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Taxis as urban transport

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Summary:

Taxis are an instantly recognizable form of transport, existing in almost every city in the world. Still the roles that are filled by taxis varies much from city to city. Regulation of the taxi industry has a long history. However this has not yet resulted in a universal solution. The taxi industry is complex and therefore it might be the case that there is no such solution at all. This report discusses the merits of different regulatory systems, provides a guide for evaluating different forms of regulation and assesses which system is most suited to the city in question.

Sammendrag:

Drosjer finnes i alle byer og de er umiddelbart gjenkjennelige. Likevel er det stor variasjon i hva som ligger i begrepet drosje, og hvilken rolle drosjene har i det lokale transportsystemet. Denne rapporten peker på ulike reguleringsformer, forklarer bakgrunn og viser til gode og mindre gode eksempler på drosjeregulering. Rapporten konkluderer med en generell veiledning til temaer som må vurderes når en skal regulere drosjenæringen og hvilke føringer ulike prioriteringer gir på hvilke virkemidler som bør benyttes.

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Preface

Taxis are an important part of the transport system in most developed and developing cities. Still "the taxi" does not refer to the same concept everywhere. A combination of local markets and heterogeneous market structures result in wide set of challenges for authorities seeking to regulate the industry. This heterogeneity can probably explain why so far there is no singular solution to the regulatory challenges the industry presents. This report provides an overview of different approaches to taxi regulation.

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Contents

Public safety, congestion, market failures and city image, are four among many arguments for public intervention in the taxi markets. The best way for a public authority to intervene in the taxi markets will depend upon a number of factors, several of them of local. This report provide a summary of knowledge on taxi regulation, with emphasis on urban environments. For analytical purposes the taxi market is divided into four market segments, street hail/cruising, rank/stand, pre-book and contracts.

There are three general types of regulation; quantitative, qualitative and economic. Quantitative regulation of the taxi markets will typically be to limit entry by restricting the number of licenses. Qualitative is most often to limit market entry by requiring all drivers to pass a test, and setting requirements for which vehicles can be used in taxi service. Economic regulation is mostly related to setting fares. From a theoretical point of view qualitative regulations will be preferable as it can provide a clear link between the public authority's objectives and means used to regulate the industry. However in order for qualitative regulations to be effective, they require both resources in monitoring and appropriate means for sanctioning. From the point of view of the regulators quantitative regulation can be a more cost efficient approach. As the number of licenses is an easily observable and controllable variable, that can be linked to a number of the objectives of the regulator. Economic regulations can be combined with both qualitative and quantitative regulations. Empirical experience suggest that to have an active regulator, with the necessary toolbox, is more important than whether the regulation is based upon quantitative or qualitative restrictions.

Taxis are a part of a functioning community and although the concept of taxis are almost universally recognized very few persons in the general public actually knows how the taxi industry works. Similarly the term "taxi" does not mean exactly the same everywhere. It varies from country to country and in many cases from city to city within a country.

There are several challenges that the taxi industry is faced with in the market solution. This includes safety, quality, competition with other modes, social issues and illicit behavior. The obvious solution is to regulate the industry. This report points at the rationale behind and experience with different forms of taxi regulation.

Taxis provide a point-to-point service to the general public and are therefore part of "public transport", even though the lack of regular schedules, routes and set stations – all features characteristic of public transport – gives it a semi-private character. As fixed service systems cannot support all travel demand, full area coverage is dependent on taxis.

The definition will usually vary from country to country and include different market segments. In this report, the word "taxi" is defined as "a vehicle with a driver available for hire by the general public", The vehicles are smaller than buses or coaches and registered for a maximum of nine persons. This is not the only definition of a taxi, it is one of many.

The taxi market

There are four major market segments in the taxi industry: hail, taxi rank, pre-book and contract. The hail and taxi rank segments are unique to the industry, while the pre-book and contract segments overlap to some extent with non-taxi industries, but this will vary with the definition being used.

The four market segments have different properties. This may cause some challenges to the regulating authorities. The hail and taxi rank segments are characterized by one customer meeting one or more taxis and pose unique problems for regulators relating to information asymmetries. The pre-book segment is a much more conventional market, in economic terms as is the contract market.

Market structure

The general public will normally see the taxi as a car with a dome light on top, the name of some company on the side and the word "taxi" and assume that it has a meter, that it is regulated somehow, and that there is a company behind the service they are calling, hailing or stepping into. However, taxi companies today can be, and often are, very different, even in one and the same community. Companies can vary from "the total taxi firm", where the drivers are employees of major companies, and most market decisions are taken at company level in one end of the scale. In the other the "permit only lessor", where the drivers lease the permit to operate a vehicle and is responsible for everything. How the supply side of the market is structured influence how the market responds to regulations. At the same time the market structure will be a function of regulation.

Taxi economics

From the customers point of view the taxi industry provide a flexible and fast service. This flexibility comes at a high price per person kilometre, compared to other modes and as a consequence private taxi markets are mostly local.

From the operator side the industry is characterised by variable turnover, meaning that a taxis revenue will vary from vehicle to vehicle and day to day on top of an underlying weekly and seasonal pattern. This is true between cities, between taxi companies, and between individual drivers. There are many factors contributing to these differences. One of the most important is that although entry requirements to the industry tend to be quite easy to meet, operating a successful taxi vehicle / company takes considerable skill and effort.

The difference in skill and quality is difficult to observe for the potential customer. Together with this chances are that, at least in the street and rank segments, each customer and driver will only meet once. These factors result in an asymmetric relation between driver and passenger. This asymmetric relation is at the core of the economic challenges faced by both the customers, operators and regulators.

Different demand and different solutions

Few comparative studies have been conducted on taxi markets. Those studies that have been conducted illustrate that a taxi is not always a taxi. As an example taxis in New York are primarily hailed on the street, more than 90 percent, while in

Stockholm only about 20 percent of the trips are hailed, the majority is booked by telephone. In cities such as Dublin and New York, most of the population use taxis regularly, while in cities as Paris and Amsterdam large parts of the population never use taxis at all. There is an interdependency between how the taxis are defined and regulated and how they are used. It is also a fact that the urban structure and quality of the ordinary public transport network will affect the modal split and therefore the demand for taxis.

Taxi regulations

Taxi regulation has a long history. It can be traced back to the 1630s in London and probably longer in other cities. The fact that there is a long history for taxi regulation, does not mean that regulating taxis is old fashioned. Many of the arguments used for regulating taxis in the horse drawn era are still valid. The objectives of taxi regulation typically refer to; public safety, congestion, market failures and city image. For analytical purposes it can be useful to divide taxi regulation into qualitative, quantitative and economic regulations. Current trends in Europe is a move from quantitative to more qualitative regulations.

Quantitative regulation has a long history, requiring a license for each vehicle and limiting the number of licenses in the market. In some cases the number of licenses are limited (caped) and tradable, as in the case of New York. In other cases the licenses are personal, following the driver. The advantage of this form of regulation is that it is relatively simple, the main disadvantage is that it is a blunt tool, there is only indirect linkages between objectives such as, safety, market failures and city image and the total number of taxi vehicles.

Qualitative regulations, include vehicle standards, driver standards and so on. As an example the Knowledge exams in London require as a strict quality standard for taxi-drivers in the city. However, everyone that passes this test, can legally operate a vehicle. There are no quantitative regulation. The main advantage of this form of regulation is that it can use indicators that can coincide directly with the objectives of the public authority, such as to ensure that the drivers are skilled and the vehicles are good. However it is costly to monitor such a system and it also require a wide range of sanctions in order to be effective.

Fare regulation is also common. Typically this include setting a fare which is compulsory or setting a maximum fare when trips are charged by a meter. This is done to prevent overcharging. And is directly related to the challenge presented by the information asymmetry between driver and customer.

All of these forms of regulation can be used separately or in combination. The outcome of a regulation will depend more upon how these regulations are implemented, rather than if they are qualitative, quantitative or economic. For regulations to be effective sufficient sanctions must be available.

Recommendations

There are two general recommendations for taxi regulations. First, the taxi markets are local and this has to be kept in mind when taxi operators is regulated. Second, real taxi markets are a complex mix of different segments with different properties. This means that there is no single right answer to the question of regulation. Each

segment has a different theoretical optimal solution. This points in to a multi-tier system (regulating the different segments separately). However there are both economics of scale and scope at work, favouring a single tier system (having the same regulation for all segments).

In terms of which regulatory approach to follow, the link between objectives and regulations are strongest with the qualitative approach, however this approach is costly. Quantitative regulations are much less costly, but is not as easy to link with policy objectives (unless congestion is the main concern). Economic regulations are most suitable to address the information asymmetry in the street market segments.

