Governance and Economics of the Taxi Industry with Special Reference to Sydney

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Abstract

This paper discusses the regulation, performance and reform of the taxi industry in Sydney. Numerous regulations govern entry, industry structure, service quality and prices for the Sydney taxi industry (as in other large Australian cities). The paper finds few efficiency or social reasons for these regulations and taxi performance is poor. On plausible assumptions, the net benefits from unrestricted entry into the Sydney taxi industry are in the order of $265 million per annum. The productivity and service benefits would be greater if accompanied by reform of other restrictions on taxi services especially the anti-competitive control of the taxi radio networks over all taxi operators. The paper also discusses why governments are so resistant to reforming the taxi industry. The main reasons seem to be a lack of understanding of the benefits of market operations, a preference for out-sourcing monitoring of regulations to a few industry players and a concern about the social costs and claims for compensation (although there is no legal basis for compensation). The paper shows that there are a variety of strategies to achieve reform and minimise compensation costs.

Key words: taxi industry, regulations, competition

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1 Introduction

The taxi industry is heavily regulated in most Australian cities with regulations covering the number of taxis, industry structure, service quality and prices. These regulations have been retained despite numerous Australian and international reviews finding that the taxi industry is over-regulated in Australia and other countries respectively (see Productivity Commission, 1999; National Competition Council, 2000; UK Office of Fair Trading, 2003; OECD, 2007). Moreover, in cities in New Zealand, Ireland, the Netherlands, Sweden and the United Kingdom where supply restrictions have been removed or loosened, 'the results of these reforms have been highly positive, with reduced waiting times, increased consumer satisfaction, and in many cases falling prices being observed' (OECD 2007, p.8).

In this paper I describe the regulations on the taxi industry in Sydney and discuss the consequences, estimate the benefits of deregulation and discuss why the government is so reluctant to de-regulate the industry. While the focus is on Sydney, similar issues exist in most other Australian cities.

The paper is laid out as follows. Section 2 describes the taxi industry, the main regulations and some performance outcomes in Sydney. Section 3 discusses public policy objectives including efficiency, equity and access issues. Sections 4 and 5 describe evaluation methods and estimates of the net benefits of taxi deregulation in Sydney. Section 6 discusses policy implications. There is a brief concluding section.

2 The Taxi Industry in Sydney and Australia

Figure 1 provides a sketch of the taxi industry in Sydney. There are four main participants: licence plate owners, taxi operators, taxi radio networks and taxi drivers.[1]

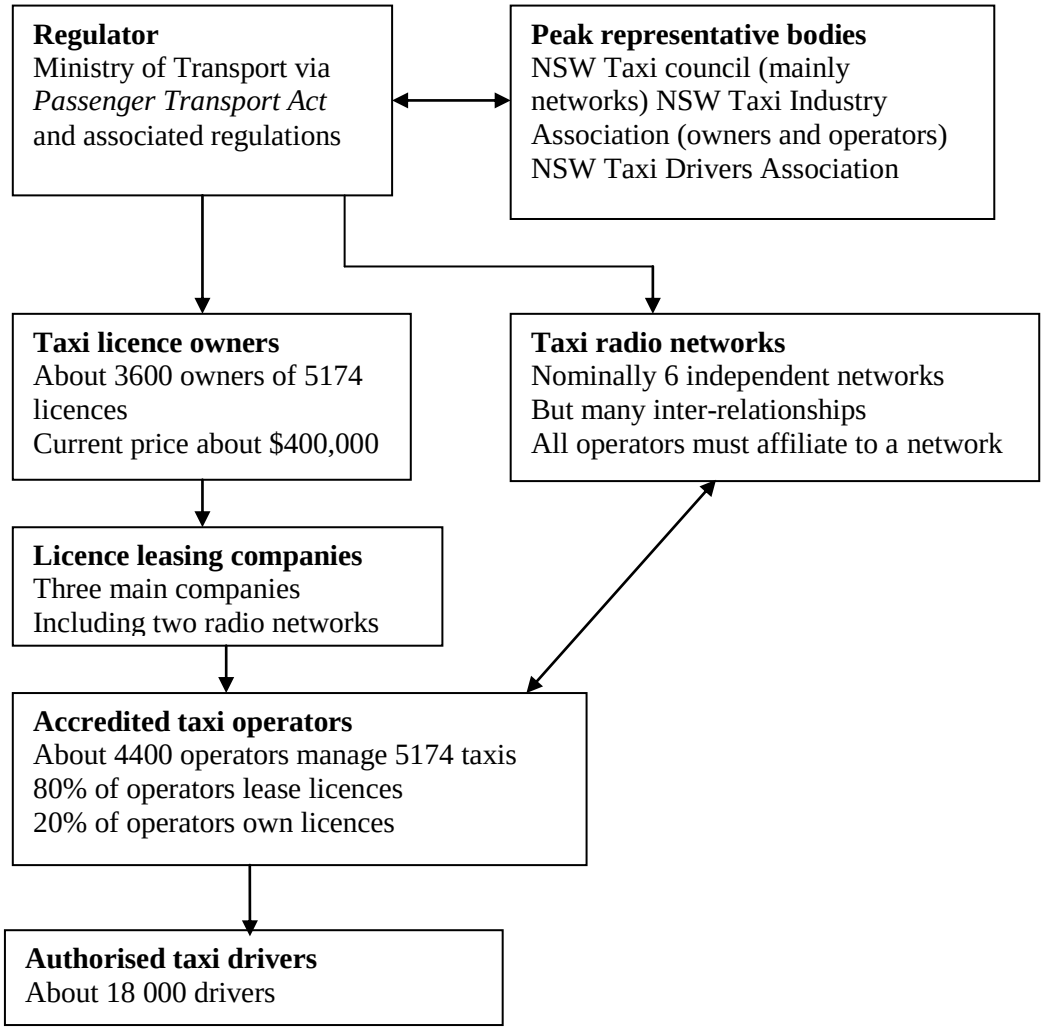
About 3600 taxi licence holders own 5174 taxi plates for use in Sydney (IPART, 2009). Some 75% are perpetual licences mostly issued free before 1990. The other 25% of plates issued or sold by the Government since 1990 include: "ordinary licences" (10 to 50 years), "short-term licences" (1-6 years), wheelchair accessible taxi (WAT) licences, some 265 "9200" (night-time) licences for shifts from 5.0 p.m. to midnight, and about 100 restricted peak-hour licences.

About 4400 licensed operators manage the 5174 taxis. Eighty per cent of the operators lease a taxi plate; 20% own a plate. Taxi operators manage, maintain and insure the taxis. They may drive the taxi or bail (lease) it to a driver. Critically, government regulation requires all operators to be affiliated to a taxi radio network. These networks provide various services including a radio booking system, a GPS tracking system and alarm monitoring service.

IPART (2009) lists 11 radio networks in Sydney. However, the publicly listed Cabcharge through CCN Communications owns six radio networks and hosts another (St. George), so there are in effect six 'independent' networks. These are CCN (3341 taxis including St George): Premier (947 taxis), Legion (525 taxis), Manly and RSL which share a radio office (322 taxis combined) and Lime (67 taxis) – see IPART (2009) and Abelson (2010).

[1] More detail on the taxi industry in Sydney can be found in Abelson (2010).

