



How to design the Dutch taxi market anno 2015

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Abstract

The Dutch taxi market has a long history of regulation and deregulation. Dutch policy makers have had a difficult time to create an optimal functioning market. The policy makers failed to account for the inherent problems the taxi market faced. New initiatives like Uber claim to be a solution to many of these problems. This thesis discusses the problems that are present in the taxi market anno 2015. Several basic market variants, each with their own key market characteristics, are examined to what degree they provide solutions to these problems. One of the analysed basic market variants turned out to have the competence of mitigating most of the problems. The Dutch taxi market anno 2015 requires a very different regulatory approach in order to mitigate the inherent problems the market faces. A distinction between call and street taxis should be made and a regulated fare and quantity control should be introduced for street taxis.

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1. Introduction

Before the year 2000 the Dutch taxi market was regulated with standard tariffs and a fixed number of licenses. In order to improve the taxi market quality and to lower the prices for the passengers the government had changed the way it regulated this sector.¹ After the year 2000 the market became deregulated, which means control through legislation lessened. The fixed tariffs and the fixed amount of licenses for taxis were abolished because of this deregulation. It was thought that prices would decrease, but the opposite was actually true.² The policy makers failed to account for the inherent problems the taxi market faced.

The Dutch taxi market is still not functioning as well as policy makers would want it to function.³ The prices for Dutch taxi transfers are thought to be relatively high compared to taxi prices around the world, taking the number 10 spot in Europe (Figure 1).

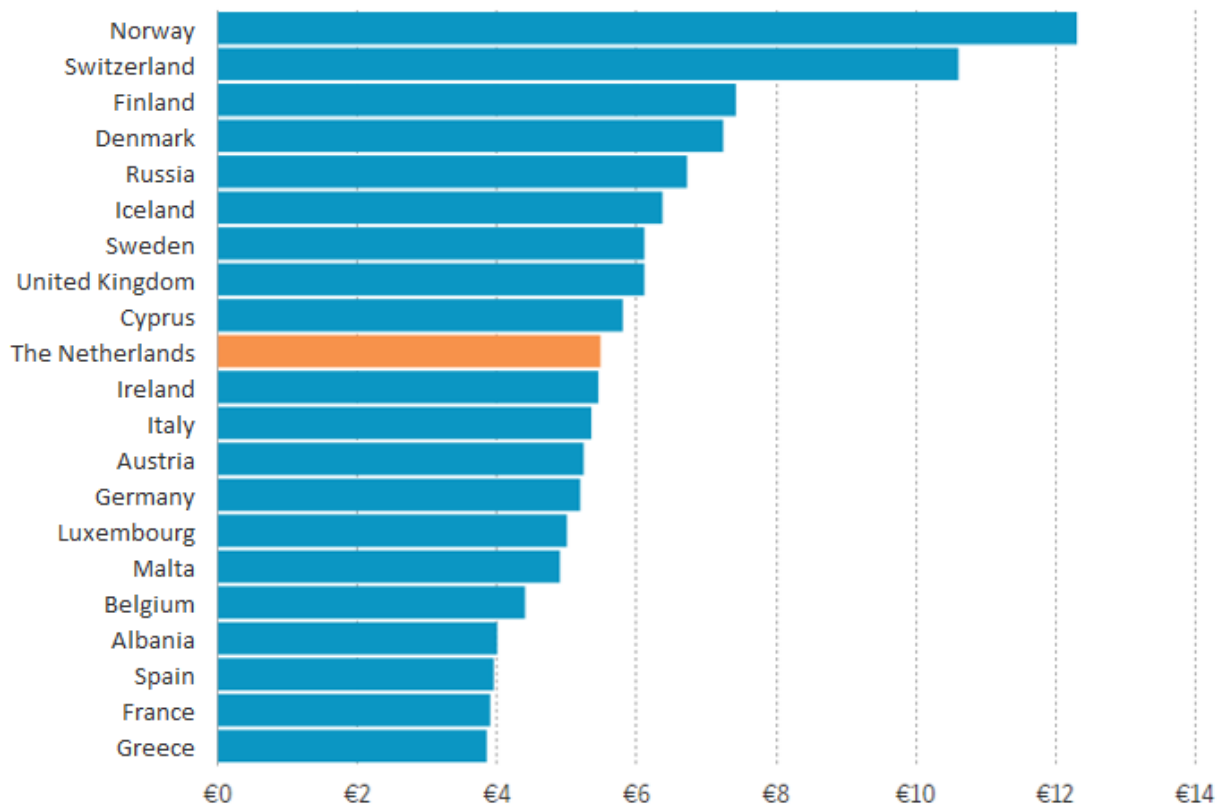


Figure 1 Prices constructed from starting tariff + first kilometre travelled. Source: (van Kampen & Sterk, 2015).

The high prices are not accompanied by a better quality of taxis than other countries either. The quality problems such as detouring, messing with the receipt or even refusing to take a passenger are still occurring. In 2011 the Dutch taxis in Amsterdam ranked at the bottom 3 from an inquiry of the taxi quality in 22 European cities.⁴

¹ Regulations are rules that have derived their authority from legislation.

² (Nu.nl, 2003)

³ (Kamerstukken II 2014/15, 31 521, nr. 88)

⁴ (Trouw, 2011)

The deregulation of the Dutch taxi market back in the year 2000 led to a lot of incidents because of increased competition among incumbent taxi drivers and newly entered taxi drivers, some even ended violently.⁵ The taxi industry has inherent problems regarding transparency and information asymmetry. New technologies claim to be a solution to these problems. One of these technologies is the smartphone application Uber. Uber is an intermediary service that connects (professional) taxi drivers with incoming taxi requests. One of Uber's services is UberPOP which connects car owners, with or without the proper taxi licenses, to drive passengers like a taxi service would. This service is currently deemed illegal in the Netherlands since it does not comply with current regulations, however UberPOP is still in service risking high fines. This is also the case in France where Uber does not provide the service UberPOP anymore since it fears for the safety of its drivers after violent protests by incumbent taxi drivers.⁶ These protesting taxi drivers consider UberPOP as unfair competition since they are not complying with the same regulations. However the taxi market in some other countries have different regulation which allows this service to be legal. "Regulation is often based on old production techniques and selling channels which are predated and thereby falling short to adopt new initiatives, restricting the process of growth" stated by Minister Kamp of Economic Affairs with the eye on services like UberPOP.⁷ Techniques and innovations in the taxi market have changed rapidly in the past few years, but anno 2015 regulations have not changed a lot.

This leads to the question how the Dutch taxi market can best be designed anno 2015. The taxi market can be divided in to the contract market and non-contract market. This thesis will only concentrate on the non-contract market which includes the call (dispatching) taxis and the street taxis (found at taxi stands, or hailed on the streets).

Thesis outline

The structure of this thesis is as follows. Chapter 2 gives a brief introduction to the Dutch taxi market, with the regulations and deregulations that have been in place in the past 35 years. Chapter 3 discusses the methodology this thesis uses in order to provide an answer to the question how the Dutch taxi market should be designed anno 2015. We will also sketch six new basic market variants. Chapter 4's analysis shows which basic market variant is best using arguments from prior theoretical and empirical research. Chapter 5 discusses design and implementation lessons from countries across the world, and contrast these lessons to the optimal market variant. Chapter 6 provides concluding remarks how the optimal market variant should be implemented in the Netherlands.

⁵ (Telegraaf, 2000)

⁶ (Spierings, 2015)

⁷ (Couzy, 2015)

2. The market: from regulation to deregulation

The Dutch taxi market has a long history of regulation and deregulation. This will be explained in the upcoming sections. Section 2.1 will elaborate on the period till 1988. Section 2.2 will give a sketch of the Dutch taxi market between 1988 and 1994. Section 2.3 is dedicated in showing the operations regarding the taxi market in the period of 1994-2000. Section 2.4 shows the first evaluation of the changed regulation from 2000-2004. Section 2.5 elaborates on further (de)regulation and their impact. Finally, Section 2.6 shows recent initiatives in the taxi market.

2.1 Taxi market until 1988

In 1970 the taxi transfers were only responsible for about 0.2% of the total public transport. It was concluded that one of the biggest reasons why taxi usage was not used more often was the relative high prices passengers had to pay compared to other modes of public transport. In 1970 a specialised work force recommended several points for establishing a new Act, which would improve the taxi market prices in their eyes and make it more popular. To popularise the taxi market in 1975 the “Wet Autovervoer Personen”⁸ became active. This Act abolished the distinction between street and call taxis. The opportunity to sell one “seat” in a taxi became available, which was thought to diminish the costs for passengers when a lot of passengers use it.⁹ In order to make the taxi transfers cheaper, taxi vehicles were set free from paying “motorrijtuigenbelasting”¹⁰. The transport market regulations in the Netherlands, for all modes which included the taxi market, were introduced in order to reduce “wasteful competition” and to secure “reasonable earnings” for the license holders.¹¹ It was believed that a free market would lead to too many taxi drivers, i.e. wasteful competition, which would lead to insufficient earnings for the incumbent taxi drivers.¹² The regulations for the taxi market consisted of regulated fares and a restricted amount of licenses. A uniform tariff was implemented for the taxi drivers across the country which did not allow for any form of price competition.¹³ The licenses for taxis were tradable. Tradability in combination with the fact that there was a restricted amount of licenses made the licenses valuable. The national government was responsible for the entire public transport regulations and was the sole issuer of licenses until 1988.¹⁴

2.2 Taxi market 1988-1994

In 1988 the Passenger Transport Act, in Dutch “Wet personenvervoer” (Wp) was implemented in the Netherlands. This Act abolished the national government interference in local transportation networks, including the taxi market. The underlying idea was that the local authority could solve local problems more easily than the national government could. This would lead to a more flexible market resulting in more competition where needed, while at the same time establishing an overall increase in the use of taxis in the

⁸ In English: Act Car transport Persons

⁹ (Kamerstukken II, 1975/76, 13 711, nrs. 1-3)

¹⁰ In English: Motor vehicle taxes.

