuel prices, living costs, etc.). However, according to the other CA, base fare is a fixed component of the applicable fare in addition to the components applicable on the basis of time and distance of the trip. There is also a fixed minimum fare for a trip, which is separate from base fare and is equivalent to the metre down/flag down rate and is applicable if the fare amount calculated is less than the minimum fare. The minimum fare and time, base and distance (TBD) fare are calculated based on various factors and input costs such as fuel cost, earnings in the market, traffic conditions, average speeds, car maintenance cost, insurance cost, etc.

  Meanwhile, both CAs state that the base fare is determined by the CAs themselves in accordance with state regulations, if any. One of the CAs also attaches the qualifier that the weightage of different factors is regularly reviewed and revised to stay competitive.

- ***Personalised Pricing***

  According to the responses furnished by one of the CAs, both base fare and total fare may be influenced by several factors, including the type of city, such as Tier I or Tier II; distance to be travelled by the rider; type of ride, i.e., shared/pool, economy, premium; time of day, etc. However, the CA has not categorically stated that that either base fare or total fare cannot be influenced by the individual rider attributes. Meanwhile, the other CA has informed that every city will have a unique base fare, minimum fare, distance rate and time rate based on market conditions, but there is no explicit differentiation based on type or tier of cities. Further, base fare and minimum fare might also differ based on time of day, geography and type/category of ride. Similarly, total fare might also differ based on trip distance, time of the day and type/category of ride and depends on the surge. However, both base fare/minimum fare as well as total fare are not influenced by individual attributes like gender, occupation, frequency of rides undertaken by the rider, rider rating, payment mode, rider's complaints history (frequency), operating system used by rider to book rides, higher frequency of travelling in the same route and rider's app-switching behaviour.

  Meanwhile, both CAs have stated that the base fare will not be different for two individuals who book a cab of the same category at the same time, from the same location and for the same destination.

  With respect to the total fare, one of the CAs has responded that the total fare can be different for two individuals who book a cab (of the same category) at the same time, from the same location and for the same destination. Further, it has also been informed that the discounts offered to each rider are personal and provided on the basis of booking the characteristics of a rider, revenue of the ride, corporate tie-ups, etc. Meanwhile, the other CA has responded that total fare cannot be different for two individuals who book a cab (of the same category) at the same time, from the same location and for the same destination. However, discounts/promotions can be different for two individuals, resulting in different net payments. It is further elaborated that discounts/promotions are not personal to each rider but are offered based on multiple factors. For example:

  a. Route specific discounts (e.g., airport rides)
  b. Rider lifecycle discounts (e.g., discounts offered to new riders)

c. Use case-specific discounts (e.g., promos for riders visiting vaccination centres)
d. Loyalty/Subscription discounts (to riders who purchase a subscription pass)
e. Discounts for use of specific payment methods (Paytm, MasterCard, etc.)
f. Time of day (Higher promos during lean demand periods like afternoon hours)

- ***Surge Pricing***

Both CAs have stated that the application of surge is automatic and mediated by an algorithm. The methodology/algorithm takes into consideration demand and supply situations (driver availability and rider demand) in real time for calculation of the surge multiplier. One CA also stated that algorithms consider dynamic marketplace conditions and are continuously improved over time and that surge is applied in a particular geography and the applicable surge does not change once the trip is booked.

Further, according to one of the CAs, the probability of finding a surge in descending order (from highest to lowest) is during bad weather; promo-codes/discounts are offered; festivals; end of concerts/shows/events; weekends and leisure activities; and rush hours. It also stated that surge pricing may vary on weekdays, on weekends, at night (post 21:00 hours till 05:00 hours), during the daytime (depending on travel time and destination), differences in locality, different categories of car, etc. Meanwhile, the other CA informed that events like abnormal weather (rains), festivals, end of concerts/shows/sports events and rush hours can lead to demand-supply imbalances. However, these situations might not necessarily always lead to the imposition of a surge. To optimize reliability, the surge algorithm reacts to driver availability and rider demand at a hyperlocal level and in real time.

In response to a specific question regarding the factors that can impact surge, one of the CAs responded that surge may be impacted by the type of city, for instance, Tier I and II; distance to be travelled by the rider; type of ride, i.e., shared/pool, economy, premium; time of day, etc. However, the said CA disagreed that the surge can be personalized based on past riding behavior such as frequency of rides taken, payment methods, category of rides, frequent complaints, type of mobile operating system used to book a ride, etc. On the other hand, the said CA agreed that surge incentivizes drivers to increase supply of their services and that surge pricing is specific to a geography.