Figure 1 Structure of taxi industry in Sydney



There are direct management and financial relations between the three largest companies. The Managing Director of the parent entity (Adelhill Limited) of Premier Cabs holds over a million shares in Cabcharge, has been a director of Cabcharge since 1996, and draws an annual salary of some $100,000 from Cabcharge (Cabcharge, *Annual Report, 2007-08*). Cumberland Cabs Company Pty. Ltd., a subsidiary of Premier Cabs, owns over a million shares in Cabcharge. Legion Cabs (Trading) Cooperative Society Limited owns 2.75 million shares in Cabcharge. In addition nearly all taxis are fitted with Cabcharge's EFTPOS facility for which Cabcharge charges 11% of the fare (GST inclusive).

There are about 18,000 authorised taxi drivers in Sydney (Cook, 2005). The drivers pay operators between $120 and $200 per shift depending on the time of the day and week. They also pay fuel costs.

In summary, the Cabcharge, Premier and Legion taxi radio networks control over 90% of the taxi operators and taxis in Sydney, with the latter two having a strong allegiance to Cabcharge. This virtual monopoly is supported in large part by the regulation that all operators must affiliate with an established network.

Major regulations of the Sydney taxi industry

There are four main forms of regulation on the taxi industry: regulations of quantity (or entry), industry structure, services and prices.

Quantity (entry) regulations
The Ministry of Transport and Infrastructure (MTI) has always restricted the number of taxi plates either by offering a limited number to the market or by offering plates at uncompetitive prices compared to buying or leasing secondary market licences, Consequently the uptake of new licences has averaged only 1% per annum and these have been mainly wheelchair accessible taxis (MTI, 2010a).

Drawing on various sources, an estimated 1300 plates have been issued since 1990. This represents an increase in the taxi stock of about 33% over 20 years, i.e. an average growth rate of 1.4% per annum inclusive of new WAT licences. On the other hand, between 1991-92 and 2008-09, real gross state income rose by 85 per cent, which was equivalent to 3.8% per annum.[2] Allowing an income elasticity of demand for taxi services of 1.0, demand for taxi services would have risen likewise by 85% between 1991 and 2009. Consequently the price of a taxi licence rose from $150,000 in 1990 to over $400,000 in late 2009, a real price rise of some 66% (MTI, 2010b).

Late in 2009, government policy changed and it is now auctioning a limited number or 10 year licences. In 2010, it is auctioning 267 new 10 year licences, equivalent to about a 5% increase in the stock. While this policy process aims to eliminate excess demand, licence prices have only fallen slightly.

Regulation of industry structure
In the NSW regulatory structure, the radio networks are both major industry player and industry monitor. In effect, the regulations empower the networks to control all operators and drivers in Sydney. As outlined by the MTI (2008), this document:

> "forms part of the regulatory framework within which network providers are to provide clean safe and reliable taxi services to the travelling public. … The provision of these services is achieved through a complex set of regulatory mechanisms that reflects the structure of the NSW Taxi Industry and provides clarity on the taxi-cab network provider's accountabilities, include (*sic*) how these accountabilities are to be appropriately cascaded down through to taxi cab operators and drivers. In this regard, *the taxi-cab network provider is considered to be the principal entity for taxi-cab services*." (Author's italics).

Accordingly, taxi operators are required to:

- be affiliated with a taxi network for the provision of booking services,
- fit taxis with a network receiver and prescribed communication and safety devices, and
- ensure that all taxis are fitted with the decals of the network and painted in the colours of the network.

Taxi drivers are required at all times to:

[2] ABS Cat. No. 5220.0, *Australian National Accounts: State Accounts*, Table 1.

- wear the approved uniform of the network to which the taxi is connected,
- use the taxi's receiver in accordance with network procedures,
- observe the published rules and by-laws of the networks,
- comply with all reasonable requests of the network with respect to passenger services.

Taxi drivers are prohibited from soliciting for work and from using unauthorised trunk radio devices to coordinate work with, or to pass work on to, other taxi drivers.[3]

To obtain a taxi network authorisation, an applicant must satisfy the Director-General of Transport that "the applicant has the ability and *willingness to discipline any user of the network* who fails to meet the standards or comply with the rules". (www.transport.nsw.gov.au. Author's italics).

The key standards the networks are expected to meet relate only to booked services. The networks are expected to meet at least 97% of all booked requests over a month and to pick up at least 85% of intending passengers with a waiting time of no more than 15 minutes and 98% of passengers with a waiting time of no more than 30 minutes. These standards relate to the whole area of Sydney, but networks can offload to another network with a formal written agreement between the two networks.

Service regulations

Numerous regulations apply to each segment of the taxi market.[4] The following three regulations have significant impacts on industry operations.

- All taxis must be large enough to carry at least four adult passengers and be less than 6 years old. The vehicle size requirement restricts the type of vehicle that may be used and increases unit costs.

- A taxi driver must accept a hiring immediately when offered whatever the destination within the Sydney metropolitan area. Taxi drivers are not allowed to specialise in particular services. This contravenes the fundamental economic concept of the gains from specialisation of services. As a taxi driver observed to the writer: "Taxi drivers have very limited capacity to plan and optimise their schedule".

- Taxis are not allowed to display a destination sign except in very limited circumstances. This restricts the opportunity for multiple hiring. Indeed multi-hiring en route is proscribed.

Price regulations

The MTI (on the advice of the Independent Pricing and Regulatory Tribunal, IPART) sets fare structures and maximum fares. The fares include a flag fall fare, distance and time charges, a night-time surcharge and booking fees. Road tolls and EFTPOS charges are added to the fares. The set fares include costs of taxi licences and are designed to ensure a full return on capital and labour for all participants in the taxi industry. However IPART does not regulate the network fees to operators or Cabcharge's 11% EFTPOS fee (GST inclusive) which is a monopolistic charge.

[3] NSW *Passenger Transport Regulation 2007*, clause 147.
[4] See *Passenger Transport (Taxi-cab) Services Regulation* 2001 and the *Passenger Transport Regulation* 2007.

The fares do not distinguish between peak and off-peak periods although, at the prescribed fares, there is significant excess demand for taxis in peak hours and excess supply in off-peak hours. At the request of the NSW Taxi Council, IPART (2008) recommended that a higher fee (up to $11 extra) could be charged for premium services on conditions that *the taxi must be booked through a network* and that the networks must offer a standard service at the regulated standard fee at the same time. It is not clear how premium services would be defined or how such a scheme would work.

In an attempt to protect taxi drivers, the NSW Office of Industrial Relations sets the maximum pay-in rates per shift for drivers. These rates vary by time of day and week. These rates appear to be above market rates and so not applicable, but if a cabbie wishes to drive a taxi at the most profitable time (Friday evening) he or she may have to agree to drive at a less profitable time (such as Monday evening). Immediately the fares increase on 1 July each year, so do the pay-in rates.

Performance of Sydney taxi industry

To discuss performance standards, I draw on four sources. First, the Cook (2005) Inquiry into the industry was highly critical of the effects of network controls over taxi operators and drivers and their consequence for consumers: "Over a very long time the regulatory framework has become distorted. It has protected the interests of established industry players while becoming punitive and ineffective in managing customer service." The inquiry argued that the prime objective of the networks is to extract income and economic rents out of the operators. Only one in six taxi services in Sydney are network booked services. The networks do not provide customer taxi services and have only indirect concern for the quality of the consumer service. In the words of a taxi operator interviewed by the writer:

> "*There is a cancer at the heart of the taxi industry. The control of the networks has eroded responsibility and reward for providing a quality taxi service*".

