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Taxis as a Part of Public Transport

Sustainable Urban Transport Technical Document #16

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Advice

This report discusses the merits of different regulatory systems for the taxi industry. It provides a guide for evaluating different forms of taxi regulation and assesses which system is most suited to particular cities in question.

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Abbreviations

BRT	Bus Rapid Transit
DKK	Danish Krone
EUR	Euro
GPS	Global Positioning System
IRU	International Road Transport Union
IVM	Institut pour la Ville en Mouvement
LRT	Light Rail Transit
MRT	Mass Rapid Transit
PHV	Private Hire Vehicle (legal term in Ireland)
QQE	Quality, quantity and economic regulations
SPSV	Small Public Service Vehicle (legal term in the UK)
SUTP	Sustainable Urban Transport Project
UK	United Kingdom
USD	US-Dollar



About this Publication

Taxis are an instantly recognisable form of transport, found in almost every city in the world. However, the role that taxis play varies from city to city – “taxi” does not refer to the same concept everywhere.

This report discusses the merits of different regulatory systems for the taxi industry. It provides a guide for evaluating different forms of taxi regulation and assesses which system is most suited to particular cities in question.

Regulation of the taxi industry has a long history; no universal regulatory solution has been discovered. Differing local markets and economic structures create a wide set of challenges for authorities seeking to regulate the industry. The taxi industry is complex and therefore it may be that no such singular solution exists. Nevertheless some recurring patterns can be observed and recommendations can be derived. They can be seen as a guideline; individual adaption to local circumstances is nevertheless inevitable.



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1. Rationale and Objectives

1.1 Introduction

Although taxis are almost universally recognised as a concept, few members of the general public know much about how the taxi industry works. The scope of services summarised under the term “taxi” varies from country to country, sometimes even from city to city, as do the challenges of the industry.

This technical document presents an *overview of international experience with taxi regulations*, including the challenges faced by regulators and policy makers, as well as *rationales for different forms of regulation and general recommendations*.



Fig. 1: Taxis waiting for customers in Berlin.

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1.2 Challenges

Taxis are an important feature of urban mobility, but they may pose a challenge in many cities due to the following:

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

- Overpricing (weak negotiating position of customers).

These issues can be 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 to have certain proof of qualification, and so on.

The exact content of these regulations varies from city to city. However, regulatory measures must be carefully designed, assessed and, if necessary, corrected in order to achieve the challenges they are meant to overcome. Comprehensive experience with different regulations has been gathered and lessons can be learned thereof.



Fig. 2: Taxi jam in Trujillo (Peru). © Jeroen Buis, 2014



2. What are Taxis?

Taxis provide a publicly available service and are therefore part of public transport. However, the lack of regular schedules, routes and set stations – all features characteristic of public transport – gives it a semi-private character. Fixed public transport services cannot support all travel demand. Hence, **full area and time coverage is dependent on taxis, which operate 24/7 and from point to point**. They are a vital link in public transport systems functioning in accordance with public demand. Therefore, they are a **useful supplement to conventional public transport**. In some areas, taxis are even the only form of public transport available.

In developing cities, taxis are a growing concern as road space is becoming scarcer due to population growth and a rapid increase of motor vehicles. On the other hand, the taxi market, as a labour intensive industry, generates

income for a huge number of families. Thus, regulating taxi services may imply controversial discussions.

2.1 Taxis are part of the public transport system

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 part of the transport solution in a city, not 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 is to start with the regulatory objectives. Just because there may not be one right answer it does not mean that there are no wrong answers.



Fig. 3: Taxi in London. © Carlos Pardo, 2010



Fig. 4: Reserved lane for buses, taxis and bicycles in Brussels.
© Manfred Breithaupt, 2014

Taxis in the urban transport service hierarchy

Compared with other modes of public transport, taxis provide **high flexibility and convenience for low transport volumes at high costs**. Taxis can provide door-to-door service, available 24 hours on 7 days per week. In

rural areas with low population density, taxis are **often the only available form of public transport**.

Conventional buses require suitable streets, and preferably bus stops, which increase the minimum trip distance and predefine access points to the transport system. Bus Rapid Transit (BRT), Light Rail Transit (LRT) and Metro require dedicated infrastructure. Heavy rail has even higher requirements.

Taxis, in contrast, are not bound to fixed routes or predefined access points; therefore they **operate flexibly and can instantly meet new demand**. For other modes of transport, comprehensive planning and construction can be necessary, extending the time span between identification of new demand and implementation of a new service. For rail modes, this time span includes costly construction of dedicated infrastructure. BRT also requires some construction but can partially re-use existing infrastructure. Buses can reschedule very quickly, provided there is spare capacity in the fleet. If none exists, there is usually a functioning market that allows capacity to be added within days.

While other modes of public transport usually receive subsidies for operation or infrastructure or both, **taxis are fully financed by user fees** (apart from road and taxi rank infrastructure provided by the government). This, among other factors, makes them particularly more expensive than other modes. An exception to this can be found in sparsely populated rural areas, especially in northern Europe, where many taxi services operate on behalf of the government.

Table 2-1: System characteristics of public transport modes

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



Fig. 5: Taxis in Rio de Janeiro. © Jeroen Buis, 2007

Although the taxi industry has a central function in any public transport system, it is often given less prominence by city planners and policy makers compared to other modes of public transport. A consequence of not being at the top of the political agenda is that taxi policy

is often *ad hoc* and not carefully tailored to the problems it is meant to solve. This is not an optimal starting point for regulation. A better approach would be to define the role of taxis in a city, and then regulate accordingly.



Fig. 6: Moto taxi in Monrovia (Liberia). © Julia Thutewohl, 2014



Fig. 7: Bike taxi drivers in Yogyakarta (Indonesia). © Manfred Breithaupt, 2006

2.2 Definition of the term “taxi”

It is 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.

In this report, the word “taxi” means **“a vehicle with a driver available for hire to 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 taxis, however. Each place typically has its own definition of what a taxi is (Table 2-2) – properties may vary slightly from country to country and in some cases from city to city. Various definitions have their pros and cons. For example, some definitions exclude the pre-booking market segments (as in the UK). One important starting point for understanding “the taxi market” is in recognising that taxis operate in different market segments and with different properties.

Table 2-2: Taxonomy of names used to describe taxis

Description of vehicle	UK term	US term	Other terms used
Vehicle for hire and reward. Available for engagement on the street. Maximum of 8 passengers.	<ul style="list-style-type: none"> ■ Taxi ■ Hackney/hackney carriage ■ Street taxi ■ Black Cab (in London) 	<ul style="list-style-type: none"> ■ Taxi ■ Cruising taxi 	<ul style="list-style-type: none"> ■ Metered taxi ■ Auto-rickshaws ■ Cab ■ Tuk-tuks ■ Cycle-rickshaws ■ Special Hire
Vehicle for hire and reward. Available by pre-book only. Maximum of 8 passengers.	<ul style="list-style-type: none"> ■ Minicab ■ Private Hire Vehicle (PHV) 	<ul style="list-style-type: none"> ■ For hire vehicle ■ Livery vehicle ■ Dispatch vehicle ■ Black car 	<ul style="list-style-type: none"> ■ Hackney (Republic of Ireland)
Small vehicle used for multiple occupancy taxi journeys; passenger numbers may be higher than 8.	<ul style="list-style-type: none"> ■ Taxibus 	<ul style="list-style-type: none"> ■ Shuttle 	<ul style="list-style-type: none"> ■ Paratransit (in international documents) ■ Jitney (in Philippines also Jeepney) ■ Camioneta ■ Shared taxi ■ Shared auto ■ Sammeltaxi ■ Bush taxi ■ Minibus ■ Taxi ■ Matatu ■ Marshrutka ■ Dolmos
Specialist vehicle used in exclusive hire.	<ul style="list-style-type: none"> ■ Limousine 	<ul style="list-style-type: none"> ■ Limousine 	<ul style="list-style-type: none"> ■ Limousine ■ Black car

© adopted from Cooper *et al.*, 2010



Fig. 8: High-capacity taxi in Brussels. © Manfred Breithaupt, 2014



Fig. 9: Paratransit in Nakhon Ratchasima (Thailand). © Dominik Schmid, 2010

Table 2-3: Taxi market segments

		Hail segment	Rank segment	Pre-book segment	Contract segment
		Street markets			
Engaging		On the street	At a taxi stand	By telephone (call, text message), internet, other	Determined in the contract
Payment	Where?	At destination	At destination	At destination	At regular time intervals
	How?	Cash or card	Cash or card	Cash or card (eventually via smart phone app)	Bank account
	Far setting?	Metered or negotiated	Metered or negotiated	Metered or negotiated	Negotiated for several trips
Customer-Taxi relation		One customer one taxi; Atomistic *) market	One customer one or more taxis; Atomistic market	One customer; One or more dispatchers	Several customers; Several taxi companies

*) Note: 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. See also Hay (1974).