¹¹ (Baanders & Canoy, 2010)

¹² (Toner, 1992)

¹³ (Pro Facto, 2005)

¹⁴ (Kamerstukken II 1983/84, 18 100, nr. 2)

transport sector. In order to drive a taxi a license was needed. Decentralising the license issuance and legislation to local government was thought to lead to a more liberal and decentralised public transport, in which the taxi market was included.¹⁵ The responsibility to issue taxi licenses per taxi driver were handed over to the twelve Dutch provinces. In turn the provinces could delegate these duties to cooperating municipalities, which eventually resulted in 27 license distributors.¹⁶ Transport zones were set up in which only taxis with the license of that zone could operate and pick up customers. The tariffs were set up by each authority and were uniform within a taxi region. These tariffs consisted of a fixed tariff, a kilometre tariff, a waiting tariff. Above a predetermined speed the kilometre tariff would kick in, below this speed the waiting tariff would kick in.

The intended effects of the Wp1988 were not achieved though. The in 1988 implemented law was more focused on protecting existing taxi services than passenger's wishes. The supply of taxi drivers was artificially rationed by the protected incumbent operators, which lead to consumer satisfaction being insufficiently promoted.¹⁷ In order to control quality the requirements regarding the taxi vehicle, the driver and operator were enforced by the local government. The 27 license distributors used their authority to formulate further legislation regarding quality-, capacity- and tariff policies, which created more entry barriers for new taxi drivers and did not lead to the aimed increase in competition.¹⁸ The effect of this was that the taxis only played a small role in the whole transport sector, which was not what the Wp1988 had intended. Requirements for the taxi drivers and the capacity regulations lead to entry barriers and regulation regarding prices and transport zones restricted entry. Tariffs were collectively determined by taxi advisory commissionaires which represented the industry. A result was that monopoly profits were made, which were expressed in the high prices paid for taxi licenses on the (black) market.¹⁹

2.3 MDW operation 1994-2000

In 1994 a new operation was set in motion: operation "Marktwerking, Dereguleren en Wetgevingskwaliteit" (MDW)²⁰ with the objective to increase the deregulation of the Dutch economy along multiple sectors.²¹ One of the first tasks of this operation was to assess in what way the current regulations for the taxi market were still favourable for the government regarding its transport policy. In 1995 the MDW work group published a report "Taxi naar de toekomst" showing that the occupancy rate and quality were both still low and the prices of the taxis were still very high. The low performance of the taxi market was caused by too many regulations surrounding the taxi market. The MDW operation advised a new market structure to implement a herringbone structure and price negotiations. The idea was that when a customer is not forced to take the first taxi, and can negotiate with other taxi drivers his negotiation

¹⁵ (Kamerstukken II 1984/85, 18 985, A; Stadsarchief, 2000)

¹⁶ (Kamerstukken II 2000/2001, 25 910, nr. 35; Baanders & Canoy, 2010)

¹⁷ (Kamerstukken II 1997/98, 25 910, nr. 3)

¹⁸ (Kamerstukken II 1996/97, 24036, nr. 40, 45)

¹⁹ (van Damme, 1996)

²⁰ In English: Functioning of Markets, Deregulation and Legislative Quality (MDW).

²¹ (Kamerstukken II 1996/97, 24 036, nr. 40, 45)

power will increase resulting in lower prices for the customer. The MDW rapport “Taxi naar de toekomst” in combination with the “Raad voor Verkeer en Waterstaat” saw opportunities to improve the policy regarding the taxi market.²² The expectation was that taxi rides could fulfil a larger role in the transportation system. A new policy could improve the market mechanism and competition in order to drive down the prices and adjust the demand and supply of transfers to give taxis a more pronounced role in the public transportation system.²³

The Cabinet realised this and starting January 1st 2000 the “Wet personenvervoer 2000” (Wp2000) came in effect. By lowering the entry barriers for the taxi market, greater competition between the new and incumbent taxi drivers was expected to occur.²⁴ The desired effects of the new taxi policy was to increase the absolute and relative taxi usage with respect to other means of transports such as private car rides in order to fight congestion.²⁵ The Wp2000 abolished the limit on the number of licences distributed, in order to create an easier accessible taxi market.²⁶ Incumbent drivers who had invested a lot of money in order to gain one of these licenses had now lost their investment. The licenses were not worth anything anymore, which lead to discontent amongst the incumbent drivers.²⁷ To encourage competition, the Wp2000 only issued national licenses instead of the regional licenses, which were the only licenses distributed before Wp2000. This enabled taxi drivers to expand their catchment area, instead of being limited by the old licenses which restricted them to more local working. This was intended to decrease the amount of vacant cruising time and simultaneously enhance profit maximisation when searching for customers. With Wp2000 taxi operators were free to set their own tariffs within a given maximum. It was expected that prices would drop and quality would rise because of competition. No distinction was made between call or street taxis.²⁸

2.4 The first deregulation evaluation: 2000-2004

With the introduction of the Wp2000 the amount of taxi licenses were not fixed anymore which lead to an inflow of drivers.²⁹ The average amount of kilometres per taxi trip increased, but the number of rides undertaken within the taxi market had decreased since deregulation (see Table 1).

	1999	2000	2001	2002	2003
Passenger kilometres (x10⁹)	950	1200	1060	1250	1140
Number of passengers (x10⁶)	6.6	6.3	5.8	5.9	5.3
Number of trips (x10⁶)	92	92	82	88	76

Table 1 Passengers and trips performed by the street and call taxis. Source: (TNS NIPO Consult, 2003).

This could indicate that taxi drivers were now less willing to accept short rides from their customers, given that there are more taxis waiting at the taxi stands leading to longer waiting time for the taxi driver.³⁰ Since

²² (Kamerstukken II 1996/97, 24036, nr. 40, 45)

²³ (Kamerstukken II 1996/97, 24036, nr. 40, 45; Kamerstukken II 1997/98, 25 910, nr. 3)

²⁴ (Kamerstukken II 1999/2000, 25 910, nrs. 1-2)

²⁵ (Kamerstukken II 1996/97, 24036, nr. 40, 45)

²⁶ (Ministerie van Verkeer en Waterstaat, 2000)

²⁷ (Taxicentrale Amsterdam, 2015; Hooghiemstra, 2000)

²⁸ (Ministerie van Verkeer en Waterstaat, 2000)

²⁹ (Ministerie van Verkeer en Waterstaat, 2000)

³⁰ (Centraal Economisch Plan, 2008)

the implementation of the new maximum tariffs per component, every component's price had risen compared to 1999, before Wp2000.³¹ Table 2 shows that the developments of the taxi fares were higher than would be expected by inflation.

	1999	2000	2001	2002	2003	2004
Tariff development street and call taxi	100	113	115	123	126	126
Consumer prices (inflation)	100	102	108	112	114	n.a.

Table 2 Tariff development in the Netherlands in relation to inflation. Source: (SEO, 2008).

According to SEO, the increased prices in Table 2 were partially due to asymmetrical information between the driver and passenger.³² Evaluation showed that in most cities only one to three taxi dispatch centres were active, with resulted in limited competition.³³ The call taxi centres were thought to create and maintain a reputation for themselves, since contrary to the street taxi market they are able to retain customers. To protect this reputation, and ensure more passengers, they would provide better quality services at a lower cost. However most of the taxi dispatch centres consisted of independent entrepreneurs and small firms, which the Competition Law (Mededingingswet, Mw1998) considers as individual entrepreneurs. This forbids them to agree upon a price setting. In 2003 the Rotterdam Taxi Centrale (RTC) proposed a uniform tariff for its affiliated taxis, however the NMa (Nederlandse Mededingingsautoriteit) declared this to be in conflict with the Mw1998 and rejected the proposal.³⁴ By not being able to quote a price at all, a comparison between call centres prices was made impossible.³⁵ It was unclear for the passenger to identify what the trip with a certain taxi would cost. Even though the tariffs were supposed to be clearly visible on the inside and outside of the taxi, about 75% of the customers did not even notice them.³⁶ This did not give taxi drivers an incentive to engage in price competition. The herringbone structure suggested by the MDW created sceptics. Taxi drivers have more experience in negotiating and also have a greater interest in these negotiations than the passenger since the taxi drivers make their living from these negotiations.³⁷ Bouckaert (1996) demonstrated with a simple economic negotiation model that prices were not expected to decrease. Another reason why the competition was not as fierce as anticipated was that passengers chose to, or were forced to take the first taxi in line.³⁸ The image of the taxi market in the Netherlands was becoming increasingly negative due to highly publicised incidents and confrontations between established taxi firms and newcomers.³⁹ The discontent under the taxi drivers grew larger because of the implementation of the Wp2000. Taxi drivers set too high tariffs and in some cases even detoured. The Wp2000 did not achieve its desired effects to improve price and quality, but actually ended up having a negative effect on both.⁴⁰ The intended effect of deregulation in 2000, that was met, was that the number of taxis went up by 50%. However the unintended effects were that tariffs increased, while at the same time,

³¹ (TNS NIPO Consult, 2003)

³² (SEO, 2008)

³³ (TNS NIPO Consult, 2003)

³⁴ (NMa, 2003)

³⁵ (Baanders & Canoy, 2010)

³⁶ (TNS NIPO Consult, 2003)

³⁷ (van Damme, 2000)

³⁸ (Taxiprijzenrecht, 2015; MuConsult, 2002)

³⁹ (RebelGroup, 2014)

⁴⁰ (SEO, 2008)

almost without exception, the revenues per taxi decreased. In the large cities the revenues per taxi even decreased by as much as 25%, while the prices for the taxi trips increased.⁴¹

2.5 Reregulation measures and their impact: 2004-2015

In the period 2004-2015 reregulation measures have been introduced such as a national exam, restructured tariffs and the “Toegelaten Taxi Organisatie” (TTO)⁴².