Second, in its annual pricing review IPART (2009) provides data on some key performance indicators for taxi booking services. Table 1 shows that only 69% of passengers requesting bookings are picked up by a booked taxi. An unknown number of unmet requests are due to customer cancellations, no-shows or off-loads to other networks.

Table 1 Bookings and pick-ups in 2008-09 (excluding WATs)

Measure	No.	%
Number of bookings requested ('000)	12,736	
Number of jobs accepted by taxi drivers	10,100	79.3
Total pick-ups	8,752	68.7

Source: IPART, 2009.

Table 2 Pick-up times as % of total pickups made and bookings requested

	<15 minutes	15-30 minutes	30-60 minutes	>60 minutes	Other
All pick-ups	92.9%	6.3%	0.8%	0.0%	n/a
Bookings requested	63.8%	4.3%	0.5%	0.0%	31.3%

Source: IPART, 2009.

Table 2 shows waiting times for phone bookings based on network data. For passengers picked-up, the waiting times are within regulated standards. However, these data are of doubtful value if many requests are not met. More fundamentally, bookings requested are **not** equivalent to bookings required. An unknown number of people do not book taxis in peak hours because the services are not reliable. This reduces further the utility of timeliness claims.

The third source on performance is the Colmar Bruton (2003) survey of 1347 taxi users across Australia including 302 taxi users in Sydney. The following are the main results.

- Of all Australian cities, Sydney recorded the lowest scores for taxi trip satisfaction.
- 38% of respondents in inner Sydney and 22% of respondents in outer Sydney had tried to get a taxi in the last six months and failed.
- About 5% of respondents in Sydney had made a complaint to a taxi-related agency but four times that many had felt like complaining and did not do so.

Network-generated records of complaints (which are reported by IPART) are incomplete records of industry performance because many potential complainants do not bother to make a complaint.

The Australian Tourism and Transport Forum survey of *Taxi Standards in Australian Cities* in December 2009 (see www.ttf.org.au) provides a fourth source on performance. Over half the respondents were based in Sydney. Three-quarters of respondents regarded taxi services as poor or very poor in Australian cities and Sydney was rated the worst city. Ninety per cent of respondents said that reform of the taxi licensing scheme should be explored.

The taxi industry in other Australian cities

Most Australian cities share many features of the Sydney taxi industry. These include highly regulated entry and high licence plate prices (over $400,000 in Melbourne), requirements that operators must affiliate with a taxi radio network, the dominant role of the network(s) in the industry, the ubiquitous Cabcharge 11% add-on for EFTPOS payments, close company relationships and high market shares for one or a few taxi companies in the city (Swan Taxis in Perth, Aerial in Canberra, Black and White Cabs and Yellow Cabs in Brisbane).

3 Policy Objectives and Market Regulation

Policy objectives are often defined vaguely as the 'public benefit' (Nicholls, 2003). Here we follow the standard economic classification of efficiency and equity (or social) objectives but also consider an objective that is sometimes proposed for public transport, namely universal or equal access.

Efficiency objectives

A market is efficient when firms supply the services that people want at least cost. It is inefficient when people are willing to pay for a service but it is not provided. It is well established that competitive markets produces these efficient outcomes (Abelson, 2008).

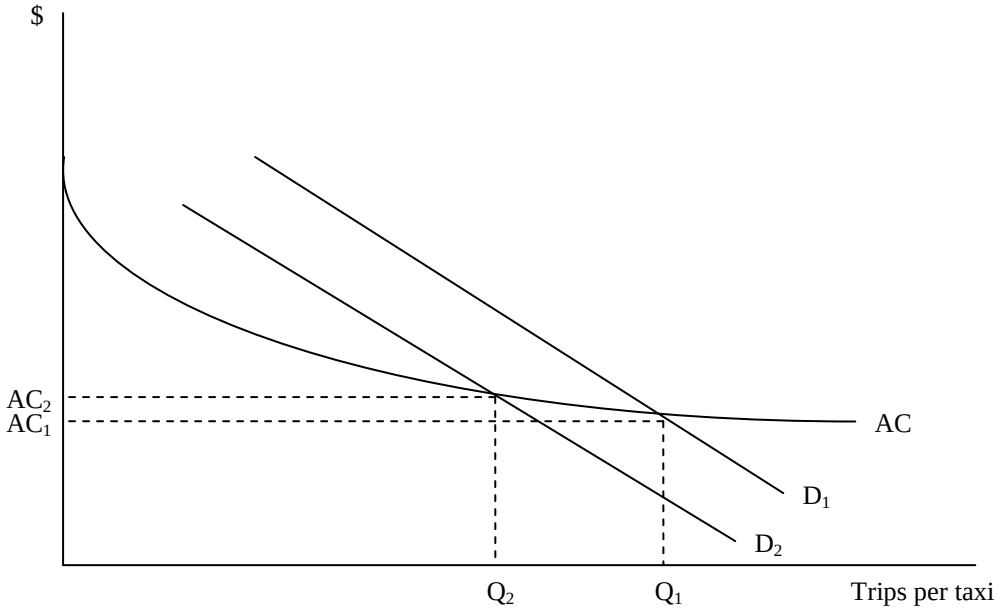
We should note here that the taxi market may be viewed as three markets (cruising, rank and booked markets) with distinct features. There are also markets for taxi radio networks (or communications), operators and drivers. Most of these markets meet most requirements of a competitive market. They provide excludable private goods. There are few economic barriers to entry and exit to the industry and, without regulation, most parts of the market would be competitive.

However, the literature identifies some potential market failures in taxi markets, including imperfect competition, external effects and information failures. Imperfect competition arises when there are significant fixed costs and average costs fall with size of operation. This phenomenon could apply to taxi radio networks. A study or a market experiment (deregulating the conditions required for networks) might indicate the extent of this. However, given the many potential suppliers of communications equipment, it is questionable whether there are major cost barriers to provision of radio network services.

Falling average cost may also apply to taxi-cab operations. Many costs per shift are fixed and accordingly the marginal cost per trip is below average cost. The key concern is that an increase in taxis may result in lower utilisation and more idle time per taxi. If demand for a taxi's services falls from D_1 to D_2 as in Figure 2, trips per shift fall from Q_1 to Q_2 and average cost rises. This is the "excess entry" result derived from Chamberlin's (1933) model of monopolistic competition. It follows that entry restriction may minimise unit costs (Liston-Heyes and Liston-Heyes, 2007).

However, there are three offsetting factors. First, excess capacity provides an offsetting welfare benefit by reducing passenger waiting time, which in turn increases the demand for taxi services. Second, if artificial imposts like taxi licence fees are abolished and fares fall, the demand for taxis will increase at *no* cost to taxi drivers. Third, taxi drivers with spare time in off-peak hours may obtain income from alternative work such as community transport or courier work or even work outside the transport sector.

Figure 2 Rising average cost with declining taxi utilisation



Turning to externalities, taxi services like most motor vehicles have environmental impacts on air quality, noise, greenhouse gas emissions and road congestion. However, these impacts are managed best by control over types of vehicle and fuel use and by road user charges rather than by restricting taxi numbers and services.