2.3 Taxi market form and segments

There are *four major market segments in the taxi industry: hail, taxi rank, pre-book and contract* (see Table 2-3). 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. New technology also affects the relation between segments; since 2009, the wider availability of smart phones and apps has shifted demand from the street market segments to the pre-book or e-hail market segments.

2.3.1 Hail

A “hail” taxi is one that is *flagged down or hailed on the street*. When a taxi is vacant, it is sometimes (more or less) randomly driven around a city, picking up passengers at the roadside. The hail 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 have been examined in several empirical studies (Schaller 2007, Shreiber 1975) and there seems to be agreement that some regulation is needed, based on the observation that the customer is faced with a temporary monopoly of supply when hailing a taxi. For the customer, choosing to wait means uncertainty, as there is *uncertainty* about when the next vacant taxi will come along or what the driver will charge ^[1]. This gives *bargaining power to the driver*, and in an unregulated market one would expect prices to rise unpredictably. Adding to this uncertainty is the fact that there are no economies of scale in operating taxis in this market segment. The only capital need is a car. Consequently, one would expect a high number of taxi vehicles, high fares and low salaries, poor quality and profits in a completely free market.

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

^[1] One can argue that this information problem can be abated by technology. Many taxi companies now have apps providing price and availability information. These reduce the information gap and bargaining power of the driver. Thus, it moves street hailing closer to the pre-book market segment.



Fig. 10: Hailing a taxi in New York.

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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.

Box 1: Taxi Regulation in 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% of all trips made (Schaller 2006). Taxi regulation in New York City and its medallion system in particular, 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% of all miles were spent cruising searching for a passenger. 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-creation through government intervention, *i.e.* rent visible through the high prices that the tradable medallions fetch.

*) Find more information on one-, two- and multi-tier systems in Section 3.5.

2.3.2 Taxi rank

A taxi rank or stand is **a place where taxis queue for customers or customers queue for taxis**. 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 organised 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 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 of supply, even if there are

taxis from different companies available. There are little or no economies of scale in offering the service. There are few barriers to entry for taxi operators, and an unregulated market can result in a high number of vehicles, low wages, low profits, and consequently a reduction in service quality. The free market approach is found to be inadequate in most western cities, and this taxi market segment is often regulated. Typical regulations include:

- Licensing (a licence needed in order to drive legally);
- Entry restrictions (a cap on the number of licences, unmet demand test, etc.);
- Quality requirements on drivers (local knowledge, language, etc.) and vehicles (technical specifications, accessibility, etc.);
- Price regulation (and/or price information).

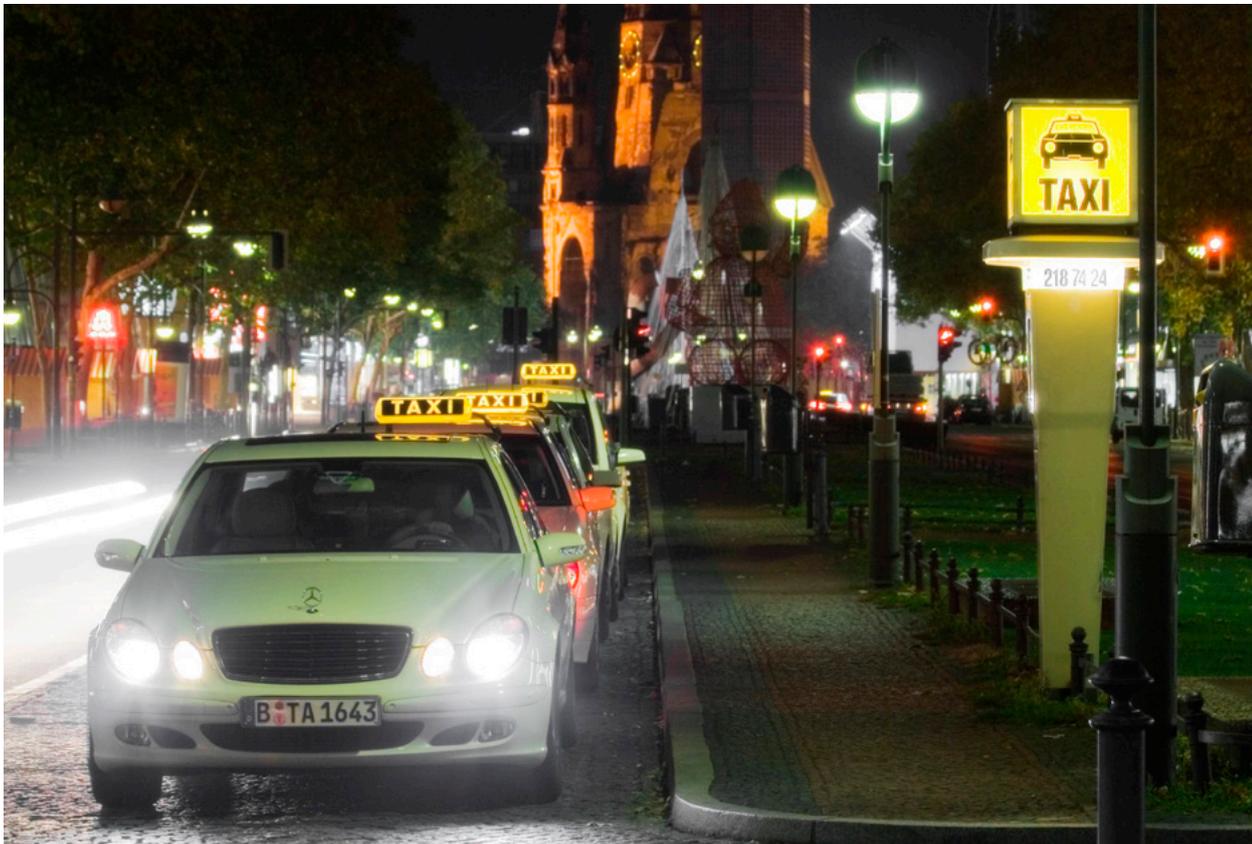


Fig. 11: Taxi rank in Berlin. © Till Krech @flickr, CC BY 2.0, <https://flic.kr/p/szMST>



Fig. 12: Taxi rank at Hong Kong airport. © Michael Coghlan @flickr CC BY-SA 2.0, <https://flic.kr/p/nDGr26>

2.3.3 Pre-book

From an economic point of view, the pre-book market is very different from the street market segments. 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. For that purpose, there is often a need for special IT infrastructure as well as a round-the-clock telephone service (the latter often being a regulatory requirement). This induces higher fixed costs compared to 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.

For companies, in turn, there are **incentives to build up a good reputation**, which will benefit their economic performance. As a result, this market segment can successfully function with less regulation than street markets. However, some regulation – such as quality requirements for vehicles and drivers to ensure safety and on opening hours to ensure availability – may still be of value.

E-hailing & taxi apps

Within the last years, apps such as myTaxi, taxi.eu and Uber have to some extent **disrupted the traditional taxi market**. These apps usually combine requesting a taxi by specifying exact start and end point of the ride, matching nearby customers and drivers, booking, calculating the optimal route, payment and rating.

Compared to the traditional phone-booking segment and the street segments, there are **several advantages**. Through GPS-based matching, customers and drivers can be brought together faster and more efficiently, reducing waiting time for both sides and the necessity for unoccupied cruising. By integrating rating mechanisms into the process, taxi apps provide a solution to the problems arising from asymmetric information; taxi drivers have an incentive to offer good service quality as their behaviour influences the ratings they receive and in consequence their future opportunities to attract customers. Also, costly detours which would remain unnoticed by non-local customers are inhibited through integrated routing.

In the US and Europe, **app-based companies have created some controversy**, as the legal frameworks surrounding such companies are often unclear. In other places, the evolution of services like Uber has **triggered serious discussions about the quality of regular taxi services**. Consequently, as in the case of Sao Paulo this has led to the introduction of stricter quality regulations for the taxi market, see Box 4.

Taxi apps follow several different models:

- **The price and availability app:** the app provides price and availability information for taxis from different dispatchers that the app user can contact directly.
Example: <http://www.taxikalkulator.no>



Fig. 13: Chicago taxi cab drivers protesting against Uber X.