In other words, in all but the largest of cities, where costs of regulation are low compared with the size of the industry, and the economics of scope from using the same vehicle in different market segments are insignificant. The regulator can choose between several "second best" solutions. As a consequence taxis should not be seen out of context from the other mobility and environmental objectives of a city.

Kundenes sikkerhet, kvalitet på tilbudet, konkurranse mellom transportmidler, miljø, sosiale forhold, kriminell adferd er viktige årsaker til at myndighetene ønsker å regulere drosjenæringen. Hvilke typer reguleringer som fungerer best vil avhenge av de lokale forholdene. Rapporten oppsummerer kunnskap om regulering av drosjenæringen i urbane strøk. Dette inkluderer analyser av de ulike markedssegmentene, praiing på gata, holdeplass, forhåndsbestilling og kontraktsmarkedene.

Det er tre hovedtyper regulering, kvantitative, kvalitative og økonomiske. Kvantitative består i å regulere antallet kjøretøy/eller løyver. Kvalitative består i å regulere forhold som lokalkunnskap, type kjøretøy osv. Økonomiske består i å regulere pris. Hvilken form for regulering som er mest egnet vil avhenge av en avveining mellom fordelene og ulempene med de ulike reguleringsformene. Prinsipielt vil myndighetene ha tydeligst sammenheng mellom mål og virkemiddel ved å bruke kvalitative reguleringer. Samtidig krever slike reguleringer en betydelig ressursinnsats til oppfølging samt reelle sanksjoneringsmuligheter for å være effektive. I praksis vil disse formene for regulering opptre sammen, men i ulike deler. Erfaring tilsier at utformingen av reguleringene og håndhevelsen av dem er langt viktigere for utfallet enn om det styrende elementet i reguleringen er kvantitativt eller kvalitativt.

Konvensjonell kollektivtrafikk er bundet opp til tunge passasjerstrømmer, med ruter og avgangstider. Selv om fraværet av faste avgangstider, traseer og subsidier, gir drosjetilbudet en halvprivat karakter fungerer drosjene som en integrert del av et komplett kollektivtransportsystem, ved at de gir full areal dekning og dør-til-dør transport.

Konseptet med drosjetjenester er svært intuitivt. Som passasjer betaler en for å bli transportert dit en skal. Dette gjør at drosjetjenester i mange tilfeller kan tilbys i et uregulert marked. Samtidig bidrar egenskapene i drosjemarkedet til at denne frimarkedsløsningen som regel ikke er ønskelig. Årsaker til at mange byer velger å avvike fra markedsløsningen er særlig forhold knyttet til, sikkerhet, kvalitet, intermodal konkurranse, miljø, sosiale forhold og kriminell adferd.

For å analysere drosjemarkedet er det hensiktsmessig å dele det inn i ulike markedssegmenter. I hovedsak er det fire segmenter som er særlig viktige. Praiing, holdeplass, forhåndsbooking (telefonbooking) og kontrakt. Praiing på gata, og holdeplassmarkedene er unike for drosjenæringen mens de andre markedssegmenter er helt eller delvis overlappende med andre næringer, avhengig av reguleringer. Praiing og holdeplassmarkedene har mange spesielle egenskaper som er knyttet til forholdet mellom passasjer og drosjefører. Mens forhåndsbestilling- og kontraktsmarkedene fungerer mer som vanlig markeder.

I tillegg til ulike markedssegmenter med ulike egenskaper, er drosjenæringen preget av store svingninger med hensyn på etterspørsel. Dette gir utfordringer i å tilpasse tilbudet til etterspørselen.

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I sum gir dette et marked, hvor det finnes mange løsninger for hvordan reguleringene utformes. I hovedsak kan de deles inn i kvantitative -reguleringer av antall, kvalitative – regulering av ulike forhold knyttet til kvaliteten på tilbudet som føreropplæring og utforming av kjøretøy, og økonomiske –regulering av pris og prisstruktur. Fra myndighetenes perspektiv vil en kunne oppnå mange av de samme effektene, til en langt lavere kostnad, ved å i stedet følge en kvantitativ tilnærming. Både kvantitative og kvalitative reguleringer kan kombineres med økonomiske reguleringer.

1 Rationale and Objectives of Study

1.1 Introduction

Although taxis are almost universally recognised as a concept, very few members of the general public actually know how the taxi industry works. Also the exact content of the term "taxi" varies from country to country and from city to city. Therefore also the challenges of the industry varies. This study present an overview of international experience with taxi regulations, the challenges faced by the cities, the definition of the term taxi, arguments used for different forms of regulation, international experience and general recommendations.

1.2 Challenges

Taxis are an important element in an urban mobility system, and yet some issues may pose a challenge in many cities. Examples of such issues are:

- Safety (related to car quality and driver behaviour)
- Quality (low quality of vehicles and service)
- Competition with public transport (city space is limited)
- Quantity (oversupply or undersupply)
- Social (long working hours and low irregular wages)
- Illicit behaviour (fight for passengers, criminal activities)

Issues such as these have been found in many cities. The obvious solution is to impose regulations. Typically, these regulations include licensing, restrictions on the number of vehicles allowed and on the type of vehicle, requirements on drivers having certain proof of qualification, and so on. The exact content of these regulations will vary from city to city.

Taxi operation is a useful supplement to conventional public transport. However it is a labour intensive industry. Taxi service pre-dates other public transport modes.

- In this context, this report shall provide a better understanding of the taxi industry and options to regulate the operation both in order to improve the quality for the customer and to improve competitiveness of the industry.

2 What is a taxi?

Taxis provide a publically available point-to-point service and therefore are part of "public transport", even though the lack of regular schedules, routes and set stations – all features characteristic of public transport – gives it a semi-private character. Because fixed service systems cannot support all travel demand, full area coverage is dependent on taxis. They are a vital element in a public transport system functioning in accordance with public demand. In some areas or contexts, it may be the only public transport available. In developing cities taxis are particularly interesting as road space in city is getting more scarce, as both the population and the number of motor vehicles increase rapidly.

Taxis in the urban transport hierarchy

	Capacity	Trip distance	Time horizon for creating a new link/line	Cost	Flexibility
Heavy rail	high	5km+	years	very high	Low
Metro	high	1km+	years	very high	low
Light Rail	medium-high	1km+	years	high	low
BRT	medium-high	1km+	months	medium	medium
Busses	medium	500m+	hours - days	medium	medium
Paratransit	low - medium	0+	minutes - hours	low	high
Taxis	low	0+	minutes	non	high

Compared with other transport modes taxis have low capacity. In terms of persons per direction per hour it is comparable to private cars.

Taxis can, like paratransit, provide a door-to-door service. Conventional busses require suitable streets, and preferably bus stops, which increases the minimum trip distance. Both BRT, LRT and Metro require dedicated infrastructure. Heavy rail have even higher requirements.

The main advantage of taxis over other modes is the time horizon between realizing a particular new demand and the implementation of a new service. For rail modes, this include construction work, BRT will also require construction but can at least partially re-use existing infrastructure. Busses, can reschedule very quickly, provided there is spare capacity in the fleet, if it is not, there is usually a functioning market that allow capacity to be collected within days. For taxis and paratransit new demand can be met within minutes, or hours if the paratransit is scheduled, provided the passenger flows are low enough. Taxis also has an advantage in being non-subsidized, while other modes usually require a form of subsidizing either for operation or infrastructure or both.

Compared with other modes, taxis provide high flexibility for low transport volumes.

Although the taxi industry has this central function in any public transport system, it is often given less attention by city planners and policy-makers compared to other modes of public transport. Contrary to bus and rail companies, taxi operators do not receive subsidies. In that way taxis can be defined as belonging to the 'intermediate public transport' system, and since taxi services are provided by private operators, they are also referred to as 'privately operated public transport' services. A consequence of not being at the top of the political agenda is that taxi policy is often created ad hoc, addressing specific real or imagined problems rather than regulated by specific objectives. This is not the optimal starting point for regulation. A better approach would be to define the roles taxis ought to have in a city and then regulating accordingly.

In the following, the word "taxi" is used meaning "a vehicle with a driver available for hire by the general public", i.e. vehicles that are smaller than buses or coaches and registered for a maximum of nine persons. This is not the only definition of taxi. Usually there will be a local definition based on the locally defined factors (Table 2.1) – properties that may vary slightly from country to country and in some cases city to city. Here, we argue the pros and cons of various definitions. For example, some definitions exclude the pre-booking market segments (as in the UK). One important starting point for understanding "the taxi market" is to recognize that taxis operate in different market segments and with different properties.