Lack of information, or more precisely asymmetric information, is another potential market failure. Taxi users may not know the quality of their taxi vehicle or driver, although in a competitive market operators would have an incentive to create a reputation of service. There is certainly a case for regulating safe standards for vehicles and drivers. However, safety issues are generally tackled most efficiently by testing vehicles and training and testing drivers rather than by suppressing trade.

In relation to price information, the main problems arise in the hailing market rather than in the rank or booking services. In the latter markets, comparative prices are easier to obtain.[5] In the hailing market, taxis have a spatial monopoly and there can be significant search costs. Then, monopoly pricing can occur even with a large number of prospective (deregulated) suppliers (Diamond, 1971). Another predicted consequence of uninformed consumers in a deregulated hailing market is decline in service quality.

However, these conclusions assume that consumers are poorly informed about service quality and prices. It is increasingly possible for anybody to access comparative price information at any time on the internet, even in the hailing market. Price information deficits can be dealt with by requiring taxis operators to post fares and/or indicative trip prices and other relevant service information on a common public website as well as in taxis.

Another efficiency issue is the inter-relationship between demand and supply. Demand is a function of fares and customer waiting time (and therefore of the supply of taxis). The supply of taxi services depends in turn on taxi fares and costs and on driver waiting time (and therefore on the demand for taxis). Some theorists (Cairns and Liston 1996; Liston-Heyes and Liston-Heyes, 2007) have observed that this interaction between demand and supply can produce more than one equilibrium (output) solution in the market and that one equilibrium may be preferred on welfare grounds to another. In principle, this could justify some regulation. However, the practical implications are less clear. It would be asking a lot of an industry regulator to adjust industry settings because of a market failure to achieve the preferred welfare-maximising equilibrium.

In summary, economic principles suggest that competition would improve services in the taxi industry. Information failures justify regulating vehicles and drivers for safety issues. Other market failures provide little justification for substantive regulation of the industry.

Notwithstanding these arguments, some analysts have found that deregulation of taxi markets has had adverse consequences (Teal and Berglund, 1987; Dempsey, 1996; Toner, 1996). Bekken (2007) produced a balanced and more up-to-date summary for European countries which was accepted by OECD (2007). Bekken found that removal of entry restrictions significantly reduces waiting times. This may not reduce fares because fares are often suppressed inefficiently especially in peak hours under a regulated regime. Also, unit costs may rise because of lower utilisation in low demand areas. Almost always, deregulation produces more fare and service variations. When entry is deregulated but fares

[5] However this may cause problems in congested areas like airports.

remain regulated, servicing of profitable areas tends to increase and servicing of less profitable areas to fall. Also, vehicle or driver standards have fallen in some places, but this may reflect inappropriate relaxation of regulations rather than unrestricted entry.

The conclusion is that an efficient policy package is required. Deregulation of entry needs to be combined with deregulation of industry structure and service rules and possibly price deregulation, but with continued regulation of basic taxi and driver standards.

Equity objectives

There are many possible equity objectives. They may include protecting consumers generally or by area or by type of user such as those who need wheelchair access. Price regulation or cross-price subsidies may protect consumers albeit at a potential loss of competition and services for some consumers.

Government may also aim to protect one or more of the industry supplier groups. Restrictions on entry may protect existing owners of capital but discriminate against new entrants. Entry restrictions may also be viewed as supporting incomes of existing taxi drivers but as will be seen in Section 6 this is an illusion.

Current regulations in Sydney are doubtless designed to protect consumers against higher prices as well as to increase wheelchair-assisted services. They are also doubtless designed to protect owners of taxi plates and possibly taxi drivers. Undoubtedly the regulations also assist the taxi radio networks but this may be a by-product of policy rather than an objective.

A broader interpretation of the regulations in Sydney is that government views taxis as a form of public transport and regulates the industry with the objective of providing households across the city with universal or equal access to taxis services with only short waiting times. To achieve this objective, the government gives the networks powers to direct taxi drivers to take any jobs that arise along with performance requirements for the networks.

Universal or equal access for taxi services

There are five questions to be answered with respect to the universal access objective.[6]

- What does the principle of universal or equal access for taxi services mean?
- Is this a reasonable principle?
- Does the present regulatory regime for taxi services provide approximately universal or equal access?
- Can a regulated regime provide universal or equal access?
- Would deregulation provide more universal or more equal access?

What does the principle of universal or equal access to taxi services mean?
A starting definition of universal or equal access could be that all members of a community would have similar levels of access, defined perhaps as waiting times, and pay similar fares for a basic and safe taxi service. This definition would presumably allow fares to vary with

[6] These questions do not deal with the special case of wheelchair accessible taxis which raises further issues.

distance and by time of day or night. This would allow discrimination against people who want to travel long distances or at night.

However, “community” and “basic service” need to be defined. Presumably the principles apply to people within a defined urban area. Thus all people within Sydney should have equal access, but all people in Coffs Harbour could have a different level of access. Would a basic service involve an average waiting time of say 10 or 15 minutes? More issues would arise if operators were permitted to run smaller, older and lower cost taxis. Policy makers who wish to base public policy on the principle of universal or equal access to taxi services need to define what they mean by the principle including the pricing implications.

Is the principle of universal or equal access for taxi services reasonable?
The principle of universal or equal access for taxi services (or indeed to other public transport services) sounds reasonable, but there are strong reasons why it may be accepted only with qualifications.

First, demand and supply conditions may vary greatly within an urban area. In areas of low population or employment density, the cost per taxi trip is likely to be higher because of greater taxi driver waiting time. If a household locates in an area where taxi costs are high, they cannot expect levels of service or prices similar to those in an area where taxi costs are low. Presumably equality of access should be qualified by some consideration of costs.

Second, it is questionable whether public transport disadvantage is a separate category of household disadvantage. Households on any given level of income can choose less housing and better public transport or more housing and less public transport. Certainly the latter group has chosen less public transport, but the two households have equal real income. Of course income disadvantaged households have less of both housing and public transport. But the underlying disadvantage is income rather than transport. A policy that addresses transport disadvantage separately is horizontally inequitable — it is not treating like households in a like way.

Does the present regulatory regime for taxi services provide approximately universal or equal access?
The current regulatory regime in Sydney does not provide universal or equal access. There are numerous examples of taxi drivers selecting their passengers and ignoring those that are less profitable or unwanted. IPART (2009) reported that in 2008-09 taxi drivers rejected 34.6 million booking requests from radio networks and accepted only 10.1 million jobs. For each job accepted taxi drivers turned down three jobs although they presumably had no passenger at that time. The full reasons are not known. Media stories suggest that it is far harder to get a taxi in outer suburban areas than in inner city areas. And it is well known that taxi drivers routinely drive around at night with doors locked and windows virtually closed and select passengers to preferred destinations, often turning down requests for short trips. This selection of passengers is inconsistent with the principle of universal or equal access.

Can a regulated regime provide universal or equal access?
The lack of access to taxis that people in Sydney experience reflects three related factors: barriers to entry due to the licence fee and the prohibition on independent businesses, excess demand for taxi services in peak hours and price regulations that do not reflect the real costs of taxi operations.

The barriers to setting up a taxi business restrict the services supplied to lower demand areas of Sydney. They also create the excess demand for taxis in virtually all areas in peak hours. The regulation of prices makes long taxi trips more profitable than short ones. When there is excess demand, or even when there is a choice of passengers at other times, taxi drivers try to choose the more profitable trip.