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- **The (external) platform app:** a platform that can be joined by individual drivers regardless of their company, provided by external actors which had previously not been involved in the taxi industry; usually covering several cities and/or countries. Examples: Curb in the US and myTaxi internationally.
- **The joint dispatcher app:** similar to the platform app, but provided by dispatch companies or their umbrella

Box 2: MyTaxi

MyTaxi claims to be the world's largest taxi app. It is a free app that combines matching, booking, payment and rating. Licensed taxi drivers from different companies can operate with MyTaxi by simply downloading the app and signing up. Local taxi fares apply; MyTaxi keeps a fixed share (7% as of September 2015) of the turnover.

<http://www.mytaxi.com>

Box 3: Uber

The American company Uber, founded in 2009, offers several different services in the taxi field, ranging from limousine services to car-pooling. It is widely known for the Uber X or UberPop service, where the app provides an online platform for customers to book rides with private drivers using their own vehicles. The Uber services comprise matching, booking, payment, rating, and – different from other companies – also the setting of prices. Prices vary significantly depending on supply and demand and type of service. The so-called surge pricing mechanism multiplies prices by 8 or (rarely) even higher in periods of high demand.

In setting and monitoring standards for drivers who want to operate in the business, Uber conducts part of the regulator role. This has been approved in California, where companies such as Uber are regulated as “Transportation Network Companies” since 2013. In many other places, Uber is facing legal disputes; for example in Germany Uber X has been banned for operating without taxi licenses.

<http://www.uber.com>



Fig. 14: Taxi with mytaxi branding. © Alper Çuğun @flickr, CC BY 2.0, <https://flic.kr/p/TEB9CX>



Fig. 15: Uber app. © Acanyi @flickr, CC BY-SA 2.0, <https://flic.kr/p/n4jfLL>

organisations and used by all associated drivers; example: <http://www.taxi.eu>

- **The app-based ride-sourcing company:** a company is set up exclusively for app-based pre-bookings and uses dedicated drivers and vehicles; typically the drivers own the vehicles and get paid through the app-company, or a company operating on behalf of the app-company; examples: Uber, Lyft

2.3.4 Contract

Public authorities and private companies often have a recurring need for taxi services. For public authorities, this may be the transport of school children, the elderly, and persons with reduced mobility. For private companies, it may be the transport of personnel on a regular or semi-regular basis. In both cases, **buying taxi services can be an economically attractive alternative to providing them in-house.**

In this market segment, 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 (see Aarhaug, 2015).

Box 4: No more cursing!

In São Paulo, Brazil a new era is dawning for taxi drivers. From now on drivers have to pay a fine for outbursts in the car, being unshaved or starting disputes about football.

The metropolis of Sao Paulo has adopted a strict code of conduct for taxi drivers: Wearing shorts while driving is prohibited, as well as cursing and being upset about football related issues. Otherwise, drivers will face penalties of the equivalent of around EUR 8.25.

Those measures, asserted on Monday, are part of a program in which Sao Paulo responds to the transport service Uber. From the beginning of March, passengers are able to assess the quality of their taxi service via smartphone. In line with these reviews, taxi drivers can be cited to appear at a disciplinary commission or even a court.

Shirt, long trousers, seat belt

According to the decree, taxi drivers are obliged to wear a shirt, dark or suit trousers, as well as closed shoes and a seat

belt – chauffeurs of luxury vehicles are prescribed to wear suit and tie. Further, drivers should avoid disputes about football, politics and religious issues. They are obliged to welcome their passengers with “optimism and pleasure”.

The new regulation also includes rules of conduct, which are rather self-evident, such as to avoid discriminating passengers. Additionally, certain technical devices become “a must” now: Someone who does not offer a mobile recharger or refuses to accept credit card payments faces a penalty.

Similar to their colleagues in Europe, the taxi drivers are protesting against the transport service Uber since several months. Uber is currently one of the most successful start-up companies in the world.

The company arranges trips via smartphone-application and the internet in various supply and price ranges. In many countries, established taxi enterprises try to drive their competitors out of the market.

© Spiegel Online, 19 January 2016

2.3.5 Shared taxis (informal or paratransit)

Shared taxis are a **form of public transport somewhere between conventional taxi and bus services**. Taxi sharing is common in many developing countries (in some developed countries, too), and is **often called paratransit** in transport literature. It can be categorised 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. 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. Vozyanov (2015) describes how shared taxi services, so called “marshrutkas”, were established in eastern Europe following the collapse of the communist regimes, as a privately initiated and self-financing form of public transport. Marshrutkas provide mobility since the former state-operated public transport system for various reasons ceased to function or to adapt to the changing demand. This development is similar to how shared taxi services have evolved in several developing

countries, and in special political contexts in developed countries, e.g. in Belfast, Northern Ireland.

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. These services are also provided by various app-based companies, including Uber. In developed countries, this service is formalised in several ways, including “dial-a-ride” types of semi-scheduled service in low demand periods or areas. When this transport is organised by the local authorities with schedules, and often subsidies, it becomes part of the contract market segment.

Paratransit vehicles are usually larger than private cars and smaller than conventional buses, **typically with a capacity between 8 and 20 passengers**. Shared taxis usually have larger **service overlap with scheduled public transport** than metered taxis do. Meakin (2004) looked at the distinction between paratransit in developing countries and conventional public transport, and points

at the fact that paratransit often includes *small-scale or individual ownership and 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 their often unregulated supply, often resulting in *demand responsive supply*. The small size of vehicles also allows them to work at lower fares and on low demand corridors. However, it also typically results in low wages and long working hours. Still, the fact that shared taxis are able to attract passengers demonstrates that these services have certain value that is lacking in the conventional public transport system. For this reason it is advisable to carefully consider the costs and benefits of all transport options in a broad strategy, rather than to impose an outright ban on the shared taxi sector. A better way could be to formalise the sector, as has been the case in South Africa (see Figure 16).

In South Africa there is a strong move to formalise the taxi industry. This is being done with a focus on shared taxis through two distinct schemes (see Venter, 2013 and Walters, 2013). The first is a re-capitalisation of the shared taxi industry, where older vehicles are being replaced with new, subsidised ones. The second is a series of projects to replace shared taxis with BRT on corridors with high passenger demand. Safety issues, related to both accidents and crime, have been important in motivating this move.



Fig. 16: Bus conductor calling for passengers in Lima. © Carlos Pardo, 2007

In Mexico there has also been a move towards the re-capitalisation of the taxi industry, prompted by different reasons. The objective is to replace old and polluting taxi vehicles with newer and more fuel-efficient models (in line with the objectives of the C40 Cities initiative).

For further information on informal transit we recommend the recent study "Paratransit: A key element in a dual system", published by AFD and Codatu, see Salazar Ferro 2015.

Available here: http://www.codatu.org/wp-content/uploads/transport_collec_artisanal_V03ecran_EN.pdf

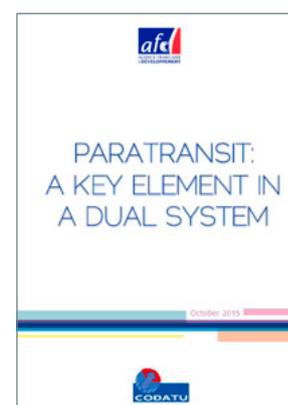
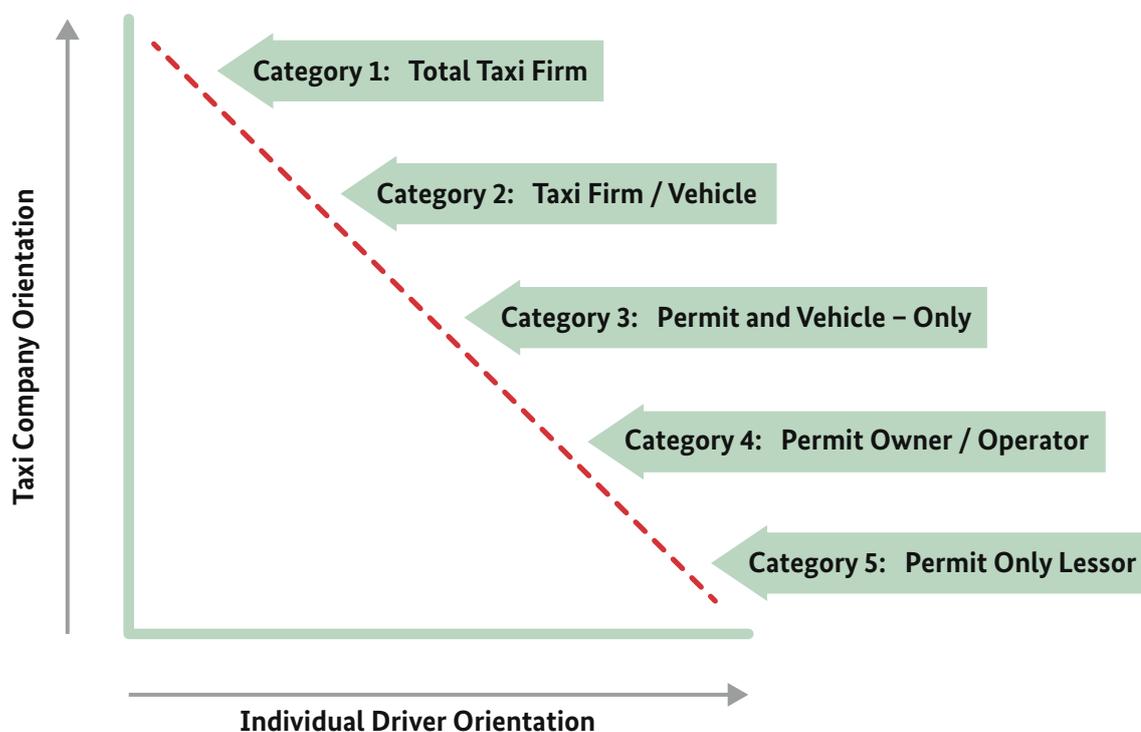




