Abstract

One of the main problems in Bangkok public transportation that many people have complained a lot is rejection from taxi drivers. Even though there are laws imposed on taxi driver that they can't reject any of the customer, but the problem still exist until nowadays. When a taxi driver reject his or her customer, there are negative effect to both taxi driver and customers. A customer would need more time to get the new taxi, while taxi driver have to drive empty car to find a new customer. There incurred the transaction cost that should not have been incurred. If this problem could be fix, there will be lesser transaction cost associated with both parties, customers and taxi drivers. So in order to understand taxi drivers' behavior, more information and analysis need to be done. The method that this paper choose to analyze taxi drivers' behavior is cost-benefit analysis. After the analysis, the result showed that taxi drivers' behavior is actually a rational behavior. Traffic jam and taxi fare rate are the main factors contributed to create revenue gap in each situation. The revenue gap lead to taxi driver's behavior of self - maximizing profit, by choosing the best type of customers and reject the rest. One of the solutions is to reduce the revenue gap by setting the new taxi fare rate, in order to make each customers and destination become indifferent. When it is indifferent, taxi driver would not have high opportunity cost forgone, only then taxi driver would not reject some specific type of customers.

Introduction

Transportation in Bangkok is one of the city's major problems. There are traffic jam all over the city, no matter how many detour there are in Bangkok. Escaping from traffic jam in some specific area is one of the most challenging problem solving for Bangkok resident. It can be trying out different detour, get on the road earlier than most people, or using other kind of transportation apart from road. One of the best kind of transportation apart from road is train. The government realized the problem and working their best to improve all train line in Bangkok, but time is still needed. Currently there are two main lines of train, the BTS and the MRT, which is obviously not enough to meet the total demand at the current situation. Some people still need to use other type of transportation to get to the train station. Another option for transportation that also helped solve the problem is express boat. Bangkok is a city surrounded by river, which was used as a barricade to prevent other countries invasion in the past. Only small number of bridges were created in the old day for the country defensive strategy, bottleneck problem. Now the rivers become obstacle for Bangkok resident, as they created the bottleneck problem on small number of bridges. Because there are many people living across the river, so the bottleneck problem still exist with people traveling in and out of Bangkok. That is the problem of rivers in Bangkok, but there is also some benefit of the river as well. The government also provide express boat for traveling along the river, which is very helpful in traveling in specific area. But there is also the same drawback just like trains in Bangkok, the line is quite limited. It is not possible to take the boat and train to everywhere in Bangkok. So when people wanted to travel to specific place that train and boat cannot get through, they either drive or get the best substitute, taxi.

Taxi is one of the best transportation in term of luxury and most comfortable. Just relax on the car and the driver will take the passenger right to the request destination. But the drawback from taxi is that it cannot get away from traffic jam. Taxi would get stuck on the road just like any other car, and the taxi fare would keep rising more and more. Passenger knows that it is not efficient to bear all the cost alone in traffic, so they prefer getting some friends along while using the taxi service. This way the taxi fare would be shared among the passenger, and each passenger cost is reduced. Sharing with friends is one of the best method to solve the problem with expensive taxi fares in Bangkok, in exchange with comfortable compared to train and express boat.

Taxi may seem to be one of the best transportation, but taxi actually created some problem to customers as well. Nowadays many customers' request got rejected from Taxi drivers due to many reasons like traffic jam, insufficient time, or the customer is a Thai. There are laws proposed to solve the problem by charging these taxi drivers some fine of 500 Baht when they rejected their customers, but the problem still exist until nowadays. More understanding and in-depth research is needed in order to solve this problem. This can be very beneficial for Thai society. So the question is about the economic reason behind Bangkok taxi drivers' behavior. Economic cost and behavior of taxi drivers and customers have to be analyzed more.

Related Literature Review

Some of the main problem in urban area around the world is the shortage of taxi supply on the road. It occurs occasionally and differently from place to place. In New York City, USA it is quite difficult to find a taxi when it's raining, while in Bangkok, Thailand it is difficult to not

get rejected from taxi drivers. Taxi drivers in Bangkok seems to have higher bargaining power compare to other place in the world. Many customers' destination still got rejected from Thai taxi drivers from time to time.