Table 2-1. Taxonomy of names used to describe taxis (adopted from Cooper et al. 2010).

Description of vehicle	UK term	US term	Wider terms used
Vehicle for Hire and Reward. Available for engagement on the street	Hackney carriage, street taxi, small public service vehicle, etc.	Taxi Cruising taxi	Taxi Small public service vehicle Metered taxi Auto-rickshaws Tuk-tuks Cycle-rickshaws
Vehicle for Hire and Reward. Available by pre-book only or available from depot	Private Hire Vehicle Minicab Taxicab	For hire vehicle Livery vehicle Dispatch vehicle Black car	Hackney (Republic of Ireland)
Small vehicle used for multiple occupancy taxi journeys	Taxibus	Shuttle	Paratransit *(in international documents)* Jitney Camioneta Shared taxi Shared auto Sammel taxi Bush taxi Minibus Taxi
Specialist vehicle used in exclusive hire	Limousine	Limousine	Limousine

2.1 Taxi market form and segments

There are four major market segments in the taxi industry: hail, taxi rank, pre-book and contract. The hail and taxi rank segments are unique to the industry, while the pre-book and contract segments overlap to some extent with non-taxi industries. The form and extent of the overlap depend on regulation. Also the relation between the segments is affected by new technology. Since 2009 the wider availability of smart phones and apps have shifted demand from the street market segments to the pre-book/e-hail market segments.

Table 2-2 Taxi market segments

	Hail segment	Rank/stand/kerb segment	Pre-book segment	Contract segment
	Street markets			
Engaging	On the street	At a taxi stand	By telephone, sms, internet, other	Determined in the contract
Payment	At destination Cash or card Metered or negotiated fare	At destination Cash or card Metered or negotiated fare	At destination Cash or card Metered or negotiated	At regular time intervals Bank account Negotiated for several trips
Customer taxi relation	One customer one taxi Atomistic[1] market	One customer one or more taxis Atomistic market	One customer One or more dispatchers	Several customers Several taxi companies

2.1.1 Hail

By hail we mean flagging down/hailing a taxi on the street. When a taxi is vacant it is being driven around a city randomly picking up passengers at the roadside. The hailing segment is prominent in larger cities with high taxi densities, and to function economically it needs a proportionate density of both passengers and taxis.

The economics of the hail segment has been studied in several empirical studies (Schaller, 2007) and there seems to be agreement that some regulation is needed based on the observation that the customer is faced with a temporary monopoly supplier when hailing a taxi. For the customer, choosing to wait means uncertainty, as s/he does not know when the next vacant taxi will come along or what the driver will charge. This provides bargaining power to the driver, and in an unregulated market one would expect prices to rise unpredictably. Further in this direction is the fact that there are no economies of scale in operating taxis in this market segment. The capital need is a car. Consequently, one would expect a high number of taxi vehicles, high fares and low salaries, poor quality and low profits as a free market solution.

Many, or most, cities find or have at some point in history, found this solution unattractive and have imposed regulations that have taken different forms. Typically, these include licensing, restrictions on the number of vehicles allowed and on the

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[1] An atomistic market is a market where there are little or no economies of scale, with many small actors both buyers and sellers. In this case we will expect the sellers to be price setters acting on uncertain incomplete information following Hay (1974).

type of vehicle, requirements on drivers having certain proof of qualification, and so on.

2.1.2 Rank/stand

A taxi rank or stand is a place where taxis queue waiting for customers. These ranks are usually located outside major transport hubs, e.g. at airports, railway stations, other transport nodes, hotels and government buildings and in city centres. At a taxi rank, taxis wait for hire or passengers wait for taxis. In most cities, taxi ranks are organized on the basis of first in-first out, but even when this is not the case there is a strong tendency for people to choose the first taxi in the rank.

From an economic perspective the rank has many of the same properties as the cruising or hail market segment. However, it does not need such high taxi densities, because the taxis are located at hubs rather than dispersed over a large surface area. There is a tendency for prices to be pushed up in a free market situation, because in most cases customers are faced with a monopoly supplier, even if there are taxis from different companies available. There is little or no economy of scale in offering the service. The barriers to entry are few, and in an unregulated market will result in a high number of vehicles, low wages, low profits, and consequently a tendency towards corners being cut and quality reduced. The free market solution is therefore found unattractive in most Western cities, and this market segment is often regulated. Typical regulations include licensing (a licence needed in order to drive legally), restricted entry (a cap on number of licences, unmet demand test, etc.), quality requirements on drivers (local knowledge, language, etc.) and vehicles (technical specifications, accessibility, etc.) and regulated prices (and/or price information).

Airports and other transport nodes

A particular variety of the problem in regulating the rank/stand market segments is connected to how to utilize best the very limited space available at key transport nodes, such as airports. Oversupply is a particular problem at such nodes. Oversupply is typically present where there are a large number of independent taxi companies, or contracting drivers (category 4 and 5 in figure 2-1), these actors typically prefer to wait at an airport for the possibility of a few high yield trips rather than more frequent, but less certain and more demanding work in the city. There are three main approaches:

- Open entry, where all taxis are allowed to access the node. The typical outcome is that a high number of low quality drivers and vehicles serve trips from the node, often with a very long queue, and other companies, with higher quality vehicles and drivers serve the trip to the node.
- Limited entry, where a few taxi companies are contracted to serve the airport. Typically these companies will be able to offer newer vehicles, high quality staff and lower price to the passengers in return for the privilege.
- Single taxi concessionaire, is the extreme case of limited entry, with only one company /dispatcher offering trips from the node. This is most relevant at minor airports.

An interesting aspect of these ranks/stands is that they typically are located at airports premises, and therefore can be regulated differently from the rest of the taxi industry in the area. The owner of the property where the taxi rank/stands are located will typically have great legal liberty in deciding how the taxi supply at his node is to be organized.

2.1.3 Telephone / pre-book

From an economic point of view the telephone market is very different from the "street" market. Here, the customer, or someone acting on behalf of the customer, orders a taxi from a dispatcher, who then allocates a vehicle for the particular trip. In many cases this is done automatically. In these market segments there are significant economies of scale, as there is economics of density and often a need for expensive computer infrastructure and a round-the-clock telephone service. This induces fixed costs, which are expensive compared with the street market segments. In this market segment, however, potential customers can quite easily call different companies and compare prices and availability. It is also easier to gain experience with different companies, as there will be fewer of them. This market can therefore function quite well with much less regulation than the street markets. However, some regulation – such as quality requirements (on vehicles and drivers) to ensure safety and on opening hours to ensure availability – may still be called for.

Taxi apps / e-hail

The development of apps such as myTaxi, Taxi Magic and Uber, affects the pre-book market in several ways. First, it attracts customers that previously would have been street market customers. Second, each app based company is in essence a new dispatcher. The main benefit for the consumer is connected to densities, and increased information. In particular in the US, but also in Europe app based companies have created a lot of turmoil, as the legal framework surrounding such companies are unclear in many cases.

Taxi apps follow different models.
- The dispatcher app. A taxi company or dispatcher company create the app, and the app is used exclusively by that company.
- The joint dispatcher app, where several existing taxi companies join in on a common app, which can be used in different cities. Examples include Taxi Magic https://taximagic.com/en_US, in the US and myTaxi internationally.
- The app based private hire vehicle (PHV) company. Where a company is set up exclusively for app based pre-bookings and use dedicated drivers and vehicles, typically the drivers own the vehicles and get financing through the company. Examples include Uber.
- The price and availability app. Where the app provide price and availability information for taxis from different dispatchers in which the app user then can contact directly. Example http://www.taxikalkulator.no/

MyTaxi

Claims to be the world's largest taxi app. It is a free app providing software similar to a taxi dispatcher, including finding the taxi and payment. MyTaxi operate with existing taxi companies.

In a way MyTaxi turn single trip street market taxi users into pre-book contract segment users. www.mytaxi.com

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Uber

Is an American transport network app, which connects drivers with riders. It is handling both dispatch and payment. It uses dedicated drivers and vehicles, and is in that way similar to a taxi company. It also allow the riders to rate the drivers and in such a way conducting part of the regulator role as well. www.uber.com

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2.1.4 Contract

In many cases, public authorities and private companies have a recurring need for taxi services. For the public authority, this may be in the form of transport of school children, the elderly, and the disabled and so on. For private companies, it may be to transport personnel on a regular or semi-regular basis. In both cases, buying these taxi services can be an economically attractive alternative to having them in house.

In these market segments the taxi industry will normally face competition from other industries, depending on the legal framework. In the same way as the pre-book market segment, this segment can function quite well with little regulation.