Fig. 17: Paratransit bus in Mexico City. © Manfred Breithaupt, 2010

2.4 Taxi industry organisation

How the taxi industry is organised is often not clear to the general public, and the variation between communities, even within a community, greatly affects the incentives for the actors involved. Using a model to illustrate the organisational differences in the taxi industry, Dr Ray Mundy (Mundy 2010, Cooper *et al.*, 2010, etc.) stated that there is *considerable confusion as to what defines a taxi company*. The general public sees a car with a dome light on top, the name of some company on the side and the word “taxi” and assumes 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 can be, and often are, very different.



Graph 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, many of which have long traditions in the US (see Gilbert and Samuels, 1982), but now operate in only a few cities. The firm sets drivers’ shifts (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 he or she 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.

Category 3: The permit and vehicle-only lessor firm provides *contract drivers with the vehicle and permits*

and licences ^[1], but little or no marketing or dispatching. There are hybrid variants between category 3 and category 2 firms.

Category 4 is *a firm in which the permit holder is also the driver*. Firms in this category will not usually have a dispatching function or contracts with hotels and such, 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.

^[1] The definition of the terms “permits” or “licenses” depends upon local legislation. Here the two terms are used synonymously.

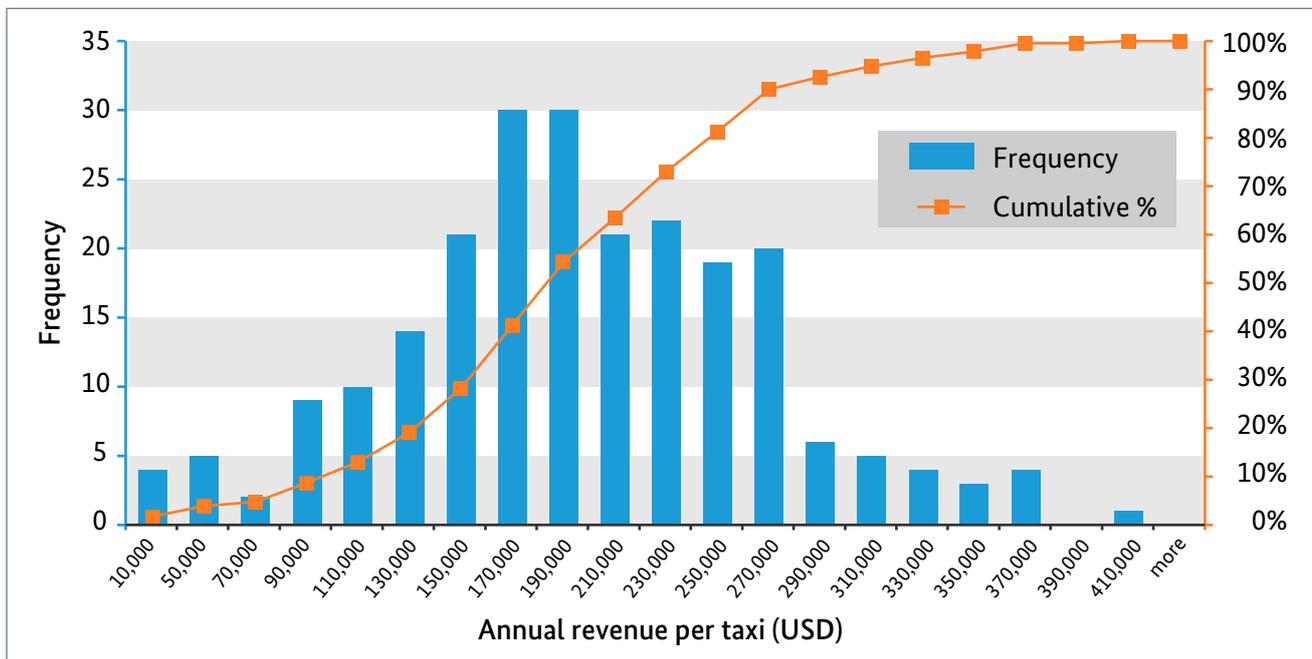
2.5 Economic characteristics of the taxi market

2.5.1 Revenue varies between taxis

Economically, the taxi industry is characterised by variable turnover and revenue. 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 Graph 2-2.



Graph 2-2: Annual revenue distribution per taxi vehicle in the Norwegian county of Vestfold.
© Adopted from Aarhaug et al., 2013

Graph 2-2 illustrates how different taxis operating in the same market achieve very different annual revenues. At the low end there are vehicles that are active only during some parts of the year. For vehicles operating a full year, revenue varies from about USD 100,000 to more than four times that amount. 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. It is remarkable that the bell-curve-like shape of this graph seems to be present in most taxi markets where operational decisions are taken at vehicle level. The revenue levels will vary from market to market, but the distribution between vehicles is similar. Suggesting a similar distribution of skill and effort between markets with respect to drivers and owners.



Fig. 18: Taxis in Nanjing. © Arimbi Jinca, 2006

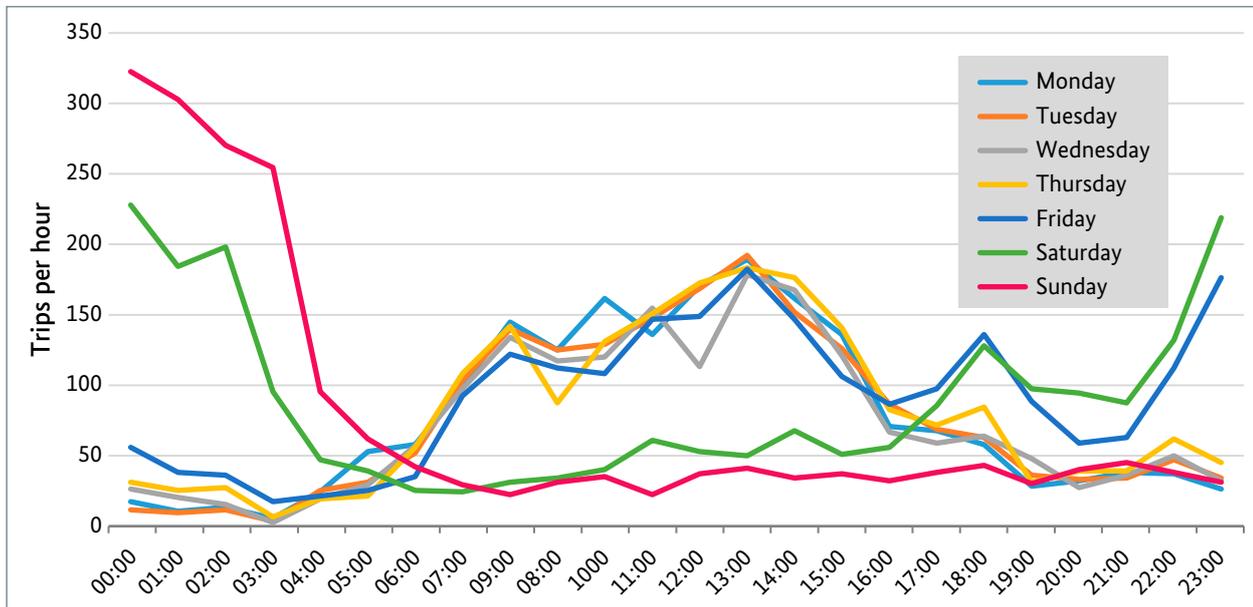
2.5.2 Demand varies through the week

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

Graph 2-3 is constructed from register data illustrating periods of high demand during the week (typically during working hours), followed by different periods of very high demand when shops and offices close at weekends. During the rest of the week there is comparably low demand in the evening hours. Demand can also vary between seasons. When regulating the taxi industry, it is important to keep these demand fluctuations in mind.