Economic behavior of labor supply predicted how number of hours people work is positively correlated with hourly wages. The reason behind this theory is based on trade off and opportunity cost. Labors have to choose either one between working and leisure time. If the wage is low, it means that the opportunity cost of choosing leisure time or the forgone wage is low. On the other hand, if the wage is high, people would prefer to work more as choosing leisure would give up high forgone wage. Assuming that the labors are rational and trying to maximize their own utility (Mankiw, 2012).

There's also some specific case in which labors are irrational and contradicted with the theory of labor supply. It is well-known in New York that taxi is very difficult to find when it is raining. People on the street are willing to grab taxi more since it is more convenient for traveling. This raining situation created an excessive demand for taxi, so taxi drivers make more money per hour during the rainy day. According to economic behavior of labor, more taxi drivers should be willing to work more hours when it's raining. But the result is shortage of taxi supply on the street when it's raining. This is because taxi drivers have particular level of income they target each day. Taxi driver set up their income targeting every day before they start working. When the target is met, these taxi drivers prefer to go home and spend their leisure time. This means that the increased in demand of taxi on the rainy day increased the rate of return per hour, so taxi driver reach their target faster than usual, and stop working earlier (Camerer, Babcock, Loewenstein, & Thaler, 2000).

There‘s also another reason why taxi drivers prefer to go off duty when it is raining. Some of taxi drivers claim that the reason taxi drivers stop working early on the rainy days is the dangers associated with driving in raining condition. Rainy day makes the road slippery and more difficult to drive. It is also unpleasant to drive in bad weather. So there are higher costs involve with getting into accident that taxi drivers do not want to risk. So it might become rational for working very few hours on the rainy day (Crusing for Dollars, 2007).

In Bangkok, Thailand a decrease in supply of taxi would not only be a decrease in number of taxi on the road. Because there's always high quantity of taxi in Bangkok, but these taxi would more likely to reject customer's requests. When taxi rejected the customer's request, this action would also be considered as a decrease in taxi supply in Bangkok as well. Because as taxi drivers rejected their customer, it means that specific taxi has left the market. This situation usually happens when it is prime time like before the school start and after school finished. Even though the fines and punishment have been proposed for taxi drivers, who rejected their customer, nothing much has changed compared to before the laws was proposed.

Taxi rejected customers with many reason like traffic jam, can't get the rented car back in time, and refill LPG is needed. In Bangkok Traffic jam is one of the biggest problem, there are more cars than capacity of roads. When the taxi got stuck in the traffic, the cost is higher than the revenue that the taxi driver would normally get. This is because the price on the meter increases at a slower rate than when the car is running. So instead of going to a traffic congested area, taxi drivers prefer to drive continuously somewhere else. This is the reason why taxi driver rejected the customers' request, especially when the customer request for places likes in the middle of the city.

Not only that, time is also another reason why taxi rejected their customers' request. Taxi drivers claim that there would be fines, if the rented car is not returned in time. Refilling gasoline is also another problem, because there are not many LPG station in Thailand and it takes a long time. People have to get in line in order to get their LPG refilled. There are times when these taxi drivers are in a hurry to either refill the LPG or return the rented car, with time constraint, these taxi drivers have to reject their customer. This problem would most likely happen when the place that the customer wanted to go is too far away from where the taxi drivers wanted to go (Pongkate, 2013).

Taxi fares in Thailand are relatively cheaper than other countries. The experiment assumes that the taxi always running, no tips or taxes, stick with the same standard, and keep smallest changes. The resulted show that the taxi fares in Bangkok is almost the cheapest compared to neighboring country. Assuming the Purchasing Power Parity takes place as well. Even our neighboring country like Hanoi, Vietnam the fares are 2 times higher than Bangkok, Thailand (How is Thailand Taxi Fare (ค่าแท็กซี่ไทยอยู่ตรงไหน?), 2013). This is because the government has set up a price floor for taxi meter to start the price at ฿35 and will be increased according to the time and distance used in traveling.

Public transportation in Bangkok is not fully developed compared to other capital cities around the world. Many lines of train are still on progress of building, while express boat is quite slow and inconvenient. So one of the best choices for transportation in Bangkok is taxi. Bangkok also has the cheapest taxi fares compared to other countries; hence there is higher demand of taxi at a lower price. This might be one of the reasons why taxi drivers in Bangkok seem to have higher bargaining power than customers. Not only that low price of taxi might be signaling on the quality of the service itself as well.

