

THE ECONOMICS OF SMARTPHONE TECHNOLOGY AND THE TAXI MARKET

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The discussion of deregulation in the taxi industry has always been hampered by the possible negative effects on pricing, safety and quality of service. In this intriguing essay, Jamie Wilson outlines how the widespread use of smartphone apps such as Uber and Hailo may act to circumvent these problems. Ending on an optimistic note, he states that these apps could provide the means by which the efficiency of this industry could be greatly enhanced.

Introduction

The taxi industry has long been characterised by its extraordinarily high levels of regulation. A cornerstone of regulation in many taxi markets is the quantitative restriction of driver licences which prohibits market entry. Other key regulations often include; fixed pricing, vehicle specifications, rules on safety and driver examinations (Bekken, 2007). For many, these strict regulations are deemed necessary as it's argued that the unique aspects of the market mean that liberalisation could have disastrous consequences. For example, in 2007 The European Conference of Ministers of Transport (ECMT) proposed a number of negative impacts from taxi deregulation which included suggestions that deregulation could lead to, amongst other things: chaos on streets, an increase in accidents, a decline in vehicle standards, and control of the sector by monopolistic dispatch centres (ECMT, 2007).

This negative view of deregulation of the taxi market is, however, hotly contested. There are a number of examples of jurisdictions who have loosened regulations in the market without experiencing the doomsday scenarios as previously set out by the ECMT and others opposed to such moves. In fact, deregulation in some cases, like in Ireland, has led to extremely positive results with the Irish market seeing customer waiting times plummet and the taxi sector being elevated in importance as a form of public transport (Barrett, 2010).

What this discussion aims to explore is the role technology can play in this debate around taxi regulation. In particular we will be looking at the increased prevalence of what are known as 'Transportation Network Companies', 'Real Time Ridesharing Services', or, as will be referred to here, 'Digital Dispatch Services' which have recently en-

tered the market (State of California, 2013; District of Columbia, 2014). By looking at how these companies harness smartphone applications, we can see how such technology solves some of the key problems which proponents of regulation often use in their arguments. Specifically, this piece will focus on the key topics of: passenger safety, quality of service, and the issues around pricing. In addition, an analysis of how the industry has reacted to these companies will be addressed. Firstly, however, we will delve into the details of these Digital Dispatch Services.

Digital Dispatch Services

The birth of the internet has helped transportation develop in a number of areas such as the airline industry, where it facilitated disintermediation and helped truly open aviation to the masses. Thanks to the mobile nature of smartphone technology we are now seeing the benefits associated with the internet trickle down to the taxi market. The proliferation of smartphones into everyday life for consumers in developed economies has seen the market for smartphone taxi applications or 'apps' (as they will now be referred to) flourish. 'Uber', 'Hailo', 'Gett', 'Green Tomato Cars' and 'MyTaxi' are but a few of the major players in the market. These brands offer a broadly similar service whereby companies link up customers and taxi drivers to each other via their smartphone's GPS technology which allows customers in real-time to order a taxi to their current or desired location. This process is known as 'e-hailing'.

In less than five years these companies have had a significant impact on the marketplace. It is reported that Uber, established in 2009, recorded an estimated \$1 billion dollars in bookings in 2013 (Panzarino, 2013). Similarly, Hailo, incorporated in 2011, boasts of an e-hail accepted every five seconds somewhere in the world and annual sales of over \$100 million (Sawers, 2013). The location of these apps is focused around the larger cities of the United States, Europe and Asia. The scale of these businesses explains how this technology has already had a significant effect on how people take taxis.

Safety

The umbrella term of 'Safety' is often used in the tag lines or mission statements of taxi regulators and lobby groups. Although this term includes a variety of customer safety risks with hiring a taxi, such as vehicle collision or vehicle failure, the type of safety which will be examined here is with regards to the possibility of customers being violently or sexually attacked by drivers. If we consider the intimate nature of taxi driving, vulnerable customers such as lone women or the elderly could be seen to be at risk of driver attack. British Police figures reveal that every year around 200 to 250 cases of sexual assault by cab drivers are reported in London. It's worth mentioning however that these crimes are committed by unlicensed cab drivers which the police point out are used by customers due to the lack of legal taxi services (Metropolitan Police, 2012).

Although there is little conclusive data on the rate of these types of crimes in officially licenced taxis or if such rates even increase following deregulation, this issue is often used in defence of regulated taxi markets. For example, in response to proposed market liberalisations in Australia, the Victorian Taxi Family Group emotively claims: 'PASSENGER SAFETY JEOPARDIZED WITH TAXI INDUSTRY DEREGULATION' (Victorian Taxi Family, 2013). Regardless of rates however, certain unfortunate cases do undoubtedly occur and thus reducing the capacity for such crimes should be held in extremely high importance for those in control of the sector.