Meanwhile, it maintained a neutral stance to the assertion that 'it is observed that surge in one area is followed by surge in adjacent area'.

However, the other CA simply stated that that surge is not affected by rider specific attributes and personal history.

Further, both the CAs have stated that it is difficult for drivers to create an artificially induced surge.

- ***Pricing Algorithms***

  According to both CAs, automated pricing algorithms are used to estimate the total fare. However, as per one CA, different components of total fare, such as base fare, minimum fare, time rate and distance rate can be manually provided. One of the CAs has also stated that unless there is a bug due to tech data inflow, the pricing algorithm as such is not changed frequently. Meanwhile, the other CA informed that pricing algorithms are continuously improved based on cumulative experience. Both CAs have categorically stated that they do not engage in data crawling activities from other CA platforms.

- ***Transparency:*** With respect to information sharing regarding fares, surges, cancellation charges, etc., between riders and driver partners, it is noted that:
  - ***Base Fare:*** One of the CAs elaborated that drivers are aware of the base fare. Every time fares are revised, drivers attached to the platform receive intimations via push notifications, messages, etc. A break-up of all applicable fares and incentives are also given in the invoices raised towards each ride. Additionally, riders are made aware of the base fare through the customer app, prior to the booking of a ride. The total fare is also elaborated in the invoice shared after a ride is completed. However, it is stated that the base fare shown to riders and drivers is not the same, as the fare shown to drivers will not include the commission to be paid to aggregators. Similarly, the other CA stated that drivers have access to base fare and minimum fare and any rate changes are communicated (in-app messages). Additionally, since 2016, riders are also being presented with an upfront fare (which includes the base fare) before booking the trip on their platform, and the base fare and minimum fare can also be accessed online.

- ***Total Fare:*** As per one of the CA, the total fare shown to riders and drivers is not the same. The total fare shown to riders will include discounts, if applicable, whereas the total fare shown to drivers will include the commission collected by aggregator. With respect to information sharing regarding total fare, it is informed that drivers are not made aware of the total fare during ride initiation. However, they get to know the total fare after the ride is completed (when the same is displayed for the customer to pay). Meanwhile, the other CA stated that riders are presented with upfront fare before each trip. Meanwhile, drivers are informed of the applicable fare structure (base fare, time rate and distance rate) and minimum fare in the city. After the trip, the components of total fare are included in and are the same on the driver and rider receipts.
- ***Surge:*** With respect to the surge, one of the CAs stated that the surge multiplier applied to both riders and drivers is the same. It is also stated that the surge multiplier is visible to the driver at the time of accepting a ride. Similarly, the other CA states that drivers are informed of the surge at the time of dispatch, which they can also check in-app later for a particular trip. Meanwhile, both CAs state that surge price is included in the total fare, which is conveyed to the rider at the time of the booking. However, the precise surge multiplier is not broken down and shown to riders when they book a cab.
- ***Revenue Sharing with Driver Partners:*** According to one CA, the fare collected is paid to the driver after deducting the commission payable for the usage of the platform. It is stated that this commission is uniform for all partners. It is added that the drivers are paid a part of the ride fare as their earnings for providing transportation services. The commission is collected by the aggregator for facilitating the same on its platform. Further, it is informed that the commission charged for the use of CAs' platform by drivers is informed of on-boarding and any change in the structure of the same is typically communicated through SMSs, WhatsApp, push notifications, in-app notifications, etc.

  Similarly, the other CA also stated that the revenue-sharing mechanism is uniform for all driver partners. Further, it informed that, since June 2021, it has shifted from the Driver Service Fee model to the Rider Convenience Fee model. Hence, since June 2021, revenue comprises two components: (a) transportation

charges (entirely passed to drivers, and the drivers get a detailed breakdown of the total fare in the trip receipt); and (b) fees for CAs' services are charged directly to riders and are visible to the drivers in the trip receipts. Even before June 2021, revenue sharing was displayed on the driver's receipt. Further, it is categorically stated that drivers are not paid a commission. Transportation charges are drivers' earnings, and their earnings from a trip are in the same proportion for a particular category in a particular city.