So these are facts found from the all the research paper and articles from journal. Many of them point out the same problems, with different reasons. The main problem is the decrease in supply of taxi. Decrease in supply of taxi including from lower quantity supply of taxi on the road and taxi driver rejecting customers' request. This is because when a customer needs to spend more time finding for taxi, that means there is a decrease in quantity of on service taxi. Some explain the irrational behavior happen in other countries, which may or may not be able to apply with Thailand. So all these facts will be useful to improve taxi industry in Bangkok, Thailand.

Contribution

When a taxi driver reject customers, both parties are negatively affected. The passengers could not get the service they want, while the taxi has to drive empty car along to find new customers. Sometimes it could take a long time before taxi driver could find the new customer that the driver preferred. There incurred the transaction cost that should not have been incurred. In this situation social welfare is decreased from both party, so it would be better if there is a solution that could fix the situation in order to increase social welfare for both customer and taxi drivers.

Methodology

First of all, both theory have to be tested in reality whether the theory holds in Bangkok or not by doing survey. The survey would ask where taxi driver in Bangkok practice income targeting on the daily basis or not, if yes, then does it really make an impact to any reduction in supply of taxi. If taxi driver reduce supply in the market because of other reason like traffic jam, analyzing cost and revenue of taxi driver would be needed. There will be some comparison

between revenue received during normal ride and traffic jam. The survey would also ask for opinion or policy that taxi driver prefer. Either rising in overall taxi price or rising of price ratio during traffic jam. The survey would also ask whether taxi driver would reject lesser passenger when new policy is made.

The surveys would let taxi drivers choose how the taxi fare rate should be improve in the future. Currently Thai government is imposing a new rate for taxi industry, which increase the rate. Taxi drivers would get to comment on this policy, whether it will change their service behavior or not. Another model of taxi fare rate would also be introduced, in order to see how taxi drivers would react. In this model, another factor would be taken into account more than the previous model, which is time. This model is called "Time Oriented Model", assume that time is one of the main factors driving both cost and revenue from taxi service. The price of "Time" would be given equivalent to the opportunity cost of taxi drivers getting stuck in traffic jam.

Result

The economy of industry can be best described with a competitive market with a price floor. 35 baht, the starting price of the meter, acts as the price floor for taxi fare. The moment the passenger step into the taxi, the meter would start itself at 35 baht. This means the price of total taxi fares can never be lower than 35 baht. This price floor makes price negotiation between consumer and producer impossible, because it is the fixed starting price from the government. At this rate of price, it makes Thailand one of the cheapest taxi fares in the world ("ค่าแท็กซี่ไทยอยู่ตรงไหน?", 2013). Assuming the Purchasing Power Parity takes place as well. Even our neighboring country like Hanoi, Vietnam the fares are 2 times higher than Bangkok, Thailand. It is clearly observed here that this price floor creates higher quantity demand when compared to

quantity supply. Results, there are more customers calling for taxi than the number of taxi on the road. This give the taxi driver the higher bargaining power, knowing that it is not difficult at all to find the new customers or new destination taxi drivers preferred. This is one of the reasons why taxi driver can easily reject customers without taking opportunity cost of driving empty car around Bangkok, because these taxi driver knows that they can find new customers easily.

After the surveys of taxi drivers around Bangkok, here are the information obtained. Taxi drivers in Bangkok do not set any daily income targeting, due to time constraint. Taxi are mostly rented from taxi cooperative with high cost. Each shift of the renting is about 12 hours, but taxi drivers claim that the maximum time they have is around 9 hours. Because they need time to refill their gas and driving to specific part of the city they want to provide services. Cost per day of each taxi is around 1000 baht, this means taxi driver must earn more than 1000 to earn some profit. But the traffic situation in Bangkok is very difficult to predict, which is why taxi driver do not know exactly what to expect each day. Not only the traffic situation, but the type of customers also affect the rate of revenue the taxi drivers would get. Sometime, there are more short-trip kind of customers more than long-trip customer and vice versa, which is why it is hard to estimate. This means that the current taxi fare rate in Thailand does not guarantee steady income for taxi drivers. There are high dispersion in revenue from different situation during the day, which is why taxi drivers can't set up daily income targeting.