Shared taxis

Taxi sharing is common in many developing and in some developed countries, too. In literature a common term used is paratransit. This can be seen as a form of street market taxi, a separate segment or as part of conventional public transport. It occurs in many different forms and with varying degrees of regulation and legality. Shared taxis are a form of public transport somewhere between ordinary taxis and mass transit systems. In some places they operate along pre-defined lines, as an unscheduled bus service; in others the taxi picks up passengers along the way with the first passenger giving directions. A variation is the dispatcher-controlled shared taxi. Here the dispatching company collects trips with roughly similar origins and destinations and groups them into shared vehicles at reduced fares compared to metered fares in conventional taxis. In developed countries this service is formalized in several ways, including "dial-a-ride" types of semi-scheduled service in low traffic periods or areas. When this transport is organized by the local authorities with schedules, and often subsidies, it becomes part of the contract market segment.

The vehicles used in these services are often larger than private cars and smaller than conventional buses, typically with between 8 and 20 seats. Shared taxis will usually have larger overlapping market segments with scheduled public transport than metered taxis have. Meakin (2004), looking at the distinction between paratransit in developing countries and conventional public transport points to the fact that paratransit often include small-scale or individual ownership, self regulation and that it often develops where there is a gap in the formal public transport system.

Gwilliam (2005) states that public transport operators tend to view the shared taxi and minibus sectors as undesirable competition. One reason for the attractiveness of shared taxis is of course their often unregulated supply, resulting in low wages and long working hours, allowing them to work at lower fares and on lower traffic volume corridors. Still, the fact that they are able to attract passengers demonstrates that these services have some value that the conventional public transport system does not have. For this reason it is advisable to consider carefully the costs and benefits of all transport options in a broad strategy, rather than impose an outright ban on the shared taxi sector. A better way could be to formalise the sector.

2.2 Taxi industry organization

How the taxi industry is organized is often not clear to the general public, and the variation between communities, and even within a community, greatly affects the incentives of the actors involved. When using a model illustrating the organisational differences in the taxi industry, Dr Ray Mundy (Mundy 2010, Cooper et al. 2010, etc.) stated that there was considerable confusion as to what defined a taxi company.

The general public see a car with a dome light on top, the name of some company on the side and the word "taxi" and assume that it has a meter, that it is regulated somehow, and that there is a company behind the service they are calling, hailing or stepping into. However, taxi companies today can be, and often are, very different, even in one and the same community.
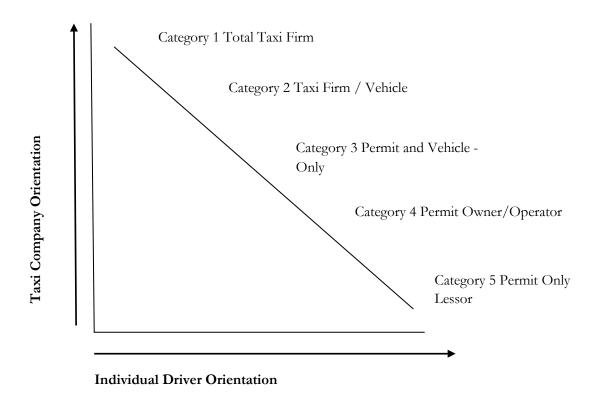

Figure 2-1 Continuum of City Taxicab Firms (Mundy, 2010).

Category 1 is the "total taxi firm", which is a full service company carrying out maintenance, advertising, insurance and dispatching. Its drivers are employees of firms which have long traditions in the US (see Gilbert and Samuels, 1982) but now operate in only a few cities. Shifts are set by the firm (Mundy, 2010).

Category 2 introduces the taxi driver as an independent contractor. For the taxi company, the advantage is that it does not have to pay drivers directly and does not have a tax responsibility for its drivers. A variation within this system is that the vehicle is provided by the driver rather than by the company. The driver will decide whether s/he will or will not take a particular trip. This type of company provides a range of functions, including marketing, dispatching, credit card processing, corporate work, and so on.

The permit and vehicle-only lessor firm provides contract drivers with the vehicle and permits/licences[2], but little or no marketing or dispatching. There are hybrid variants between category 3 and category 2 firms.

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[2] The content of the term permits or licenses will depend upon local legislation. Here the terms are used as synonyms.

Category 4 is a firm in which the permit holder also is the driver. Firms in this category will not usually have a dispatching function or contracts with hotels and such like, and are forced to use public taxi ranks and personal clients.

The category 5 firm is the permit-only lessor. These firms only pay annual fees, with the permit holder either driving a single vehicle himself or leasing the permit to an independent taxi driver who provides the vehicle, the insurance and maintenance.

2.3 Economic characteristics of the taxi industry

2.3.1 Large variations between taxis

Economically, the taxi industry is characterised by variable turnover. This is true between cities, between taxi companies, and between individual drivers, and there are many reasons behind it. One of the most important is that although entry requirements to the industry tend to be quite easy to meet, operating a successful taxi company takes considerable skill and effort.

An example of variable turnover between taxi drivers is given in figure 2-2.
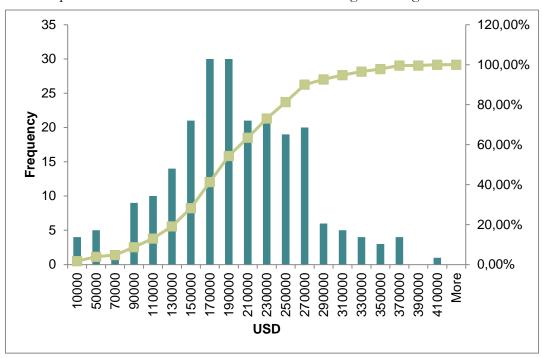

Figure 2-2 Annual turnover distribution per taxi vehicle in the Norwegian county of Vestfold (adopted from Aarhaug et al. 2013).

Figure 2-2 illustrates how different taxis operating in the same market achieve very different annual turnover. At the low end there are vehicles that are active only during some parts of the year. For vehicles operating a full year, the turnover varies from about USD 100 000 to more than four times as much. One explanation is the difference in effort related to the number of hours the vehicle is operational, the degree to which the owner uses hired drivers, and how skilled the driver is in having the vehicle available in the right places at the right time. What is remarkable in this graph is not just that it has this shape (not too different from a bell curve), but that this shape seems to be present in most taxi markets where operational decisions are

taken at vehicle level. The level of turnover will vary from market to market, but the distribution between vehicles is similar.

2.3.2 Demand varies through the week

Not only is there great variation in revenue within the taxi population, there is also a repeating cycle in demand.
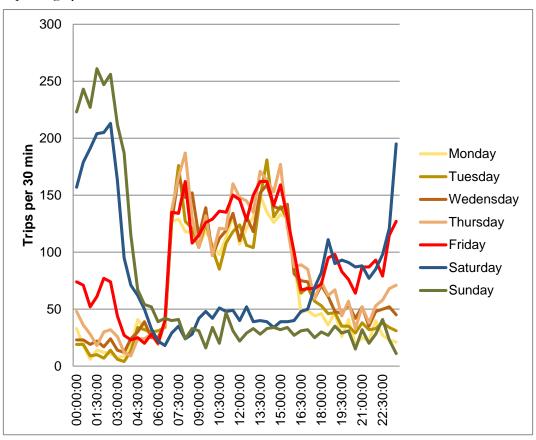

Figure 2-3 Trips during a typical week (Aarhaug et al. 2012).

Figure 2-3 is constructed from register data illustrating that during the week there are periods of high demand and these typically related to the working day. Then there are periods of very high demand, when shops and offices close at weekends. During the rest of the week there is comparably low demand. Demand also varies between seasons. When the taxi industry is being regulated it is important that these demand fluctuations are kept in mind.

If the objective of the regulation is to have good taxi coverage at peak traffic periods the licensing requirements should include references to this. A recurring problem in countries, where there is a high percentage of owner operators, is that supply and demand can work counter-cyclically. When vehicles are double and triple-shifted, both weekday and weekend peaks will be covered, but there will typically be long periods with excess supply during daytime between the peaks and during week nights. Long hours with limited demand result in low hourly pay for hired drivers (Aarhaug et al. 2012, 2013, etc.).
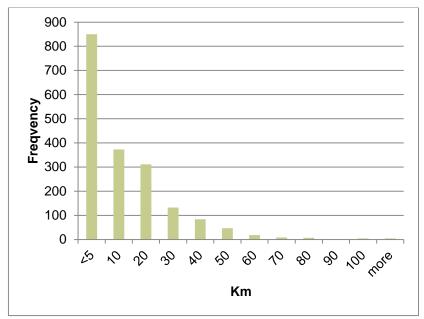
2.3.3 Taxi markets are local

Figure 2-4 Length of taxi trips for a day (Aarhaug et al. 2013)

Figure 2-4 illustrates the distribution by length of taxi trip. The example is taken from a small dispatcher in Norway, but could be from almost anywhere. Part of the reason taxi markets are local is low occupancy rates combined with price per kilometre. It quickly gets expensive when distances increase. The relatively high unit cost of taxi travel may also explain the appeal of shared taxis, in particular for longer trips.

