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## **Theory meets practice in the taxi industry: Coase and Uber**

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## Raktas Working Paper series

### Theory meets practice in the taxi industry: Coase and Uber

**Keywords:** Economics, Coase Theorem, Uber, Transaction Costs, Social Utility, Nature of the firm, Disruptive Innovation, Mobile app, Taxi industry, Raktas, Justin Jenk

#### Abstract

This paper demonstrates how the transformation of the taxi industry is an example of Coase's Theorem in practice. The Coase Theorem, as postulated by Nobel Laureate Ronald Coase (1991), is one of the simplest yet profound ideas in economics. The recent advent of new mobile app entrants in the regulated taxi industry, (such as Uber and Lyft) based on: technology, disruptive innovation; mobile app based businesses; using digital practices with smartphones as the core platform, have allowed the recent and ongoing transformation of the city defined, regulated and oligopolistic taxi markets; with value-added effects. The mobile app taxi companies and their business actions are reducing transaction costs, increasing social utility and disaggregating the structure of firms – in keeping with Coase's Theorem.

#### The Coase Theorem

The Coase Theorem, as postulated by Nobel Laureate Ronald Coase (1991), is one of the simplest yet profound ideas in economics. His insights as postulated in: 'The Theory of the Firm' (1937) and 'The Problem of Social Cost' (1960) have been summarized as the "Coase Theorem" (a term he never liked).

Specifically, the Coase Theorem states that "if trade in an externality is possible and there are no transaction costs, bargaining will lead to an efficient outcome regardless of the initial allocation of property rights". George Stigler restated it: "with zero transactions costs, private and social costs will be equal".

The concept that economic efficiency is achieved best by full allocation of, and completely free trade in, property rights. It states that what really matters is that everything is owned by someone and that, initially, who owns what doesn't matter.

The concept is based on two main ideas:

- (1) Freedom of individual choice, and;
- (2) Zero transaction costs (expenses associated with the process of buying and selling).

The theorem helps explain the unprecedented cost advantage that online and digital firms will have in the marketplace (where transaction costs are approaching zero) over the traditional firms. Also it helps explain the structure of firms (especially in house vs devolved functions) and has several other applications, such as in who pays for the pollution costs. Therefore Coase's Theorem has three characteristics: reducing transaction costs; increasing social utility; and changing the nature of participating firms.

The ongoing transformation of the regulated taxi industry - regulated, entrenched and monopolistic - by the arrival of new entrants using technology and digital based business is another example of the Coase Theorem at work.

## **Taxi industry undergoing radical change from mobile app based new entrants**

The business system based on mobile apps for taxi booking or ridesharing to better meet user-rider-passengers' key buying factors (KBFs) is an emerging and disruptive approach in this highly regulated and entrenched taxi industry, resistant to change. Through management of the taxi value chain (e.g. improved booking, responsiveness, availability and payment) these mobile app companies manage virtual fleets. The leading proponent is Uber, but there are others, such as Lyft and Hailo.

The taxi industry is a monopolistic, highly regulated and ossified one. Licensed taxis (operated by owner-operators) provide metered fares at set rates. Regulations are organized around individual urban markets and subject to local ordinances, practices and politics.

Current industry practices and structures are being challenged. Often licensed taxis are hailed from the street and fares paid in cash (e.g. London has 23,000 licensed black cabs, New York City 40,000 medallion yellow cabs.) These fleets are a supplement by radio-taxis and chauffeur services (allowing for increased capacity, but requiring booking). Payment methods and fares remain confused.

The taxi industry is characterized by poor behaviours: entrenched providers; poor infrastructure, inefficient booking, pre/post journey delays, poor capacity-supply/demand management, poor service & fulfillment, questionable vehicle quality, (in)experienced drivers, poor Consumer Experience (CX), high/monopolistic fares, payment confusion, difficult working conditions.

To date changes by incumbents have been bolt-ons to existing analogue businesses (e.g. credit card payments, telephone and computer bookings) but in a haphazard manner.

Some cities have tried to manage the capacity imbalances (e.g. Stockholm with unrestricted pricing; London by increasing the min-cab/radio fleets and seeking to coordinate fleet capacity within its overall public transport authority-TfL; Washington DC with temporary ordinance changes).

While journey times are invariably similar the KBFs of users-passengers-riders are clear the ability to secure a taxi, waiting times for pickup, journey quality, fares and payment add important quality and time issues that drive customer KBFs.

Mobile app-led new entrants have used disruptive strategies; challenging established regulations and practices, through a complete redesign of the value offering to enhance consumer utility and value. By applying technology, digital business and communication practices to improve service levels, margins and engage consumer support the mobile app new entrants are forcing changes to regulation and industry behaviors. Incumbents have largely relied on legal redress to meet this competitive threat, rather than change their existing practices.