It is obviously clear that income targeting is not the main factor that reduce the supply of taxi in Bangkok. But other factors are found as the surveys goes on. Almost all of the taxi drivers complained about limited time. Mostly taxi drivers talked about wasting time, not enough time, and how to use time effectively and efficiently. There are two main factors affect the time, they are the destination and traffic jam. Traffic jam waste their time by making each

trip slower while some destination also cost more time than how it supposed to be. Sometime customers ask the taxi driver to go out of metropolitan area, in this case it is the destination that waste more time. Because when taxi driver reached the destination, there is no guarantee that a new customer would be found in that area. So taxi drivers have to drive back to the city without any customer on board, this mean taxi drivers would have to pay for gasoline cost all the way back to the city. So instead of having new customers on board, taxi driver have to waste their time driving back to the city first.

One of the main problem in taxi industry is asymmetric information about destination in the market. This asymmetric information happens when that taxi driver's preference of destination is opposite to the customer's destination. Taxi drivers do not know which customers would go to the same place as he wants, this also apply to customer as well. Example, taxi driver's home is in the west, while the customer's request is in the East. Taxi driver would have to go to the opposite direction of his home for some distance, this will increase the higher cost for taxi driver to go home. So taxi driver would try to reduce this cost by rejecting this customer, and find the new customer that would like to go to the West as well. Not only that, suppose that taxi driver took the customer and send him off to the East, there is no guarantee that the taxi driver would get a new customer back to the West. The worst case that could happen is, taxi driver do not get any new customer at all, which again increase the higher cost for taxi driver to get home.

After the survey, next step in methodology is to analyze cost and benefit using all the given information from taxi drivers' perspective. Total cost and total revenue in different situation will be used to find the dispersion in revenue between these situations. By understanding each type of situation, it might help understanding taxi driver's action more.

Figure 1

Data	
Rented Time	12 hours
Actual Time	10 hours
Rented Cost	500 baht
Other Cost	500 baht
Total Cost	1000 baht
Cost per hour	83.33 baht
Distance of Service	250 KM
Distance per hour	25 KM
Distance of Empty	80 KM

Figure 2

Current Taxi Fare Rate	
1 KM	35 Baht
2-12 KM	5 Baht
12-20 KM	5.5 Baht
20-40 KM	6 Baht
40-60 KM	6.5 Baht
60-80 KM	7.5 Baht
80- higher KM	8.5 Baht
Park	1.50 Baht/minute

Figure 3

Price Rate \ Situation	Traffic Jam for 9 hours	1 Customer for the day	10 Customers for the day	20 Customers for the Day	30 Customers for the Day
Start 1 KM (35 baht)	35	35	350	700	1050
Traffic Jam (1.5 baht/ minute)	810	0	0	0	0
Distance Driven (Fare Rate)	136	1947.5	1360	1000	900
Total Revenue	981	1982.5	1710	1700	1950
Total Cost	-1000	-1000	-1000	-1000	-1000
Profit	-19	982.5	710	700	950

Figure 4

Price Rate \ Situation	10 Customers for the day	Traffic Jam for 9 hours	Traffic Jam for 9 hours (Time Adjusted)
Start 1 KM (35 baht)	350	35	35
Traffic Jam (1.5 & 2 baht/ minute)	0	810	1080
Distance Driven (Fare Rate)	1360	136	136
Total Revenue	1710	981	1251
Total Cost	-1000	-1000	-1000
Profit	710	-19	251
% Different Compared to 10 Customer for the day	0.00%	74.31%	36.69%