- ***Driver Incentives:*** One CA stated that driver incentives are based on the performance on the platform, which can be defined using bookings, ride time, kilometres driven for a period of time, etc., and drivers are eligible for incentives on completion of a set criteria. Incentives are processed for on-boarding oneself to the platform and also considering the number of bookings fulfilled after joining the platform. Drivers are made aware of the incentives available to them through the app or through push notifications or inbox messages on the app, SMS/WhatsApp and recorded calls. Similarly, the other CA also informed that drivers can be paid incentives on multiple criteria, such as engagement (e.g., number of trips) and lifecycle (e.g., number of months on the platform). Eligible drivers are made aware of these criteria by the aggregator before the incentive week starts. Further, based on market conditions, incentives may be provided to drivers at the time of enrolment with aggregator. These incentives are subject to change based on location, market conditions and business needs.
- ***Cancellation Charges:*** In case of both the CAs, only the riders are charged with a cancellation fee. One of the CAs has also specifically mentioned that the cancellation fee is charged when a ride is cancelled after a fixed time duration (provided the driver is not delayed beyond reasonable time to reach the pickup location). Further, as per one of the CAs, cancellation fee is different for different categories and depends on the type of cancellation reason chosen by the customer. Additionally, one of the CAs also states that, after the trips, riders and drivers can look at trip receipts to understand cancellation charges.

  With respect to apportioning of cancellation charges between the CAs and drivers, one CA has stated that cancellation charges are split on a 50–50 basis between the CA and drivers. However, in case of the other CA, cancellation charges are apportioned in the same proportion as the fare for a completed trip.

For example, if a rider is charged INR 10 cancellation fee for a particular type of ride in Delhi, the amount is apportioned as follows: driver (INR 7.33); CA2 (INR 1.95); and taxes (INR 0.72). However, the cancellation policy is dynamic and evolves continuously.

Stakeholder Consultation with Transport Authorities

- ***Surge Pricing:*** According to the Central Transport Authority, the objective of surge/dynamic pricing is to efficiently manage supply and demand to ensure efficient services for all. However, they have observed that unregulated surge pricing, especially in time of need, can lead to consumer exploitation. Thus, the Authority, in the Motor Vehicle Guidelines 2020, proposed a floor (0.5 times base fare) and ceiling (1.5 times base fare) for surge pricing to ensure reasonable affordability for consumers, while giving flexibility to CAs to manage supply and demand.

  As far as state transport authorities are concerned, Draft Motor Vehicle Aggregator Scheme 2021 put up by the Delhi Government for public comments has proposed a maximum surge of twice the base fare. Meanwhile, the Madhya Pradesh Transport Authority stated that, in their opinion, a surge multiplier of 1.5 is all right and will induce on-boarding, i.e., attract cab owners to integrate with the aggregator. However, the Rajasthan Transport Authority considers a surge multiplier of 1.5 to be high and states that it should not be more than 1.2. They opine that the implementation of surge is totally in favour of the motor vehicle aggregator and is contrary to consumers' financial interests.

- ***Level Playing Field:*** According to the Central Transport Authority, Motor Vehicle Aggregator Guidelines 2020 try to bridge the gap between regulation for traditional taxis and CAs. Guidelines that pertain to base fares, licensing, compliances with regards to driver and vehicles, installation of GPS, etc., create a level playing field for both. The Central Ministry believes that, with changing mobility trends and technology disruptions, this gap will reduce further. However, Transport Authorities of both Rajasthan and Madhya Pradesh are of the view that there is no distortion in the level playing field between the traditional taxi industry and CAs. According to the Rajasthan Transport Authority, CAs work only in big cities with a population of over 8 lakhs and provide intra-city services in urban areas, whereas the traditional taxi industry normally provides inter-city or inter-state services. Meanwhile, the Madhya Pradesh Transport

Authority is of the view that there are clients for both traditional taxi players and CAs—some passengers prefer traditional taxis, while others prefer CAs.