National exam and new tariffs

In July of 2004 a national chauffeur exam was introduced with the aim to set a standard for street knowledge and expertise. In the same year new rules were introduced to give passengers more insight in the tariffs via a tariff card. However the desired effects were still not realised to increase the street knowledge and also informing customers about the tariff card.⁴³ To decrease the asymmetric information in the taxi market and increase transparency the government chose to restructure the tariffs in February 2008. The maximum starting tariff now included the first two kilometres travelled. The reasoning behind this was on the one hand to provide cost transparency and on the other hand to encourage taxi drivers to accept short trips. The maximum waiting tariff was restructured so passengers only had to pay for the waiting time before they entered the taxi, for instance when the customer chose to drink one more beer at the pub while the taxi is waiting, and not during idle waiting at traffic lights.⁴⁴ The underlying thought was that when the general distance was known, the price of the trip could be calculated beforehand and communicated to the customer.⁴⁵ Driving through the rush hour, which results in longer waiting times during the trip, was now discouraged since only distance travelled determined the gains for the taxi driver.⁴⁶ The tariff transparency did not seem to be the solution to the problem the taxi market has been facing of improving price and quality. This is borne out by an international comparison between 71 (capital) cities on taxi prices. Amsterdam crowned the top 5 most expensive taxi cities, however this comparison did not compare the quality of the taxis in those countries.⁴⁷ In April 2012 the tariffs were once again restructured, changing the maximum starting tariff including the first two kilometres into purely the maximum starting tariff (without the first two kilometres). Also a new tariff was added, namely the maximum tariff per minute to encourage rush hour trips for the taxi driver which is currently still in place.⁴⁸

Toegelaten Taxi Organisatie

To tackle the problems resulting from Wp2000 and to increase the quality of taxis a new taxi law was implemented in October 2011, the “Taxiwet”.⁴⁹ This law aimed to increase the quality for the passenger for the street taxi market in large cities. The core of this new law gave local government the ability to enforce

⁴¹ (TNS NIPO Consult, 2003)

⁴² In English: Recognised Taxi Organisation (TTO)

⁴³ (RebelGroup, 2014)

⁴⁴ (SEO, 2008)

⁴⁵ (Rijksoverheid, 2009)

⁴⁶ (Berenschot, 2009)

⁴⁷ (SEO Economisch Onderzoek, 2008)

⁴⁸ (Rijksoverheid, 2011)

⁴⁹ (Rijksoverheid, 2011)

extra quality standards for taxi drivers.⁵⁰ If a taxi driver wishes to serve a specific taxi stand, local governments now have the authority to force these taxi drivers to join a TTO. When taxis become affiliated to a TTO the underlying idea is that between TTO's identifiable taxi brands will emerge and compete in order to gain a customer base.⁵¹ In the 2014 evaluation it became clear that the new law helped local government get a grip on the street taxi problems.⁵² Local governments have indicated that even without using the authority to demand extra quality standards, the TTO's work as a preventative measure to improve the quality of the street taxi market.⁵³

2.6 Recent initiatives in the taxi market: Uber

Recently, the international taxi industry has changed with regard to the way customers find taxis. Mobile phone applications (Apps) connect customers' trip requests via the mobile phone App with the nearest driver. When both parties accept the trip, the nearest driver will come by and pick up the customer at their location. There are multiple App based taxi services in the Netherlands, for instance Uber⁵⁴, Taxi Centre Amsterdam (TCA) and Rotterdam Taxi Centre (RTC) all provide a similar type of App. However internationally Uber is the largest by far reaching an estimated valuation of \$50 billion.⁵⁵ Uber uses a two-way rating & review reputation mechanism. The customer can rate the driver one out of five stars and also write a review. The driver can also rate the passenger one out of five stars. Uber provides multiple taxi services. In the Netherlands a customer can order an UberBlack, UberLux or UberPOP. The difference between UberBlack and UberLux lies in the quality of the car. UberLux is a bit more luxurious than UberBlack.⁵⁶ UberPOP is not aimed at luxury and offers "every day cars", and that is also reflected in their pricing (see Table 3).

	Regular taxi in Amsterdam	UberPOP	UberBlack	UberLux
Starting tariff	€2.95	€1.00	€3.00	€6.00
Euros per minute	€0.36	€0.15	€0.35	€0.40
Euros per kilometer	€2.17	€0.95	€1.90	€2.20

Table 3 Uber's pricing in the Netherlands compared to taxis at the Amsterdam Taxi Centrale (TCA). Source: (Uber, 2015; Taxicentrale Amsterdam, 2015)

Both UberBlack and UberLux have a certified taxi driver, which is not the case for UberPOP. Payment is made automatically when the trip ends via credit card, no cash is needed. Uber takes a 20% cut of the fare, and the Uber driver keeps the other 80%. UberPOP allows individuals who own a car that is no older than 2005 to become a driver. Recently Uber decided only to allow UberPOP drivers to enter the Dutch market who have an official Dutch chauffeur's license.⁵⁷ However these drivers still do not have the required entrepreneurship license to legally transport individuals. UberBlack and UberLux are both to a large extent

⁵⁰ (Kamerstukken II 2012/13, 31 521, nr. 71)

⁵¹ (RebelGroup, 2014)

⁵² (RebelGroup, 2014)

⁵³ (Kamerstukken II 2014/15, 31 521, nr. 88)

⁵⁴ Internationally comparable taxi Apps are Lyft, Via, Taxify or Easy Taxi.

⁵⁵ (Forbes, 2015; Nu.nl, 2014)

⁵⁶ (Uber, 2015)

⁵⁷ (Savela, 2015)

complying with the Dutch laws and these services will soon be fully legal.⁵⁸ However UberPOP remains illegal. UberPOP connects requesting passengers with drivers who have a privately owned car. Uber states that UberPOP is part of the sharing economy and therefore does not need to comply with the taxi laws with which regular taxis are forced to comply. However, Meelen and Frenken (2014) define a sharing economy as when the driver already intended to make the trip. The spare room in the car is then shared. When a chauffeur only makes the trip to transfer an individual from A to B it is defined as a taxi. The latter is the case for Uber and the current government standpoint is that Uber should be included in the regular taxi market. Uber claims that the tariffs for UberPOP are considerably lower than the regular taxi tariffs, as shown in Table 3. However these tariffs do not show Uber's surge pricing. Uber surges when demand is high and supply is low, tariffs are increased to dwindle down demand and to give an incentive to Uber drivers to become active. These surges usually occur at times when sport games end, people come back from a night out or when the weather is bad resulting in higher prices paid by the passengers. In New York City this led to tariffs that were 7.5 times higher than usual during New Year's Eve.⁵⁹ The Dutch government states that since UberPOP also sets commercial tariffs for customers it should be labelled as a taxi transfer service and thus comply with the Dutch taxi laws. The vehicles are not approved by the RDW and there is no blue license plate present. In addition there are no taximeters and board computers installed in the vehicles, as required by law. In addition, by not using professionally recognised chauffeurs as well as privately owned vehicles UberPOP does not comply with the Dutch law. The current government standpoint is that the quality and safety for the passenger are insufficiently guaranteed with UberPOP. The "Taxiwet" evaluation shows that the government is willing to lessen the official rules and need to apply for permits, the "regulatory burden", for the taxi market to create more room for new innovations, while at the same time not giving a disadvantage to existing taxi drivers and taxi businesses.⁶⁰ However there are critics on the "Taxiwet" evaluation. The evaluation recommends keeping current regulation, even though in the same "Taxiwet" evaluation it conflictingly states these regulations have not resulted in an improved taxi market.⁶¹ The right paper work and practical exam to become a taxi driver in the Netherlands is about €1200, and becoming a part of a TTO is another €700.⁶² This shows that the entry barriers to the taxi market is still quite high for a "deregulated" market.

⁵⁸ (Kamerstukken II 2014/15, 31 521, nr. 88)

⁵⁹ (Shontell, 2013)

⁶⁰ (Kamerstukken II 2014/15, 31 521, nr. 88)

⁶¹ (Financieel Dagblad, 2015)

⁶² (Kamerstukken II 2014/15, 31 521, nr. 88)

3. Methodology

The history of taxi market interventions in the Netherlands as described in the previous chapter shows that Dutch policy makers have had a difficult time to create an optimal functioning taxi market. The aim of this thesis is to assess whether the current regulations are the best solution for price and quality given the current technologies and initiatives in the taxi market.

The two features price and quality are key when designing the taxi market. The aim is to increase quality as much as possible for the passengers, while at the same time keeping the prices low. Quality regarding the taxi market in this thesis can be divided in vehicle standards, driver standards, ensuring passenger safety, minimum service standard and short waiting times. To answer the question how to optimally design the Dutch taxi market anno 2015, six different basic market variants will be formulated (see Section 3.1). These basic variants consist of multiple key taxi market characteristics, and each variant differs slightly from the other. The basic market variants have their origin in the taxi markets characteristics around the world.

The best basic market variant will be selected in Chapter 4 based on insights of prior theoretical and empirical research. In particular, we will study the theoretical and empirical results of the following five problems that are present in the taxi market: the credence good problem, the low bargaining power of the passenger, the open access problem, the thin market problem, and the regulatory capture problem. The price-quality ratio is higher the more these five taxi market imperfections are mitigated.

When the best basic market variant has been chosen, design and implementation lessons from countries around the world will be examined in Chapter 5. We will contrast these lessons to the optimal basic market variant.

3.1 The basic market variants

The basic market variants are based on the following six market determinants: national level, street/call taxi distinction, price regulation, quantity regulation, minimum regulatory burden and allowing new initiatives.

The first determinant defines whether the taxi market is controlled at a national level or not. As shown in Chapter 2 this distinction can lead to a very different regulatory implementation. Before Wp2000 the taxi market was decentralised allowing municipalities to formulate their own regulation. After Wp2000 the taxi market was controlled at a national level and for the whole country regulation became uniform. The second determinant chosen is the street/call taxi distinction, which is currently not in place in the Netherlands. When looking at countries around the world many of them do make this distinction, leading to the question whether this distinction would be favourable for the Dutch taxi market. The third determinant is price regulation. As seen in Sections 2.1, 2.2 and 2.3 the government can choose to fix the prices or free them up (to a maximum) which will have a very large impact on how the market functions. Before Wp2000 the

Dutch taxi market had restricted entry which was abolished with Wp2000 as seen in Section 2.3; this leads to the fourth determinant whether quantity regulation should be implemented. By lessening the official rules and need to apply for permits, entry barriers diminish; the regulatory burden was lessened with Wp2000 compared to the situation before 2000. This leads to the fifth determinant, should a minimum regulatory burden be implemented leading to (partial) deregulation. As seen in Section 2.6 new initiatives like UberPOP are currently being banned from the streets in the Netherlands while in other countries UberPOP is legal. This leads to the last determinant, whether new initiatives like UberPOP should be allowed.

