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The economics of regulating ride-hailing and dockless bike share

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The Economics of Regulating Ride-Hailing and Dockless Bike Share

Discussion Paper

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Roundtable

Rex Deighton-Smith

International Transport Forum,
Paris

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Discussion Paper



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Paris

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Regulating app-based shared mobility services

The current decade has seen rapid growth in, and diversification of, mobility services based on smartphone apps using real-time information and tailored to user needs. Ride-hailing services were some of the earliest to emerge and have grown extremely rapidly world-wide in the last five years, with companies such as Uber, DiDi Chuxing, Grab and Ola being among the most prominent. However, there have also been rapid developments in other modes, including car-sharing, bike-sharing and scooter-sharing services. Prominent names in these fields include Lyft, BlaBlaCar, Zipcar, Mobike, Ofo, Jump, Bird and Lime.

Regulatory responses to the emergence of these services have varied widely, particularly in the ride-hailing market. Regulators were often slow to respond to the emergence of ride-hailing, but have now adopted stances ranging from outright prohibition and attempts to enforce existing taxi and limousine regulations to attempts to welcome and facilitate the entry of the new services. In a number of cases, regulators have rapidly changed approach, typically moving from the former to the latter response. This reflects the historically heavily regulated nature of the taxi industry and the substantial rents typically enjoyed by incumbents. The taxi industry has, in this sense, been particularly vulnerable to disruption.

The ride-hailing model has specific characteristics that call into question significant elements of the rationale for traditional taxi regulation. At the same time, the taxi sector has long been criticised as one afflicted by sustained regulatory failure, with substantial consumer costs and steady loss of market share being the results. Hence, the economic and social basis for regulation of the sector must be reassessed carefully to ensure that new regulatory frameworks are developed that maximise welfare and provide a level playing field between competing services within the same market.

The regulatory context for most other, app-based shared mobility services – among which bike-sharing has initially been most prominent – differs significantly from that facing the taxi and ride-hailing sector. Some city authorities have sponsored “docked” bike-share schemes, which face disruption from dockless bike-share (and scooter-share) operators. Such disruption is, however, on a much smaller scale than that experienced in the taxi industry. In most cases, new dockless bike-share schemes are providing a new mobility option. This is also true of other, emerging variants of the model, including electric bikes and mini-scooters (*“trottinettes électriques”*), as well as electric motor-scooters.

Some similarities are, however, evident. The use of the same basic technology as the basis for the innovative service offer is the most obvious. However, another is the existence of significant concerns regarding negative externalities. In the taxi/ride-hailing context, this relates to concerns about urban congestion and pollution. In bike-sharing, concerns are similarly related to loss of urban amenity due to large numbers of bikes parked in intrusive places. Consumer protection concerns also arise in both sectors. More fundamentally, the convergence between the sub-sectors that is already evident is expected to continue and develop, creating an imperative for consistent, flexible and adaptable regulatory responses.

Given the significant differences in regulatory context for the two sectors, they are essentially discussed separately, albeit that key similarities and linkages between the sectors are identified and discussed where appropriate. However, the conclusions section addresses both sectors and highlights their increasing convergence.

Ride-hailing

Ride-hailing involves the provision of a taxi-like service via the use of Global Positioning System (GPS) enabled software that links drivers and passengers directly, without the need for a dispatch centre. The platforms are account-based, with payments being automatically processed via the subscriber's credit card. Different service options are typically available, ranging from shared rides through to individual rides in either standard or luxury vehicles.

Impact on existing markets

Economic efficiency benefits

A significant part of the disruptive potential of ride-hailing derives from the economic efficiency benefits that it possesses vis-à-vis traditional, regulated taxi industries. The most apparent, and often the most significant, source of these efficiency benefits is the rapid increase in supply which ride-sharing brings. The majority of taxi markets have been characterised by the maintenance of rigid supply restrictions over extended periods. These have distorted consumer demand, forcing substitution toward less-preferred means of transport (OECD, 2007, p 30). They have also given rise to substantial economic rents, which can frequently be capitalised via tradeable medallions. This, in turn, has significantly increased taxi fares. Ride-hailing has eliminated, or greatly reduced, these long-standing economic distortions.

Second, the ride-hailing model gives rise to significantly greater capacity utilisation. Taxi fleets that are sufficiently large as to allow peak demands to be met more or less adequately necessarily suffer from low utilisation levels at other times of the day or week, given that taxi vehicles are dedicated, or single-purpose vehicles. Conversely, the ride-hailing model leverages private use vehicles, increasing their utilisation level. Drivers, similarly, typically work on a part-time basis and have control over the hours they choose to work. This gives rise to a high level of flexibility in supply in response to demand changes.

This flexibility is further enhanced by the pricing models used. At a basic level, the availability of different service levels (Uber X, Uber Black) at different prices allows for a more efficient matching of consumer demands, in contrast to the largely uniform offers usually seen in highly regulated taxi markets. Importantly, the flexible ("surge") pricing model used by some ride-hailing services both ensures that services flow to their highest-value uses during times of scarcity and promotes rapid and substantial supply responses to excess demand. Both factors entail economic efficiency benefits (Hall, Kendrick and Nosco, 2016).

In addition, app-based services cut transactions costs, notably by automating and improving the efficiency of the despatch function, improve the utilisation of existing capacity and reduce information asymmetries between drivers, fleet operators and passengers (OECD/ITF, 2016, p. 6).

Ride-hailing also appears to have achieved efficiency benefits by catering to previously latent demand in areas poorly served by taxis. For example, the OECD notes that around one third of Uber trips in New York City originate in boroughs other than Manhattan, compared with only 14% of taxi trips. The above-mentioned efficiency gains are likely to constitute one reason for this unsubsidised service improvement, while the nature of the app is also believed to act against "cherry-picking" of the most profitable and convenient ride-requests (OECD, 2018, p 9).

Disruption of existing business models

The entry of ride-sharing services has proven highly disruptive in many taxi markets. As noted, the extent of the disruption experience is largely a product of the size of the artificial restrictions on supply maintained by regulators and the monopoly rents that have accrued as a result. The entry strategy of major ride-hailing operators has been to exploit regulatory ambiguities, typically entering new markets without seeking regulatory permission. For example, Lyft and Sidecar chose to ignore, cease and desist orders served on their original operations in San Francisco in 2012 and continue to operate. Regulators ultimately did not enforce the orders and, by 2013, had created a new regulatory category to accommodate ride-hailing (Flores and Rayle (2016)). They have also mounted strong defences against any enforcement action taken by regulators, including funding the defence of drivers. This approach has led to rapid supply increases. Experience indicates that the entry of ride-sharing typically expands the total (i.e. taxi plus ride-sharing) market significantly, with ride-share companies gaining from substitution from a range of transport modes, including taxis, private vehicles and public transport. In addition, new trips appear to be prompted by the availability of a reliable, high-quality service at low price (Schaller Consulting, 2018).

The extent of the impact on incumbents is demonstrated by the rapid decline in taxi medallion values, where these are tradeable. For example, New York City medallions had reached a peak value of around USD 1.3 million early in the current decade, while the average transfer price for unrestricted medallions in June 2018 was USD 280 000 (<http://www.nyc.gov/html/tlc/>), accessed 18 September 2018. In Melbourne, Australia, medallions reached a peak value of over AUD 500 000 in 2011, but had declined to around AUD 150 000 within two years of Uber entering the market in 2014 (see: <http://taxi.vic.gov.au>). Where ride-hailing has been fully accommodated within the regulatory system, this has typically meant the end of attempts to limit supply in the industry. Thus, for example, the Victorian government began issuing new taxi licences at administrative cost in 2017, effectively rendering existing licences valueless.

Rapid falls in medallion values often caused hardship, particularly to recent entrants who had paid high prices using borrowed funds. A desire to mitigate such hardship and to avoid financial liability (arising via compensation claims from incumbents) seems to have underpinned the responses of many governments, who sought to block the operations of newly-established ride-hailing operators in the context of strong lobbying from traditionally politically influential taxi industry incumbents.