If the regulatory objective is to have good taxi coverage at peak traffic periods, the licensing requirements should reference this. A recurring problem in countries with a high percentage of owner-operators is that supply

and demand can work counter-cyclically. When vehicles are double or triple-shifted (i.e. the same vehicle is driven by several drivers at different times of the day), 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 weeknights. Long hours with limited demand result in low hourly pay for hired drivers (Aarhaug *et al.*, 2013).

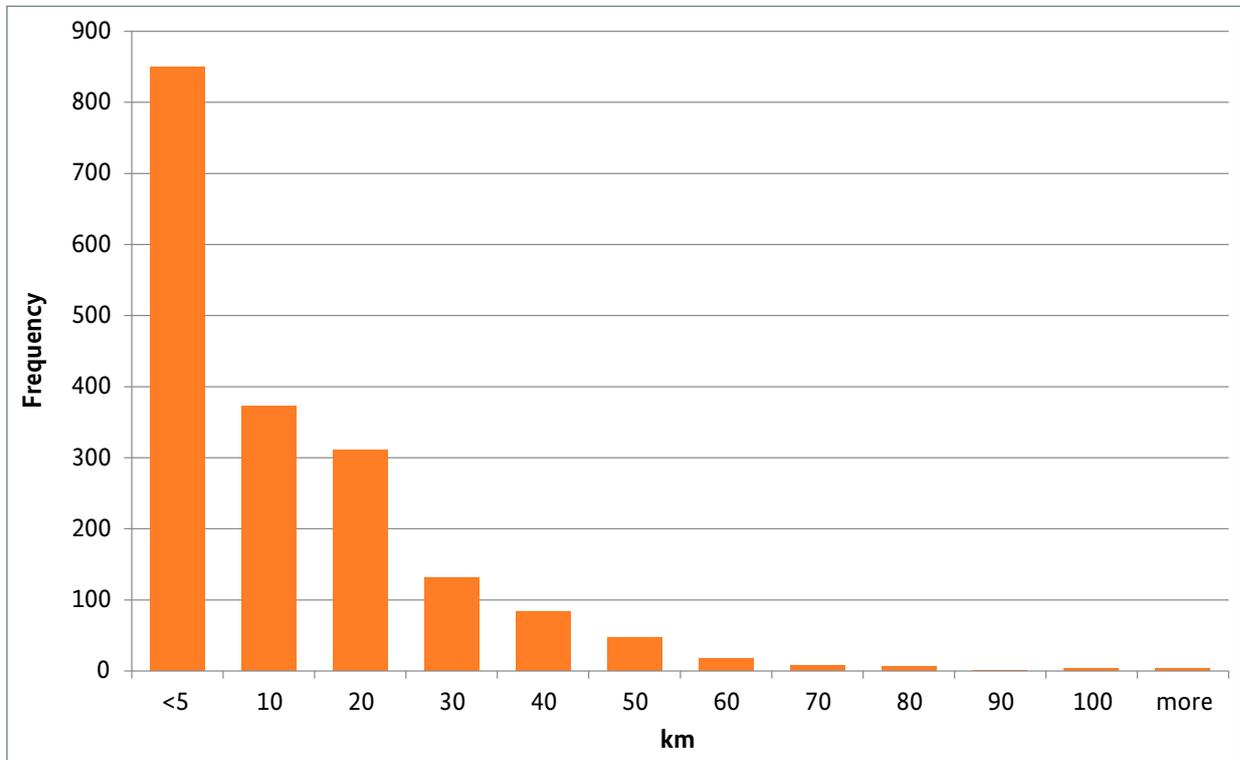


Graph 2-3: Trips during a typical week. © Aarhaug et al., 2013



Fig. 19: Taxi driver making a break somewhere in Mexico. © Winston Hearn @flickr, CC BY 2.0, <https://flic.kr/p/jL6Sy>

2.5.3 Taxi markets are local



Graph 2-4: Length of taxi trips in a day from small dispatcher in Norway. © Aarhaug et al., 2013

Graph 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 are low occupancy rates combined with prices 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, especially for longer trips (see the shared taxi Section 2.3.5).



Fig. 20: Bike taxis in Dhaka (Bangladesh). © Santhosh Kodukula, 2014

2.5.4 Taxis meet different demand in different cities

A dearth of comparative international studies exists on the demand side of the taxi industry. The 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. It found 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% indicated that they never used taxis.

This survey illustrates how taxis are engaged differently in different cities. New York is at one end of the scale, where street hailing is used for approximately 90% of all taxi rides; at the other is Stockholm, where street hailing accounts for just above 20% of taxi use, and telephone bookings accounting for more than 50% (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 many other case studies conducted in different cities (Nelson and 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. Characteristics of a city and its taxi regulation have a bearing on the use of taxis. In New York and Dublin, taxis are a major mode, while use is limited in cities such as Paris. Size and density of a city, availability of alternative modes of transport such as buses and trains, as well as regulation and culture can all affect the extent to which taxis are used.

For a more detailed analysis of the economic principles underlying the taxi industry, see:

Gwilliam, K. M. 2005. *Regulation of taxi markets in developing countries: issues and options*, Transport Notes – Urban Transport Thematic Group, Transport Note No. TRN -3, The World Bank, Washington, D.C., USA. URL: <https://openknowledge.worldbank.org/bitstream/handle/10986/11780/33896a10TRN131Taxi1Reg.pdf?sequence=1>



Fig. 21: Tourists using rickshaws for exploring the city of Da Nang (Vietnam). © Manfred Breithaupt, 2010



Fig. 22: Bike sharing systems offer alternative mobility options to citizens, Mexico City. Adriana Lopez, 2013



3. Why and How to Regulate Taxis?

Taxi regulation has a long history. Gilbert and Samuels (1982) look to the 1630s for the origins of modern taxi regulation, when cities experienced problems with horse carriages plying for hire in public spaces. Regulation was introduced to abate these problems. While a lot has changed since then, the need to regulate taxis in some way has not. On the contrary, it is well established. Arguments used for regulation include consumer interests, public safety, congestion, market failures (particularly in street market segments) and city image.

Maintaining a balance between taxi supply and demand is at the core of taxi regulation. Where supply and demand are not approximately balanced, operating malpractices become prevalent and 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) suggests that refusals are

high with high utilisation. The **problems associated with an excess of taxis arise from accumulation of taxis at central locations and issues related to low revenue.**

Academic descriptions of taxi regulation commonly include three elements: quantity, quality and economic regulation (QQE). Quality and quantity regulations are sometimes referred to as entry regulations:

- Quantity regulations address the number of vehicles available;
- Quality regulations typically address:
 - ❖ the operator's qualifications to operate,
 - ❖ vehicle standards,
 - ❖ insurance;
- 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



Fig. 23: Taxi driver in Chicago protests against taxi regulation. © Scott L @flickr, CC BY-SA 2.0, <https://flic.kr/p/reuyeZ>

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?

Box 5: Taxi regulation in Namibia

Due to a severe lack of organised public transport (e.g. buses), private taxis are the backbone of passenger transport all over Namibia. Taxis account for almost 60% of all motorised transport in Windhoek, the capital of Namibia.

Most common taxi vehicles in the country are typical passenger cars; but due to the high transport demand, mini buses also operate on an everyday base. Mini buses have long been used for long-distances only. Namibia has a centralised taxi regulation in place. All permits for public transport are acquired in Windhoek. Generally, a special permit for public passenger transport is required to operate a taxi. Initially, the permit is limited to operation of a certain route or area and to a particular vehicle. Further, every vehicle has to pass a compulsory vehicle test before it is allowed to operate on public roads. However, there is no consistency in this

system, as the permit can be prolonged without having to pass the vehicle examination again. This leads to a high number of rather unsecure vehicles on the road. Progress is expected due to the full implementation of the Decade of Action Plan, both regarding vehicle examinations and requirements to drivers.

Due to a lack of enforcement, taxi and mini bus operators regularly divert from the approved routes or areas or even don't possess a permit at all. Local authorities are targeting this problems by different control mechanisms. Windhoek, Oshakati and Otjiwarongo have a taxi registration system in place to keep track of the number of taxis operating within their jurisdiction. Fares are regulated by the national Transportation Board, taxi associations need to apply to the board when they see a need for higher tariffs.



Fig. 24: Taxi in Windhoek (Namibia). © GIZ Namibia, 2012

Box 6: The link between regulation and customer satisfaction

The best indicator of a good taxi system is customer satisfaction and frequent use.