Thus the lack of access for some people is directly related to the regulated nature of the industry. The regulation that requires taxi radio networks to serve the whole the metropolitan area within 15 minutes, even with off-loading to another network, is ineffective and unrealistic. In any case booked services are only 16% of all taxi trips.

Could industry regulations be redesigned to ensure equal access? It is hard to see how this can be done. There are limits to the extent that a regulator can order taxi operators or drivers to provide an unprofitable service. So long as entry is restricted and fares are regulated, taxi services will not be universal. Taxi drivers will attempt to select the most profitable passenger(s) and discriminate against the others. Indeed, fare regulations alone would cause taxi drivers to refuse some demands for trips for which passengers would be willing to pay but cannot do so under the maximum fare regulation.

Would deregulation provide more universal or more equal access?
OECD (2007) concludes that deregulation of entry and industry structure provides more widespread and universal services. Given the level of excess demand for taxi services at present, as evidenced by the size of the licence fee, complete deregulation of entry would probably increase taxi services by at least 20% to 30% in 2 to 3 years (Abelson, 2010). The market would be far more competitive and driven by user demands.

If, as part of a reform package, fares were deregulated but publicly advertised, fares would tend to reflect taxi costs. This could increase prices for some groups, for example elderly people who travel short distances. But this will enhance access in that taxi drivers would not discriminate against these groups. However, if equal access is defined as equality of fares across all trips, greater fare variations would be regarded by definition as less equal access.

4 Evaluating the Costs and Benefits of Taxi Deregulation

In this paper I evaluate the net benefits of free entry into the industry. Operators and drivers would be required to pass basic safety standard checks but pay only a small annual fee to fund an independent regulator.

Theory and evidence suggest that entry deregulation would produce higher benefits if accompanied by other deregulatory policies including choice of taxi vehicle and communication system independently of established radio networks and allowed to make private arrangements with consumers and each other. Prices could be set competitively and vary by time and place subject to publication on a common website. The extra competition would generate an array of new services and prices and cost savings. However, these complementary deregulatory policies are not formally defined or assessed in this evaluation.

It should also be noted that the evaluation is based on the present level of demand. The paper does not forecast changes in demand, supply and net benefits.

Evaluation principles

The evaluation principles are developed in the four figures below. Figure 3 shows two perfectly elastic supply schedules. With initial supply (S_1), the fare (F_1) is the average cost (AC) of a taxi trip plus the licence fee (LF). The demand for taxi trips is given by schedule D_1 and there are Q_1 taxi trips per period. With no licence fee, the fare falls to F_2. Also, the demand curve shifts right to D_2 as more taxis enter the market and customer waiting times fall. The fall in fares for existing consumers is a transfer from taxi suppliers to users. However, existing users also gain surpluses equal to area A due to lower waiting times. New users gain consumer surpluses equal to areas B + C + D.

Figure 4 provides an equivalent exposition drawing on the concept of generalised cost (GC) that is often employed in transport economics. This facilitates quantitative estimates. The demand for taxi trips is shown as a function of GC which is the sum of the fare and the user cost of waiting time. In this figure:

GC_1 = AC + NW, where NW is normal waiting time (i.e. average waiting time with no entry restrictions).

GC_2 = AC + NW + LF.

GC_3 = AC + NW + LF + EW, where EW is excess waiting time.

In Figure 4, Q_R is the number of taxi trips with restricted entry and Q_U the trips with unrestricted entry. With unrestricted entry, there is no excess waiting time or licence fee and generalised cost falls from GC_3 to GC_1.

Figure 3 User benefits from increase in taxi services and lower fares

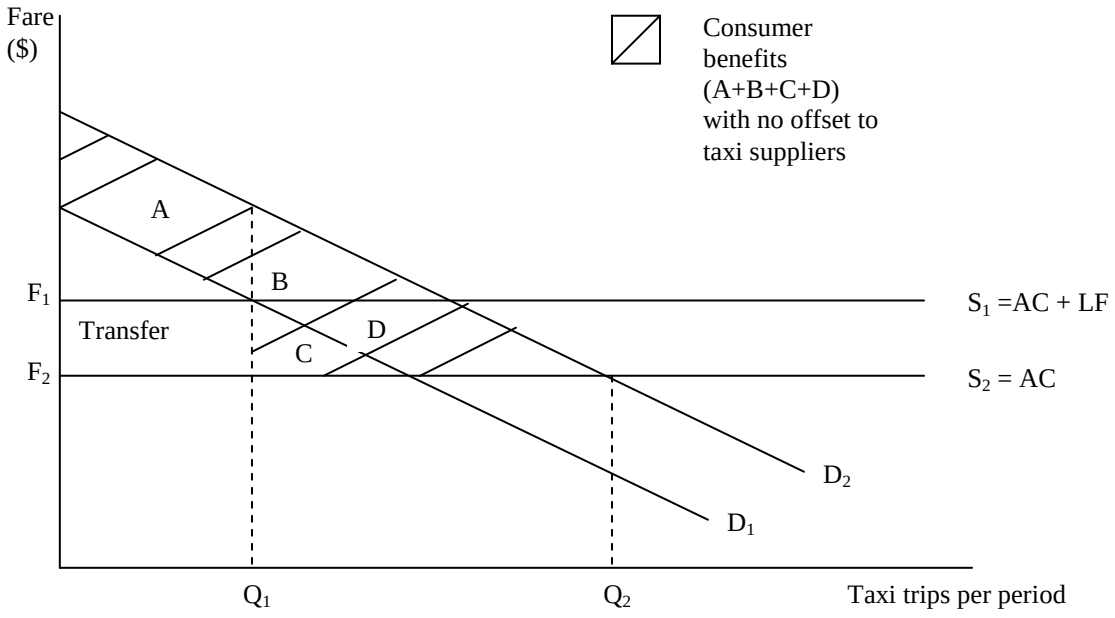
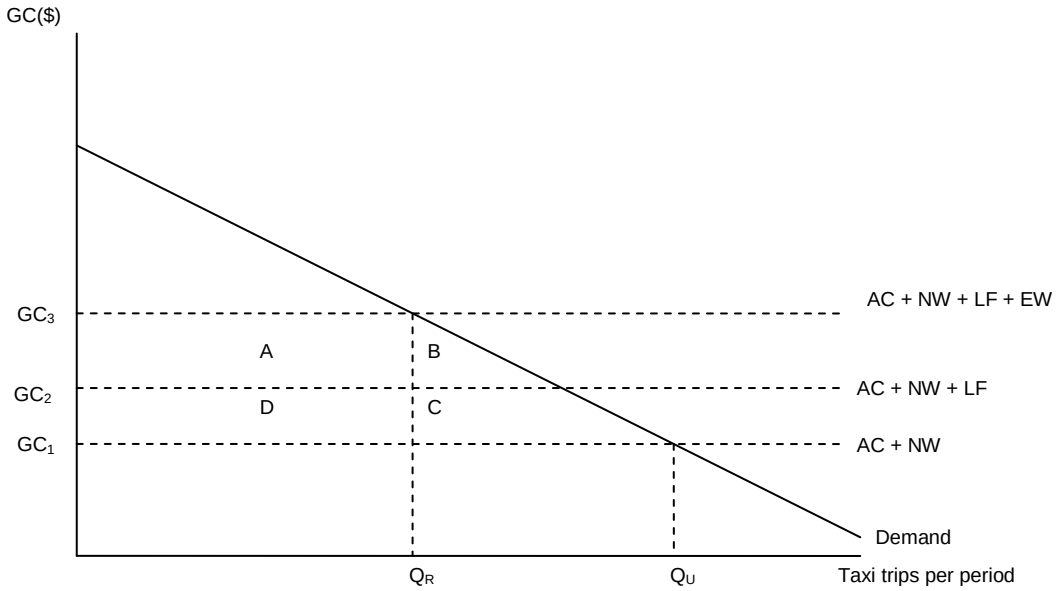


Figure 4 Basic economic benefits: alternative exposition



The gross benefits of deregulation to existing taxi consumers equal areas (A + D). The benefits to new users are areas (B + C). Thus gross user benefit = A + B + C + D. However, the fall in taxi fares associated with area D is a loss to taxi owners. Thus the net social benefit equals areas (A + B + C).