However, the ride-hailing services' strategy of rapid entry and aggressive moves to build market share have typically been successful in building strong consumer support for these services, based on direct experience of a superior service. This has changed the political dynamic surrounding the industry.

Governments have, in some cases, rapidly changed their regulatory responses as a result. For example, Uber's entry to Melbourne in 2014 was initially met with substantial enforcement action from the regulator, imposing administrative fines on drivers and commencing court action. However, by mid-2016, the government had indicated its intent to reform the regulation of the industry to accommodate ride-hailing. A court decision that year finding that app-based ride-sharing services did not come within the ambit of the existing regulatory structure highlighted the problems faced by governments who were seeking to exclude ride-sharing from their jurisdictions. Similar legal issues have arisen in many jurisdictions.

The potential for entrance by ride-hailing services to cause disruption in the small number of taxi markets which have previously had entry restrictions removed is necessarily smaller, since there are few economic rents for ride-hailing services to compete away. Nonetheless, regulators have taken an antagonistic approach in a number of cases. For example, more than 30 Uber drivers had been fined for

running an illegal taxi service in Stockholm by mid-2016, causing the Uber Pop service to exit the market. (<https://www.thelocal.se/20160511/>). Similarly, in Dublin, regulation has effectively stopped Uber operating its normal business model (Irish Times, 2017).

The rationale for taxi regulation

Traditional taxi regulation can be divided into two distinct types. Quality regulation, which is typically applied to drivers, vehicles and networks, seeks to ensure that the services provided meet minimum acceptable standards. Conversely, quantity regulation involves restricting the supply of taxis in pursuit of a range of equity and efficiency goals.

The rationales for each of these types of regulation are discussed below. Importantly, the case for regulation differs according to the segment of the taxi market addressed. The taxi market can be divided into the following segments:

- Street hail, in which passengers flag down passing taxis. This segment is important in inner city contexts.
- Taxi ranks, in which passengers queue for taxis at specified destinations, typically being expected to hire the first available taxi.
- Pre-booked, in which passengers reserve a taxi by phone (or, more recently, via an app) either for immediate dispatch or for a specified future time.

Quality regulation

Safety

The fundamental rationale for quality regulation is safety-based. Safety-based regulation is largely focused on ensuring consumer safety, though data indicate that driver safety is, objectively, often a larger issue. For example, the homicide rate for taxi drivers has been found to be the highest of all occupations in the United States (Schwer et.al, 2010), while homicide accounts for 60%-80% of taxi driver workplace deaths in the US (Cato Institute, 2015).

Consumers face accident risks due to poorly maintained vehicles and poor driving, as well as potentially being the victims of assault, theft or other crimes committed by drivers. Taxi networks have clear market incentives to address these risks in order to establish positive reputations and thereby increase consumer willingness to use their services. However, while this dynamic is likely to be significant in the pre-booked market, the “local monopoly” element of the rank and hail markets, where consumer choice is limited due to uncertainty as to the arrival of the next taxi (street hails), or due to the rule requiring the next cab to be taken (ranks) means it is significantly less effective in these contexts. Moreover, tourists and other non-local riders are less well-placed to make choices based on the reputation of taxi networks.

Consumer safety regulation typically includes vehicle regulation (regular inspections of mechanical condition, random checks, vehicle age limits, equipment requirements, such as security cameras, sometimes vehicle type approval) and driver regulation (driving history checks, driving experience requirements, criminal background checks), and may also include licensing/accreditation requirements for network services. It typically also includes requirements for drivers to display identification in the vehicle.

Driver safety-related regulation includes security cameras (which have a two-sided safety purpose – i.e. to protect both drivers and passengers) and, in some jurisdictions, requirements for physical barriers between drivers and passengers. It may also include giving drivers the right to refuse passengers who they believe may pose a safety risk, such as the intoxicated or aggressive.

Minimum service standards

Taxi regulation typically includes a range of minimum service standards. One type relates to vehicle quality, and can range from limits on the type or types of vehicles able to be used as taxis, to more specific rules, such as requirements to have operational air-conditioning. A second type of service standard governs market behaviour, and includes the “cab rank principle” – i.e. a general requirement to pick up any passenger seeking a ride – requirements that the shortest route be taken to a destination, or that the passenger’s chosen route must be followed or that drivers must render assistance with luggage.

The rationales for these interventions are subject to debate. While often justified by regulators in terms of the need to meet “community standards” or expectations, there is no obvious reason to expect that a competitive market would not ensure such expectations were met, at least given an industry based on branded taxi chains, as is usually the case. However, tightly regulated taxi markets typically exhibit an absence of competitive behaviours: the presence of significant excess demand in this context necessarily reduces competitive pressures on incumbents, while regulatory restrictions reduce the scope for competitive behaviours. For example, where supply is tightly regulated, price regulation is invariably adopted in order to limit the size of the transfers to producers available via the exploitation of the monopoly rents conferred. Regulated prices, particularly when combined with other provisions restricting service differentiation (e.g. vehicle standards) reduce the range of competitive strategies available and limit the incentives to compete vigorously. Thus, the rationale for most, if not all, minimum standards can be seen as being one that is derived from the negative impacts imposed by other regulatory interventions. The goal of service standard regulation is, therefore, to minimise the ancillary (or “unintended”) regulatory costs imposed by other aspects of the regulatory structure. However, service quality problems arising from tight supply restrictions are not readily addressed through other regulatory interventions. Long-standing concerns regarding outlying and low-income areas being poorly served by the taxi industry are an example of this, while the entry of ride-sharing appears to be correcting this in some markets.

A further form of minimum service standard regulation relates to access for people with disabilities. Accessible vehicles have formed an increasing proportion of the taxi fleet in many jurisdictions, a trend driven largely by government policy initiatives, including the availability of medallions on preferential terms. A corollary is the establishment of rules requiring passengers with disabilities to be given preference in the allocation of bookings to these vehicles, and other, related service obligations. These policies recognise that much of the public transport system is relatively inaccessible to people with disabilities, so accessible taxis can greatly improve mobility options for this group.

Price regulation

The core rationale for price regulation, as noted, is that of limiting the size of the monopoly rents able to be captured by taxi medallion-holders as a result of regulatory supply restrictions. Here, again, one form of regulation gives rise to a need for what might be termed countervailing regulation. However, price regulation has also been common in taxi markets with little or no supply restriction (“open entry markets”), where the monopoly rent issue has little or no significance. In this context, the rationale for price regulation is centred on the information problems faced by consumers in the rank and hail markets and the consequent “local monopoly” power enjoyed by the taxi. These problems are not significant in the pre-booked market, however. Reflecting the limited size of the problem, light-handed regulation is

often adopted, whether maximum price regulation, price notification requirements or restrictions on pricing structures, to facilitate comparisons (OECD, 2007, p 20).

Quantity regulation

Quantity regulation entails limiting the supply of taxis via the operation of the licensing system. A range of rationales have been advanced for quantity regulation, with some being based on economic efficiency arguments and others on equity principles. All have been heavily contested and the preponderant view among economists has long been that deregulation of entry to taxi markets yields net benefits (Moore and Balaker, 2006). Key rationales advanced for quantity regulation are:

Productivity

The wide variation in taxi demand across individual days and across the week implies that overall load factors are low. Restricting market entry increases average load factors, compared with the open entry alternative, thus yielding higher average productivity. Conversely, restricted entry implies higher wait times, thus reducing service quality – an offsetting loss to productivity. It has also been argued that increasing supply, by increasing perceived quality, yields increased demand. (Arnott, 1996).

Secondly, typical transport pricing structures, which see price public transport journeys priced at significantly more than marginal cost while taxi prices are priced at a level much nearer marginal cost, give rise to a distortion in demand in favour of taxi use. Restrictions on entry and the associated price increases can, in this view, reduce the size of this distortion. However, this is clearly an indirect policy response to the identified problem of inefficient public transport pricing (OECD, 2007).

Congestion and pollution.