Section VII: Conclusion and Policy Implications

The present study is, *inter alia*, aimed at examining three broad issues: a) Whether personalised pricing in the cab industry exists and, if so, does it necessitate regulatory intervention, or can consumers' satisfaction on account of availability of technology-backed cab services counter-balance the potential damage associated with dynamic pricing? b) What are consumers'/riders' perceptions about surge pricing? Whether surge pricing is necessarily a rent-seeking behaviour and, if so, does it require any regulatory intervention? c) Are there concerns related to transparency regarding their pricing structure and fare calculation? If yes, identifying broad areas for bringing transparency. However, due to lack of transparency, it is difficult for policymakers to assess the impact and effectiveness of surge pricing to match the supply of cars with enhanced demand.

6.1. Main Findings

6.1.1. Personalised Pricing

CAs were perceived to be and also found to be (based on a limited controlled experiment) indulging in personalized pricing. Existing literature indicates that the possession of personalized data about riders enables CAs to indulge in price differentiation. The information collected from a survey of a diverse spread of 2000 consumers/riders across four different cities on multiple parameters revealed the perception of riders that the pricing computed by CAs takes into account several factors, including distance travelled, number of trips, type of ride, mode of payment, nature of mobile handset used, *etc.*, which may play a role in price determination. Further, the controlled experiment carried out by the study team also indicated that fares vary across different search rounds for a particular individual (based on demand and supply dynamics) as well as for different individuals in a particular round (personalised pricing).

As per the information furnished by one of the CAs during stakeholder consultation, base fare and total fare may be influenced by several factors, including the type of city, for instance, Tier I and Tier II; distance to be travelled by the rider; type of ride, *i.e.*, shared/pool, economy, premium; time of day, etc. However, the CA has not categorically stated whether total fare or

base fare can be influenced by individual rider attributes. It is stated that dry run fare + wait time minutes*wait time charges + commission percentage gives an estimated base fare, which may also vary from one city to another and is also based on current fuel prices, general inflation cost, etc. Similarly, total fare for the CA is composed of minimum fare, base fare, per km fare, per minute charges, pre-wait charges (if any), third-party charges like insurance premium (if applicable), surcharge multiplier and taxes. The individual components of the total fare can vary across cities given the market dynamics in terms of vehicle optics (fuel, maintenance, insurance, etc.), demand and supply situation and traffic situation (ride time fare). Meanwhile, the other CA has explicitly stated that base fare/minimum fare as well as total fare are not influenced by individual attributes such as gender, occupation, frequency of rides undertaken by the rider, rider rating, payment mode, rider's complaint history (frequency), operating system used by the rider to book rides, higher frequency of travelling in the same route and rider's app-switching behaviour. It is stated that the TBD (time, base, distance) fare is calculated based on various factors, including input costs such as fuel cost, earnings in the market, traffic conditions, average speeds, car maintenance cost, insurance cost, etc., and every city will have a unique base fare, minimum fare, distance rate and time rate based on market conditions, but no explicit differentiation is made based on the type or tier of cities. Further, base fare and minimum fare might also differ based on time of day, geography and type/category of ride. Similarly, total fare might differ based on trip distance, time of the day and type/category of ride and the surge multiplier. Additionally, responding to a specific question, both CAs informed that the base fare cannot typically be different for two individuals who book a cab (of the same category) at the same time, from the same location and for the same destination. With respect to total fare, one of the CAs has stated that it cannot be different for two individuals who book a cab (of the same category) at the same time, from the same location and for the same destination. However, discounts/promotions can be different for two individuals, resulting in different net payments, though such discounts/promotions are not personal to each rider but are offered based on multiple factors. Meanwhile, the other CA stated that the total fare can be different for two individuals who book a cab (of the same category) at the same time, from the same location and for the same destination. This CA also informed that the discounts offered to each rider are personal and provided based on the booking characteristics of a rider, revenue of the ride, corporate tie-ups, *etc.*

Further, with respect to surge, one of the CAs stated that surge may be impacted by the type of city, for instance Tier I and II; distance to be travelled by the rider; type of ride, *i.e.*, shared/pool,

economy, premium; time of day, *etc*. But both the CAs have disagreed that it can be impacted by rider-specific attributes and the personal history of a rider.

Hence, while the survey results point towards personalized pricing, the stated business practice of one of the CAs does not concur with the same. In this context, it is also important to note that the existing economic literature suggests that even if personalized pricing is practised as such, it may not necessarily lead to adverse impact on consumer welfare or raise any competition issues, and the effect depends upon several other parameters. However, there seems to be a dissonance between the stated business practices of the CAs with respect to personalized pricing, public perception of the same and the actual limited evidence based on the controlled experiment.