Figure 5 introduces two complications. First, the observed number of trips (Q_R) at GC_3 in Figure 4 does not represent the true demand for taxis at this price. Many people do not use taxis in peak hours because of the expected waiting time or indeed the possibility that no taxi may be available at the required time. That GC_3 is not an equilibrium price is evidenced by IPART suggesting a premium of up to $11 on the fare for "premium" services. Real demand exceeds observed usage. This is reflected in the D_2 demand curve in Figure 5. Given this demand and a deregulated generalised cost of GC_1, usage would now rise to Q_U*.

Second, the social cost of a taxi trip differs from average (private) cost. The private cost includes indirect taxes (excise taxes and GST) and road tolls, which are transfer payments and not resource costs. On the other hand, taxi trips have some negative externalities (notably traffic congestion and air quality effects). Given that the estimated indirect taxes exceed the negative externalities (see below), the long-run marginal social cost inclusive of externalities (LRMSC) + NW line is drawn below the AC + NW line. It is assumed that fares must overall cover long-run marginal cost.

In Figure 5, the benefits of deregulation to existing taxi users still equal areas (A + D). Discounting the loss to taxi suppliers, the net social benefit remains area A. However, the benefits of generated trips are now greater. The benefits to users equal areas (B + C + E + F + G). The other net benefits to society equal areas (H + J). This is the excess of government revenue and road tolls over the environmental costs of taxi trips.

Figure 5 Adding evaluation complications

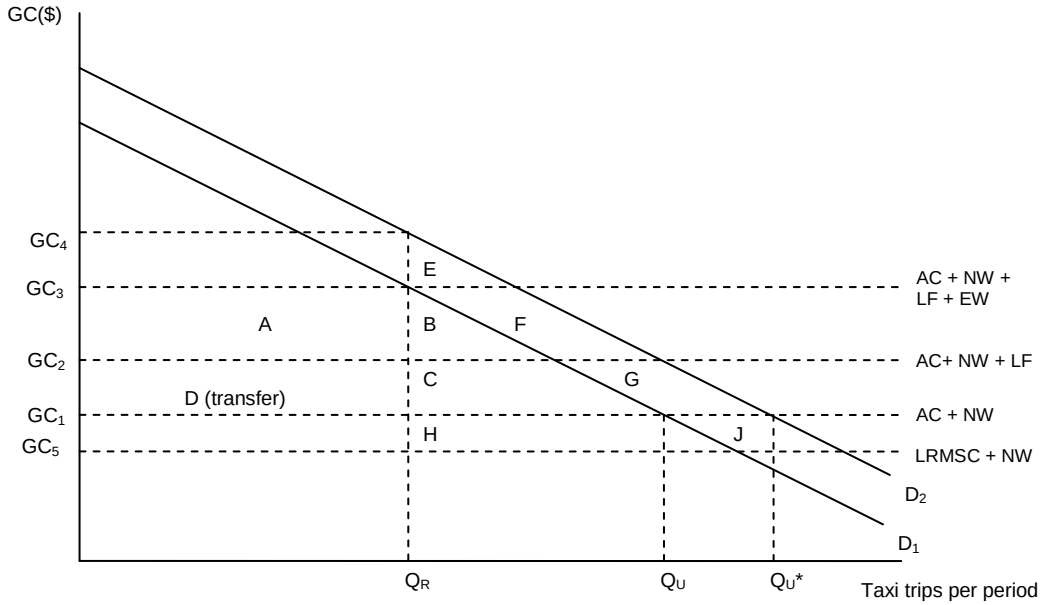
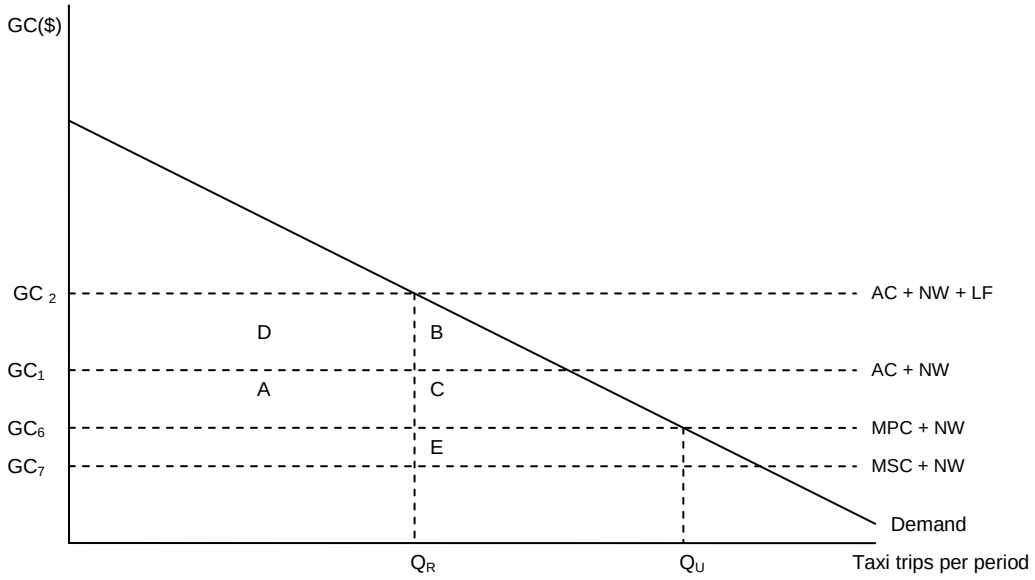


Figure 6 An off-peak model



Finally, we introduce differential pricing in peak and off-peak hours. With unregulated pricing, peak fares would likely exceed average unit cost in peak hours so as to equate supply with peak demand. In off-peak hours, fares would be closer to marginal operating cost.

Figure 6 depicts an off-peak scenario. Demand is lower and it is assumed that there is no excess waiting time. It is also assumed that fares will fall as the private marginal cost (PMC) of operating in off-peak hours does not include fixed vehicle costs. Thus GC_6 is lower than GC_1 and taxi use (Q_U) is determined by the intersection of the demand curve with GC_6. Again, marginal social cost (MSC) is lower than PMC.

In this off-peak model, existing taxi consumers gain benefits equal to areas (A + D). However, in this case both areas A and D are offset by losses to taxi drivers (who make higher returns in the peak periods). On the other hand, benefits to new consumers equal areas (B + C). Net social benefits equal area E.