Supply restriction is proposed to limit the contribution of the taxi industry to urban congestion and air/noise pollution. This argument is also predicated on the fact that load factors are likely to be lower where supply is greater. This is a potentially significant factor in large, dense cities. Contrary views highlight the fact that the taxi fleet represents a tiny proportion of the overall vehicle fleet. This implies that any congestion impacts of increased supply are likely to be marginal, despite significant local concentrations of taxis. Moreover, little quantitative support for the congestion proposition has been advanced. Second, congestion and pollution are problems to which the whole vehicle fleet contributes, so that policies to address these issues should be broadly applicable, rather than targeting a small subset of the fleet. Third, it has been argued that the higher quality taxi services enabled by greater supply can reduce congestion by making it feasible for a larger proportion of the population to use urban transit, in preference to private vehicles (i.e. for “last mile” journeys) (Heyes and Liston-Heyes, 2007).

Distributional issues.

Also based on the “load factor” comparison identified under the productivity heading is the contention that increased taxi supply will tend to further diminish the already low incomes of taxi drivers. However, empirical studies do not support the proposition that taxi drivers are better paid in restricted entry taxi markets, with the resulting monopoly rents essentially being captured by medallion owners. Driver incomes are instead driven by supply and demand for their services, suggesting that removing quantity restrictions should have a moderate positive impact (Abelson, 2010).

A second variant of the distributional argument is that, while demand for taxi services is strongly cyclical, the supply of taxi services in a free entry market is strongly counter cyclical, as (non-regulatory) entry barriers are low and taxi-driving is an unskilled occupation. Thus, for long-term taxi drivers, the downturn in their earnings which occurs during an economic downturn is exacerbated by new entry to the industry

from among the unemployed in open entry markets. In this view, regulation of entry prevents an unconscionable cyclical decline in driver incomes. However, major market restrictions to protect incumbent labourers from declines in income due to changed economic circumstances are generally rejected as policy options in market economies and there is no clear basis for excepting the taxi industry in this regard (OECD, 2007).

In sum, while there are identifiable market failures in at least some aspects of the taxi market, many of the rationales typically advanced to justify regulation are strongly contested. While empirical data would cast light on some of these areas of dispute, it is generally scant. Finally, several rationales for taxi regulation are “derived”, in that additional regulation is justified on the basis of the need to address the negative impacts of other regulatory interventions.

How has ride-hailing affected the rationale for regulation

The following discusses the impact of ride-hailing on the underlying rationales for regulating the taxi industry identified in the previous section. It includes discussion of specific regulatory responses to the entry of ride-hailing in particular jurisdictions, where relevant. However, there is as yet limited experience with the impact of ride-hailing in many jurisdictions, suggesting that uncertainty as to the medium to long-term impacts remains in some areas.

Safety regulation

Passenger safety

While major ride-hailing companies (e.g. Uber and Lyft) do conduct driver background checks, these are conducted by private providers and are often less stringent than those mandated by governments in respect of taxi or private hire vehicle drivers. That said, ride-hailing services have frequently proposed to regulators that their drivers should be subjected to the same, government-managed background checks as applied to taxi drivers, and some governments have adopted this approach, even in contexts where ride-hailing is not otherwise formally recognised within the regulatory structure (for example, Melbourne prior to 2017).

Importantly, the ride-hailing model contains several additional elements that help to ensure the safety of consumers. In particular, this includes more reliable driver identification, the driver rating and feedback mechanisms, the “panic button” contained within the app and the ability to track journeys in real time. These amount to a fundamentally different approach to assuring passenger (and driver) safety from that adopted in most regulatory structures and suggests that some of the safety-related issues raised in respect of ride-sharing reflect a confusion of means and ends.

The relative effectiveness of these alternative approaches has been controversial, but data on the relative incidence of offences against passengers by drivers in the two sectors is scant and difficult to interpret. Uber recently suffered adverse publicity from published data indicating that its drivers accounted for almost half of criminal charges levied against drivers of taxis and private hire vehicles in the London area, yet the fact that the company has a market share exceeding 50% suggests that its drivers are not statistically over-represented (Business Insider, 2017). Nonetheless, the controversy led Uber to respond by announcing a package of safety improvements (<https://www.uber.com/newsroom/getting-serious-safety/> (Accessed 21/9/18)).

In general, it appears that consumers regard ride-hailing as being at least as safe as taxis, despite the lower level of regulation applied in most jurisdictions. At a fundamental level, the very rapid growth of

ride-hailing in many markets indicates that consumers generally have a degree of confidence in the safety model, in that safety concerns have not proven an impediment to the growth of patronage.

Consumers' views of the relative safety of ride-sharing and taxis are necessarily also affected by the robustness of the existing regulatory regimes for taxi drivers. Thus, there is some evidence of perceived safety being a positive driver of consumer preference for the ride-hailing sector over the taxi sector in particular jurisdictions. For example, the OECD (2018) reports that safety is commonly cited by passengers in Mexico and the Philippines as a key reason for choosing ride-hailing over taxis, whereas it is rarely cited by passengers in Toronto.

Driver safety

In relation to driver safety, a fundamental difference between ride-hailing and traditional taxis is that the anonymity of the passenger is removed, because use of the ride-hailing app is account based, the passenger's identity is always known. This necessarily provides a substantial disincentive to aggression against the driver. The fact that payment is automated and occurs via a credit card platform means that robbery – the motive for many aggressions against drivers – is also removed as a consideration. This is a major part of the safety equation, given that driver risk is generally significantly higher than passenger risk in the taxi industry (That is, drivers are more likely to be the victims of crimes committed by passengers than vice-versa).

Vehicle safety

Ride-hailing companies have commonly adopted broad vehicle quality requirements, typically based on the age of the vehicle (commonly a maximum of six to ten years), but have not typically regulated maintenance schedules or undertaken inspections. Geradin (2017) notes that Uber in Poland requires drivers to present evidence that technical inspections have been completed, but this appears to be an exception. However, the regulatory context for ride-sharing differs from that applicable to the taxi industries in two key ways. First, the vehicles used for ride-hailing trips are owned by drivers and are generally also used for private purposes. This means that private incentives exist for good maintenance practices that are absent where taxi drivers operate vehicles owned by third parties. Second, the part-time engagement of most ride-hailing service providers, plus the fact that there is usually only one driver per vehicle (in contrast to taxis often being operated over multiple shifts in a day) means that the average mileage covered by ride-hailing vehicles is substantially lower than for taxis. Thus, the basic rationale for more intensive vehicle maintenance checks in the taxi industry is, to a significant extent, absent.

More broadly, accident data consistently show that poor vehicle condition is a significant causal factor in only a small minority of cases. For example, a recent European study estimated that inadequate maintenance was the cause of only 4% of the accidents studied (Thomas et al., 2013). An earlier literature review similarly found that vehicle roadworthiness was a "contributing factor" in 6% of vehicle accidents while also concluding that it was unclear whether regular inspection regimes contributed to a reduction in this incidence (Rechnitzer et al., 2000). In sum, the rationale for strong regulation of vehicle maintenance standards in the taxi industry appears to be relatively weak, while significant differences between the taxi and ride-sharing contexts raise questions as to whether a similar approach should be adopted in the latter context.

Minimum service standards

As noted, ride-hailing companies generally establish broad minimum requirements for vehicles used in providing services. This implies a degree of attention to minimum service standards. However, the rationale for regulating minimum standards in this area is weakened by the substantial increase in

market competition that results from the entry of ride-sharing services. Similarly, the importance of market conduct rules requiring operators to pick-up any and all intending riders is reduced by substantially increased competition.

However, the issue of regulating to maintain and improve access for people with disabilities has been a controversial aspect of the growth of ride-hailing. While some services, including Uber, notionally allow riders to request an accessible vehicle, Uber has been widely criticised for poor service provision in this area. Recent data from the United States show that, while people with disabilities use private hire vehicles twice as frequently as the general population, they are substantially less likely to use ride-hailing services: while ride-hailing accounted for 78.8% of all private hire vehicle trips taken in 2017, ride-hailing trips account for only 28.0% of total private hire vehicle trips by people with disabilities (Schaller Consulting, 2018, p.13).