2.4 Taxis meet a different demand in different cities

There is a dearth of good comparative international studies on the demand side of the taxi industry. Institut pour la Ville en Mouvement (IVM) in Paris conducted a study in 2009 (Darbéra, 2010) focusing on the cities of London, Paris, New York, Amsterdam, Lisbon, Berlin, Dublin and Stockholm and finding that the use of taxis in these cities varied. In Dublin, Lisbon and New York, more than half the respondents indicated that they used taxis regularly. The highest proportions of non-taxi users were found in Paris and Amsterdam, where more than 20 percent indicated that they never used taxis.

This survey illustrates how taxis are engaged differently in the different cities: at one end of the scale New York, where street hailing is used by approximately 90 percent; at the other Stockholm, with street hailing just above 20 percent and telephone bookings accounting for more than 50 percent (Darbéra, 2010). The IVM study also points at the income distribution of taxi users. It is found that taxi usage is highest among the richest and poorest quintiles, excepting Paris, where the richest quintile dominates. Darbéra (2010) uses this fact to argue that fares in Paris are set too high for the poor.

Darbéra's (2010) findings on the demand side of taxi transport are in line with findings from the many case studies that have been conducted in different cities (Nelson/Nygaard, 2008, Schaller 2007, Goodbody, 2009, Fels et al. 2012, among others). Although the concept of taxis is almost universal, the exact meaning of the term varies greatly from city to city. Properties of the city and its taxi regulation have a bearing on the use of taxis. In New York and Dublin, taxis are a major mode, while in cities such as Paris use is limited. Also size and population density of the city, definitions and regulation will all affect the extent to which taxis are used.

3 Why regulate taxis?

Taxi regulation has a long history. Gilbert and Samuels (1982), and others, point at the 1630s for the origins of modern taxi regulation. The need to regulate taxis in some way seems well established, and it is mainly consumer interest motivating this. In some cases, references to public safety are used, in others congestion, market failures, particularly in relation to street market segments. City image is also used as an argument. In some countries, taxi regulation may be a legal requirement.

At the core of taxi regulation is the observed fact that it is essential to maintain a balance between taxi supply and demand. Where supply and demand are not approximately balanced operating malpractices will become prevalent and they can prove difficult or impossible for the regulator to control. This is both the case where demand exceeds supply and where supply exceeds demand. Experience suggests that when demand exceeds supply, drivers will tend to select the most lucrative passengers. Schaller (2006) and others suggest that refusals are high with high utilization. The problem associated with an excess of taxis arise from accumulation of taxis at central locations and issues related to low revenue.

There are several arguments used for and against different forms of taxi regulation, in particular quantitative regulation. Entry regulation is not the only form. The most commonly used academic description includes three elements: quality, quantity and economic regulation (QQE).

Quality regulations typically address:
- the operator's fitness to operate
- vehicle standards
- insurance
- driver knowledge

Quantity regulations address the number of vehicles available.

Economic regulation relates to fares.

Quality and economic regulation are much less debated than quantity regulation, although there are still significant differences in opinion on the topics of quality (what is the required level?) and economics of the business (what is a correct fare?). Regulators want to know why the market fare does not fall when the number of entrants increases. These questions aside, the big debate is about quantitative regulation. How many taxis should there be in a given area and why?

3.1 Trends in taxi regulation

In this section I focus on quantitative regulation (number of vehicles or licences), as this is the most contested issue in the taxi business and also one of the most studied. However, neither the academic nor the empirical debate provide a clear conclusion. Arguments tend to be repeated on both sides of the debate.

The underlying question in regulating taxi numbers is the extent to which the taxi industry is a "normal" market. The main argument for deregulation (removing barriers to entry into the taxi market) is that government intervention in a market causes waste and inefficiency, while denying consumers the range of price and service options they desire. Dempsey (1996) has presented a historical view of developments in taxi regulation.

Pointing at the US, Dempsey (1996) observes that taxi regulation has gone the "full circle". His research shows that American cities began regulating local taxi firms in the 1920s as a result of market failures. Half a century later, about 20 cities deregulated. This was part of a general trend of deregulation in the US in the 1970s and 1980s, which also deregulated rail and air travel. However, most cities that deregulated later re-regulated through dissatisfaction with the deregulated solution – a full regulatory cycle.

In Europe, the picture is diverse. There are virtually no entry regulations in the Republic of Ireland, strict entry regulation in France, and several compromise solutions in other countries. In many countries (including the UK, Denmark and Norway), regulation varies from city to city. If there is a trend in Europe it is a move from quantitative to qualitative regulation, as in the Netherlands and Sweden (Bekken and Longva 2003). The UK Law Commission (2012) also points in this direction.

In South Africa there is a strong move to formalize the taxi industry, this is done with a focus on the shared taxis, see Venter (2013) and Walters (2013). This has been done by two distinct schemes. The first is a re-capitalisation of the shared taxi industry, where older vehicles have been replaced by new and subsidized ones. The other is a project or rather a series of projects to replace shared taxis with BRT's. Safety issues, both related to accidents and crime has been important in motivating this move.

In Mexico there has been a move towards re capitalisation of the taxi industry, but motivated by very different reasons. The objective is to replace old and polluting taxi vehicles with newer and more fuel efficient models, (C40 Cities).

The apparent lack of universal tendencies in how the taxi regulation is developing does not mean that many of the same mechanisms have international validity.

3.2 Licensing (qualitative)

New York City

In New York City all 'Yellow Taxi' taxicabs are subject to a detailed set of rules including type of vehicle (from 2014 - 2024 the Nissan NV200).

Also a detailed requirement for paint, finish and lighting, including (from §67-07):

(a) *Taxi Yellow.* The exterior of the vehicle must be painted taxi yellow (Dupont M6284 or its equivalent), except for trim. Samples of paint color and code are to be submitted to the Commission for approval.

(b) *Front Design.* The front of the vehicle, and especially the bumper, should be designed with strong emphasis on reducing injury to pedestrians. There must be no unnecessary projections such as rigid hood ornaments.

(c) *Signs.* The vehicle must be provided with signs that conform to the marking specifications in §58-32(i) of these rules.

(d) *Auxiliary Turn Signals.* Suitable wiring must be provided for a pair of auxiliary turn signal lamps to be located next to the roof light. These lamps must not be activated with the brake lights.

(e) *Roof Light.* The vehicle must be equipped with an approved Roof Light.

Foot note to textbox[3]

The primary argument for licensing is for public safety to be ensured by allowing only qualified vehicles and drivers access to taxi markets. Licences can be set up in a number of ways depending on local regulation.

Licences may require that vehicles meet certain technical standards, safety for example, but also be instantly recognisable as a taxi. In addition, licences might include details on livery and type of vehicle. From a transport economics point of view, a safety requirement is recommended, but livery requirements and vehicle type requirements are more ambiguous, which does not mean, however, that such requirements are always out of place. It could be argued that they have to be met because they are part of the city experience. They can also help to prevent fraud and illegal operators easier to spot; it can result in better information from the demand side view, but it limits the possibilities for service differentiation.

Licensing drivers can mean many things. Typical safety requirements include the need to have a valid driver's licence and a clean criminal record. A documented knowledge of the local area may be called for, although to what extent is debated. Knowledge of the local language and, in cases where this is a minor language, also knowledge of an international language may be deemed necessary. The details on how these requirements are formulated and implemented will to a large extent influence the outcome of the system. For example, low-level requirements can result in many unsuitable drivers entering the market, and too strict requirements in difficulties recruiting necessary drivers. Either outcome can be undesirable. The

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[3] http://www.nyc.gov/html/tlc/downloads/pdf/2011rulebook_ch67.pdf

requirements will also influence which communities the taxi drivers will be drawn from.

3.3 Fare regulation

An economic mind would expect prices to fall when excess capacity is introduced into a market. Paradoxically, the opposite has been observed in the taxi industry. This has been the experience in the US (see Dimpsey 1996, Nelson/Nygaard 2008), in Scandinavia (Longva et al. 2010) and in the Netherlands (Bekken and Longva 2003). There is a need to study if this effect is universal. Bekken and Longva (2003) compared different deregulation processes and observed that countries/cities that have deregulated both entry and fares are found to have experienced an increase in fare levels. So why are the empirics not in line with standard economic theory?