Figure 3

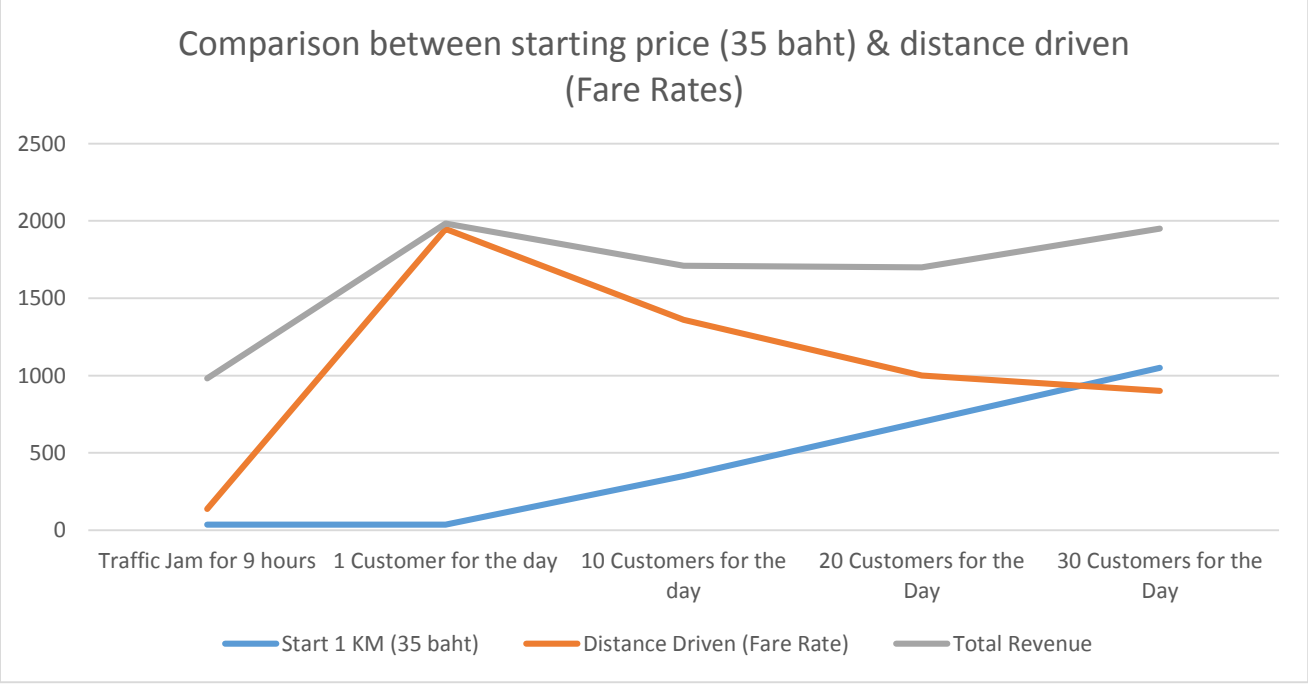

Figure 1 shows all the data obtained from both interview and literature review. Many taxi drivers claimed that they only have 10 hours of providing service even though the renting price stated for 12 hours. This is because taxi drivers needed some time to get the car and themselves ready before providing the service. These include eating lunch, refill the fuel for the car, and tidy up the car. Total cost of taxi drivers can be divide into 2 part, rented cost and other cost. Rented cost is the cost of borrowing the car, which is approximately around 500-600 baht per day. Other cost include cost of tidy up the car, filling gasoline, and taxi driver's lunch. The sum of these two costs is around 1000 baht per day, which can be calculated as 83.33 baht per hour. The average distance of the whole day service is around 250 KM, but 32% of 250KM, 80 KM, is the distance that taxi driver do not have any passenger on board. In other word, it is the time and distance spent in order to find new customers.

Figure 2 shows the current taxi fares rate being used nowadays. There is an increase in price rate as the distance of service increase. The best rate that taxi driver could earn is 8.5 baht per 1 KM, but it would take 80 KM and more to achieve this price rate. The amount of time the customer spent on the taxi would be price at 1.5 baht per minute, either the car is running or getting stuck in the traffic.

After all kinds of information are gathered, next step would be finding the different in level of income between each situation that taxi driver might face during the day. These situation are assumed at the extreme level in order to be easily understandable and clearly comparable. Figure 3 shows the different in each cases. First case assumed that there is only one customer for the day and taxi driver got stuck in the traffic jam for the whole day with that customer. In this case, taxi fare rate would be mainly from the time meter. The time meter runs only when the car is park at the rate of 1.5 baht per minute. Hence the total taxi fare in this

situation would be 981 baht. Second case assumed that there is only one customer as well, but this time the taxi get to run for the whole day non-stop, no traffic jam at all. In this case, taxi fare rate would be mainly from distance meter. The distance meter would calculate the fares using the fare rates according to Figure 2. Hence the total taxi fare in this situation would be 1,982.5. This means that the difference in revenue between these 2 cases is more than 2 times, it can be conclude that rational taxi driver would definitely prefer second case to the first case. In other word, taxi drivers do not want to engage in any traffic jam, because it reduces the potential maximum revenue that a taxi driver could get.