While taxis currently provide most accessible services, it has been suggested that the growth of ride-hailing could reduce their ability to continue to do so in future. For example, the OECD has stated:

“As ride-sharing and ride-sourcing services gain market share, concerns about accessibility arise. Firstly, as taxi rides decrease, the funding for accessibility declines. Secondly, a decrease in taxi numbers may mean a fall in accessible vehicles as well, unless the demand for accessible rides is reflected in the services offered by ride-sourcing firms”. (OECD, 2018, p 16).

However, it is not clear that this will be the result. Arguably, provision of accessible services remains a rare market segment in which ride-sharing is not effectively competing with taxis, suggesting that it could become an area of greater focus for the taxi sector, yielding an incentive for it to expand and improve services. A potential impediment to this dynamic is that, currently, in many jurisdictions public subsidy schemes are inadequate to compensate operators for the marginal costs of serving people with disabilities. In effect, these services have been cross-subsidised by the taxi companies as a result of regulatory obligations imposed upon them in formerly closed markets. The feasibility of maintaining these obligations, or placing similar obligations on ride-sharing providers in the context of a more competitive market is questionable. In the latter case, the part-time use of most vehicles for ride-hailing purposes would seem to make imposition of requirements for a certain percentage of the fleet to be accessible infeasible, or at least largely ineffective.

Overhauling these existing schemes to ensure that they provide adequate financial incentives to providers to supply services to people with disabilities is therefore likely to be an essential reform. Such a reform would be consistent with sound policy principles, which suggest that public service obligations should be funded explicitly.

Given such a policy change, it is probable that ride-sharing companies would also seek to compete in this part of the market: notably, Uber already offers accessible services via UberWAV and UberAssist. While its performance has been heavily criticised to date, it seems clear that, given adequate financial incentives, ride-sharing could contribute to an improvement in accessible transport services in the same way that it has led to substantial improvements in service quality in the private hire vehicle market as a whole.

While the largely part-time nature of ride-sharing drivers could be seen to militate against such an outcome (given the requirement for fit-for-purpose vehicles), there is some evidence to suggest that private owners of accessible vehicles (e.g. those with family members with disabilities) are beginning to engage in the provision of these services as ride-hailing drivers. Given the significant costs of specialised vehicles, the general dynamic in which engaging in ride-hailing is a means of helping to defray the capital costs of vehicles should be operative in this segment as well.

Price regulation

Much of the rationale for price regulation in the taxi industry has been predicated on the widespread use of supply restriction and the consequent need to limit the extraction of monopoly rents. The second rationale for price regulation relates to market failure issues specifically in the rank and hail market.

The impact of ride-hailing fundamentally changes both of these rationales. Where ride-hailing has become well-established, there have been large supply increases and a disappearance of monopoly rents. Equally importantly, the convenience of the app-based approach to booking services, allied with the high density of cruising providers, has greatly reduced the relative importance of the rank and hail sectors of the market, while providing feasible alternatives to it in most circumstances. Indeed, the distinction between street-hail and pre-booked segments has arguably become virtually irrelevant. In these circumstances, the traditional rationales for taxi price regulation appear to have limited continuing validity.

However, one pricing strategy adopted by leading ride-hailing providers has itself given rise to public concern and calls for regulation. The “dynamic pricing” model leads to so-called “surge pricing” being applied at periods of high demand, so that prices can be a multiple of the usual fare. This approach is consistent with economic efficiency principles in that the price signals it generates are expected to provoke a supply response, enabling more of the excess demand to be met, and rations available supply to riders with the highest willingness to pay (i.e. those who value the service most highly). Despite its consistency with economic principles, the OECD has suggested that this model may raise legal issues in some jurisdictions:

“Different jurisdictions treat this issue differently. For instance, in the US, excessive pricing is not considered as an offence, while in the EU it might be considered an abuse of dominant position under Article 102(a) of the Treaty on the Functioning of the European Union (TFEU).” (OECD, 2018, p. 27).

However, the OECD also notes that competition authorities rarely act against excessive prices in the absence of evidence of cartel behaviour or exclusionary contact. If unsupported by such structural deficiencies in the market, such pricing is likely to be temporary and self-correcting, as it sends signals as to the existence of a profitable market entry opportunity.

This analysis, while generally sound, arguably fails to address the specific context of the private-hire vehicle industry, where demand varies widely from hour to hour, both due to predictable daily patterns and in response to specific events. It is precisely in the circumstances in which there are major demand spikes that the economic efficiency benefits of the ride-hailing model are greatest: the existence of a large fleet of part-time service providers yields the potential for substantial supply responses to occur over a very short period, in a way not possible in a traditional taxi market characterised by strong entry controls. Data on the size of the actual supply responses to surge pricing are lacking. However, regulation limiting surge pricing would limit the economic benefits of ride-sharing, in pursuit of questionable equity gains, particularly in light of research indicating that ride-hailing users tend to be younger and better educated and have higher incomes than the general population (e.g. Schaller, 2018; Clewlow and Mishra, 2017).

Quantity regulation

As noted, the rationale for quantity restrictions in the taxi industry has long been heavily contested. In particular, the productivity argument has been criticised for failing to take into account waiting time and service reliability as key quality determinants. Recent research by Schaller (2018) suggests that the

volume of ride-hailing vehicles in high-density urban centres is such that these vehicles now account for a substantial proportion of overall vehicle traffic. Schaller estimates that over the past six years, ride-sharing services have added 5.7 billion vehicle miles travelled and increased trips by 241 % in nine major cities in the United States. Moreover, he estimates that total (taxi plus ride-hailing) trips will exceed local bus trips in the United States by the end of 2018 (albeit that bus trips account for only 4% of total journeys). Only 40% of ride-hailing trips are said to represent diversion of private vehicle demand, while up to between 2% and 22% of trips (according to different estimates) would not have been taken in the absence of the ride-sharing option. Similarly, Clewlow and Mishra (2017) find that 49% to 61% of ride-hailing trips would have not been made at all, or would have been made by walking, biking, or transit, were ride-hailing not available.

These data must be seen in the context of a reversal of the substitution away from the taxi industry that has occurred due to the market distortions arising from severe supply restrictions (OECD, 2007). To this extent, it a priori gives rise to economic efficiency benefits. However, this analysis does cast doubt on claims of ride-hailing's potential to reduce private vehicle use overall and also suggests that the contribution of private hire vehicles to congestion (and, equally, to pollution) may be significant, in at least some contexts. This has led to calls for taxation of ride-share in response to its contribution to congestion (Schaller, 2018) and the introduction of such taxes in a small number of cities (e.g. Sao Paulo. See Biderman 2018).

Proponents of these taxes have argued that they are more politically feasible than a broader tax (e.g. Schaller, 2018) and constitute a sound second-best option, particularly in light of the high proportion of “empty running” undertaken by ride-share vehicles. The World Bank has also highlighted the potential for these taxes (and, in particular, various exemptions from them) to be used to encourage the provision of ride-sharing services that complement public transport and taxis in off-peak periods, particularly in underserved areas and populations. These charges have also been structured to promote equity objectives, such as the provision of accessible vehicles and opportunities for female drivers (e.g. Sao Paulo). However, as discussed above, theory indicates that effective and non-distorting anti-congestion policies must address the vehicle fleet as a whole, and be supported by broader transit and city planning policies, rather than targeting specific sectors. Welfare losses are clearly likely to arise from the imposition of a tax that is specific to ride-hailing, given the economic efficiency benefits it has brought, vis-à-vis the traditional taxi market. In particular, the fact that several studies (including Schaller, 2018) have shown that ride-hailing has expanded the transport market – i.e. led to additional trips being taken – indicates that it has brought real connectivity benefits.