In the evaluation below, peak hour effects are evaluated based on Figure 5 assuming that the fare will remain at AC + LF. Off-peak hour effects are based on Figure 6. Based on discussions with taxi drivers, peak hours constitute a third of operating hours per week (40 of the working 120 hours) and taxis do twice as many paid trips in a peak hour as in an off-peak hour. This implies that peak hours account for half of all existing trips in Sydney (30 million per annum) and off-peak hours for the other half (also 30 million trips per annum).

5 Estimated Net Benefits of Taxi Deregulation in Sydney

For the evaluation of taxi deregulation, estimates are needed of taxi trip costs, fares and waiting time in peak and off-peak periods, a peak period equilibrium fare, social costs and benefits, and the elasticity of demand with respect to generalised costs. The detailed data and estimates (based on 2007-08 data and prices) are shown in the Annex. I comment here briefly on the basis for these estimates.

IPART (2008) estimated that the average (producer) cost of a taxi trip in 2008 was $20.20 and the cost of the licence fee per trip was $2.43. However, in an unregulated market, peak-hour fares would likely be above average cost and off-peak fares below average cost. In the absence of data that would enable modelling of these prices, I assume that taxi drivers would continue to charge LF ($2.43 per trip) in peak hours even though it would no longer be a cost but that off-peak fares would fall by the same amount below average cost. Given equal peak and off-peak trips, this ensures revenue neutrality for taxi operators.

The average waiting time for all phone-booked taxis in 2008 is 8.3 minutes (IPART, 2008). For this evaluation, a “normal wait time” with a deregulated taxi fleet is assumed to average 5 minutes. This is 3.3 minutes below the average time. Given an equal number of peak and off-peak trips, the average excess wait time in peak hours is therefore 6.6 minutes per taxi (making an average wait of 11.6 minutes in peak hours).

Waiting time is usually related to income. The average weekly income in 2008 was $1145 (ABS, 6302.0). This equals $30.5 an hour for a 37.5 hour week. In-vehicle leisure time is usually valued at 33% of hourly wage, but waiting time is valued at up to twice this amount. This suggests that waiting time for taxis would be valued at $20 per hour per passenger.

However, working time is usually valued at the wage rate. For business users of taxis this may be above the national average wage rate, so we allow $40 an hour. Allowing for 2/3 leisure and 1/3 business users, the weighted average could be (0.67 $\times$ $20) + (0.33 $\times$ $40) = $27 per hour.

Allowing for 1.8 passengers per taxi, this would be $48.6 per hour or $0.81 per minute. Thus the average cost of 5 minutes waiting is $4.0 per taxi. The cost of 11.6 minutes waiting is $9.3 per taxi.

Estimating the market clearing price with current regulations (GC_4 in Figure 5) is also problematic. The taxi industry has argued for a premium fare of an additional $11 per trip in peak hours. For this exercise, the average market clearing price premium in peak hours is assumed to be $5.50.

To estimate the third party effects, the GST component ($1.84) of the average fare is taken out of AC. However, environmental and congestion costs are included.[7] Allowing $0.10 per vehicle km for these costs @ 7 km per trip, these costs are $0.70 per taxi trip.

To estimate generated taxi trips I allow a price elasticity of demand with respect to generalised cost of -1.0, based on Toner and Mackie (1992) and OXERA (2003). This is an average elasticity. Arguably the elasticity could vary for fares and waiting time and for peak and off-peak hours.

Summary of results

Table 3 shows estimated benefits and costs of entry deregulation in Sydney. On plausible assumptions about waiting times and other costs, the estimated net gain is $265 million per annum. Over 20 years, with unchanged demand and supply conditions, this produces a net benefit with a present value of $2.8 billion (assuming a real discount rate of 7% per annum).

These benefits are based on free entry into the industry and price flexibility. They may require some concurrent reduction in the power of the networks over the industry. As OXERA (2003) reported, total expected benefits of deregulation were not obtained in the United States because the reforms did not address the oligopolistic nature of industry. If taxi operators were free to compete and develop their own competitive brands, there would almost certainly be additional service and productivity gains.

In terms of the distribution of the gains, consumers are estimated to obtain annual benefits of $295 million and there would be small gains to government revenue. On the other hand, taxi industry suppliers would lose an estimated $51 million a year. Owners of taxi licences would lose annual taxi licence fees of about $140 million. But with deregulated pricing, taxi operators are assumed to retain peak hour fares and so they would gain the LF component of fares in peak hours.

Deregulation of entry into the industry would have two other noteworthy equity effects. First, it would promote employment. Each taxi licence issued creates 2.7 equivalent full-time jobs. This assists people (including students and retirees) who want to supply taxi services without having to pay $300 a week for their share of the licence to provide a service. Second, deregulation would assist low income and elderly people who do not own or cannot drive private vehicles. Taxis play an important role in providing transport to individuals for whom other forms of public transport are not suitable.

[7] Arguably, the GST component of the fare should not be included as a benefit to government because government may lose GST on expenditure foregone to make a taxi trip. On the other hand, any excise tax and road tolls associated with generated trips should be included as a benefit to the recipients. These have not been allowed for in these calculations.

Table 3 Summary of results

Estimated annual benefits in peak hours		($m)
Existing users lower waiting time (Area A)	Q existing x (GC3 - GC2)	157.2
New user benefits (Areas B+ E+ F)	Q new x (GC4 - GC2)x 0.5	49.5
Taxi supplier gains new users (Areas C + G)	Q new x (GC2 - GC1)	22.3
New social benefits (Areas H+J)	Q new x (GC1 - GC4)	10.4
Total benefits		239.4
Transfers		
To suppliers: higher peak hour fares	Q existing x GC2 – GC1	72.3
Estimated annual benefits in off-peak hours		($m)
New user benefits (Areas B + C)	Q new x (GC2 - GC6) x 0.5	14.7
New social benefits (Areas J + K)	Q new x (GC6 - GC7)	11.1
Total benefits		25.7
Transfers		
Existing users lower fares (Areas D + A)	Q existing x (GC2 - GC6)	146.0
Summary results: all users and suppliers		($m)
Gains to taxi users	No offsetting losses	221.3
Gains to taxi suppliers	No offsetting losses	22.3
Social benefits	No offsetting losses	21.5
Total net benefits per annum		265.1
Transfers per annum		($m)
Supplier gains from higher peak fares		72.3
Supplier losses from lower off-peak fares		146.0
Net gain to consumers (loss to producers)		73.7
Total annual impacts		($m)
Gains to consumers		295.0
Losses to taxi industry suppliers		-51.4
Social gains		21.5
Total net benefits		265.1

6 Policy Questions

Given these results and others in the international literature, why have such strong regulations been retained in Sydney and elsewhere in Australia? There seem to be several possible explanations.

First, one explanation is that the policy makers have little exposure to economic arguments. This does seem to be a possibility.

Second, policy makers may believe that the analysis is flawed. Clearly the estimated benefits of deregulation are based on a large number of inputs and assumptions and this paper has not presented a range of results or sensitivity tests. There is also international evidence that poorly constructed packages of reforms may be ineffective. Certainly some regulations need to be retained. However, it would be hoped that policy makers would agree

that the underlying theory and evidence are robust and the results not sensitive to plausible alternative assumptions. Even if we did assume that the net benefits might vary by +/- 10% depending on changes in base assumptions, the results are indicative of the large potential gains that could be realised from deregulation of the taxi industry.