Copenhagen taxi fares (zone 1, vehicles with 4 passenger seats) from 25.09.2013			
Fare		**DKK**	**USD**
Flagg drop	Street	24,00	4,42
	Dispatch	37,00	6,81
Waiting		7,00/ min	1,29 /min
Kilometre	**Fare 1** 7am – 4 pm	14,20/km	2,62 /km
	Fare 2 4 pm – 7 am	15,00/km	2,76 /km
	Fare 3 Friday 11pm- Saturday 7 am Saturday 11 pm – Sunday 7 am Public holidays	18,75/ km	3,45 / km
Exchangerate 1 USD = 5.4 DKK (oct 13). http://www.taxinaevn.dk/dokumenter/Takster2013.pdf			

On the street market segments (hail and rank) there are economic incentives for the individual taxi owner, company or driver to push up prices as described in section 1.2. This is a result of a series of market imperfections, one of which is that competitive shopping is impractical because it can induce significant transaction costs in the hail and rank market segments. The explanation behind this is that in the hail segment customers hailing a taxi are faced with a temporary monopolistic supplier. The customer does not know how long s/he has to wait for a new vacant taxi to arrive or what the driver will charge. In the rank market, the customer is faced with a strong norm to choose the first taxi in the rank. Taxi ranks are often designed so that only the first vehicle is available. Even if taxi prices are made available they may not be transparent to the customer, and it is not easy for the customer to inspect the quality of service from outside the vehicle. As noted by Shreiber (1975), an individual taxi operator, acting independently, cannot gain more passengers if he unilaterally reduces his price below the going market rate. However, Shreiber also notes that there is elasticity between taxi and other modes of public transport. As a result, the upward pressure on price from the individual taxi driver may lead to a

lower market share for the taxi industry in a taxi market without fare regulation than in a market with fixed or maximum fares.

The practical solution to this problem is that regulation should take the form of price caps. Stipulating the maximum price taxis are allowed to take, at least in the hail and rank market segments, this means that if the market price is below the regulated price, this is the market price that will be used; if it is above the regulated price, the regulated price will be used. It is very difficult to set a "correct" regulated price, however. One would expect the taxi industry to lobby for a higher fare, while the general public and politicians would want a lower fare. A regulated maximum fare would also protect the public from arbitrary high fares charged by opportunistic taxi drivers, who assume that they will not encounter the same passenger again, and that if the passenger does complain s/he will not be able to pin a complaint on the driver in question. A regulated maximum fare would still allow a driver or company to give discounts if the market fare was below the regulated one. A maximum fare is preferred to a fixed fare.

Pros and cons of fixed and market fares

	Fixed fare	**Market fare**
Street segment customers	Predictable prices	Un-predictable prices
Taxi operators	Cannot set fares to market conditions	Can set fares correctly
Regulator	Difficult to match supply and demand	Difficult to control quality

Fixed fares

The main beneficiaries of fixed fares are the street segment customers, who are able to find a taxi. They will find predictable prices with an expectation that these prices are lower than their willingness to pay. Fixed fares will also enable the regulator to set fares in order to target social inclusion issues.

The cons are related to economic inefficiencies. With a fare set by the regulator one will expect the price to be set below the market price, with supply falling short of demand as a consequence. This materializes as queues for taxis.

Market fares

The main beneficiaries are the taxi operators, who can set fares in order to capture more of the markets willingness to pay, and the taxi customers who were not able to find a taxi in the fixed fare situation.

On the down side are customers who have to pay a higher fare, for the same service and customers who do not know the market and are unable to find the right quality, price combination for their demand.

The fare scale (or tariff structure) is particularly important in the markets where the fare is used by the regulator to adjust supply and demand. In such cases both the level and structure of fares are important. Setting the fares, and the fare components can influence the market in different ways, in particular in the most price sensitive segments. In this way the fares can be used as an instrument both to regulate the "intersection point" between taxis and mass transit and the quality of service from the taxis.

The fare scale can have several components, flag drop (initial charge), distance taper, waiting time charge, night time and peak time mark ups, dispatch, passenger, luggage, airport surcharges etc. As an example a low fixed fare can be set for trips between the airport and city centre in order to discourage oversupply at the airport or a high flag drop can be used to encourage drivers to take short trips. Surcharges can be used to increase or decrease both demand and supply at particular time intervals or locations. As both demand and supply can be assumed to, at least in the long term, be price elastic market prices and price regulation cannot be viewed totally separate from total fleet size.

Fare scale / tariff structure

the basic structure can vary between three main models
- A fare which is set at time *or* distance, depending upon speed (i.e. one dollar per km *or* half a dollar per minute if the speed is below a set speed)
  - Fare = Initial Charge (flag drop)+ kilometre price + distance price
- Flat fixed prices, say 25 dollar for airport to city centre.
  - Fare = a set unit
- Parallel tariff; time and distance components are equal regardless of speed i.e. one dollar per km *and* one half dollar per minute)
  - Fare = Initial Charge + price per km * total km + price per min * total time

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In the pre-book market segments it is difficult to find good economic arguments for price caps, except in cases where the taxi industry is organized as a monopoly, in which case there will still, most likely, be a form of intermodal competition limiting fare levels. Only in cases where the taxi service is a true monopoly, that is if it is the only viable public transport option (this can be the case in rural areas or niche market segments), would one expect a pre-book service to charge monopoly prices. And, even in these cases, the requirement for retaining such a pricing policy would be that of maintaining the taxi company's role as a monopoly supplier.

3.4 Entry regulation

If we assume that licences are issued for vehicles and drivers, there is still the question of how they should be distributed. There are two main approaches: one limiting the number, the other allowing all suitably qualified to enter. Again the outcome will be determined by how each is implemented.

There are several rationales for limiting entry into the taxi market.
- to prevent crowding at stands and in city centres;
- to maintain profitability (to compensate for other duties, as 24 hour service requirements or specific quality standards);
- to protect workers, as wages are lower and working hours longer for drivers operating in the open entry system.
- It has also been claimed that entry regulation prevents overcharging (Nelson/Nygaard, 2008).

The main arguments against entry regulation are
- that it creates economic rent
- that such restrictions are not a market solution.

The UK Law Commission (2012) points at the two different market segments in taxi regulation – the hail and rank and the pre-book – and argues that these segments should be regulated differently. It also points at the lack of success of markets that have deregulated entry, without treating each market segment differently, while referring to the example of the Netherlands.

Leading authors on the topic of entry regulation do not find general solutions to the question of entry regulation. One example being Bekken (2007) who claim that a lot of the literature is based upon political views rather than empirical studies, and therefore does not settle the question. Cooper et al. (2010) argue that there may not be an answer to the question on whether or not to regulate entry. Shaller (2007) argues that this will depend upon which market segment one emphasise, that the street market segments benefit from entry regulation, while the pre-book market segments do not.

By taking a couple of cases with different regulatory regimes, and others where the regulations have changed, some insights can be derived, but local details affecting the result can readily be overlooked.

Sweden

In Sweden, the barriers to entry to the taxi business were removed in 1990 together with restrictions on fares. The outcome was different in different market segments and geographical areas. In cities, most taxis are organized by major dispatching companies while one or two are independent operators. Bekken and Longva (2003), quoting Branschläget (2002) and Laitila et al. (1995), point at increases in prices in large, medium and small cities. In large cities the number of taxi vehicles has increased, but hours supplied in the market have decreased. Demand has changed little. In mid-sized cities, all indexes, prices, operators and demand have increased. However, in smaller cities and rural areas, prices have increased but demand has dropped significantly. Directly following deregulation the total number of vehicles, operators and bankruptcies increased. The number of vehicles and taxi operators has since stabilised and has largely remained so. Bankruptcies dropped to pre-deregulation levels in about the year 2000.

Following this reform, several quality and economic regulations have been introduced to address specific problems in the markets, but still there are issues relating to few, even no, taxi services being provided in rural areas, and to small actors charging high prices despite low quality in larger cities.

New York

The yellow cabs in New York are an important part of the city image, particularly on Manhattan Island where they augment public transport by about 25 percent of all trips made (Schaller 2006). Taxi regulation in New York City, and in particular the medallion system,[4] has been the subject of much debate. Fares, too, are regulated. A large part of the market is cruising cabs. Indeed, in 2006 Schaller reported that 39

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[4] A medallion system is a system where each vehicle is required to have a medallion. The medallion itself is tradable, and in the case of New York fetches prices in the high $300 000 dollar range (Schaller, 2006).

percent of all miles was spent cruising. In addition to the street market, there is a large pre-book market neither regulated nor branded as taxis in New York's two-tier system and not subject to the same entry regulation.