Issues for regulation arising from the entry of ride-sharing

Accommodating ride-hailing in the regulatory structure

Ride-hailing has seen massive growth globally: Clewlow and Mishra (2017) note that where car-sharing had achieved 5 million users globally some 15 years after becoming commercially viable, ride-hailing has grown to have more than 250 million users after a much shorter period. The rapid entry model and the substantial improvement in key aspects of the market offer, compared with heavily regulated taxi industries, has quickly generated a loyal consumer base. For example, a recent study by the European Commission reported a mean consumer satisfaction score of 8.23 for ride-hailing and other non-taxi services, compared with 6.72 for taxis. (European Commission, 2016). This has rapidly changed the political economy of taxi regulation.

Given this, it seems beyond doubt that ride-hailing will become a central element of the “taxi” industry throughout the world. Geradin (2017) argues that:

“...there is a regulatory momentum for Uber and other intermediation platforms, as several [EU] Member states have adopted reforms aimed to regulate the services provided by these platforms in a way that allows them to operate at scale and contribute to improved urban mobility, while ensuring that these services are provided in a safe and transparent manner.”

Geradin identifies Europe, Estonia, Lithuania and Finland as examples of countries accommodating Uber within their regulatory systems. He points out that the broader picture is one in which Uber has faced “significant regulatory challenges”, including recent cases brought to the Court of Justice of the European Union in respect of Uber’s Spanish and French operations, but argues that even if judgements favourable to the regulators are rendered in these cases, it will have little lasting impact on Uber’s activities. Another recent report by the European Commission effectively also argued for a permissive regulatory approach to ride-hailing, stating that any regulatory obligations placed on “intermediaries”, such as ride-hailing apps, should be “proportionate, non-discriminatory and not prevent competition with taxi intermediaries” (European Commission, 2016).

The current reality is that, despite ride-hailing having entered taxi markets in a range of European countries several years ago, many have still not established clear and permissive regulatory regimes. Geradin (2017) argues that *“Most of the controversies surrounding Uber and other platforms in Europe can be traced to the regulators’ failure to act.”* Ride-hailing has often continued to operate more or less successfully, despite these impediments. Perhaps paradoxically, the failure of many governments to develop new regulatory arrangements that accommodate ride-hailing has led to complaints of unfair competition from the taxi industry. Taxi industry incumbents have complained that they continue to be bound by highly restrictive regulatory regimes, while these are generally not applied to – or at least are successfully ignored by – the ride-hailing sector. This dynamic introduces further distortions, and uncertainties to the market.

When regulatory regimes that accommodate ride-sharing are introduced, they have often included substantial reductions in the extent of the regulation applicable to traditional taxis, with the changes being justified in terms of the need to allow taxis to compete on an equal footing with ride-hailing. For example, this occurred in several Australian States and Territories, including Victoria, New South Wales and the Australian Capital Territory (ACT) in 2017 and 2018. Key changes included making new taxi licences available on demand, loosening vehicle restrictions and removing requirements for taxis to be affiliated with dispatch networks.

Regulatory principles and approaches

Governments seeking to adopt new regulatory arrangements which accommodate ride-hailing and establish a basis for fair competition between ride-hailing and the traditional taxi sector should consider the necessary content of the new regulatory arrangements from the perspective of policy principles that address the key challenges involved. Several such principles are identified and discussed below.

One regulatory regime or two?

A fundamental question is that of whether taxis and ride-hailing ought to be subject to a single regulatory regime, or whether there is a case for differentiation. The high degree of substitutability between these services suggests that a single regulatory regime is required to avoid economic distortions (Wyman, 2017). However, Geradin (2017) argues that some fundamental differences between taxis and ride-hailing make it difficult to design a single regime that efficiently addresses both.

He suggests that different regulatory requirements may be needed but argues that consistent approaches should be adopted as far as possible. An example of this approach is that of Estonia, which identifies three categories of service under a single Public Transport Act, with ‘intermediaries’ being one of these. The key principle should be that the regulation regime should avoid distorting competition between the two sub-sectors.

Market failure focus

Regulation should focus on controlling market failures. It should not seek to address the economic position of taxi industry incumbents. While incumbents are likely to suffer significant losses following the entry of ride-sharing, the wider economic benefits are substantial, while the losses incurred are largely attributable to past regulatory failures, rather than ride-sharing per se. Hence, equity concerns should, if considered compelling, be addressed by non-regulatory means, such as the imposition of a levy on all taxi and ride-hail journeys to fund partial compensation schemes for medallion owners (e.g. Melbourne, Sydney). This approach is preferable to the alternative of continuing to provide regulatory protections to the taxi sector, in that the latter approach implies significant, continuing welfare costs (Wyman, 2017). Notably, however, there is a clear argument that governments have neither a legal nor moral responsibility to compensate investors who have speculated on the value of intangible assets (OECD, 2007).

The need to implement this principle effectively suggests that competition authorities should be closely involved in developing new regulatory regimes, rather than responsibility being retained entirely by taxi regulators and transport ministries, which have historically proven prone to high levels of capture.

Regulation should be neutral technologically and in relation to business models

The rapid evolution of the ride-hailing sector means that regulation should, as far as possible, be able to accommodate both changes in business models (e.g. those likely to arise from the recent spate of mergers of ride-hailing and bike-share companies) and further technological shifts. That said, while Gerdadin (2017) suggests that new regulatory arrangements should be developed with driverless cars in mind, it is not clear that this is a realistic ambition, given the substantial uncertainties that exist regarding the nature of the business models that will evolve (Stocker and Shaheen, 2017) and, significantly, the broader regulatory architecture within which this technology will operate.

A potentially significant issue in relation to this principle is the desire of governments to see ride-hailing and other app-based mobility services evolve in a way that supports and expands the public transport system. Such objectives are likely to be best served by removing regulatory restrictions on the business models and service offers which may potentially arise in this field. The apparently rapid evolution in shared mobility service offers underlines the importance of an essentially permissive regulatory approach. Conversely, attempts to impose significant public service obligations on emerging businesses that do not have well-established business models risks undermining potentially valuable innovation.

An efficient regulatory framework

The above discussion shows that much of the traditional rationale for taxi regulation has been subject to challenge over recent decades, while the entry of ride-hailing has cast further doubt over the ability of much, though not all, of the regulation of the taxi industry to yield net benefits to society. Wyman (2018) argues that the taxi industry in most countries managed to avoid the deregulation that occurred in much of the transport and telecommunications sectors during the 1980s and that:

“The technological and business model changes introduced by Uber and its competitors now provide the opportunity to remove significant components of the antiquated regulatory

framework governing the taxi industry. Though some degree of regulation is still justified, there is significant room to reduce the scope of regulation of the traditional industry, and regulators should not seek to impose unnecessarily burdensome requirements on the new entrants.”

As this suggests, an efficient regulatory framework for the taxi and ride-hailing industry should focus on addressing the remaining areas of market failure via targeted, light-handed regulation that is neutral between traditional taxis and ride-hailing, so as to allow fair competition between these two sub-sets of the industry. This would include streamlined regulation in relation to driver standards and light-handed price regulation, possibly based on price notification that is restricted to the rank and street hail markets.

Dockless bike-share and related offers

Various other app-based shared mobility services have begun a rapid emergence in recent years. They can be distinguished from the ride-hailing and demand-responsive transport schemes discussed above in that they involve the shared use of a vehicle, but not the services of a driver. The most prominent to date have been dockless bike-share schemes. That is, the shared vehicle is a basic and low-cost one. This has several implications, including the fact that supply can be (and has been) rapidly expanded. Conversely, new variants of this model involve offering electric mini-scooters and even electric motor-scooters as dockless hire vehicles. Given that there is a substantially greater body of experience dockless bikes, and that regulatory issues have arisen and begun to be address, this section of the paper focuses primarily on dockless bikes. Other variants of the model are discussed where relevant.