We will now distinguish six basic market variants. The choice for six variants has been made based on countries across the world with similarities and differences to the Dutch key market characteristics (see Chapter 5). Not only the Netherlands had a deregulation two decades ago, also Sweden and New Zealand underwent this process. On the other hand there are countries that still have strict regulations like Belgium, France and New York City. A closer look will be given to these countries with contrasting regulations in Chapter 5.

	Variant 1	Variant 2	Variant 3	Variant 4	Variant 5	Variant 6
National level	Yes	Yes	No	Partially	Partially	No
Street/call taxi distinction	No	Yes	Yes	Yes	Yes	Yes
Price regulation	Until a maximum	Yes for street taxis, until a maximum for call taxis	Yes for street taxis, set free for call taxis	Until a maximum	Yes for street taxis, until a maximum for call taxis	Yes for street taxis, until a maximum for call taxis
Quantity regulation	No	No	Yes for street taxis	No	Yes for street taxis	Yes
Minimum regulatory burden	No	Yes	Yes	Yes	Yes	Yes
Allowing new initiatives	To a certain extent	To a certain extent	To a certain extent	Yes	Yes	Yes

Table 4 Summary basic market variants.

We will now elaborate shortly on these variants.

Variant 1 (à la the Netherlands)

This variant consists of the recommendations as formulated in the “Taxi Wet” evaluation (2015). The taxi market will be organised and monitored at a national level, as is currently the case. The tariff system will also be the same as the one that is currently implemented with free pricing up to the maximum. Partially easing the regulatory burden and also making the market (to a certain extent) more accessible for new initiatives is the goal. The current quality regulations will be continued and also no quantity constraints will be implemented in the market. No distinction is made between street and call taxis. UberPOP remains illegal, as mentioned in Section 2.6.

Variant 2 (à la the Netherlands, New York City)

This variant consists of the recommendations as formulated in the “Taxi Wet” evaluation (2015). However a distinction is made between street and call taxis. The tariff system will be the same as currently for the call taxis, but regulated for the street taxis. The taxi market will be organised and monitored at a national level, as is currently the case. Easing the regulatory burden and also making the market (to a certain extent)

more accessible for new initiatives is the goal. The current quality regulations will be continued and also no quantity constraints will be implemented in the market. UberPOP remains illegal, as mentioned in Section 2.6. Just as in New York this variant makes a distinction between call and street taxis, and the other regulations are conform the current Dutch regulation.

Variant 3 (à la Sweden, Belgium)

This variant brings decentralisation, and deregulation. The taxi market will be monitored by regional authorities. A distinction will be made between street taxis and call taxis. The fares for all street taxis will be regulated as currently with a maximum, those of call taxis will be set free without a maximum tariff. A street taxi cannot switch to a call taxi, and vice versa. The entry to the call taxi segment will be free. However a fixed amount of licenses (the amount determined by the municipalities) for the street taxis will be implemented. The requirements for a taxi will be the same as currently, with the implementation of “Taxi Wet” easing of the regulatory burden. UberPOP will need to abide by current regulations to become legal. UberBlack and –Lux will become part of the call taxis and thus free to set their prices and also their surge pricing, which it currently cannot do. This variant relates to Sweden since the taxis are free to charge tariffs as high as they wish, and to Belgium because the taxi market has a clear distinction between street/call taxis and is also decentralised.

Variant 4 (à la New Zealand)

This variant brings partial decentralisation. The taxi market legislation will be implemented at a national level and enforced at a regional level, by giving local authority limited regulatory power. A distinction will be made between street taxis and call taxis. Call taxi tariffs will be set free up to a maximum, street taxis will be forced to join an association that determines the tariffs for all affiliated taxis which are also subject to a maximum (just as in New Zealand). There will be free entry to the call and street taxi segments. The regulatory burden will be decreased in order to allow services like UberPOP to become legal. Uber with all their services will join the call taxi segment and thus be free to set their prices up to a maximum.

Variant 5 (à la New York)

This variant brings partial decentralisation. The taxi market legislation will be implemented at a national level and enforced at a regional level, by giving local authority limited regulatory power (control of height regulated tariffs, limit on capacity control). A distinction will be made between street taxis and call taxis. The fares for street taxis will be regulated just as in New York and a maximum tariff will be implemented for call taxis. There will be free entry to the call taxi segment, however the street taxi segment is constrained to a maximum number of taxis, just as is the case in New York. The amount of street taxi licenses distributed are determined by local authorities. The regulatory burden will be decreased in order to allow services like UberPOP to become legal. Uber with all their services will join the call taxi segment and thus be free to set their prices up to a maximum.

Variant 6 (à la France, San Francisco)

This variant brings decentralisation. The taxi market will be monitored by regional authorities just as in France and San Francisco. A distinction will be made between the street and call taxis, street taxi tariffs will be regulated and the call taxi tariffs will be set free up to a maximum. The entry to the taxi market will

have a capacity constraint, for both the street and call taxis. The regulatory burden will be decreased in order to allow services like UberPOP to become legal (as in San Francisco), but the maximum tariff will be upheld. Just as in France, the street taxis will have capacity constraints and a regulated fare.

4. Analysis: Insights from theoretical and empirical research

In this chapter the six basic variants will be analysed to see which variant eventually mitigates most problems in the Dutch taxi market anno 2015. Insights of prior theoretical and empirical research will be applied to the current context in order to find solutions to these problems. This analysis will lead to a conclusion of what the best basic market variant will be to apply to the Dutch taxi market anno 2015.

As has been explained above, the taxi market does not operate like a typical economic market where an increase in quantity results in lower prices. There are underlying principles, factors, which determine how the taxi market works.

The existence of taxi regulation is based on assumptions that the market faces fundamental problems, which leads to market failure. These market failures should then be corrected by regulation.⁶³ The taxi market can be described with multiple characteristics which should be resolved:

1. Mitigating the credence good problem;
2. Increasing the bargaining power of the passenger;
3. Mitigating the open access problem;
4. Mitigating the thin market problem;
5. Mitigating the regulatory capture problem.

Mitigating these problems leads to a better quality and lower prices.⁶⁴ In Sections 4.1 to 4.5 these problems will be analysed and discussed how, and with which variant, they are best mitigated.

4.1 Mitigating the credence good problem

A credence good can be defined as a good or service of which the quality (utility) can only be determined after it has been consumed by the consumer, and even then it might still be impossible to determine. The provider of the service will know the quality levels.⁶⁵ Akerlof's (1970) used-car example shows this very clearly. According to Akerlof, when assuming no market regulation used-cars will become credence goods. The customer will be unable to tell the difference in value between a "good" used-car (cherry) and a "bad" used-car (lemon). A "cherry" has a higher valuation than a "lemon", but only the dealer of the cars will be able to tell the difference between the two. Information asymmetry is the result. The customers know they have less information than the dealer and will become weary of the dealer's word. The customer will only be willing to pay the value of a "lemon" for a used-car, which will be lower than the value of a "cherry". There will be no incentive for the dealer to search for "cherries" since the dealer knows he will only be able to sell them at the lower rate of going "lemons". This results in that the owner of a "cherry" will not take

⁶³ (Harding, 2015)

⁶⁴ (Harding, 2015; Baanders & Canoy, 2010)

⁶⁵ (Harding, 2015)

his car to the market since the price he will receive will never be the true value of the car. This results in crowding the “cherries” out of the market by the “lemons”. The “bad” drives out the “good”.⁶⁶

A taxi ride is also a good example of a credence good in which there is a large asymmetrical information effect, since the customer will only be able to assess the quality and quantity (time and distance travelled) of the journey after it has been conducted. This gives the taxi driver an incentive to “cheat” by either detouring, overcharging or operating a substandard vehicle, since the customer can only assess this aspect after the trip has been executed.⁶⁷

One street taxi driver lowering prices or increasing quality will not cause an upsurge in customers since one driver is not able to send out a large enough signal to differentiate the market. The going rate for the dominant service level and the high searching cost for another street taxi will determine what the customer is willing to pay. This will drive the higher quality street taxis from the market, since the customer cannot judge the quality of the taxi before the trip commences.⁶⁸

The credence good problem can be mitigated by informing the customer on the driver’s reputation. This can be done by allowing new initiatives with smartphone technologies, like the one Uber uses. The reputation of the driver is provided to the passenger, this allows for screening of the driver’s behaviour by the passenger via other passenger’s posted reviews. This will create an incentive for the driver to not “cheat”.

Conclusion

As seen in the above section allowing new initiatives gives customers the ability to see the driver’s reputation which creates an incentive to not “cheat”.

As Table 5 below shows, in order to mitigate the credence good problem new initiatives in the taxi market that allow for reputation mechanisms with reviews come out the best. Variant 4, 5 and 6 mitigate this problem best by stimulating new initiatives that use this mechanism.

	National level	Street/call taxi distinction	Price regulation	Quantity regulation	Minimum regulatory burden	Allowing new initiatives
Mitigates credence good problem	Inconclusive	Inconclusive	Inconclusive	Inconclusive	Inconclusive	Yes

Table 5 Shows how the credence good problem is best mitigated.

4.2 Increasing the bargaining power of the passenger

The distinction between the call and street taxi is important since the market mechanisms operate in different fashion. The bargaining power of the passenger is low in the street taxi market as described by the

⁶⁶ (Akerlof, 1970)
⁶⁷ (Balafoutas, Beck, Kerschbamer, & Sutter, 2011)
⁶⁸ (Harding, 2015)

credence good problem, and the street taxi driver knows this. When a passenger hails a taxi on the street or enters the first taxi at a taxi stand (because they may be forced to enter the first one) they will not have a choice, especially when the passenger is in a hurry.⁶⁹ The driver does not have an incentive to lower its prices since this will not create an increase in the number of customers, as described in Section 4.1. However decreasing quality can increase the profits per trip for the driver. The driver is unlikely to meet the passenger a second time, so building a good reputation is less important for him. A consequence is that in a deregulated taxi market the prices for street taxis will increase and quality will decrease.

The call taxis are clearly branded as part of the dispatching unit with the corresponding telephone number displayed on the taxi. If a customer is not satisfied with their transfer they may choose to not call this dispatching unit again. This reputation mechanism is important to attract customers, and maintain their customer base since 30% of the passengers account for 70-80% of the transfers.⁷⁰ This incentivises all drivers of this dispatching unit to deliver a good service, and the corresponding dispatching unit has an incentive to monitor this. However the tariffs can currently not be quoted in the Netherlands by the taxi central, as mentioned in Chapter 2, since the Competition Law (Mw1988) does not allow for price agreements between independent owner drivers and small taxi firms. This does not create desirable levels of competition.