For a large proportion of the previously mentioned apps a key aspect of their service is the implicit safety features which they provide. For most of these apps, in order for customers and drivers alike to avail of the service, both sets of stakeholders must register online profile accounts. Details on profiles include; names, addresses, credit card details and in the case of drivers, their licence identification. When customers successfully avail of these services a record of the trip is registered with the affiliated company as well as with the passengers and drivers. These records include all the details on transactions such as date, time, price paid, location (pick up and drop off) and the specifics of the drivers and customers profiles. What this means is that if a violent crime were to occur, there is clear evidence which places both the driver and the customer together at that specific time, which obviously highly increases the risk of detection.

By increasing the risks of detection, these apps apply the criminology theory of 'Situational Crime Prevention'. This is where the capacity for crimes to occur is greatly reduced where efforts are in place which increases the likelihood of offenders getting caught (Cornish and Clarke, 2003). What this feature also does is work inversely and provides protection for the taxi drivers. Although rates of driver attacks on customers are unclear, what is certain is that taxi drivers are in serious risk of attack. In the USA, taxi drivers are twenty times more likely to be murdered on the job than other workers (OSHA, 2010).

Quality

The way in which the traditional taxi market operates means that there exists a view that if taxi markets were to be deregulated a decrease in quality of service would likely ensue. The ECMT, who were referred to in our introductory paragraph, explain this concern:

"Another argument for regulation arises from the fact that taxi users cannot have prior knowledge of the quality of the service offered. An unsafe vehicle or incompetent driver cannot normally be identified by the customer in advance. In this sense as well, taxi service constitutes a "credence good"."(ECMT, 2007, p.158)

It is believed that this aspect of quality is particularly applicable to the cruising taxi market (rather than the telephone booking market where drivers represent company reputations) because individual taxis pick up and drop off customers on a 'one off' basis, so as such, the importance weighted towards repeat custom is low and thus the incentive to provide an exemplary service is greatly reduced (Heyes and Liston-Heyes, 2007).

The solution posed by the smartphone based companies to alleviate this problem is quite simple. A central aspect to their service offering is the idea of driver feedback. At the end of each taxi journey, along with the driver and customer details being recorded the customer has the opportunity to provide both quantitative and qualitative feedback on their experience to the company in question. This feedback can constitute all aspects of service, from driver interaction to the condition of the vehicle. This means that drivers are now held accountable for their 'one off' customers as feedback is based on the aggregated experience of all trips used through the apps. Not only does this greatly increase the incentive to provide good quality customer service but it also means that the potential for the service to be considered a 'credence good' is greatly diminished as poor quality drivers are essentially screened out of the market.

Pricing

Along with the restriction of market entry, another area which is highly regulated by those in control of taxi markets is pricing. Fixed fares are often put in place with rates usually being based on some formula of fixed cost, distance and/or time of journey.

Christian Seibert, in his paper 'Taxi Deregulation and Transaction Costs' discusses why the high transaction costs in searching for a taxi may make deregulated pricing inappropriate (Seibert, 2006). Seibert states that in a market where prices are deregulated, while finding a cheaper taxi fare would provide benefit to customers, it also imposes a transaction cost in terms of the time taken and the effort expended in locating the cheapest fare. This can mainly be attributed to imperfect competition and co-ordination problems in a deregulated taxi market. To illustrate, Seibert proposes an example:

"A customer may be standing on a street corner hailing down taxi after taxi trying to find a taxi with a fare with which they are satisfied, a process that takes time and effort. All the while, there may be a taxi prepared to charge a satisfactory fare, but it is driving down a street one block away so the customer will not be able to hail it." (Seibert, 2006, p.72)

These smartphone technology applications have the capabilities to remove these imperfect competition and co-ordination problems that Seibert discusses. Through these apps customers are able in real time to search for taxis which are near their location, or near a location where they wish to be collected. With the available technology the fare can be negotiated with the taxi driver or the company through the software on the appli-

cation. Not only would the comparative levels of effort be greatly reduced in searching for an appropriate fare, but the problems of imperfect competition and coordination would also be removed. However, as a large proportion of developed economies fix prices for most taxi services, such a pricing system would be prohibited.

Many would argue that even with the advantages of pricing through smartphone technology, with deregulation prices would become distorted as a monopolistic market would emerge amongst the Digital Dispatch Service companies. This fear is based on experiences of such conditions developing within the somewhat similar telephone dispatch market (Darbéra, 2012; Heyes and Liston-Heyes, 2007). However, thanks to mobile internet even if a monopolistic market were to develop the likelihood for monopoly pricing to occur is highly unlikely. Already there exist smartphone applications in the taxi market such as 'Kabee' which run price comparisons on nearby taxi companies, therefore allowing consumers to choose the lowest fare. This is similar to how technology is used in other price deregulated markets like the airline industry, with services like 'Skyscanner' and 'Google Flights' key to ensuring firms compete on price (Buhalis and Law, 2008).