Impact on existing markets

Dockless bike-share schemes are effectively creating a new market in most of the cities in which they have been introduced. In at least some cities, they have quickly become a favoured mobility option. For example, the Institution for Transportation Development and Policy (ITDP) reports that, within a few months of dockless bikes becoming available in Tianjin, China, they were responsible for one quarter of all bike journeys in the city (ITDP, 2018). While dockless bikes represent an entirely new market in many or most cities in which they operate, in others they are in competition with docked bike-share schemes that have typically been established by municipal governments and heavily subsidised by them. By comparison with docked schemes, the key expected benefits of dockless bike-share are the convenience benefit of being free from needing to locate a docking station to deposit a bike at the end of a ride and the potential to find bikes-for-hire more readily, again because they are not confined to a limited number of docking stations.

A corollary of this convenience benefit is the deployment of large numbers of bikes by operators. These fleets are typically substantially larger than those deployed by docked schemes. For example, the 2 500 Obikes deployed in Melbourne Australia was more than four times the city’s 600 docked share-bikes. However, these numbers are dwarfed by the Chinese experience: In Tianjin, China, there were 300 000 dockless bikes available within months of the first operator starting business in 2017 (ITDP, 2018).

For municipal governments, the entry of self-funded dockless bikes provides the prospect of retiring the city-subsidised docked bikes and eliminating on-going subsidies. Conversely, the prospect of dockless bike-share entrants being seen to “out-compete” government-supported docked schemes may be seen as politically unpalatable in some circumstances.

In common with ride-hailing, dockless bike-share companies have generally chosen to enter new markets without consultation with government authorities, implicitly assuming or asserting that their operations comply with existing regulatory requirements. Reflecting the fact that bike-share of any form is a relatively new development in most cities, and the fact that governments have generally established contractual arrangements to control the use of docked bike-share schemes, there have been few, if any, regulations directly tailored to addressing this market until recently. However, most cities that have experienced the entry of dockless bike-share schemes have quickly identified public policy concerns that, at least arguably, require regulatory responses.

The rationale for regulation

The earliest experience with the large-scale adoption of dockless bike-share has been accumulated in China, which is the home country of a number of major providers, such as Obike and Mobike. The Institutions for Transportation Development and Policy (ITDP) has reviewed the experience of the introduction of competing bike-share schemes in Tianjin, a centre of the Chinese bicycle industry, and identified key regulatory issues (ITDP, 2018).

Externalities

The most prominent issues posed by the rapid entry of dockless bike-share schemes in most countries are negative externalities for the broad city population. These arise from a) the impact of large numbers of thoughtlessly parked bikes impeding the usability of public spaces and b) broader visual disturbance/pollution issues. A common issue is the deliberate misuse of bikes, with mischievous or vandalistic intent, with bikes being placed up trees, in rivers, on railway tracks and the like. The fact that bikes are parked in a “freestanding” manner, rather than being docked, is the basic physical characteristic that enables this problem to arise.

Consumer protection

Safety issues

Some commentators have argued that safety risks associated with the use of dockless bikes are sufficiently significant as to require regulatory responses. On this view, the frequent use of bikes by a range of users, and potentially the fact that they are exposed to the weather, imply a need for regular maintenance, without which deterioration in their condition could make them unsafe to ride. Others (e.g. Bordenkircher and O’Neill 2018) have argued the need for consumer education, to ensure adequate familiarity with local regulation and, potentially, to highlight risks for inexperienced cyclists. Transport for London has included safety requirements in its 2017 Code of Practice for bike-sharing, including identifying an ISO standard to which bikes must conform, requiring “robust” maintenance regimes to be established and a system for reporting damaged or unsafe bikes to be in place, as well as a reporting system in respect of any deaths or injuries (Transport for London, 2017).

However, recent research on the actual safety performance of these schemes does not appear to support concern over safety as an important issue. Fishman and Schepers (2018) concluded that:

“The results of our two sub studies lead us to conclude that, on a per kilometre basis, bike share is associated with decreased risk of both fatal and non-fatal bicycle injuries when compared to general bike riding. This contradicts worries prior to the introduction of bike share schemes (Flegenheimer, 2013). Notwithstanding the importance of creating cities that support safety riding (Jacobsen and Rutter, 2012), these results imply that concerns about decreased levels of cycling safety are unjustified and should not prevent decision makers from introducing bike share schemes.”

Conceptually, it is not clear why bike-sharing schemes would give rise to safety issues that are distinct from and more substantial than those applying to other forms of cycling. While it is possible that significant numbers of users are casual or inexperienced cyclists, it can be noted that governments have not generally sought to regulate private cycling to any significant degree.

Financial protection

Dockless bike-share companies typically require users to lodge deposits with the company as part of the subscription process. In some markets in which the service provider has chosen to exit, numbers of consumers have experienced difficulties in retrieving these deposits. For example, when Obike departed the Melbourne market in early 2018, numbers of consumers found that the terms and conditions to which they had agreed allowed the company to convert deposits to annual subscriptions, at its discretion. This allowed it to refuse to return the deposits (Australian Financial Review, 2018). This dynamic has led some commentators to argue for some form of government regulatory intervention to protect subscribers financially. ITDP 2018 notes that the municipal government of Tianjin has stated that it will require any deposits required by providers to be kept in trust accounts administered by the municipal government.

Data/privacy issues

Some commentators have raised questions as to the nature of the financial model underpinning dockless bike-share, arguing that the apparent core business of hiring bikes is unlikely to be profitable of itself. Among the speculations made is that data harvesting and sales constitutes a key element of the financial rationale (Australian Financial Review, 2018). To the extent that this is the case, data privacy considerations necessarily arise.

However, this issue, while broadly recognised by governments, is typically addressed on a cross-sectoral basis – that is, a single Data Privacy Act sets out requirements applicable throughout the economy. Thus, it is not obvious that this issue contributes to a case for sector-specific regulation (although similar issues may exist in relation to ride-hailing). In addition, significant questions have been raised as to the potential for bike-share operators to monetise the data they collect via the app that underpins their business. In particular, it has been argued that the data collected largely lacks the key characteristics of being highly differentiated, scalable and useful that would potentially give it significant commercial value. Moreover, operators have denied that they sell user data (Australian Financial Review, 2018).

Regulatory responses

Overview

Despite the very recent development of the dockless bike-sharing model, a significant number of jurisdictions have already developed and implemented regulatory responses. Examples include:

Singapore

Legislation passed in March 2018 requires operators to be licensed by the Land Transport Authority, which will regulate the size of each operator's fleet in an effort to reduce the size of negative externalities associated with poor parking. Caps are expected to be variable in response to the operator's performance in these negative externalities. Regulation will require geofencing (i.e. require bikes to be parked within nominated areas) and set time limits for operators to remove improperly parked bikes. (Straits Times, 2018).

London

Transport for London (TfL) released a dockless bike-share Code of Practice in 2017 (Transport for London, 2017) which has the stated aim of ensuring bike-share schemes complement London's transport strategy. The Code sets operational and safety standards and includes a requirement for operators to engage with local government before entering the market.

Tianjin

As discussed above, Tianjin has legislated controls on the sector, which cover the handling of deposits, making data collected available to the government to facilitate policy planning and requiring bikes to be GPS equipped and subject to geofencing, with an incentive and penalty system. It has also allocated clear enforcement responsibilities among the city authorities.

In addition, the ITDP (2018) has published a "policy brief" which sets out four proposed objectives for regulatory intervention. These are:

- Effective management of public space.
- Fostering equity and efficiency.
- Improving planning and enforcement.
- Protecting users.

ITDP argues that the key policy perspective justifying government intervention is that, even though cities do not provide direct funding to dockless bike-share operators, these businesses depend on public assets, including footpaths and streets for their operation.

Specific regulatory responses

The following provides a brief discussion and critical assessment of the main specific regulatory responses implemented and/or proposed to date in response to the policy issues identified in the previous section.

Regulating to address negative externalities

Several responses to the core issue of negative externalities have been adopted or proposed, often in parallel. Geofencing appears to be widely regarded as a fundamental response to this issue and requires that bikes be equipped with GPS tracking so that their location can be verified. A more costly intervention, proposed by the ITDP (2018), is a licensing requirement that bikes must be locked to existing infrastructure, such as a sign or bike rack, in order to "complete" the ride. ITDP states that several providers already offer this function in their fleets. However, implementing this feature necessarily also requires significant increases in bike parking infrastructure, given the level of demand it

will generate. The question of how this is to be funded necessarily arises. In addition to its higher cost, this option appears to diminish the flexibility of the dockless bike-share model, effectively introducing “quasi-docks”.