6.1.2. Surge Pricing

The riders' survey reveal that they are aware of the existence of surge pricing. However, by and large, the riders do not seem averse to the concept of surge pricing. The results based on econometric analysis (path analysis) indicates that, despite app-based cabs being expensive at times, people are willing to pay 'surge', keeping in view aspects such as 'convenience' and 'driver's behaviour'. Thus, surge pricing in the cab industry does not necessarily exhibit a rent-seeking behaviour due to the consumer's satisfaction on account of convenience and availability of technology-driven cabs. However, the riders' survey highlights that, at times, the surge had been higher than expected by the riders.

In this context, MoRTH (the Central Transport Authority), as part of the stakeholder consultation, also opined that, while the objective of surge/dynamic pricing is to efficiently manage supply and demand in order to ensure efficient services for all, there is a lack of clarity on calculation of surge pricing and how high the surge can be. They acknowledged that several instances have been reported where surge pricing has gone as high as 2–5 times the base fare, especially during exigencies such as rain, storm, traffic conditions and other unforeseen emergencies. The Ministry is of the view that such unregulated surge pricing, especially at the time of need, can lead to exploitation of consumers. The State Governments, during the consultation process, opined that while surge implementation is in favour of cab aggregator and may be contrary to the consumer's financial interest; but it may help in attracting cab owners (drivers) to integrate with the aggregator.

Meanwhile, as regards the drivers' survey, interactions with drivers have revealed that the surge being charged from the riders is different from those specified to the drivers, as the fares charged to the riders are different from those displayed to the drivers. Thus, though it may be possible that part of the surge that is being charged from the riders and that being shown to the drivers does incentivize drivers to increase supply, part of it seems to be kept by the CAs themselves. However, as part of stakeholder consultation, one of the CAs has categorically stated that surge applied to both riders and drivers is the same. Meanwhile, the other CA has not categorically commented whether surge applied is the same shown to both riders and drivers. Further, with respect to the dissemination of information pertaining to surge and surge multiplier to the riders and drivers—one of the CAs stated that the surge multiplier is visible to the driver while accepting a ride. Additionally, both CAs have stated that the surge is included in the total fare, which is conveyed to the customer at the time of booking and hence, the surge applied is not shown separately to riders. In periods of unusually high demand-supply imbalances, riders are also presented with automated messages such as "Fares are slightly higher due to increased demand" and "Fares are a lot higher due to increased demand". However, the precise surge multiplier is not shown to the rider at the time of the booking. This listing of consolidated price upfront is stated to be in consonance with other segments like travel and tourism industry, including hotels and airlines. CAs also stated that the drivers are informed of the surge at the time of dispatch, which they can also check in app later for a particular trip.

The study team observes that though the CAs have claimed otherwise, there seems to be an ambiguity between the driver's knowledge of the surge as well as the exact component of the same being shared with them by the CAs. Had there been greater transparency as regards the surge being charged from riders and surge being passed on to drivers, it may have reduced this information asymmetry and led to better functioning of the markets in addition to incentivising the drivers to increase supply.

6.1.3. Non-Transparency of Parameters that Govern Algorithmic Pricing and Associated Information Asymmetry

The riders' and drivers' surveys carried out by the study team and the controlled experiment undertaken pointed towards non-transparency in various aspects, such as each ride being uniquely priced in the CAs' industry, a particular rider receiving different fares for an identical

entry and destination point in subsequent rounds of the controlled experiment, the existence of a base fare differential indicating personalized pricing by one of the CAs, drivers' perceptions that the surge applicable on a ride requested often by a particular rider is different from the surge offered to the driver and the price, including the surge component/multiplier, is calculated by algorithms.

CAs on the other hand have responded that, firstly, the base fare cannot be different for two individuals who book a cab (of the same category) at the same time, from the same location and for the same destination. One of the CAs has stated that total fare can be different for two individuals who book a cab (of the same category) at the same time, from the same location and for the same destination. However, the other CA stated that total fare cannot be different for two individuals who book a cab (of the same category) at the same time, from the same location and for the same destination. Secondly, CAs have also stated that base fare as well as total fare may be influenced by the type of city, for instance, Tier I and II; distance to be travelled by the rider; type of ride, i.e., shared/pool, economy, premium; time of day, etc. Thirdly, on the issue of whether surge shown to both riders and drivers is the same, one of the CAs has stated that the surge applied to both riders and drivers is the same. Finally, with respect to algorithms, CAs have responded that pricing on the platform is dynamic, and the algorithm is structured to automatically calculate pricing based on supply, demand and other conditions. It is also informed that algorithms are continuously improved based on cumulative experience but are not engaged in data crawling from other CA platforms.