Many economists criticise this organisation as being a textbook example of rent-creating by government intervention, i.e. rent visible through the high prices that the tradable medallions fetch.

London

London's taxis are not regulated by number, but by strict quality controls, particularly for drivers, who have to pass the famous "knowledge" test. Fares are regulated. There is a two-tier system in place in London, with metered taxis subject to strict quality controls and unmetered, less strictly regulated, minicabs. Taxis can accept hailing and street work, while minicabs are required to work in the pre-book market segments

http://www.the-london-taxi.com/

3.5 What are the alternatives

The taxi market operates within two general systems: the one-tier system, in which all market segments come under the same taxi regulation, and the two-tier (or multi-tier) system, in which on-the-street markets are regulated differently from pre-book markets.

3.5.1 Single-tier system

A single-tier system is one in which the hail, rank and pre-book market segments are all regulated in the same way, with the contract markets included to some extent. Regulation must therefore address the challenges experienced in all market segments. The approach is used in several European countries, including the Nordic countries and the Netherlands. The pros of this system are its relative simplicity, and that it opens up more possibilities for economies of scale. The cons relate to the inadequacy of a single system to be tailored to meet the needs of all the different market segments.

3.5.2 Two-tier system

A two-tier system has separate regulations for the street and pre-book market segments. The main advantage is that it is easier to treat the needs of the different market segments separately. Stricter regulation is often needed for the street market segments than for the pre-book markets because of certain market failures on the street market segments. A disadvantage of the two-tier system is that there are fewer possibilities for economies of scope. A vehicle which technically could operate in several different market segments, in response to demand, is legally restricted against doing so, as in London. Inefficiencies are created, and although this may not be of great importance in larger markets, it can be a real problem in smaller markets.

4 Examples of good practice

Probably the most important characteristic of a good taxi system is that customers are pleased with it and use it.

When comparing customer surveys, such as the one conducted by IVM (Darbéra, 2010), the most striking observation is that there is no obvious link between the regulatory framework and customer satisfaction, while there may very well be a link between customer satisfaction and the way the regulation is enforced. The absence of quantity regulation, with little or no price regulation and limited quality regulation, seems to yield success in the larger Swedish cities, but has not proved successful in smaller cities and rural areas. In London, strict quality and price regulation has resulted in an instantly recognisable industry which is very popular. Similarly, in New York, a strict quantitative and price regulation regime has been successful, although quality regulation is less strict. Common to both the New York and London examples is that in parallel with their strictly regulated taxi industry there is a less strictly regulated private hire vehicle industry for the pre-book market segments. The private hire industry is part of the Swedish taxi industry and accounts for a large proportion of turnover, in particular for the larger dispatchers. The street segments in Stockholm have several quality issues relating to independent operators combining high cost and low quality[5].

In Darbéra's (2010) sample of cities, the highest reported taxi use is in Dublin, where there is open entry and set fares. The current regulation in Dublin is the result of a Supreme Court decision in 2000 ruling that a cap on taxi licences was unconstitutional. The conclusions one might draw from the effects of this reform can be debated, but the facts are that the pool of taxi vehicles increased dramatically (more than tripled from 2700 to 8400 vehicles) following the deregulation. The number of pre-book-only vehicles dropped to about 40 percent (from 3500 to 1500) with owners changing to taxi licences. Together with the increase in number of vehicles, there has been an 83 percent increase in the use of taxis from 1997 to 2008 (Goodbody, 2009). In pure economic terms this is a good reform; efficiency has increased. Still, the second period situation is not an optimal solution. The downward pressure on wages and inadequate quality of service has resulted in efforts by authorities to introduce stricter quality requirements both related to drivers, quality and service. Similar experiences can be found in Sweden and the Netherlands.

4.1 Are there general recommendations?

There are two general recommendations. First, taxi markets are local and this has to be kept in mind when they are being regulated. Second, real taxi markets are a complex mix of different segments with different properties – facts that have varying and changing importance between and within cities. This means that there is no

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[5] See for example http://www.taxipriser.se/hem.html

single right answer to the question of regulation. However, a good regulatory system is one in which these recommendations have been taken into account.

The following table is a simplification of stereotypical markets and their ideal regulation.

Table 4-1 Stylized summary of taxi market properties

	Hail	Rank	Pre-book	Contract
Economies of scale in operation	No	No	Yes In dispatching, and booking systems	Yes, to some extent Depending on the contract, tendered contracts typically have requirements on administration and fleet size
Competition	Atomistic market, Little price competition[6] between individual operators	Atomistic market, Little price competition, higher probability of price competition if there are large integrated companies	Yes, main factor is accessibility, (i.e. fleet size) but also price	Yes
Regulatory challenges	Maintaining quality of service Keeping efficient prices, roadworthy vehicles, qualified drivers	Maintaining quality of service Keeping efficient prices, roadworthy vehicles, qualified drivers	Open entry: Market forces should keep supply, quality and price efficient Regulated entry: Balancing economies of scale, against benefits from competition	Open entry: Market forces should keep supply, quality and price efficient Regulated entry: Balancing economies of scale, against benefits from competition
Theoretical solution	Regulated price, Quality regulations, but for social reasons (congestion and operator economy) quantity restrictions can be called for	Regulated price, Quality regulations, but for social reasons (congestion and operator economy) quantity restrictions can be called for	Subsidized monopoly can maximize social welfare --------------- Market solution on price and supply is realistic Minimum standards on quality are called for	Market solution on price, supply and quality

Since real taxi markets are a combination of several market segments with different properties, this should be taken into account in the regulations.

Within all these market segments it is important to remember which kind of taxi companies are operating within the city in question. If they are integrated companies or franchises (category 1 in ch.2) these will respond very differently to regulation compared to owner operators. In general it is easier to regulate the more integrated the taxi industry is.

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[6] In the hail and rank markets, you will expect little or no price competition between taxis, if the taxi companies are in the categories, 3-5, as the individual taxi driver only to a marginal extent will be able to expand his market by reducing his price. Also quality will be difficult for the customer to assess before the trip is started. In many cities there is also a strong social norm, typically stating "first in first out" at ranks. Such self regulation by the taxi industry, further reduce the drivers incentives to lower his prices. In cities where such norms or regulation does not exist you can observe fierce competition between drivers for customers, taking the form of drivers "flooding" the transport node the taxi stand serve.

5 Conclusions and recommendations

5.1 Local regulation

The paramount issue is that taxi regulation needs to be tailored to local problems, objectives and market conditions. Taxi markets are local in nature because no two cities are the same, and although there are several recurring challenges in taxi regulation, the mix is local. Still, there may well be elements of taxi regulation – such as minimum standards of vehicles in regard to pollution, accessibility and safety, and driver legal and economical suitability – which could fit well with national regulation.

When looking at a particular city it is important to remember that a wide variety of industry structures have the potential to produce a satisfactory taxi service, but each will present its own challenges. The regulatory regime must enable the maintenance of a balance between supply and demand within the constraints of urban transport policies. The regulatory agency must monitor the performance of the taxi industry against policy objectives, and must have the capability and legal powers to apply corrective measures when necessary.

Voluntary rules as the IRU's taxi drivers check list http://www.iru.org/cms-filesystem-action?file=mix-publications/taxi_driver.en.pdf can be used as a starting point. Also it is important to tailor the regulation to the industry structure as integrated companies and owner operators respond differently to regulation.

5.2 Quality control

It is important that there is some form of quality control over both vehicles and drivers. Proficient drivers will ensure public safety, and there must be "transparency" in the industry, i.e. limiting the extent to which profitability can be gained from cutting standards below a defined minimum.

With respect to vehicles this could include[7]:
- Age of the vehicle: the vehicle should be less than a given number of years.
- Emission standards: emissions should be less than given standards.
- Accessibility standards: all or a proportion of vehicles should be accessible by wheelchair users, etc.
- Marking: taxis should be readily distinguishable from other vehicles.

Pitfalls in regulations include combinations of criteria that result in too few vehicle types being available for taxi work, thus driving up the costs of operation. Emission standards that benefit a particular technology; fuel that may not be equally attractive in a few years' time; too strict standards may all contribute to high costs. If emission standards are to be used, limiting emissions should be the focus of regulations and not subsidizing a particular technology. Economists disagree about the extent to

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[7] Examples of all of these can be found at: http://www.nyc.gov/html/tlc/html/home/home.shtml

which specific markings (livery) of vehicles is beneficial, arguing whether different operators should be able to use the exterior of the vehicles to brand themselves, or whether the important distinction is between taxis and non-taxis. In the real world this will be a question of extent rather than either/or.