When comparing customer surveys, such as the one conducted by the French Institute “Institut pour la Ville en Mouvement” (IVM) ^[1], the most striking observation is that there is no obvious link between the regulatory framework and customer satisfaction. Yet, there may very well be a link between customer satisfaction and the way regulations are enforced. The absence of quantity regulation, with little or no price regulation and limited (but enforced) quality regulation, seems to yield success in the larger **Swedish cities**, but has not proved equally successful in smaller cities and rural areas. In **London**, strict quality and price regulation has resulted in an instantly recognisable industry

that is very popular, without capping entry. 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 parallel to 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, particularly for larger dispatchers. The street segments in particular in Stockholm have had several quality issues relating to independent operators combining high cost and low quality, but these are now mostly addressed using a stricter quality and minimum size regulation. ^[2]

^[1] See Darbéra, 2010

^[2] See for example <http://www.taxipriser.se/hem.html>



Fig. 25: Bike taxi on a rainy day in New York. © Manfred Breithaupt, 2013

3.1 Developments in quantity regulation

This section focuses on quantitative regulation (number of vehicles or licences). 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 full circle. His research shows that American cities began regulating local taxi firms in the 1920s, following the experience of market failures. In particular by limiting the number of taxi licenses. 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 because of dissatisfaction with the deregulated solution.

In Europe, the picture is diverse. Until the Taxi Regulation Act 2013, there have been virtually no entry regulations in the Republic of Ireland ^[2], while strict entry regulation in France applies. In other countries, the picture is diverse: in 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.

^[2] At the moment, only applications for wheelchair accessible taxi (hackneys) and limousines are being accepted, see also <https://www.nationaltransport.ie/taxi-and-bus-licensing/taxi/spsv-vehicle-licensing-2/apply-for-a-vehicle-licence>.



Fig. 26: Transport hub in Kathmandu (Nepal). © Vedant Goyal, 2014

Box 7: Quality regulation in New York City

In New York City all “Yellow Taxi” taxicabs are subject to a detailed set of rules, specified in the *Rules for Taxicab Hack-up and Maintenance*. For example, all vehicles have to be of the same type (from 2014 to 2024: the Nissan NV200). Detailed requirements for paint, finish and lighting are in effect (§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.

Source: *New York City: Rules for taxicab hack-up and maintenance*, http://www.nyc.gov/html/tlc/downloads/pdf/2011rulebook_ch67.pdf.



Fig. 27: Yellow Cabs in a workshop in New York City. © Johnny Peacock @flickr, CC BY-NC-ND 2.0, <https://flic.kr/p/bxLGJQ>

While the reasons for change in taxi regulation may differ worldwide, the presented regulatory mechanisms can have international application.

3.2 Quality regulation

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

Licences may require that vehicles meet certain technical and safety standards, and also certain aesthetic standards to be instantly recognisable as a taxi. Therefore, 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 can be more ambiguous; this does not mean, however, that such requirements are always out of place. Aesthetic standards like the distinct yellow cabs in New York City and London's black cabs can also help to prevent fraud and make illegal operators easier to spot; they can result in better information from the demand side view, but limit the possibilities for service differentiation. Very strict regulations may impose high costs for both regulators and operators, thus the New York City example in Box 7 should not be seen as blue print for policy-makers in developing cities who are just beginning to impose regulations on previously unregulated markets.

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 required, although the extent is debated. Knowledge of the local language and, in cases where it is a minor language, additional 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** can make it difficult to recruit the necessary drivers. Both outcomes can be undesirable. The requirements also influence which communities taxi drivers are drawn from, typically one would expect that lower requirements would result in more recruitment from groups that are less in demand on the labour market.

3.3 Fare regulation

Regulating fares is quite common in taxi markets, even though regulating prices in many markets is seen as an outdated form of regulation. The main argument for regulating fares in the taxi markets is the **asymmetric information** between the driver and passenger in the street and stand market segments. The passenger has little or no knowledge of how much the trip should cost, what the alternatives are, and a very weak negotiation

Table 3-1: Taxi fare structure and level, with fixed fares, from Copenhagen, Denmark

Fare*		Fare 1			Fare 2**		
		DKK	USD	EUR	DKK	USD	EUR
Initial Fare	Street	24.00	3.59	3.22	40.00	5.98	5.36
	Dispatch	37.00	5.53	4.96	50.00	7.47	6.70
Waiting (per minute)		7.00	1.05	0.94	7.00	1.05	0.94
Kilometre		15.25	2.80	2.04	19.15	2.86	2.57

*Zone 1, vehicles with 4 passenger seats, as of 26 October 2014

**Friday 23:00 – Saturday 7:00, Saturday 23:00 – Sunday 7:00 and on public holidays

Exchange rates: 1 USD = 6.60 DKK, 1 EUR = 7.46 DKK (Sept. 2015)

Source: <http://www.taxa.dk/priser-og-takster>

possession, studies ^[3] have also shown that this demand in this market segment is quite inelastic with regard to price. In other words, the taxi driver has very little to lose from charging a high price, if he is given the opportunity. An obvious response to this situation is to regulate the prices, by stating a fixed or maximum fare, and having compulsory use of a taximeter. An example on how such a regulated fare system is organised is shown in Table 3-1, with an example from Copenhagen.

However, it is very difficult to set a “correct” regulated fare. One would expect the taxi industry to lobby for a higher fare, while the general public and politicians would want a lower fare.

One solution to this problem is that regulation should take the form of *price caps*, (using a maximum fare) rather than fixed fares. Setting a maximum fare taxis are

allowed to collect, at least in the hail and rank market segments, means that if the market price is below the regulated price, the market price will be used; if it is above the regulated price, the regulated price will be used. A regulated maximum fare would also protect the public from arbitrarily high fares charged by opportunistic taxi drivers who assume that they will not encounter the same passenger again, and that possible complaints will not be traced back to them. A regulated maximum fare would still allow a driver or taxi company to give discounts if the market fare was below the regulated one. Therefore, a maximum fare is usually preferred to a fixed fare. Another solution, in a one-tier regulatory system, is to have a minimum size (in terms of number of vehicles) for taxi companies and have a requirement for using the same fare in the pre-book and street market segments.

^[3] e.g. Rose and Hensher, 2013



Fig. 28: Taxi in Copenhagen. © Manfred Breithaupt, 2009

Fixed Fares

A fixed fare, does not necessarily mean that the fare is constant in all markets and at all times, but rather that it is the compulsory rate at a given point in time for a given situation.

The arguments for a fixed fare is strongest in the street market segments and in single tier systems where the street market segments dominate ^[4].

^[4] This is based upon economic reasoning. Other arguments, such as a wish to brand taxis as part of a cities transport system, may also be used in order to justify fixed fares.



Fig. 29: Taxi in Rome indicating fixed fares to certain areas.

© Armin Wagner, 2015

The main beneficiaries of a fixed fare system are street market segment customers who catch a taxi and do not need to negotiate the fare. The main disadvantage of a fixed fare system is that it is difficult to create a fare schedule that is both complex enough to follow the market and simple enough to be transparent. A typical outcome will be that in low demand periods, taxis that would be willing to take a trip at a lower fare will be idle, because few people will be willing to pay the fixed fare ^[5]. In high demand periods, there will be a shortage of vehicles, and passengers who would be willing to pay a higher fare are left queuing for taxis. In this situation taxi drivers will be less motivated to drive in peak periods than they would be at market fares.

As street market segments are assumed to be price inelastic (see Rose and Hencher, 2013), those who catch a taxi will receive a high consumer surplus, while at the same time there is an overall shortage of vehicles (as supply of vehicles is unlikely to fluctuate as fast as demand).

In the pre-book market segment the difficulties of matching supply with demand in a fixed fare regime will be similar to the street market segments. However, the argument for having fixed fares – the information asymmetry, and negotiation possession between driver and passenger – is much weaker. This is because it is easier to order from a different dispatcher or to choose another mode of transport from a pre-book position than in a street hire situation.

Maximum or Caped Fares

As discussed earlier, a maximum fare or caped fare system solves the low demand problem of the fixed fare. It allows a lower price, if the market price is lower than the regulated fare, but the situation at high demand remains the same.

Market Fares

Market fares should result in an efficient outcome, however there are issues related to asymmetric information and a weak bargaining position for passengers

^[5] This assumes that the supply side has some delays in adopting to demand changes.

on the street market segment. This can result in an undesirable outcome, as prices would then be expected to vary randomly. However, using the experience from the deregulation of the Swedish taxi market, one would expect larger actors to price these trips reasonably, while smaller independent actors will charge as much as possible on street market trips. The larger actors, organising many vehicles, will typically have a recognised brand, which they wish to protect and promote, while smaller

independent actors will be “a taxi”, and not expecting that the demand for their service will be dependent upon the price they charge.