Third, alternatively policy makers may believe the analysis is incomplete because the reforms would not meet the public transport objective of "universal and equitable access". In reviewing this objective above, we found that this concept is not well-defined and that competitive markets with light regulation are as likely, and possibly more likely, to achieve general and equitable access than a strongly regulated taxi industry.

Fourth, discussions with regulators suggest another reason why policy makers may favour the NSW type of regulatory structure is that it out-sources significant monitoring and control of taxi drivers to a few networks. This minimises in-house administration and responsibility. However, out-sourcing regulatory responsibility to the networks makes a major service supplier also an industry regulator. This creates conflicts of interest, inhibits competition and sets up unhealthy relationships between suppliers in the taxi industry.

The fifth and probably most common explanation for opposing reform is that the social costs of deregulation are unacceptable. The major losers from free entry would be investors in taxi licence plates. This small group has a large interest in opposing change compared with the dispersed benefits to taxi users. It is generally accepted that there is no legal requirement to compensate taxi plate holders for any reduction in the value of the plates (Deighton-Smith, 2000). The size of compensation, if any, is therefore a political decision. This decision may be informed by evidence about past purchase prices, returns on investments since purchase and hardship issues. If any compensation is considered necessary, this could be at less than current market values.

Be that as it may, several strategies could reduce the cost to government (see also Deighton-Smith, 2000; Johnston, 2000).

(1) One cost-reduction strategy for government is a gradual reform process over say 10 to 15 years. This allows plate holders to continue to gain significant income and government to offer lower compensation in the longer term. However, this delays the substantial benefits of taxi reform and risks an about-turn on the reform process.

(2) Another strategy for reducing costs to government would be to maintain regulated taxi fares in the peak or even allow them to increase notwithstanding an increase in taxis. This would soften the fall in value of taxi plates. In effect taxi users would pay compensation out of part of their gains. Taxi users would still be better off on a net basis because of the fall in waiting times in peak hours.

The next two strategies are variations on a buy-back strategy. In both cases when government buys back a licence, it would lease it out on the market and the lease revenue would partly offset the cost of the buy back.

(3) Government would buy back all licences at a discounted cost of say $330,000 or less per licence over say three years and lease them out at rates falling from $25,000 towards $0 per annum over 10 to 15 years. Government would issue significant annual

increases in licences in line with these falling rates. Plate sales to government would be optional but would be in the owner's interest given the falling lease rates.

(4) Another strategy would combine a rights issue with a buy back. The government would substantially increase the plates in the market by an annual rights issue. In a tested scenario, all existing licence holders receive a 10% increase in their holding free of charge for four years and a 3% annual increase thereafter. The plate holders can either sell this entitlement on the market to an amalgamator or sell it back to the Government at a discount rate. The government would also buy back full plate licences at a discount to the market. As in the first strategy, government would lease out plates at a declining annual price.

The net cost to government would depend on scheme detail. However, modelling by the author of these strategies indicates that the net cost to government could be less than 50% of the cost of full market price buy-back of licences. The cost would be lower if strategy (3) or (4) were combined with maintaining or even increasing peak fares as in strategy (2). Thus, if compensation is deemed necessary, a combination of (2) and (3) or (4) could substantially reduce the cost to taxpayers while gradually producing considerable benefits of taxi users.

Finally, a brief comment on the impacts of deregulation on taxi drivers is needed. Undoubtedly many taxi drivers oppose free entry (or any increase in entry) because they fear that their already low earnings will be further eroded. However taxi driver income is driven by the demand and supply of drivers. Many long-time Sydney taxi drivers have experienced real falls in income in recent yeas because the supply of drivers has increased especially with foreign students. Wages have fallen to a new low equilibrium as drivers compete for work by bidding up pay-in rates. However an increase in taxis will *increase* the demand for taxi drivers, reduce pay-in shift rates and marginally increase take-home earnings. The increase will be positive but small because the supply curve is upward sloping but highly elastic. In addition the ability of a taxi driver or small group of drivers to establish their own business and brand has the potential to significantly increase driver income.

7 Conclusions

Numerous regulations govern entry, industry structure, service quality and prices for the Sydney taxi industry. Similar regulations are in place in other Australian cities.

However, there are few market failure (efficiency) reasons for regulations other than basic safety regulations. Nor do the regulations achieve a possible public benefit objective of universal and equitable access to taxi services across the city.

On plausible assumptions the net benefits from free entry into the Sydney taxi industry are in the order of $265 million per annum. The productivity and service benefits would doubtless be greater if other restrictions on taxi services were lifted especially the anti-competitive control of the taxi radio networks over taxi operators and drivers.

Given that many other Australian and international reports have reached similar conclusions, why are governments so resistant to reforms? The main reasons seem to be a lack of understanding of the benefits of market operations, a preference for out-sourcing regulation

to a few industry players and a concern about the social costs and claims for compensation (although there is no legal basis for compensation). However the paper also shows that there are a variety of strategies to achieve reform and minimise compensation costs.

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Annex Table Base data for the economic evaluation (2007-08 data)

Quantity of taxi trips in Sydney		
Total taxi trips per annum (m)		59.8
Persons per taxi trip		1.8
Average trips per taxi per annum		11730
No of taxis in Sydney		5100
Total shifts per week		11.5
Paid taxi trips per shift		20
Hours per shift		10.5
Weeks per year		51
Operating hours per week		121
Peak hours Monday to Thursday		24
Peak hours Friday		9
Peak hours Saturday		7
Total peak hours		40
Peak hours as % all business hours		33
Peak hour / off peak hour trip ratio		2
Trips in peak hours as % all trips		50
Existing peak hour trips p.a. (m)		30
Existing off-peak hour trips p.a. (m)		30
Elasticity of demand as f (change in GC)		-1
New peak hour trips p.a. (m)		9
New off-peak hour trips p.a. (m)		6
Total trips p.a. with free entry (m)		75
Total trips p.a. with free entry (% increase)		25
Cost data (a)		
Average fare ($)	F	20.20
Licence fee per trip ($)	LF	2.43
Average cost ($)	AC = F – LF	17.77
Value of wait time per taxi ($/minute)	VWT	0.80
Normal wait time (minutes)	NWT	5.00
Excess wait time (minutes)	EWT	6.60
Equilibrium premium price ($)	X	5.50
Cost of normal wait time ($ per taxi trip)	NW = NWT × VWT	4.00
Cost of excess wait time ($ per taxi trip)	EW = EWT × VWT	5.28
GST ($ per taxi trip)	Excise excluded	1.84
Externality cost ($ per taxi trip)	Ecost	0.70
LRMSC	AC + NW - GST + Ecost	16.63
Fixed cost as % of total cost		35
Variable costs as % total cost		65
Average generalised costs in peak hours		($)
GC1	AC + NW	21.77
GC2	AC + NW + LF	24.20
GC3	AC + NW + LF + EW	29.48
GC4	GC3 + X	34.98
GC5	LRMSC + NW	20.63
Average generalised costs in off-peak hours		($)
GC1	AC + NW	21.77
GC2	AC + NW + LF	24.20
GC6	AC - LF + NW	19.34
GC7	AC - LF + NW - GST + Ecost	17.50