When we look at how the previously mentioned app 'Uber' prices its trips we see how smartphone applications not only alleviate deregulation concerns but can in fact vastly improve the efficiency of current systems. Because Uber only uses 'Private Hire Vehicles' (unlike taxis these cannot be hailed from the street but must be pre booked) it has allowed the company to bypass many jurisdictional fixed pricing laws (Darbéra, 2007). The pricing strategy that Uber operates is known as 'Surge Pricing'. This is where at times or areas which have greater demand for Uber drivers (such as Saturday nights or specific areas in a city) the rate of fares go up. Similarly, at times of low demand or areas of low demand, prices fall (Uber, 2012). Because the company records the details of all trips it knows in real time exactly what and where demand is and as such can price accordingly.

In effect, how Uber calculates its fares is how most other markets in the economy establish prices, i.e. by using the basic economic theory of supply and demand. During times of high demand and undersupply, companies or in this case, taxi drivers, are encouraged to enter the market because of higher prices. This flexible pricing allows supply to meet demand and the market to reach equilibrium.

Compare this pricing to the fixed pricing currently used by most regulators. Although proponents of such a system could argue that prices may at times be lower in monetary terms, customers are in fact forced to pay with their time rather than their money. This is because during periods of severe under supply there are no tools in the market to deal with such conditions which obviously results in more time spent waiting for a taxi. With no incentive to increase supply, customers are forced to wait for lengthy periods. Under surge pricing, although prices may be higher at times of high demand, certain customers will be willing to pay money for the time that would otherwise have been lost waiting for a taxi under the fixed price system. Even if other customers wouldn't be will-

ing to pay peak prices, by increasing the reward for drivers, supply is encouraged to quickly enter the market which promptly results in demand being met and the deflation of prices back to normal levels (Chow, 2014). The efficiencies of such a system are apparent and it's clear that with smartphone technology the potential to far eclipse the current methods of pricing are now available to us.

Industry Response

It's worth noting the adverse reaction from the taxi industry towards these new smartphone based businesses. In many states in the USA, lobbyists have successfully persuaded regulators to effectively ban such companies from the market. The International Association of Transportation Regulators has dubbed Digital Dispatch Services as: 'The Rogue Apps' (IATR, 2013). In Paris, major protests took place to remove the firms from the market as drivers attacked Uber vehicles leaving some passengers with minor injuries (Shontell, 2014). The incumbent's main argument is that the apps are breaking certain technical definitions of the law. Rather than such an argument supporting their position many believe this is posing to show how such rules have well past their sell by date (Downes, 2013).

The industry's scathing response of this new technology does little to curb the impression that the taxi market is an industry dominated by 'Regulatory Capture'. This is where a regulatory agency advances the concerns of interest groups rather than acting in the public interest (Stigler, 1971). Many economists, even those in favour of regulation, have admitted that a major reason behind high regulation is due to the rent seeking abilities of the incumbents. By restraining supply with explicit or implicit barriers to entry, the incumbent taxi drivers and firms are allowed to reap the supernormal profits from a market relatively free from competition. Such an opinion is all but supported by the industry's hostile reception, as the sector attempts to protect the regulations which benefit the producer at the expense of technological improvements which so clearly enhance the welfare of the consumer.

Conclusion

By alleviating many of the fears associated with a deregulated taxi sector, Digital Dispatch Services greatly promote the view of market liberalisation. In addition, the new technology essentially reveals the true colours of the sector's incumbents and supports the idea of regulatory capture. This view posits that monopolistic rewards are the real reason behind regulations with the issues of safety, quality and pricing being used as a guise. As we have examined, these issues are dealt with by smartphone technology and in many cases such as pricing the Digital Dispatch Service system has enormous potential to improve upon current market efficiencies. In effect, these innovations have jeopardized the supernormal

profits earned by incumbents by removing justifications for regulations which have shielded the sector from market forces which affect nearly all other areas of the economy.

As French taxi economist, Richard Darbéra points out to us: 'When looking back through history, the taxi industry seems to evolve from crisis to crisis, punctuating more or less lengthy periods of stillness' (Darbéra, 2010). It would seem that we are now experiencing one of these moments of 'crisis' with Digital Dispatch Services. The hope is that as the substantial benefits we have examined become more and more apparent for consumers, regulators will be forced into allowing this technology fully operate and thus truly enhance the efficiency of taxi driving as a form of transport.

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