Third case assumed that there are 10 customers per day with no traffic jam. In this case, taxi fare would be mainly from the distance meter as well. But the price do not mainly come from the distance driven, but also some contribution from the starting price at 35 baht per customer. Hence the total revenue from this situation is 1,710 baht. The revenue from third case is quite close to the second case. Forth case and Fifth case also have been calculated under the same assumption as third case. The only different is that there are more customers per day while each trip per customer become shorter and shorter as the number of customer increase. This means that the higher the number of customer the higher the revenue that taxi driver could earn.

Even though second case gives the highest total revenue but in reality it is not really feasible. Because it is not easy to find a customer who would like to travel a long distance which would take almost 10 hours by taxi. So second case is like the ideal case, which is not feasible. But there is also another way that can earn revenue as close as the second case, which is the fifth case. As the number of number of customers per day increase, the amount of revenue increase as well. The fifth case shows that it is possible to achieve similar level of revenue as second without driving a long distance for 1 customer. It shows that by taking about 20-30 customers

and make each trip very short, taxi drivers can earn the similar amount of revenue. Hence the total revenue from the fifth case is 1,950 baht. The relationship between each factor that contribute to the taxi fare is shown in figure 5. This explains why taxi drivers may reject customers whose destination is too far.

After cost-benefit analysis, it can be conclude that current taxi fare rate do not guarantee certain among of revenue. Because each situation gives different amount of revenue, and the gap of revenue between each situation is very big as well. It can be seen from figure 4 that traffic jam can reduce the potential amount of revenue that a taxi driver could earn by 74%. Hence when the gap between each situation is big, taxi driver realize that some specific situation gives higher revenue. If taxi driver keep getting into the worst scenario, taxi drivers could incur losses. So self-maximizing revenue strategy is developed, which result in rejecting some specific type of customers.

In order to reduce the problem of customer rejection, the suggestion from this study would recommend setting the price rate that would reduce the revenue gap between each situation. According to figure 4, the difference in revenue between traffic jam case and 10 customers per day is about 74.31%. This revenue gap makes taxi driver reject any destination that might be associated with traffic jam, as traffic jam reduce the potential revenue of the taxi driver. This revenue gap can be reduced by setting the time meter, make the rate time per baht higher than before. Assume that the rate of time per baht is now 2 baht per minute, the revenue that taxi driver would get in the worst day of traffic jam would be 1,251 baht. At this level of revenue, the revenue gap compared to 10 customers per day become 36.69%. This clearly showed that the revenue gap is reduced. At this rate taxi drivers may not reject destination that is not heavily traffic jam, because they know that they got some compensation more than before.

Even though this assumption 2 baht per minute does reduce the revenue gap, but there are more factors needed to be considered as well. If this policy is actually imposed to taxi industry, it may or may not change taxi drivers' behavior. First, some taxi drivers may not be satisfy with this new rate. Some taxi drivers may still believe that avoiding the traffic is still the best thing to do, so they would not really change their behavior. Second, there is some recognition lag for taxi drivers to realize how much revenue gap is actually reduced. It would take some time for these taxi drivers to experience all kinds of situation and compare the revenue from each cases. In short run recognition lag may take place, and nothing would be changed yet. Third, this policy aimed to solve only traffic jam problem, but not the asymmetric information about destination preference. If taxi driver want to go to the opposite direction with customer, taxi driver might still reject their customer again. This means that if this policy is really imposed, there are still many uncertainty involved here. Rejection problem may or may not be reduced.

This study has showed that the reduction in taxi supply in Bangkok is not associated with income targeting theory like New York City. The main factor reducing the quantity supply of taxi are the taxi fare rate, traffic in Bangkok, and taxi driver's behavior of maximizing profit. Traffic jam and taxi fare rate are the main factor contributed to revenue gap in each situation. There is a big dispersion in total revenue from the worst day of traffic jam and the best day of having 10-20 customers per day. So the revenue gap lead to taxi driver's behavior of maximizing profit, by choosing the best type of customers and reject the rest. One of the possible solutions is reducing the revenue gap by set up the new taxi fare rate, in order to make each customers and destination become indifferent. When it is indifference, taxi driver would not have opportunity cost forgone, only then taxi driver would not reject some specific type of customers.

But the optimal taxi fare rate that would maximize both customer and taxi driver would have to find out later. Because if the fare rate is too high, it will benefit only taxi drivers. On the other hand if it's too low, taxi driver would be worse off. So the taxi fare rate should be set up the level that reflect all taxi drivers' cost, and at the same time not too high for customers as well. For recommendation on further study would be finding the optimal taxi fare rate that maximizing social welfare

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