Current regulation with minimum quality and price control, are introduced to protect the passengers since they cannot judge the quality in relation to the price before the trip. In the Netherlands TTO's have been introduced in order to make a difference visible for the customers in the street taxi segment. The aim of the TTO's is to create differentiated brands so the passenger can make a selection based on previous experience with one of those groups.⁷¹ This gives a certain reputation mechanism to the street taxi segment that is already in place for the dispatching units.

Most of the time the customer cannot estimate what the price and distance of the trip with a taxi will be. New smartphone technologies like Uber address this problem for the call taxi in such a manner that the customer can see, beforehand, who the chauffeur will be and the ratings & reviews this chauffeur has been given. The introduction of a reputation scheme which allows customers to write a review about their trip and rate their driver decreases the information asymmetry. In the long term "bad" drivers will be filtered out since the reviews and ratings will be negative and no one will want to be transported by the "bad" driver. This will lead to an overall quality increase in the taxi market. These technologies also allow for instant access to mapping which will help the customer in estimating the distance to be travelled and thus estimating the

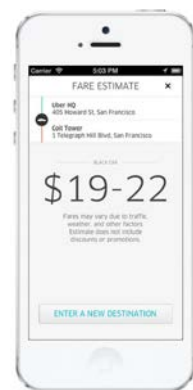


Figure 2 Example of Uber pricing transparency (Cultofmac, 2012).

⁶⁹ (Baanders & Canoy, 2010)

⁷⁰ (TNS NIPO Consult, 2003)

⁷¹ (RebelGroup, 2014)

price.⁷² This gives a lot more transparency for the customer. Also Uber charges a uniform tariff throughout the country. This, in addition to the access of mapping, allows the passenger to assess what the trip will eventually cost. As seen in Figure 2 it is instantly clear what a trip with the taxi is estimated to cost.

Customers will become more aware of how far they have to travel and how much it will cost. It seems like price regulation will become less important when multiple call taxi services arise. Customers can see the prices and compare the operators to each other. The customers will know which call taxi they are contacting when ordering with new technologies that allow for a reputation mechanism in the call taxi segment. This will inform the customer on the reputation of the driver and the pricing structure. However this is unlikely to be the case for (street) taxis at taxi stands. This segment will still to a large extent be subject to information asymmetry. Regulating the street taxi tariffs will lead to a more transparent market for the customers. Regulating the tariffs will create an incentive, as discussed before, for the street taxi market to decrease the quality of the trip. In order to prevent this, minimum quality standards should be upheld.

Conclusion

The best way to increase the bargaining power of the passenger will now be given.

	National level	Street/call taxi distinction	Price regulation	Quantity regulation	Minimum regulatory burden	Allowing new initiatives
Increasing bargaining power passenger	Inconclusive	Yes	Yes for street taxis	Inconclusive	Yes	Yes

Table 6 Shows how to increase the bargaining power of the passenger.

As Table 6 shows the variants, discussed in Section 3, which are designed to create a distinction between the street and call taxis come out the best (2, 3, 4, 5, 6). New initiatives that use clear, transparent pricing and show instant mapping are desirable in order to create transparency for the passenger (4, 5, 6). However the street taxi segment will continue to have transparency problems. The best solution would be to regulate this segment’s tariffs and create minimum quality standards which increase the regulation for the street taxi market (2, 3, 5, 6), but for the call taxi segment the regulatory burden can be decreased (2, 3, 4, 5, 6).

Variants 5 and 6 mitigate most of these problems and therefore come out best

4.3 Mitigating the open access problem

In markets where there are a large amount of suppliers and customers, an increase in supply will not affect prices. However the taxi market is subject to a very small geographical perimeter, where an increase in supply can affect the profits of incumbent taxi drivers if the upsurge in supply is not facilitated with an equal increase in demand. This will lead to a less efficient market with an increase in vacant taxis, longer driver waiting times at cab stands, hotels and airports, eventually leading to a price increase and an incentive to decrease quality and cut costs by the drivers in order to make a living. This is exactly the argument for capacity control argued by Foerster and Gilbert (1979).⁷³ Deregulating the taxi market is

⁷² (Harding, 2015)
⁷³ (Harding, 2015)

argued to lead the negative externalities to grow out of control: no safety qualities, a lot of emissions in the inner city, noise disturbance and even occupying scarce road space. In order to fight negative external effects, regulations are considered desirable.

However a lot of these matters have counter arguments. As mentioned before, the reputation mechanism can adequately take care of the quality aspect of the journey in the call taxi segment, since poor quality will result in bad reviews and less passengers. If a reputation mechanism becomes the norm, the quality and safety concerns will diminish. The street taxi segment, as mentioned in Section 4.2, will still have quality issues if not regulated with regards to tariffs and standard quality.

The noise disturbances, gas emission and scarce space externalities that were discussed have counter arguments as well. Taxis only represent a small fraction of the transportation system and the private motor vehicles in any city account for a much larger part in these externalities. Regulating the taxi capacity based on these criteria would be counter intuitive as they only induce a small proportions of these externalities.⁷⁴

The profits of street taxi drivers can however be decreased by an upsurge in the number of street taxi drivers when there is no facilitated increase in demand. This will create the incentive for street taxi drivers to “cheat” in order to increase profits since this segment is not transparent, as seen in Section 4.2. To counter this, quantity constraint is desirable, which will give the street taxi drivers a chance to earn “reasonable earnings” without cheating. However to further reduce the problems in the street taxi market, minimum quality standards will still be desirable in combination with regulated fares. These problems will be minimized in the call taxi segment when reputation is at stake.

New initiatives like the Uber services eliminate local oversupply of taxis at cab stands, hotels and airports by enabling a low cost dispatching service. This creates an incentive for the street taxis to enter the call taxi segment. This low cost service allows supply to be linked automatically with demand for mobile phone application users. This enables a taxi driver to locate passengers quickly instead of waiting for the passenger to find the taxi. A positive side effect will be less disputes amongst taxi drivers at these over supplied hotspots since they are able to acquire their passengers via the App.

Conclusion

The best way to mitigate the open access problem will now be given.

	National level	Street/call taxi distinction	Price regulation	Quantity regulation	Minimum regulatory burden	Allowing new initiatives
Mitigates open access problem	Inconclusive	Yes	Yes for street taxis	Yes for street taxis	Inconclusive	Yes

Table 7 Shows how the open access problem is best mitigated.

⁷⁴ (Harding, 2015)

As shown in Table 7 the street taxis will need quality and quantity control (3, 5) in combination with regulated tariffs (2, 3, 5, 6) in order to guarantee safe, comfortable and affordable transport for the passengers in this non-transparent segment. The call taxi segment does not have these problems when there is a reputation to uphold, allowing this segment to have no capacity control (1, 2, 3, 4, 5). New initiatives like Uber also mitigate the open access problem by allowing street taxi drivers to enter the call taxi market at low costs (4, 5, 6). Variant 5 comes out best.

4.4 Mitigating the thin market problem

A thin market is defined by a low number of potential buyers and sellers. These small numbers give a small probability of a match between supply and demand being made. This will lead to a lower number of transactions in the market. The taxi market performs in a similar fashion. A long journey to a suburb, could be more costly per kilometre than a city centre journey. The taxi driver has a smaller chance of returning with a passenger from the suburbs since there is an absence of demand. Only a few transactions will take place and the prices are typically more volatile in a thin market.⁷⁵

Search costs

In order to transform a thin market to a thick one, low entry barriers should be present to increase supply. However demand must also increase; this can be done by lowering the transaction and search costs. New technologies allow for quick downloading of a taxi app and cashless payments; this in combination with a high rate of smartphone users can reduce these costs for the passengers. The transformation from a thin to a thick market will occur because of the “thick market externality”. This “thick market externality” is a perception that an increase in supply also increases demand, and the perception that an increase in demand will also increase supply. Both parties assess their chances of finding a match as high.⁷⁶ It will become easier to find a taxi since more taxis are active, and also more demand for taxis will become visible. This will lead to a decrease in search costs.

When the taxi market is transformed from a thin to a thick market it is expected that the response time of the taxis will increase. Where Uber became active it was evident that potential passenger’s willingness to wait had decreased (Myhrvold, 2015). This can indicate that the passengers’ standard regarding timeliness has risen.

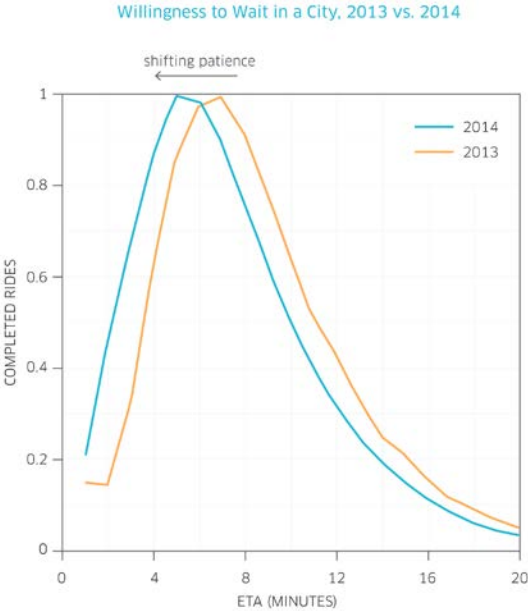


Figure 3 After one year customers are more likely to cancel a trip, compared to the previous year, because the waiting time is now considered too long (Myhrvold, 2015).

⁷⁵ (Häckner & Nyberg, 1995)

⁷⁶ (Howitt & McAfee, 1987; Harding, 2015)

Conclusion

The best way to mitigate the thin market problem will now be given.

	National level	Street/call taxi distinction	Price regulation	Quantity regulation	Minimum regulatory burden	Allowing new initiatives
Mitigates the thin market problem	Inconclusive	Inconclusive	Inconclusive	No	Yes	Yes

Table 8 Shows how the thin market problem is best mitigated.