In the pre-book market segments, market fares are expected to give an efficient and reasonable price as one would expect competition both between taxi companies and between taxis and other modes to provide downward pressure on prices.

Table 3-2: Pros and cons of fixed and market fares

	Fixed fare	Maximum fare	Market fare
Street market segment customers	<ul style="list-style-type: none"> + Predictable prices + No overcharging – No discount 	<ul style="list-style-type: none"> + Predictable prices + No overcharging + Possible discounts 	<ul style="list-style-type: none"> – Unpredictable prices – Danger of overcharging due to weak bargaining position + Discounts are possible
Taxi operators	<ul style="list-style-type: none"> – Cannot set fares to market conditions – Some trips may not be profitable 	<ul style="list-style-type: none"> – Cannot set fares to market conditions – Some trips may not be profitable 	<ul style="list-style-type: none"> – Can set fares flexibly
Regulator	<ul style="list-style-type: none"> – Difficult to match supply and demand + Can ensure customer protection, social inclusion 	<ul style="list-style-type: none"> – Difficult to match supply and demand + Can ensure customer protection, social inclusion 	<ul style="list-style-type: none"> – Difficult to control quality

Box 8: Fixed Fare Regulation in Dublin

In Darbéra’s (2010) sample of cities, the highest reported taxi use is in **Dublin**, where there is open entry and the fares are set. 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 fact is that the pool of taxi vehicles increased dramatically, tripling from 2,700 to 8,400 vehicles following deregulation. The number of pre-book-only vehicles dropped to about 40% (from 3,500 to 1,500) with owners changing to taxi

licences. Together with the increase in number of vehicles, there has been an 83% 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 resulting situation is not optimal. 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.

Tariff structure

Fare 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)^[6];
 - ❖ Fare = Initial charge (flag drop) + [(price per km × km) or (price per min × min)] depending on speed;
- **Flat fixed prices**, say USD 25 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 × km + price per min × min.

^[6] Price per distance will be used if speed is above a threshold speed, if speed is below this speed, price per unit of time will be used.

The basic structure can be modified in different ways. Kilometre and minute charges can decrease with travelled distance or time or increase due to night time and peak time mark-ups; dispatch, passenger, luggage, and airport surcharges can be added.

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

For example, a low fixed fare can be set for trips between airport and city centre in order to discourage oversupply at the airport, or a high flag drop can be used to encourage drivers to accept short trips. **Surcharges** can be used to increase or decrease both demand and supply at particular time intervals or locations.



Fig. 30: Taximeter. © JL08 @flickr, CC BY-NC-ND 2.0, <https://flic.kr/p/6p8Wwt>

In pre-book market segments it is more difficult to find economic arguments for price caps (as prices can be compared relatively easy), except in cases where the taxi industry is organised as a monopoly. In such cases there will most likely be a form of intermodal competition that limits fare levels. Only in cases where the taxi service is a true monopoly – if it is the only viable public transport option, as can be the case in rural areas or niche market segments – would one expect a pre-book service to charge monopoly prices.

Fare level and schedule can also be used to indicate, indirectly, **the role of taxis in the public transport system**. Where fixed, low fares point more in the direction of scheduled public transport and market based fares point in the direction of a private transport solution. However, there is little known empirics on the use and perception of this.

Fares, supply of vehicles and wages

One simple assumption is that a higher fare will result in higher wages and thereby make it easier to recruit drivers. However, this is not necessarily the case as the supply of drivers and vehicles is often dependent upon the general development in the labour markets. Becoming a taxi driver is often a second best option. This again results in a high level of supply in low conjunctures, and a much lower supply in high conjunctures, as more well-paid alternative jobs available. The low wages and corresponding difficulty in keeping quality standards, resulting from the great depression, has been the starting point for many regulatory systems limiting taxi numbers (Cooper *et al.*, 2010).

Wages depend on the number of trips and revenue per trip. Both few trips with high fares and many trips low fares can result in both low and high wages. Consequently, providing **a reasonable wage for taxi drivers** on the long run will require more than a given level of fares. Both demand and supply (where it is not capped) are highly dependent upon the development in other markets, and the general situation in the labour market.

3.4 Entry regulation

If we assume that licences are issued for vehicles and drivers, there is still the question of how the licenses

should be distributed. There are two main approaches: one limits the number issued, the other allows all suitably qualified to apply.

There are several **reasons to limit 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,
- entry regulation may prevent overcharging (some evidence can be found in Nelson/Nygaard, 2008).

The main **arguments against entry regulation** are:

- that it creates economic rents, and
- that such restrictions are not a market solution.

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

Leading authors on the topic of entry regulation have not been able to find a universal solution. Bekken (2007) claims that much of the literature is based upon political views rather than empirical studies, and therefore has not settled the question. Cooper *et al.*, (2010) argue that there may not be an answer to the question on whether or not to regulate entry. Schaller (2007) argues that this will depend upon which market segment one emphasises; the street market segments benefit from entry regulation, while the pre-book market segment does not.

By evaluating a couple of cases with different regulatory regimes and regulatory changes, some insights can be derived, but local details affecting the result can easily be overlooked. Following this reform, several quality and economic regulations have been introduced to address specific problems in the markets. But there are still 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.

Box 9: Taxi regulation in Sweden

In Sweden, quantitative entry barriers to the taxi business were removed in 1990 together with restrictions on fares. At the same time, quality requirements for taxi drivers were tightened and organisational reforms were carried out. The outcome was different in different market segments and geographical areas. In cities, most taxis are organised by major dispatching companies. Bekken and Longva (2003), quoting Branschlåget (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, the increase in prices was met by a significant drop in demand. Directly following deregulation, the total number of vehicles, operators and bankruptcies increased. The number of vehicles and taxi operators has since stabilised and largely remained so. Bankruptcies dropped to pre-deregulation levels in about the year 2000.



Fig. 31: Taxi in Sweden. © Mic @flickr, CC BY 2.0, <https://flic.kr/p/82ZzTG>

3.5 One-, two- and multi-tier systems

When all market segments come under the same taxi regulation, we speak of a one-tier system; in a two-tier (or multi-tier) system, different market segments are regulated differently.

One-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. This 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 challenge of tailoring a single system to meet the needs of all the different market segments.

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. The street market segments need stricter regulation than the pre-book markets because of the market failures in the street market segments. A disadvantage of the two-tier system is that there are fewer possibilities for economies of scale. A vehicle that could technically operate in several different market segments following demand may be legally restricted from doing so, as is the case 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.

Multi-tier system

As app based companies such as Uber and Lyft have become more common, several jurisdictions have adopted a multi-tier system with transport network companies forming a new tier in the regulation. Typically this comes with more lenient regulation on licensing of drivers, taximeters and vehicle standards. Transferring much of the quality regulation to the companies or platforms. The advantage of this for the authorities is less direct involvement in regulation. The disadvantage is related to the lack of direct control and the eventual creation of an uneven playing field for the pre-book market segment. Here, conventional taxis or private hire vehicles are put at a disadvantage due to stricter regulations. The worry is that this creates a “race to the bottom” situation, with lower standards and wages.

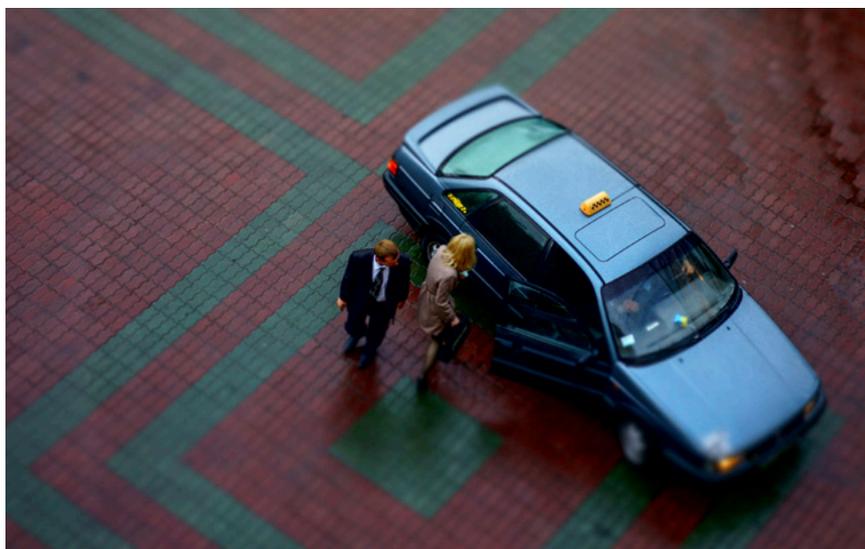


Fig. 32: Taxi in Lutsk (Ukraine).