The two taxi mobile app leaders are: Uber (rapidly scaling a productive commercial model) and; Lyft (leveraging the emerging trend of open-source and sharing to provide a rideshare). Other new entrants are challenged and incumbents are struggling to redesign existing pre-digital businesses.

## **Transaction costs reduced by mobile app based taxi companies**

It appears that mobile app taxi companies are providing reductions in prices and costs (individual as well as aggregate) when compared to established licensed incumbent taxi operators

A comparison of Uber's actual fares, compared to licensed and metered incumbents for a selected number of US cities (such as Yellow medallion cabs in New York City) reveals a consistent pattern (Figure 1). Uber's fares are consistently lower, whether on a time (minutes) or motion (speed) basis. The observed relationship is strengthened as time and motion increase.

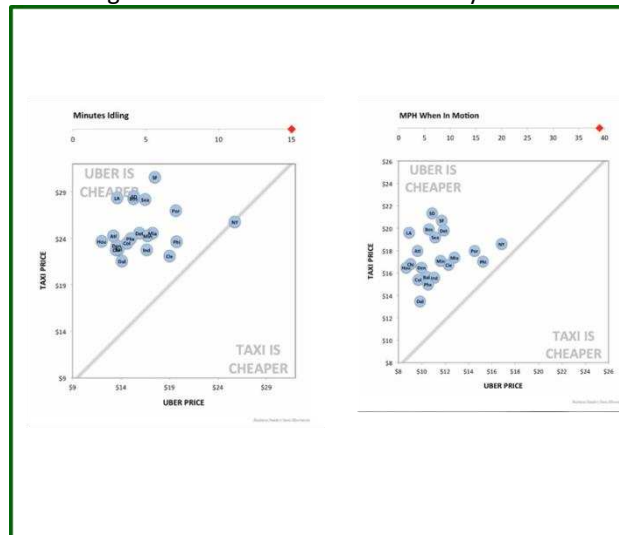
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Figure 1: Uber fares are consistently lower.



This pattern is consistently observed across all 21 sampled US cities (Figure 2). The price differential is even greater if tips are included (as these are already incorporated in Uber’s fares).

Figure 2: Uber fares are lower across US cities

	Uber	Taxi +20% Tip	Taxi / Uber
New York	17.75	18.60	1.0
Philadelphia	15.25	17.04	1.1
Portland	15.05	18.00	1.2
Cleveland	13.00	16.74	1.3
Dallas	10.30	13.50	1.3
Miami	13.25	17.40	1.3
Indianapolis	11.65	15.60	1.3
Phoenix	11.00	15.00	1.4
Minneapolis	12.15	17.10	1.4
Baltimore	10.75	15.66	1.5
Columbus	10.20	15.42	1.5
Denver	10.35	16.50	1.6
Detroit	12.30	19.80	1.6
Seattle	11.70	19.20	1.6
San Francisco	12.30	20.70	1.7
Chicago	9.50	16.80	1.8
Boston	11.10	19.92	1.8
Atlanta	10.00	18.00	1.8
Houston	9.00	16.50	1.8
San Diego	11.35	21.36	1.9
Los Angeles	9.40	19.62	2.1

Much has been made of Uber’s variable pricing (“surge”) policy; to reflect supply & demand dynamics (such as an eight times increase during a recent New York snow-storm). Yet their occurrence and duration does not alter markedly the observed pattern.

Thus Uber (and the other mobile app operators) are reducing transaction costs.

## **Mobile app taxi companies are increasing social utility**

Mobile app taxi companies whether based on a commercial service (i.e. Uber) or rideshare basis (i.e. Lyft, UberX), provide increased social utility across a number of dimensions.

An analysis by the Massachusetts Institute of Technology (MIT) with regard to Manhattan taxi journeys suggests the significant increases in social utility (Figure 3). The savings see reductions in time expended pre- and post-journey. (It should be noted that actual journey times appears to be similar whether by a mobile app taxi or licensed one – not unexpectedly). The average time reduction in the overall total journey time is estimated between 20 to 30 percent.

Figure 3: MIT analysis of Manhattan taxi journeys

- Increased availability/access
- Reduced search time from many minutes to seconds
- Reduced pre-journey time from 10 minutes to 1 minute
- Reduced post-journey time 15 minutes to 1 minute

The analytical work of MIT seems to be corroborated by a four day field test conducted by a mobile app taxi company, Bandwagon (in Las Vegas in 2014). These findings point to similar and additional benefits; such as reduced emissions (Figure 4).

Figure 4: Bandwagon's Las Vegas field test findings

- Reduced fares and costs by US\$ 18,000
- Reduce carbon emissions by 1,000 lbs
- Reduced average journey times by 32%

Thus, it would seem that Uber and the other mobile app taxi operators are delivering increased social utility to consumers and society: directly and indirectly.