As shown in Table 8 the variants that allow free market entrance (1, 2, 4), new technologies that use cashless payments (3, 4, 5, 6; UberPOP: 4, 5, 6), and also decrease entry barriers (3, 4, 5, 6) will come out the best by creating the thick market externality. Overall result Variant 4 comes out best, 5 and 6 second best.

4.5 Mitigating the regulatory capture problem

The taxi market regulations were implemented to protect the customers against excessive prices, but also to ensure safety and comfort. By restricting entry, before Wp2000, to only a fixed amount of license holders the underlying idea was that the taxis could earn a “reasonable income” as explained in Chapter 2. The taxis were a regulated agency in the Netherlands. Taxi drivers and taxi firms had large financial stakes here. These interest groups were more incentivised to influence the regulator in their favour than casual customers were who spend just a small proportion of their income on these matters. When these interest groups face new competition, instead of looking at what is in the best interest of the public, the interest group lobbied the government for their own commercial benefits. This can be seen in the Netherlands before deregulation of Wp2000; before the amount of licenses were set free, interest groups lobbied intensely against this.⁷⁷ The same can be seen now, with the new competitors that use smartphone apps which lead to intensive lobbies from taxi incumbents that fear this competition. In France “regular” taxi drivers were protesting against UberPOP. In June almost a hundred Uber drivers were assaulted. On the streets tires were set on fire, also UberPOP cars have been assaulted and destroyed by other protesting drivers. UberPOP was already made illegal in France, but UberPOP continued to offer its services with the risk of large fines. Uber has decided to stop UberPOP in France out of fear for the safety of the Uber drivers.⁷⁸

In order to fight regulatory capture immediate reforms should be undertaken. Choosing to stage out reforms, or slowly implementing them may very well result in them being reversed by intensive lobbying by taxi interest groups.⁷⁹

Especially taxi markets with entry restrictions experience regulatory capture. When the capacity of taxis is restricted, as is the case in Paris, New York, Boston and many other cities, the value of these

⁷⁷ (Baanders & Canoy, 2010)
⁷⁸ (Nu.nl, 2015)
⁷⁹ (Spierings, 2015)

licenses/medallions rises steeply. As seen in the Netherlands before Wp2000, these licenses were then traded for large sums of money. In Paris these licenses are worth about €240,000, which gives an incentive for these interest groups to lobby intensively against any new “free” competitors, see Section 4.5.⁸⁰

Conclusion

The best way to mitigate the regulatory capture problem will now be given.

	National level	Street/call taxi distinction	Price regulation	Quantity regulation	Minimum regulatory burden	Allowing new initiatives
Mitigates the regulatory capture problem	Yes	Inconclusive	Inconclusive	No	Yes	Yes

Table 9 Shows how the regulatory capture problem is best mitigated

As explained before, regulation with entry restrictions creates incentive for regulatory capture. Table 9 shows that variants that allow free entry (1, 2, 4) and easing of the regulatory burden (2, 3, 4, 5, 6) of taxi drivers will in the future diminish regulatory capture. In order to make sure planned reforms do not get reversed by intensive lobbying, a swift implementation should be enforced by the regulator.⁸¹ A government at national level would best be equipped to implement a swift regulatory change (1, 2, 4, 5). Variant 2 and 4 score best on these matters.

4.6 Conclusion best market variant

As described in Chapter 3 the more problems are mitigated by a basic market variant, the higher the price-quality ratio is expected to be. In order to decrease the information asymmetry new initiatives with reputation mechanisms are favourable to create an incentive for drivers to not “cheat” (4, 5, 6). For the low bargaining position and the open access problem a distinction is needed between the street and call taxis: street taxis should be regulated in respect to tariffs, quantity and quality (3, 5, 6), while the call taxi segment should enjoy free pricing up to a maximum and also unrestricted quantity (5). The thin market problem is best mitigated by Variant 4 since this variant does not restrict entry in the street taxi segment and can therefore create the thick market externality best, and second best by Variant 5. To diminish the regulatory capture problem a government at a national level is desirable in order to implement a swift regulatory change if needed (1, 2, 4, 5).

Variant 4 and 5 both mitigate most problems discussed in the above sections. Variant 4 is more capable of mitigating the thin market problem by not restricting the street and call taxis to a set quantity, where Variant 5 only restricts the street taxi segments and lets the call taxi segment have unrestricted entry. However as became clear in Section 4.3 restricted quantity, minimum quality control and fixed tariffs in the street taxi market are desirable in order to disincentive street taxi drivers to “cheat”. These regulations are characteristics of Variant 5. The thin market problem will still be addressed in Variant 5 by the unrestricted entry to the call taxi segment. Therefore Variant 5 is the optimal chosen variant to design the Dutch taxi market anno 2015 when we apply insights from theoretical/empirical research (see Table 10).

⁸⁰ (OECD, 2007; Toor, 2015)
⁸¹ (OECD, 2007)

	National level	Street/call taxi distinction	Price regulation	Quantity regulation	Minimum regulatory burden	Allowing new initiatives
Optimal Variant	Partially	Yes	Yes for the street taxis, until a maximum for call taxis	Yes for street taxis.	Yes	Yes

Table 10 Summary optimal basic market variant (5).

5. Implementation lessons from other countries

This chapter will elaborate on problems that other countries face with the taxi market. How these countries (should have) resolved these problems will be a valuable lesson for the implementation of basic market Variant 5.

The countries chosen for the implementation lessons are firstly those which resemble the Dutch taxi market history of deregulation (Sweden, New Zealand). By examining these countries it will become clear what sort of implementation lessons can be learned from deregulated markets. When this becomes clear this chapter will focus on the problems of other countries with a more regulated outlook (Belgium, New York City, France). Since these markets are more similar to Variant 5, they will provide representative implementation lessons for the optimal Dutch taxi market basic variant. Also San Francisco is examined with regards to their implementation of Uber. From this last case it will become clear what the consequences of Uber will be when legalised.

An important difference between the domestic and foreign taxi market is that the Netherlands does not, but a lot of foreign countries do, make a strict distinction between the *taxi market*⁸² and the market for rental car with chauffeur. Ordering a taxi via a telephone call is in many countries categorised as a rental car with chauffeur, which is not the case for the Netherlands.⁸³

5.1 Sweden

The Swedish taxi market is just as the Dutch taxi market deregulated. Sweden has gone even further than the Netherlands with no maximum tariffs. It was thought that prices would stay low, but just as in the Netherlands they rose after deregulation (see Figure 1 for the current relatively high tariffs). A problem that occurred because of no maximum tariffs was that some private taxis choose to scam passengers, by either making signs that closely imitate well known taxi brands to lure in passengers but actually ask a much higher tariff, or by stating to ignorant tourists that the tariffs (which are shown in kronor) are actually in euros. Especially the street taxis have these problems as the call taxis try to maintain their reputation. Since these problems occur it becomes more difficult for the ‘good’ street taxi drivers to obtain passengers since passengers become wary of the street taxi service. It is thought that regulating the quantity and tariffs of the street taxi market would be a solution to the “cheating” street taxi drivers.⁸⁴

What can be learned from the Swedish case is that the street and call taxi market both in practice and in theory, function in different ways. To counter the problems occurring in Sweden, the distinction between the street and call taxis is important. For both taxi sectors at least a maximum tariff should always be present as a contingency plan and for the street taxis the regulated fare is recommended. The regulated fare

⁸² Taxis that are in every country allowed to pick-up customers from street hauls and at designated taxi stands.

⁸³ (Kennisinstituut voor Mobiliteitsbeleid, 2015)

⁸⁴ (Lansky, 2009)

will allow problems with regard to over-pricing in the street taxi market to diminish, whilst the restricted number of licenses allow street taxi drivers to earn a 'reasonable income' without cheating. This backs up the theoretical arguments for Variant 5. Also since the street taxi market faces asymmetrical information problems this segment should be clearly distinguishable from the call taxi segment. Maintaining the blue license plate for the street taxi segment will show passengers they are facing with a taxi which has regulated tariffs instead of a call taxi which has free pricing (until a maximum).

5.2 New Zealand

New Zealand also deregulated the taxi market across the country in 1989. However the deregulation had been tailored more specifically than was the case in Sweden, by requiring taxi operators to become part of an association which provides 24/7 telephone booking service. Problems the country faced with monitoring the regulated taxis have been reduced since the associations try to keep their own reputation high by monitoring their own taxis. In addition customers can more easily compare the fare of taxi trips by choosing between taxis from one of the available associations. Also the amount of differentiated⁸⁵ taxis rose. The amount of taxis available for customers increased in the large cities, which resulted in shorter waiting times and an increased range of services.⁸⁶ In large cities the tariffs also decreased. Bekken and Longva (2003) point out that a reason for this could be that the taxis operators had to join an association, which created more competition between these associations. These benefits of deregulation were however not as significant in smaller cities and towns. Here the prices and waiting time remained unchanged.⁸⁷

As the New Zealand case suggests, the taxi dispatch centres do indeed lower prices to increase their reputation by price competition when this competition becomes an option. Currently most of the Dutch taxi dispatch centres consist of independent entrepreneurs and small firms. As the Competition Law (Mededingingswet, Mw1998) considers them as individual entrepreneurs, agreement upon a price setting is forbidden. The Competition Law should allow a taxi dispatching centre, which have affiliated independent taxi drivers and small firms, to quote a price and advertise that price to the customers. Since it is thought that the call taxi segment will and can defend their reputation, the free pricing (until a maximum) is desirable. In contrast, the street taxi segment does not have this reputation protection mechanism, since it will not aim to acquire returning passenger. Currently TTO's are implemented to resolve this street taxi segment problem. Variant 5 brings a regulated fare in this segment in combination with regulated quantity which will also be effective to resolve the problems in this segment. The quality standard also needs to remain high in the new optimal Dutch taxi market. It is thought that the call taxi segment can control its own quality standards, but to provide a minimum quality level in both segments the chauffeur card will still be mandatory. Also a digital version of the taxameter should suffice in the taxis since most customers and drivers prefer a digital receipt.⁸⁸ However the street taxi segment will still have quality problems. By

⁸⁵ Higher quality vehicles, or higher quality services.

⁸⁶ (Bekken & Longva, 2003)

⁸⁷ (Moore & Balaker, 2006)

⁸⁸ (Kennisinstituut voor Mobiliteitsbeleid, 2015)

abolishing the entrepreneurship license for the call taxi segment, entry barriers will diminish. For the street taxi segment this license is still needed to uphold quality standards.