© Mathias Ripp @flickr, CC BY 2.0, <https://flic.kr/p/sir7gr>

Box 10: Taxi regulation in London

London's taxis are not regulated in quantity, but by strict quality controls, particularly for drivers, who have to pass the famous “knowledge” test. Fares are also 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 ranking, while minicabs are required to work in the pre-book market segments. <http://www.the-london-taxi.com>



Fig. 33: Taxi in London. © Manfred Breithaupt, 2013



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4. Conclusions and Recommendations

4.1 General recommendations

Based on the findings in this report, two general recommendations can be made. First, taxi markets are local and this must be considered when creating regulations. Second, real taxi markets are a complex mix of different segments with different properties – characteristics that vary between and within cities. **There is no single**

regulatory solution to the problems experienced in taxi markets. However, a good regulatory system will encompass many of the following recommendations.

The following table is a simplification of typical market segments and general recommendations for ideal regulation.

Table 4-1: Taxi market properties

	Hail	Rank	Pre-book	Contract
Economies of scale in operation	No (but economies of density or indirect network effects do exist! More users – more taxis cruising around – easier or faster to find one);	No (similar to hail: more users – more ranks – easier to find a taxi);	Yes; In dispatching, and booking systems;	Yes, to some extent; Tendered contracts typically have requirements on administration and fleet size;
Competition	Atomistic market, little price competition*) between individual operators;	Atomistic market, little price competition, higher probability of price competition if there are large integrated companies;	Yes, main factor is availability (i.e. fleet size) but also price;	Yes;
Regulatory challenges	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, preventing monopolies;	
Theoretical solution	Regulated price, quality regulations, and for social reasons (congestion and operator economy) quantity restrictions can be called for;		Subsidised monopoly can maximise social welfare; ----- Market solution on price and supply is realistic; Minimum standards on quality are called for and regulation to limit the market power of the dominant actor;	Market solution on price, supply and quality;

*) In the hail and rank markets, one would expect little or no price competition between taxis, as the individual taxi driver only to a marginal extent will be able to expand his market share 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 reduces the drivers’ incentives to lower their prices. In cities where such norms or regulation do not exist you can observe fierce competition between drivers for customers.



Fig. 34: Taxis in Jakarta. © Daniel Bongardt, 2009

Real taxi markets are a combination of several market segments with different properties, which must be taken into account in regulatory approaches. Within all these market segments it is important to remember what kind of taxi companies are operating within the city. If they are integrated companies or franchises (Category 1 as outlined in Chapter 2.4) they will respond very differently to regulation compared to owner operators. In general, the more integrated the taxi industry is, the easier it is to regulate. Equally, a higher pre-book market share is advantageous from a regulatory perspective.

4.2 Tailor regulation to local needs

The paramount challenge is tailoring taxi regulation to local problems, objectives and market conditions. Taxi markets are local in nature as no two cities are the same, and although there are several recurring challenges in taxi regulation, the mix is always unique. Still, there may well be elements of taxi regulation which could fit well with national regulation – such as minimum standards of vehicles in regard to pollution, accessibility and safety, and driver legal and economical suitability. It is also important to note that with the arrival of smart phones and GPS, taxi-dispatching can now be done at a global level, even though the transport market is local.

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*. Optimally, a regulatory agency is in place and monitors 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 like IRU's taxi drivers check list ^[7] can be used as a starting point. It is important to tailor the regulation to the industry structure, as integrated companies and owner operators respond differently to regulation.

^[7] See http://www.iru.org/cms-filesystem-action?file=mix-publications/taxi_driver.en.pdf.



Fig. 35: Taxis in Monrovia. © Julia Thutewohl, 2014

4.3 Ensure some form of quality control

Some form of quality control over both vehicles and drivers is important in any taxi regulation system. Proficient drivers help to ensure public safety. Transparency in the industry limits the extent to which profitability can be gained from cutting standards below a defined minimum.

Quality control of vehicles could include :

- **Age of the vehicle:** the vehicle age must be below a given age;
- **Emission standards:** emissions must conform with given standards;
- **Accessibility standards:** all or a proportion of vehicles must be accessible by wheelchair users;
- **Marking:** taxis must be easily 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 may benefit a particular technology or fuel that may not be equally attractive in a few years' time, and too strict standards may all contribute to high costs. If emission standards are to be used, limiting emissions should be the focus of regulations, not subsidising a particular technology. Economists disagree about the extent to which specific marketing (livery) of vehicles is beneficial, arguing whether different operators should be able to use the exterior of the vehicles to establish a unique branding, or whether the important distinction is between taxis and non-taxis. In actual practice, this is a question of extent rather than either/or.

4.4 Consider quantity control

In most developed countries, quantity control regulations came into force to address particular problems, such as oversaturation of the market following the great



Fig. 36: Electric Taxi in Bogotá. © Manfred Breithaupt, 2014

depression, when people who had lost their jobs entered the taxi industry. These regulations have proved very difficult to reverse in cases where attempted. The most common problem is 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. Using quantity restriction can be a proxy for stricter quality control, as quantity control can be easier to manage from a regulatory perspective. Quantity control can also help to maintain desirable wages for drivers.

If quantity controls are to be introduced, they have to be designed so that the resulting economic rent 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 demand periods, peak-hour licences and a requirement that there be 24-hour availability for ordinary licences can be workable solutions.

Arguments for quantity controls are typically limited to the street market segments. In other words, introducing quantity controls is relevant for these segments in a two-tier regulatory system as well as in a single-tier system.

A quantity control system should also include mechanisms to allow the number of licences to be changed in response to changing market conditions. There are several tools for assessing an adequate level of supply, including indexes based upon unsaturated demand, used in the UK^[8], rules of thumb based upon numbers of licenses per 1,000 inhabitants, 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.

^[8] See Cooper *et al.*, 2010



Fig. 37: Taxis waiting at Barcelona airport. © jordi espel @flickr, CC BY-NC-ND 2.0, <https://flic.kr/p/4LkvUW>

4.5 Regulate fares with careful consideration

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 specialising on street market segments with high prices and low quality.

However, setting the fares right is not easy as it means weighing different and conflicting interests against each other. ***The taxi industry will want a high fare, the customers a low fare. And there are good arguments for both.*** Also, it is important to remember that there is interdependency between fare level and structure, and fleet size and quality.



Fig. 38: Indicated airport fare in Trapani (Italy). © Armin Wagner, 2015

4.6 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, including taxes, can be successfully regulated on a 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.

It is important that taxi regulators cooperate with other authorities, particularly with public transport regulators, 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.



Fig. 39: Changing regulation in the taxi market may cause conflicts, Valencia. © Manfred Breithaupt, 2015

4.7 Develop a strategy for regulatory changes

When a change or amendment to the regulations is needed:

- Identify the problem to be addressed. Changing regulations simply for the sake of change 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.



Fig. 40: Bike taxi in Dhaka. © Santhosh Kodukula, 2014

Table 4-2: Who should do what in a taxi reform?

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

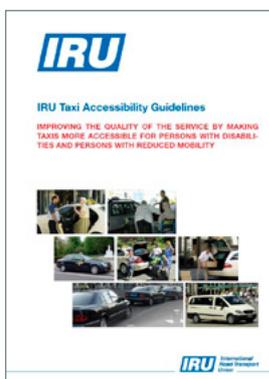


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5. Recommended Reading



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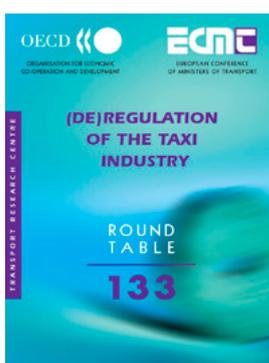
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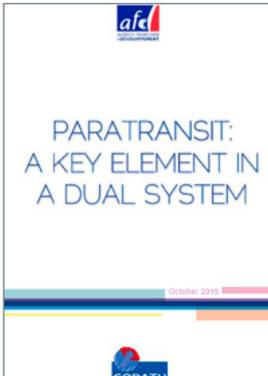
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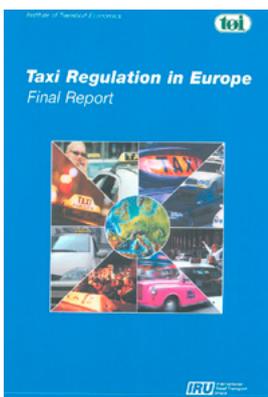
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