A related intervention is provision for penalties to be levied on operators that fail to move improperly parked bikes within set periods. Such a policy can be implemented via existing parking enforcement officers and systems, though it potentially adds substantially to transaction volumes. In addition, this policy may have significant disincentive effects on operators. A recent example is that provision of powers for municipalities to levy fines in Melbourne, Australia in early 2018 led to the sole operator (Obike) exiting the market almost immediately.

A further option to address externalities is the imposition of fleet size caps, as has occurred in Singapore. This approach appears to seek creating a degree of scarcity (or at least to restrict over-supply) to minimise the potential extent of negative externalities. ITDP (2018) argues that such caps should be variable over time in response to usage data and also suggests that increased caps for individual users could effectively operate as an incentive for better performance in managing externalities associated with their fleet. Global fleet caps clearly require active management over time if potential benefits are not to be compromised by unduly limited bike availability. However, management at the individual operator level also seems necessary if the cap system is to avoid suppressing competition between operators (i.e. a successful operator may be effectively penalised if their cap is not increased to reflect higher usage rates in a timely manner).

Finally, user education has been proposed as a necessary element in managing negative externalities. This involves provision of information to users on appropriate parking locations and obtaining formal agreement from them to comply with this requirement.

While the negative externalities arising from poorly parked bikes are widely discussed and typically seen as a fundamental part of the rationale for regulation, some have questioned how substantial the problem is in practice (Australian Financial Review, 2018). This leads to the regulatory principle of proportionality: while educational initiatives and perhaps geofencing can be justified as relatively low-cost interventions, the adoption of “lock-to” requirements, with their associated infrastructure needs, are potentially more difficult to justify. Moreover, they risk significantly reducing a key potential benefit of dockless bikes – i.e. their more widespread availability – if the associated infrastructure is not provided.

Regulating to protect users

As noted above, a number of regulatory schemes or guidelines have suggested the necessity of protecting consumers from the loss of their deposits in the event of the exit of the operator from the market, or their insolvency. Conversely, other commentary (e.g. Australian Financial Review, 2018) suggests that the ability to leverage these deposits as a source of finance may be intrinsic to the bike-share model and, by implication, heavy-handed regulation (e.g. a requirement to hold deposits in city-administered trust accounts) may act as a significant disincentive to operators establishing themselves in a city.

In addition, the question of regulatory proportionality arises. The deposits that have typically been required by providers are generally small (typically US\$50 - \$100). Thus, the size of the potential consumer protection issue is also necessarily small, and would in most circumstances be seen as falling below the threshold which justifies government intervention. Moreover, the cost of establishing and

administering trust account arrangements may itself be seen as disproportionately large in relation to the size of the potential consumer losses.

Other issues

Social licence

Some have argued that the behaviour of many citizens in wilfully leaving bikes in inappropriate locations (up trees, in rivers, etc) reflects a view that operators have commenced business in a city without seeking permission or seeking to engage with the community. As a result, they are regarded as lacking a “social licence to operate”. By implication, the adoption of a negotiated entry strategy is seen as likely to reduce the negative impacts associated with bike-share, while potentially increasing benefits by providing local governments with an opportunity to seek the addition of features to the market offer that are seen as addressing local circumstances or preferences.

This perspective is implicit in the IDTP and Transport for London (2017) guidelines, with the latter in particular explicitly recommending that intending operators obtain the agreement of local authorities before commencing operations. However, attempts to comply with this requirement have led to practical problems, with different operators having agreements with adjacent boroughs in many cases and consequent restrictions on where bikes can be left, which can significantly reduce the attractiveness of bike-share as a mobility option (London Assembly, 2018).

Nonetheless, in some cases, operators have voluntarily adopted a partnership approach even in the absence of formal requirements to do so. For example, Mobike’s recent entry to the Gold Coast in Australia. In this case, the negotiated model does not suffer from the cross-jurisdictional issues encountered in London, as the Gold Coast City Council is responsible for the whole conurbation, suggesting that they see merit in this perspective and consequent commercial benefits in adopting a negotiated approach to entry. This represents a major departure from the approach that has been taken to date in both bike-share and ride-hailing sectors. However, it is not yet clear whether significantly improved outcomes are resulting.

Discussion

The above highlights the fact that a wide range of regulatory interventions have been adopted, or at least proposed, to address dockless bike-sharing issues. This is particularly notable given the very recent genesis of this form of mobility (with the first mover, Ofo, having been established only in 2014 (ITDP (2018a)), particularly by comparison with the very slow response to the advent of ride-hailing - the other substantial new mobility option of recent years. Indeed, it is arguable that governments’ slow response to ride-sharing and the political difficulties that arose partly as a result have influenced a desire to address dockless bike-share proactively.

However, such proactive approaches necessarily increase the extent of regulatory risk, as decisions are made under conditions of much greater certainty regarding market dynamics, medium to long-term demand and even the nature (and viability) of the business model underlying the sector. The rapid exit of the only operator from Melbourne, Australia (a city of five million) following a rapidly developed and punitive regulatory intervention highlights the risk that city governments may forego the potential benefits of a new mobility option, at least in the medium-term, as a consequence of ill-considered regulatory action to address what are arguably quite limited market failures.

The size of these risks is arguably further increased by the rapid evolution and development that has already occurred in the sector and seems likely to continue and accelerate. This includes in particular,

the broadening of the available market offers to include other mobility options – notably electric bikes and mini-scooters. These developments highlight the fact that the potential for app-based shared mobility services to expand mobility options and complement existing infrastructure may be far greater than is immediately apparent.

The move toward electrically-powered vehicles is also likely to change significantly the nature of the regulatory challenges posed by the sector. The significantly greater cost of these vehicles suggests that the problems of excess supply and negative externalities due to careless parking and wilful misuse may be of far less concern. Conversely, the greater speeds reached in some cases, combined with the relative instability of electric scooters and their tendency to be used on footpaths suggests that safety concerns may be more significant.

Conclusion

While the individual markets in which ride-hailing and dockless bike-share operate have very different characteristics, there has been a strong recent trend toward mergers or takeovers between players in the two sectors to provide the basis for a broader “Mobility as a Service” (MAAS) market offering (Citylab, 2018) involving the potential to combine multiple transport modes in a single journey, or to obtain a range of different transport services from a single provider, through a single platform. This has the potential to significantly broaden the range of mobility options in cities and potentially make an important contribution to connectivity in the urban environment in particular. These developments could significantly expand the economic efficiency benefits already derived from the deployment of app-based technologies in the transport sector.

However, they will necessarily give rise to additional regulatory challenges for governments, particularly in an environment of rapidly changing and developing business models and markets. This issue is particularly acute given the slow response of many governments to the challenge posed by ride-hailing to the regulatory structure governing the taxi industry. As discussed above, there has been little positive change in taxi regulation over the past 20 years, despite much of the traditional rationale for major elements of it being increasingly called into question. The spread of the ride-hailing model has further undermined much of the rationale for regulating the sector and make a thorough-going and evidence-based regulatory response increasingly critical.

Despite this, many governments have attempted to prevent the development of ride-hailing, apparently as part of poorly-considered attempts to protect taxi industry incumbents from disruptive competition. The failure to develop appropriate and accommodating regulatory regimes both continues to reduce the benefits of the ride-hailing model in many jurisdictions and impedes the ability of the taxi industry to compete, where ride-hailing has managed to establish itself.