5.3 Belgium

In Belgium the taxi market is regulated by its provinces (Vlaanderen, Wallonie, Brussels). These provincial regulations have strong similarities throughout Belgium. In all provinces a chauffeur can only offer a ride in their own transfer area. For all provinces licenses are handed out for the street taxis. The rental cars with chauffeurs (services like UberBlack, call taxis) are set free of licenses, only in Brussels licenses are needed. The street taxi segment has quantity control and a tariff determined by local government. Since the tariffs for taxis in Belgium are considered to be lower than the Dutch taxis, regulation of tariffs seem to be an improvement from deregulation in the Netherlands (See Figure 1).⁸⁹

As became clear in the theoretical/empirical section the street taxi segment faces large information asymmetry problems. Belgium dealt with this problem by regulating the street taxi segment with regards to quantity and tariffs, leading to lower tariffs than are active in the Netherlands.

5.4 New York City

In New York City a vacant taxi will most likely drive around the city in order to find passengers. Driving around and waiting for a customer to hail your taxi is common in many foreign municipalities. The culture there is very different from the call centre and taxi stand culture developed in the Netherlands.⁹⁰ New York City has a cap on the number of medallions distributed. These medallions are needed for a taxi driver in order pick up passengers from the streets. There are currently 13,600 taxi cab medallions in the city which can be traded. Since Uber made an appearance in New York the prices of these medallions have decreased in worth from \$1 million down to \$800,000.⁹¹ UberPOP has been legalised in New York. The Uber driver and vehicle are required to comply with a set of conditions. Uber drivers that use the intermediary service are not allowed to pick up hauling customers.⁹² Uber's surge pricing has been capped up to a maximum of 2.8 fold. Even though UberPOP is legalised, research has shown that this service is not necessarily cheaper than the already existing yellow cabs in the city.⁹³

The regulated fare in New York City is lower than the current prices set by individual taxi operators in the Netherlands (see Table 11). However in New York City a few surcharges apply such as rush hour surcharges of one dollar and a special surcharge of \$0.5 when the trip ends in a central zones.

⁸⁹ (Kennisinstituut voor Mobiliteitsbeleid, 2015)

⁹⁰ (Kennisinstituut voor Mobiliteitsbeleid, 2015)

⁹¹ (Barro, 2014)

⁹² (UberNYC, 2015)

⁹³ (Bolluyt, 2015)

	Starting Fee	Fee per kilometre	Fee per minute	Waiting tariff p/h (before trip)
The Netherlands (TCA)	€2.95	€2.17	€0.36	€40.95
New York City: regulated fare	€2.28	€1.44	N/A	€31.9

Table 11 Compares the prices of a Dutch taxi (TCA) and the regulated New York City prices converted to euros.

Since the licenses are still worth a lot of money it is clear that profits are to be made even with lower rates than regular Dutch taxi fares. It also became clear that the quality of the New York street taxis is good. In 2011 85% of the surveyed people rated the New York street taxi service quality between average and excellent. Considering the problems the Dutch taxi market faces with the street taxi segment the New York rating is high.⁹⁴

The New York City taxi market has a relatively high level of consumer satisfaction as evidenced by the above survey. The Dutch taxi market can learn from this in order to increase quality and decrease prices within the taxi market. Variant 5 is in some respects similar to New York City (as already noted in Section 3.1). A clear distinction between the street and call taxis is present, with licenses for the street taxi market. Also a regulated fare is present for the street taxi market, just as in New York City. The benefits of these regulated fares could be that the tariffs decrease as the New York City case suggests.

5.5 France

In France there is a national regulation guideline but local and regional authorities are responsible for further legislation. A distinction is made between street taxis and rental cars with chauffeurs, which are the call taxis. Street taxi drivers are required to have a license in order to operate in certain municipalities and even in certain zones within these municipalities. The entry is restricted to a fixed amount of licenses. In 2007 these licenses were traded on average for 100,000 euro, in Paris 180,000 and in Nice for even 300,000 euro. Street and call taxi tariffs are regulated for the whole country except Paris, which have their own tariff regulations.⁹⁵ France is ranked as one of the cheaper taxi countries in Europe (see Figure 1). These high prices paid for licenses show profits are to be made in the taxi market, even with the relative low fares.

In a response to the discussions around Uber, the government has introduced an internet application for taxi drivers. Drivers can enrol themselves to this App for free. Just like Uber, this app can be used to request a taxi transfer. Uber is categorised as a rental car with chauffeur in France. At the end of 2014 new regulation have been implemented in order to decrease Uber's competitive power in comparison with regular taxis. According to the ministry UberPOP has been deemed illegal since the regulations regarding chauffeur and vehicle are not met.⁹⁶ As seen in Section 4.5 recent UberPOP incidents forced Uber to stop their UberPOP service in France, even though it was considered illegal before.

⁹⁴ (New York City Taxi and Limousine Commission, 2011)

⁹⁵ (Kennisinstituut voor Mobiliteitsbeleid, 2015)

⁹⁶ (Kennisinstituut voor Mobiliteitsbeleid, 2015)

France has regulated tariffs yet has cheaper tariffs than the Netherlands (see Figure 1). By regulating the street taxi segment with regards to tariffs and quantity these lower tariffs can be achieved, as the France case suggests. What also can be learned from the France situation is that the regulatory capture of the current taxis creates large problems for allowing new initiatives. The licenses have grown to be worth a lot of money that creates unfair competition when a new service enters the market that does not need one of these expensive licenses. Baanders and Canoy (2010) argue that by distributing licenses frequently (once a month at an auction) the prices for licenses are able to stay low, diminishing the regulatory capture.

5.6 San Francisco

When Uber was launched in San Francisco, the taxi market was worth about \$140 million a year. Uber's CEO Travis Kalanick stated that their revenues in San Francisco are now \$500 million a year.⁹⁷ This shows that Uber creates a multiplier effect. It does not just lower the prices of taxi (when no surging is active), it also creates more demand for taxis. As discussed in Section 4.3, the taxi market in San Francisco has been transformed from a thin, to a thick market. Both customers and drivers now assess their chances of finding a match as high. The average monthly trips in San Francisco per regular taxi in March 2012 were 1424, and in July 2014 the average amount of trips plummeted to 504.⁹⁸ This shows that Uber is "stealing" market share from incumbent taxi drivers.⁹⁹

In order to not disadvantage incumbent taxi drivers in the newly designed Dutch variant, and thus creating an unequal playing field, the same regulations should be implemented for all parties. Potential "sharing" technologies such as Uber that use private vehicles with non-professionals and regular taxis should be forced to comply with uniform regulation. In every variant where UberPOP is allowed, the "equal playing field" criteria should be upheld. Deregulation should be the same for "regular" and Uber taxis. When decreasing regulation, these should be for both the regular taxis as for new initiatives.

5.7 Conclusion

Multiple countries have been examined in this chapter, from deregulated to regulated countries.

Deregulation in Sweden lead to an increase in prices, just as the Dutch case. Problems Sweden faced with scams show that a contingency plan, like at least a maximum asking tariff, should be present for both segments. However in New Zealand in large cities the deregulation lead to a decrease in tariffs. This was accomplished by forcing individual taxis to join associations. These associations try to uphold their own reputation and therefore monitor their own fleet with regards to quality and standard prices. By making it possible for taxi dispatching units that consists of independent entrepreneurs and small firms to quote a price, it is thought that these dispatching units will defend their reputation by means of lowering prices. From the New York City case it became clear that regulation regarding the street taxi segment can be

⁹⁷ (Blodget, 2014)

⁹⁸ (Kwong, 2014)

⁹⁹ This thesis used information from San Francisco to estimate that Uber creates additional demand in the taxi market. Also the San Francisco data was used in estimating that Uber "steals" market share from incumbent taxis. Uber can have a very different effect in the Netherlands.

desirable, just as theory suggests. Even though it is thought taxi dispatching centres will maintain their own quality control, the chauffeur's card will provide a minimum standard quality for both segments. For the street taxi segment also the entrepreneurship license will be needed in order to provide a regulated minimum quality for this segment. New York City, just as France and Belgium, has strict regulation regarding prices and quantity in the street taxi segment which results in lower prices than are active in the Netherlands (see Figure 1 for France, Belgium and Dutch tariff comparison). Since large sums are paid for the street taxi licenses in these markets, the low tariffs seem to allow "a reasonable income" to be made. The implementation lessons learned from San Francisco were that Uber, while increasing the total size of the taxi market also "steals" market share from incumbent taxi drivers. By creating an "equal playing field" the same regulations should be implemented for all parties, technologies like Uber and regular taxis alike.

6. Concluding remarks

The best market variant is concluded to be Variant 5. Variant 5 consists of a distinction between the street and call taxis. The street taxi market is concluded to face large information asymmetry problems, and should become regulated to combat these problems, in contrast to the call taxis which can ask tariffs until the maximum tariff is reached. Most of the taxi dispatch centres consist of independent entrepreneurs and small firms. As the Competition Law (Mededingingswet, Mw1998) considers them as individual entrepreneurs, they are not allowed to agree upon a price setting. The Competition Law should allow a taxi dispatching centre, which has affiliated independent taxi drivers and small firms, to quote a price and advertise that price to the customers. The call taxis are expected to compete and become more recognisable by allowing affiliated taxis to serve a taxi dispatching unit that is allowed to quote tariffs. New technologies that use reputation mechanisms are encouraged since they mitigate many of the problems the taxi market faces such as the credence good problem. Also a lower regulatory burden should be implemented resulting in the legalisation of UberPOP. Since dispatching units can now differentiate themselves from each other they can compete with differentiated products, for instance higher quality car or better services. Also prices can become more visible for the passenger thanks to the current smartphone technologies.

Since the street taxi segment faces large information asymmetry it should be regulated with regards to quantity, tariffs and quality standards. The regulations will be able to offer a standard quality service and standardised tariffs. Capacity control will be implemented for the street taxi segment with the capacity determined by the local authorities which restricts street taxi to certain zones or municipalities. Short term licenses should be issued which are non-tradable. Baanders and Canoy (2010) suggest implementing a monthly auction, just as in New York, where the auction prices reflect the income the driver expects to earn. When prices at the auction rise this could indicate that more licenses for street taxis should be set free and vice versa. When done in monthly steps this creates an opportunity to respond to market changes. The value of these licenses will be able to be controlled decreasing the regulatory capture problem. This authority can be given to local municipalities, thus having a legislation at national level with partial decentralisation. Regulated tariffs seem to imply lower tariffs since it became clear than in countries where tariff regulation was active (Belgium, France, New York City), the tariffs were lower than in the deregulated Dutch taxi market.