In this context, Clause 9.6 of the Motor Vehicle Guidelines 2020 states that the aggregator has to ensure "transparency in its operations including but not limited to functioning of the app algorithm, proportion of fare payable to the driver, incentives given to driver, charges received from the driver and such other information as may be notified by the state governments, by making disclosures on the Aggregator's Website and App and updating such disclosures, as per requirement." However, these are model guidelines, and final implementation rests with the state governments. Additionally, it may be important to sensitize technology experts to be cautious while designing algorithms so that they are not prone to collusion. This is in sync with the regulatory approaches being considered by international regulatory authorities that might be considered in the future to tackle algorithmic collusion, such as price regulation, policies to

make tacit collusion unstable and rules on algorithm design.[6] Further, research[7] conducted by the Institute of Electrical and Electronics Engineers (IEEE) concludes that, for ethical business, internal trainings are required. Workshops and certifications are required for team members and AI ethics standards should also be included. Since such coordination is a theoretical possibility in case of algorithm determined prices, such sensitization of tech experts will be helpful in minimizing inadvertent collusion.

6.1.4. Level Playing Field

During stakeholder consultation, traditional taxi operators as well as their drivers/union leaders claimed that there is a lack of a level playing field, as the CAs are not subjected to the same regulatory costs as traditional taxi operators owing to different business model, and thus, it makes it difficult for traditional taxi operators to compete with CAs. In this regard, the Central Transport Authority is of the view that the Motor Vehicle Aggregator Guidelines 2020 makes an effort to bridge the regulatory gap between traditional taxis and CAs. Further, the Authority is of the view that, with changing mobility trends and technology disruptions, this gap will get further reduced. Meanwhile, the Rajasthan Transport Authority highlights that CAs work only in big cities with a population of over 8 lakhs and provide intra-city services in urban areas, whereas the traditional taxi industry normally provides services on an inter-city or inter-state basis. Meanwhile, the Madhya Pradesh Transport Authority is of the view that clients for both traditional taxi players and CAs exist—just that some passengers prefer traditional taxis, while others prefer CAs.

6.2. Recommendations

Based on the aforesaid findings, the **Main Recommendations** are given below:

6.2.1. Addressing Ambiguity Regarding 'Total Fare' Calculation

The surveys revealed that though the riders get to know the up-front fare or estimated fare before booking the ride on CAs' platform, there is ambiguity as regards what all components or heads form the basis of such fare calculation. In addition, if the base fare (one of the components of base fare) itself changes over time or is different across persons, the overall fare may be different for two individuals who book a cab (of the same category) at the same time,

[6] Algorithms and Collusion: Competition Policy in the Digital Age, http://www.oecd.org/daf/competition/Algorithms-and-colllusion-competition-policy-in-the-digital-age.pdf.
[7] A call to action for business using AI, https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/ead/ead-for-business.pdf.

from the same location and for the same destination. Findings of the study team do indicate that the base fare changed during the day and also varied across respondents, thereby making the value of multiplier per se less meaningful to capture 'surge'. The definition of base fare and other components may also vary across CAs, which can be a source of great confusion for riders. Hence, transparency regarding total fare in general and all its different components amongst drivers and riders needs to be promoted.

6.2.2. Surge is not Necessarily Counterproductive

Findings of the study team suggest that surge does motivate drivers to increase supply of their services when demand spikes. The study also finds that riders do not necessarily perceive surge as a deterrent to book a ride, though some of the riders have expressed that the surge had been higher than expected on some occasions. Thus, surge pricing in the cab aggregators industry does not necessarily exhibit rent-seeking behaviour, as the consumers derive utility from the convenience and availability of technology-driven cabs. An important point to note is that if surge pricing is completely banned, while it may provide some relief to consumers in the short term, the impacts may vary in the long run. In fact, if economic productivity is enhanced by technologies, regulations should not have the unintended consequence of limiting their availability. This is also an important reason why competition authorities generally refrain from intervening with the pricing decisions of independent economic actors in a competitive market. However, other regulators, e.g., the transport regulator, have been seen to be wary about leaving technology companies unregulated, especially given the non-transparency with which fares and surge multipliers are calculated by algorithms, which can potentially affect consumers adversely. Thus, to avoid extremely exploitative price situations and also ensure that consumers remain protected in case algorithms malfunction, the transport regulators at times impose a 'cap' on surge.