5.3 Quantity control

In most developed countries, quantity control regulations came into force in particular economic settings to address particular problems, such as oversaturation of the market following the great depression. These regulations have proved very difficult to reverse in cases where attempted. The main problem is always that economic rent is created when entry is limited, resulting in rent-seeking behaviour.

Still, there are arguments for keeping or introducing quantity controls to alleviate congestion problems in city centres. There are arguments for using quantity restriction as a proxy for stricter quality control, as quantity control can be easier to manage from a regulatory perspective. There is also the argument about using quantity control to maintain desirable wages for drivers.

If quantity controls are to be introduced, they have to be designed so that the economic rent created benefits the city or the drivers. This can be done: by limiting the validity of licences; by auctioning them out on a regular basis; or by requiring licence holders to be owner operators. In order to maintain availability in peak and low traffic periods, peak-hour licences and a requirement that there be 24-hour availability for ordinary licences can be workable solutions.

Also the arguments for having quantity controls are limited to the street market segments. In other words, introducing quantity controls is relevant for these segments in a two-tier regulatory system or in a single-tier system.

A quantity control system should also include a mechanism that allows the number of licences to be changed in response to changing market conditions. There are several "tools" for assessing the "correct" level of supply, including indexes based upon unsaturated demand, commonly used in the UK[8], rules of thumb based upon numbers of licenses per 1000 inhabitants (used in entry regulated markets), and models based upon factors such as economic activity, population, number of trips etc. Such models can be of use, but will require the regulator to make a decision on what the appropriate level of service shall be.

5.4 Economic control

There are good arguments for regulating taxi fares, in particular for street market segments in areas with quantity controls. In areas where pre-book market segments dominate this seems less necessary, but in single-tier systems without regulated fares there should be checks in place to prevent actors from specializing on street market segments with high prices and low quality.

However setting the fares right is no easy challenge as it means to weigh different and conflicting interest against each other. The taxi industry will want a high fare, the

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[8] See Cooper et al. (2010)

customers a low fare. And there are good arguments for both. Also it is important to remember that there is an interdependency between fare level and structure and fleet size and quality.

5.5 Empower the regulator

Regulation has little effect unless it is enforced. In many countries the taxi industry has traditionally been one in which it is relatively easy to operate within the grey (or black) economy, and if this is to be avoided the regulatory authority needs to have the judicial system behind it.

The regulation should preferably be local, as the taxi markets are local, however safety and quality standards and frame regulations can very well be regulated on national or state level. The most important point is that the regulating body should have the necessary tools (such as the legal right to withdraw licenses from unsuitable individuals and the right to audit the industry) in its toolbox in order to enforce the taxi policy.

Also it is important that taxi regulators cooperate with other authorities, such as tax authorities and police in order to keep the industry clean and part of the formal economy. And that taxi owners and operators have legal protection from arbitrary regulations.

5.6 Changing regulations

If, or when, a change or amendment to the regulations is needed:
- Identify the problem to be addressed. Changing regulations simply for the sake of changing regulations is not advisable. Costs associated with such a process can be significant
- Identify the tools that are most suited to addressing the problem
- Identify what the end situation is supposed to be. What are the most important parameters of success?
- Make changes gradually
- Ensure that there is sufficient information available to assess whether or not the reform is working as intended
- If it is not, identify why and amend accordingly

5.7 Taxis are part of a transport system

It is almost always difficult to come up with a definition that draws clear lines around the taxi industry. This is the case in both developed and developing cities where there are grey areas between taxis, mass transport and private transport. Is a shared taxi one that follows a pre-defined route, or is it an unscheduled bus service? What is the difference between sharing costs and vocational driving?

Most transport is for the convenience of travellers wanting to get from point A to point B and taking a taxi is one of several possible ways of doing this. Taxis should be seen as part of the transport solution in a city, not as a problem.

Taxis serve a demand that is present in almost all cities in one form or another. The taxi industry can trace its roots to antiquity. Still, there is no universally accepted answer to the question on how to best regulate the industry. The best advice seems to start with the objectives. That there is no one right answer does not mean that there is not many wrong answers.

Who should do what in a taxi reform:

Part of the reform	Involved parties	Objective
Initiating reform	Politicians, customer groups, taxi industry	Put the taxi market on the agenda
Conduct a taxi study	Taxi authority, if needed with the help external consultants	Get a good overview of the local taxi market, the parties involved, the legal framework and the economic framework
setting objectives	Politicians, customer groups	Clear objective for the role of the taxi industry in the overall transport market
Choosing tools	Taxi authority, politicians, if needed external consultants	Choosing the appropriate tools for reaching the stated objectives
Conducting the reform	All of the above	Creating a better taxi service, and document the developments
Evaluate the reform	External party	See what the outcome of the reform has been, which part is successful which part is not and why

References

Aarhaug J, J R Krogstad and K Skollerud 2013. *"Drosjer i Vestfold- ett kjøreområde, mange stasjoneringsteder"*, TØI-report 1251/2013. Institute of Transport Economics, Oslo

Aarhaug J, J R Krogstad and K Skollerud 2012. *"Drosjer i Trondheim- konkurranse på like vilkår?",* TØI-report 1207/2012. Institute of Transport Economics, Oslo.

Arnott, R. 1996: "Taxi Travel Should Be Subsidized", *Journal of Urban Economics*, 40: 316-333.

Bekken J T 2007. *"*Experiences with (De-)regulation in the European taxi industry", in *(De)regulation of the taxi industry, round table 133*, OECD.

Bekken J T 2003. *"Taxi Regulation in Europe"*. Institute of Transport Economics, Oslo.

Bekken, J T and F Longva 2003. *"Impact of Taxi Market Regulation, an international comparison"*, TØI report 658/2003. Institute of Transport Economics, Oslo.

C 40 cities, online C40 Cities: Climate Leadership Group: Mexico City

Cooper J, R Mundy and J Nelson 2010. *"Taxi! Urban Economies and the Social and Transport Impacts of the Taxicab"*, Ashgate.

Darbera, R, 2010. *"Taxicab regulation and Urban Residents' use and perception of Taxi Services: A Survey in Eighth Cities",* Paper presented at 12th WCTR 2010, Lisbon Portugal.

Dempsey, P 1996. „Taxi Industry Regulation, Deregulation & Reregulation", *Transportation Law Journal 24:73* pp73-120. HeinOnline.

Fels, A (ed). 2012. *"Customers First: Service, Safety, Choice"*. Draft report of the Victorian government taxi inquiry.

Gilbert G and R E Samuels 1982. „*The Taxicab An Urban Transportation Survivor"*, University of North Carolina Press.

Goodbody 2009. *"Economic review of the small public service vehicle industry"*. Goodbody Economic Consultants.

Gwilliam, K M 2005. *"Regulation of Taxi Markets in Developing Countries: Issues and Options"*. Transport Note No. TRN-3, February 2005.

Hey, J D 1974. "Price adjustment in an atomistic market", *Journal of economic theory* volume 8, number 4 pp 483-499.

Law Commission 2012. *"Reforming the law of taxi and private hire services",* consultation paper no 203. 10 may 2012.

Longva, F., O. Osland and M.D. Leiren 2010. *"Omreguleringer i drosjemarkedet hvilke alternativer finnes og hva blir konsekvensene"*, [norwegian] TØI-report 1054/2010.

Meakin, R 2004. "Bus Regulation & Planning", Sustainable Transport: A Sourcebook for Policy-makers in Developing Cities Module 3c. http://www.sutp.org/en-dn-th3

Mundy, R / TTLF 2010. *"Saskatoon Taxi Study"*. TTLF consulting.

Nelson/Nygaard 2008. *"Santa Monica Taxi Study – technical memorandum"*. Nelson/Nygaard consulting associates.

Schaller B 2007. "Entry Controls in Taxi Regulation: Implications of US and Canadian experience for taxi regulation and deregulation", *Transport policy 14 490-506*.

Schaller Consulting 2006. *"The New York City Taxicab Fact Book",* Schaller consulting.

Schreiber C 1975. "The Economic Reasons for Price and Entry Regulation of Taxicabs", *Journal of Transport Economics and Policy* Sept 1975.

Venter, C 2013. "The lurch towards formalization: Lessons from the implementation of BRT in Johannesburg, South Africa", *Research in Transport Economics*, volume 39 issue 1, pages 114-120.

Walters, J 2013. "Overview of public transport policy developments in South Africa", *Research in Transport Economics*, volume 39 issue 1, pages 34-45.