Street taxis should remain clearly distinguishable from regular road vehicles and the blue license plate will remain mandatory for this segment. However since the call taxi segment creates its own differentiation the blue license plates should become an option for this segment; this allows the entry barriers to diminish. It is expected that the quality of the transfers by taxis will increase and prices decrease compared to the current situation. This design is very much different from the current taxi market design in the Netherlands.¹⁰⁰

¹⁰⁰ (Kamerstukken II 2014/15, 31 521 nr. 88)

Currently there is no distinction between the street and the call taxi segment. Street taxis are not regulated with regards to tariffs or number of taxis and new initiatives like UberPOP are not encouraged (see Table12).

	National level	Street/call taxi distinction	Price regulation	Quantity regulation	Minimum regulatory burden	Allowing new initiatives
Optimal Variant	Partially	Yes	Yes for the street taxis, until a maximum for call taxis	Yes for street taxis.	Yes	Yes
Current situation	Yes	No	Until a maximum	No	No	No

Table 12 Compares the best basic market variant (5) with the current taxi market regulation.

By abolishing the entrepreneurship license for the call taxi segment, entry barriers will diminish. For the street taxi segment this license is still needed to uphold quality standards. It is thought that drivers will become affiliated to call taxi centres, and that these centres will provide the basic quality standards for their taxis in order to differentiate themselves. The chauffeur card will still be mandatory for both segments in order to provide minimum quality standards. Also a digital version of the taxameter should suffice in the taxis since most customers and drivers prefer a digital receipt.¹⁰¹ When the UberPOP drivers have a chauffeur card and the car is conform the RDW standard, UberPOP becomes legal in the Netherlands. By implementing a more deregulated call taxi market where services like UberPOP are allowed, the expectation is that multiple similar services will emerge. Local competitors will compete against Uber by differentiating services and maybe offer lower prices. This can be realised by decreasing the cut these intermediary competitors take. Uber currently takes a 20% cut, however if competition is realised a price battle might occur where the suppliers take smaller cuts. This can eventually lead to lower prices for the passenger. However it could also be that Uber becomes the most dominant player in the market and other competitors cannot compete. In that case ACM should become active and ensure competition.

As there is no reason to assume UberPOP prices are significantly different in the Netherlands than in other countries (see Appendix), there is no reason to assume that Uber will increase or decrease prices in the Netherlands in the short and medium term should it becomes legal. A side note for Uber will be that they must conform to the regulation from Variant 5, which consist of a maximum tariff for the call taxi segment. This will result in a restriction of Uber’s surge pricing for all its services (UberPOP, -Black, -Lux). Uber’s reasoning behind surging is that an increase in tariffs will create an incentive for the drivers to become active and pick up customers. If this is truly their main concern they can reduce their 20% fee during surging and allow the drivers to receive a larger portion of the payment until the maximum tariff is reached.

Further research regarding the taxi market can evaluate passenger price and quality satisfaction in the (recommended) regulated street taxi market and the deregulated call taxi market. Can the call taxi segment differentiate itself in the future? And will the incentive from competition be great enough to motivate the dispatching centres to uphold and check the quality of the affiliated taxi services? Will the regulated tariffs

¹⁰¹ (Kamerstukken II 2014/15, 31 521, nr. 88)

of the street taxis have the consumers' preference over the situation existing before regulation? These are all questions that research after the implementation of this thesis's recommendation could investigate.

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Appendix: UberPOP pricing

Is UberPOP pricing in the Netherlands significantly different from the prices in different other countries?

UberPOP's average minutes per ride and kilometres per ride across the world have been estimated. This information, in combination with the UberPOP pricing across the world (including PPP), allows for testing by means of a t-test whether UberPOP prices are significantly¹⁰² different in the Netherlands than in other countries across the world. If so, this could create an incentive for Uber to change the UberPOP prices in the Netherlands once it becomes legalised.

Uber's released Application-Programming Interface (API) helped in estimating the average distance of UberPOP taxi trips.¹⁰³ The average distance is estimated to be 6.7 kilometres with a corresponding average length of 14.6 minutes. This information is used to assess how much a trip will cost in different countries with UberPOP (Figure 4, 5). These costs have then been discounted with the Purchasing Price Parity (PPP) (Table 13).

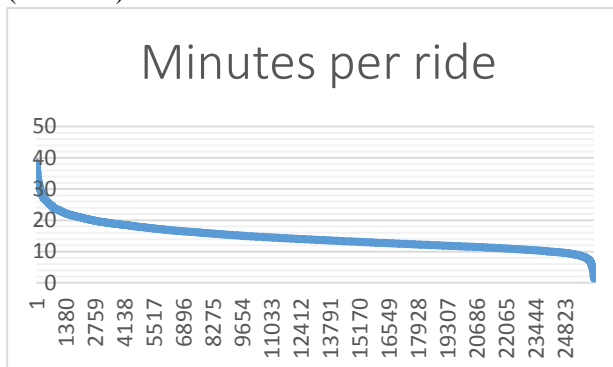


Figure 4 Minutes per ride with UberPOP on the Y-axis, passenger distribution on the X-axis. Source: (Bryce, 2015)

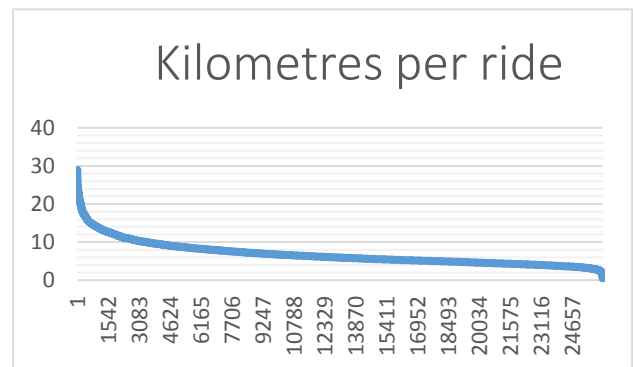


Figure 5 Kilometres per ride with UberPOP on the Y-axis, passenger distribution on the X-axis. Source: (Bryce, 2015)

City	Costs 6.7 km with 14.6 minutes UberPOP	Costs incl. PPP in Euros
NLD(Amsterdam)	€9.64	€9.64
ENG(London)	€22.00	€18.24
ENG(Leeds)	€15.31	€12.69
ENG(Manchester)	€17.65	€14.63
IRE(Dublin)	€23.98	€23.73
ITA(Milan)	€7.30	€5.58
SPA(Barcelona)	€7.60	€5.45
POR(Lisbon)	€14.53	€8.75
EGY(Cairo)	€1.93	€0.46
UAU(Abu Dhabi)	€5.80	€7.52
IND(Mumbai)	€5.68	€0.67
AUS(Brisbane)	€12.25	€11.46
USA(Houston)	€9.53	€10.95
USA(Los Angeles)	€10.13	€11.65
USA(Seattle)	€11.93	€13.71
USA(New York)	€20.96	€24.08

Table 13 Costs of a 6.7 kilometre trip lasting 14.6 minutes with UberPOP in different countries.

¹⁰² At a 5% significance level.

¹⁰³ The API data used is retrieved from users that have individually submitted it. This may create some biases and errors in the data. The bias might be that only people upload data that drive frequently with Uber.

The costs of an UberPOP trip of 14.6 minutes covering a distance of 6,7 kilometres would lead to a price of €0.64¹⁰⁴ which is not significantly different from the 95% confidence interval [7.5; 14.9] (See Table 14 below).

Uber’s average distance is 6.7 kilometres, which is a lot shorter than the average distance of taxi transport in the Netherlands in 2005, namely 12.7 kilometres.¹⁰⁵ There could be two reasons for this. The average distance was calculated based on information provided from passengers around the world where the taxi use habits could differ from those of the Netherlands. Or Uber provides an incentive with its low costs for customers to also travel shorter distances with their services.

Uber’s uniform tariff is disturbed by its surge pricing. When there are massive demand spikes and supply is not increasing, Uber raises its tariffs. This strategy is called “surge pricing”. Surge pricing leads to an increase in prices paid by the customer, and increase the earnings for the Uber driver. Uber does notify the customer about these increased prices when they occur, which will then still allow the customer to estimate what the trip will eventually cost. Surge pricing has three effects:

- It creates new supply; the higher prices provide an incentive for drivers to enter the market;
- It reduces the demand of the service; the prices will be higher which will result in a lower demand;
- It shifts supply; Uber drivers will seek to pick up passengers at the high demand areas.¹⁰⁶

When Uber is surging, the prices can rise to up to 7.5x that of their normal tariff, which was the case in New York at New Year’s Eve. To counter these exorbitant prices, Uber has now been given a “surge limit” of 2.8 fold in New York City.¹⁰⁷ The costs of an UberPOP trip of 14.6 minutes covering a distance of 6.7 kilometres will lead to a price of €0.64. The legal maximum bound for the same trip in the Netherlands would be €22.75¹⁰⁸. This shows that if UberPOP wishes to continue surging until the maximum tariff is reached, the surging can rise the service prices 2.36 fold on average until the maximum tariff is reached.

One-Sample t-test					
	t	df	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
COSTS_ INCL_P PP	6.531	15	11.1998427	7.544598	14.855087

Table 14 Summary of performed One-Sample t-test, Mean = 11.2 kilometres with a 95% confidence interval between 7.5 and 14.9 kilometres.

¹⁰⁴ Estimation is based on prices set by Uber in the Netherlands (see Table 3).

¹⁰⁵ (SEO, 2008)

¹⁰⁶ (Diakopoulos, 2015)

¹⁰⁷ (Shontell, 2013)

¹⁰⁸ Estimated based on the maximum allowed tariffs in the Netherlands. The average minutes and distance from Uber users was multiplied by the maximum tariffs stated by the government. Resulting in the estimated maximum bound of: $2.95 + (14.6 * 0.36) + (6.7 * 2.17) = 22.75$.