There have been instances in jurisdictions of limiting pricing through imposition of caps either voluntarily by cab aggregators or by authorities. For example, in response to surge pricing during Hurricane Sandy, Uber reached an agreement with the New York Attorney General to cap price increases at 3.5 times the base fare for UberX and 2.5 times the base price for Uber Black when a state of emergency had been declared. This cap policy, according to Uber, is now operative throughout the United States. Outside of emergencies, surge pricing can lead to very high multipliers (historically up to approximately 10 times the base fare) and is used as a competitive differentiator amongst CAs. In the United States, Uber caps its surge multiplier at eight times the base fare and Lyft caps its Prime-Time multiplier at three times the base fare (OECD, 2016).

In 2018, a cap was introduced by the Honolulu city council on what ride-hailing services like Uber and Lyft can charge during periods of peak demand in the city. Council Chairman Ernie Martin of Hawaii said he wrote the measure to ensure that consumers won't pay an 'unreasonable price'.[8] The Australian Government was also contemplating proposing a cap on price surge in the state due to exorbitant Uber fares during major traffic incidents and public transport delays in 2017.[9] Further, in 2019, while approving a merger case, the Egyptian Competition Authority capped yearly price increases for UberX and Careem Go services at 10% nationwide, excluding hikes linked to cost-push inflation. The authority also imposed a ceiling on surge pricing at 2.5x the regular fare.[10] Similarly, in India, now with the release of the Motor Vehicle Aggregator Guidelines 2020 (November 2020), the Central Transport Authority has also paved the way to put a check on unregulated surge pricing, especially in times of need, to stop exploitation of riders. The guidelines have proposed a floor (0.5 times base fare) and ceiling (1.5 times base fare) for surge pricing to ensure reasonable affordability for consumers, while giving flexibility to the CAs to manage supply and demand. According to the Ministry, these figures were finalized after extensive stakeholder consultation and benchmarking with the states and other countries. Now, the states and the UTs have been advised to follow these guidelines to formulate state-specific regulations.

Thus, dynamic pricing may be an intrinsic feature of such markets and not necessarily counter-productive, however it may be required to addressed aberrations through regulation. Further, there may be a need for greater transparency on the quantum of surge as well as the sharing of such surge among drivers and CAs.

6.2.3. Addressing Information Asymmetries

For promoting conducive environment in the CA industry, it is important to address concerns regarding transparency at various levels which have emerged during this study. There seems to be considerable dissonance in the actual stated business practices of the CAs and the knowledge of the riders and drivers with respect to surge and base fare differential, emphasising the adoption of better transparency prescriptions on the part of CAs to convey their actual adopted business practices more coherently and unambiguously among riders and drivers.

[8] https://www.independent.ie/world-news/uber-and-lyft-to-be-subject-to-surge-pricing-cap-in-hawaii-36985656.html.
[9] https://www.abc.net.au/news/2017-07-18/victorian-government-to-ban-uber-surge-pricing/8719700.
[10] https://enterprise.press/stories/2019/12/30/merged-CA2-careem-to-operate-in-egypt-under-eca-rules-9342/.

To conclude, the overarching finding of the study is two-fold: *First*, 'surge pricing' exists, though perception towards 'surge' is not necessarily adverse, given the convenience and other considerations which are more valued by the riders/riders. However, there is a need to ensure greater transparency to reduce information asymmetry with regard to surge computation and division of the surge component between drivers and CAs. *Second*, the advent of radio taxis, and CAs in particular, has changed the competitive landscape in India by widening the rider and driver base beyond contemplation. Thus, a need is felt to address concerns related to transparency and information asymmetries on CA platforms to ensure basic level of transparency. Given that many of the concerns raised in this study may not strictly raise competition concerns, the study concludes with a broad policy perspective, having relevance for other regulators as well. In addition, adoption of self-regulatory measures by CAs to inculcate best practices for ensuring well-functioning ecosystem may be desirable.

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