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## Firm's structure are being altered by mobile app companies actions

The existing taxi industry structure is highly regulated usually city markets with a set number of licensed owner operators charging a fixed metered tariff (such as in London and New York City) in addition to a few oligopolistic suppliers (such as radio-taxi and chauffeured services). While notionally owner-operated these incumbents are organized and regulated in an oligopolistic manner; with high barriers to entry and change.

The mobile-app based taxi companies are 'new entrants': using technology, digital dynamics and legal challenge to force radical change in the taxi industry. They are encouraging the dismantling of existing monopolistic structures to improve capacity, efficiencies and performance through improved consumer benefits and functionality, reduced costs lower prices and investment levels with improved returns and other social benefits (reduced congestion, carbon outputs etc.).

Uber is the leading example of this new firm. It is an asset light enterprise. It does not own its taxi fleet. It controls the essential functions of booking, fare setting, payment and brand communications with a minimal staff. The role of Uber is to match user-passenger-rider with Uber vetted drivers; who transact directly, with Uber's assistance. It has changed user behaviours; even how companies expense Uber rides!

The mobile app firm's role is to ensure critical functions are provided that allow passengers and taxi operators to engage one another:


- Search and availability
- Booking
- Tracking
- Payment.

In addition Uber provides critical quality control:

- Selection and vetting of participating drivers as well as ratings (of driver and passengers)
- Overall standards
- Legal
- Brand equity and associated Communications.

Furthermore, Uber is forcing changes in the structure of markets. The industry is typified by local city markets. New York City is an excellent example (Figure 5). In just four years, Uber now has at least an equal share of market as licensed incumbents (as defined by number of vehicles).

Figure 5: New York City share of market

		TLC cabs
<b>Number of taxis</b>	14,088	13,587
<b>Implied share</b> <small>(40,000 total registered taxis)</small>	35%	34%
<b>Daily rides</b>	29,333	440,000
<b>Rides/taxi/day</b>	2	32
<b>Driver hours/week</b>	40	140

This makes it the market leader. (It should be noted that share measured by number of rides, provided capacity and revenues don't indicate leadership, but a sizable position). It is not clear if Uber has forced an

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'asymmetry of choice', which would see rationalization of a market. However, its actions in the New York City market, along with Lyft, have seen the exit of another new entrant – Hailo – unable to compete.

Uber's innovation has seen the rise of an alternative business model, rideshare. This approach involves developing and managing a network of participating private drivers to interact with passengers. A rival firm, Lyft, operates exclusively on this model. Similar central corporate functions are provided, similar to those of Uber. As a competitive response, Uber has adopted this concept and brands it as "UberX". This model is reportedly 20-30% cheaper than its standard Uber offering.

Mobile app taxi companies are an evolving in the organization structure and process. This represents the third aspect of the Coase Theorem.

## **Summary: mobile app companies in the regulated taxi industry support the Coase Theorem**

In summary, the ongoing activities and evolution of mobile app taxi companies are forcing a complete change and transformation of the taxi markets of the world - city based and regulated. Their actions and effects are proving Coase's Theorem and its postulation of: decreasing transaction costs, increased social utility and impact on the structure of firms.

The actions of the 'new entrants' is a text book example of applying disruptive innovation to create value in an ossified industry (such as with low cost airline, utilities, telecommunications/mobile phones). Harvard Business School's Clayton Christensen characterized the attributes as: (i) creating a clear margin advantage; (ii) creating a sustainable business system advantage; and (iii) forcing industry and market place changes (especially capacity). Uber would seem to meet all three of these disruptor criteria.

Successful entrants have completed redesigned the whole business system from a user's perspective to improve cost- quality-time aspects by using technology and digital practices to challenge entrenched regulated behaviors.

The regulated taxi markets are being forced to change as a result: with significant benefits to consumers, industry stakeholders and society.

- Transaction costs are reduced.
- Social utility is improved as availability is increased and travel times reduced with myriad direct and indirect benefits.
- Participating firms are being forced by technology and digital dynamics to disaggregate from oligopolies into networks of individual owner-operators and participants (for rideshare). These changes to firms have significant implications to future firm structures, work practices and policies.

The taxi industry provides some excellent examples for:

1. Proving Nobel Laureate Coase's social utility at minimal transaction costs;
2. Interaction of Innovation and Regulation;
3. Disruptive innovation strategies;
4. Digital company best practices.

This working paper's topic, as well as the four cited examples, warrant further investigation and discussion; with implications to enterprise performance, investor actions and returns as well as policy.

The contents of this working paper reflect the work Raktas has provided to relevant decision-makers in the industry.

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## About

### **Raktas**

Raktas is a specialist firm that offers growth and restructuring solutions to build businesses as well as transform companies and financial institutions; usually with an implementation component. Services are directed at decision-makers that believe their organizations are facing complex situations and resource constrained.

### **Justin Jenk**

Justin Jenk is a business professional with extensive, practical experience from a successful career as a manager, advisor, investor and board member. He has an established track-record of delivering value-added solutions. He is a graduate of Oxford and Harvard.

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