While governments have in most cases been slow to respond to the regulatory challenges posed by ride-hailing, there appears to be a contrasting tendency in relation to bike-share schemes and the related services (e.g. electric bikes and scooters) that are developing in tandem with them. Many governments have moved swiftly to regulate this emerging sector and even to adopt regulation, policies or guidelines pre-emptively – i.e. before market entry has even occurred. This may be seen as a reaction to the tardy

approach taken to ride-hailing. However, the very early stage of development of these new mobility businesses and the associated uncertainty as to how their business models will develop implies a high degree of regulatory risk – i.e. that regulation may again prove a major stumbling block to the achievement of the real economic benefits of innovative service offers. Review of the rationale for regulation of these services suggests that the potential harms with their operation are modest and a cautious, light-handed approach is needed.

Finally, the apparent moves toward convergence across the sectors using app-based service provision in the transport context suggests that the policy environment will remain a dynamic one and require sustained attention from government to address emerging issues effectively.

References

- Abelson, P. (2010), “The High Cost of Taxi Regulation, with Special Reference to Sydney”, *Agenda: A Journal of Policy Analysis and Reform*, Vol. 17, No. 2 (2010), pp. 41-70. ANU Press.
- Arnott, R. (1996) “Taxi Travel Should Be Subsidized”, *Journal of Urban Economics*, 40, 316 – 333.
- Australian Financial Review (2018), “Dockless Bikes are the Frontline of a Battle Between Chinese Tech Giants”, 27 April 2018, <https://www.afr.com/lifestyle/cars-bikes-and-boats/cycling/dockless-bikes-are-part-of-a-battle-between-chinese-tech-giants-20180420-h0z1m8> (accessed 23 September 2018).
- Biderman (2018) “Mitigating Congestion and Environmental Impacts from Ride-Sharing Services: The Case of TNC Regulation in Sao Paulo, Brazil”. Paper prepared for the ITF-OECD Roundtable on Regulating App-Based Shared Mobility Services, Beijing, 1-2 November 2018.
- Bordenkircher, B. and R.L. O’Neill (2018). “Dockless Bikes: Regulation Breakdown. Twelve Tone Consulting”, Webpage: <https://nabsa.net/wp-content/uploads/2017/09/Dockless-Bike-Regulation-Breakdown-12-Tone-Consulting-1.pdf> Accessed 30 September 2018
- Business Insider (2017), “Uber drivers convicted of almost half of the sex offences in London Cabs”, 17 November 2017. <https://www.businessinsider.com/uber-drivers-convicted-of-almost-half-of-the-sex-offences-in-london-cabs-2017-11?IR=T>. Accessed 27 September 2018
- Cato Institute (2015), “Is Ride-Sharing Safe?”, Policy Analysis, No. 767, 27 January 2015. <https://object.cato.org/sites/cato.org/files/pubs/pdf/pa767.pdf>
- Citylab (2018), “Ofo Beats a Retreat from the Dockless Bikes Sharing Battle”, 7 August 2018. <https://www.citylab.com/transportation/2018/08/the-great-dockless-bikes-sharing-shakeout/566891/> Accessed 2 October 2018.
- Clewlow, R. Regina and G. Shankar Mishra (2017), “Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States”, Institute of Transportation Studies, University of California, Davis, Research Report UCD-ITS-RR-17-07.
- European Commission (2016), “Study on passenger transport by taxi, hire car with driver and ridesharing in the EU”, September 2016. <https://ec.europa.eu/transport/sites/transport/files/2016-09-26-pax-transport-taxi-hirecar-w-driver-ridesharing-final-report.pdf>. Accessed 27 September 2018
- Fishman, E. and P. Schepers (2018). “The Safety of Bike-Share Systems”, *International Transport Forum Discussion Papers*, OECD Publishing, Paris.
- Flores Dewey, O. and L. Rayle (2016),. “How Ridesourcing Went From “Rogue” to Mainstream in San Francisco”, TUT-POL, Harvard University, Graduate School of Design.
- Geradin, D. (2017), “Principles for Regulating Uber and Other Intermediation Platforms in the EU”, TILEC Discussion Paper DP 2017-37, Tilburg University Law School, Netherlands.
- Hall, J., C. Kendrick, and C. Nosko (2016), “The effects of Uber’s surge pricing: A case study”, *Working paper* http://economicsforlife.ca/wp-content/uploads/2015/10/effects_of_ubers_surge_pricing.pdf Accessed 4 October 2018.
- ITDP (2018), *Regulating Dockless Bikes: Lessons from Tianjin, China*, 25 January 2018. See: <https://www.itdp.org/2018/01/25/regulating-dockless-bikes/> (Accessed 23 September 2018).

ITDP (2018a), *Dockless Bikeshare: What We Know So Far*, <https://www.itdp.org/2018/01/04/dockless-bikeshare-know-so-far/> Accessed 23 September 2018.

Irish Times (2017), “Uber banned from operating private car rides in Ireland”, *Irish Times*, 28 July 2017. <https://www.irishtimes.com/news/ireland/irish-news/uber-banned-from-operating-private-car-rides-in-ireland-1.3169768> Accessed 3 October 2018.

Liston-Heyes, A and E (2007), “Regulation of the Taxi Industry: Some Economic Background”, In OECD/ECMT (2007)op.cit.

London Assembly (2018),. “Future Transport: How is London Responding to Technological Innovation?”, Transport Committee, February 2018, https://www.london.gov.uk/sites/default/files/future_transport_report_-_final.pdf (Accessed 3 October 2018)

Moore, AT and T. Balaker (2006), “Do Economists Reach a Conclusion on Taxi Regulation?”, *Econ journal Watch*, 3(2):109-132, February 2006.

OECD (2018), “Taxi, Ride-Sourcing and Ride-Sharing Services: Background Note”, Working Party No.2 on Competition and Regulation. DAF/COMP/WP2(2018)1.

OECD/ITF (2016), “App-based Ride and Taxi Services: Principles for Regulation”, p. 6. [DAF/COMP/WP2/2018(1).

OECD/ECMT (2007) “(De) Regulation of the Taxi Industry”, Round Table No 133. Transport Research Centre. OECD, Paris, 2007.

Rechnitzer, G, N. Haworth and N. Kowadlo (2000), “The Effect of Vehicle Roadworthiness on Crash Incidence and Severity”, *Monash University Accident Research Centre*, Report No. 164.

Schaller Consulting (2018), “The new Automobility: Lyft, Uber and the Future of American Cities”, <http://www.schallerconsult.com/rideservices/automobility.htm> Accessed 5 October 2018.

Schwer, R.K., M.C. Mejza and M. Grun-Rehonne (2010), “Workplace Violence and Stress: The Case of Taxi Drivers”, *Transportation Journal*. Vol. 49, No. 2 (SPRING 2010), pp. 5-23.

Stocker, A. and S. Shaheen (2017). “Shared Automated Vehicles: Review of Business Models”, *Discussion paper* 2017: 09. Transport Sustainability Research Center, University of California, Berkeley.

Straits Times (2018), “New Rules Passed to Curb Abuse of Bike-Sharing”, 21 March 2018, Singapore, Website: www.straitstimes.com (Accessed 23 September 2018).

Thomas, P., A. Morris, R. Talbot and H. Fagerlind (2013), “Identifying the causes of road crashes in Europe”, *Annals of Advances in Automotive Medicine*, 2013;57:13-22.

Transport for London (2017), “Dockless Bikeshare Code of Practice for Operators in London”, September 2017. <http://democracy.cityoflondon.gov.uk/documents/s101100/Dockless%20Cycle%20Hire%20Report%20W%20PT%20Sept18%20Appendix%202.pdf>

Wyman, K.M. (2017), “Taxi regulation in the age of Uber”, *Legislation and Public Policy*, Vol 20, No. 1.

The Economics of Regulating Ride-Hailing and Dockless Bike Share

This paper reviews the economic case for regulating ride-hailing and dockless bikeshare. Ride-hailing has disrupted heavily regulated taxi markets and is calling much of the rationale for taxi regulation into question. It argues for light-handed regulation to enable fair, non-distorting competition across the sector. A similar approach to bikeshare is needed, though the context differs greatly. These services are creating new mobility options, while their business models are evolving rapidly. Regulators should adopt a cautious approach which minimises the risk of undermining their potential.

All resources from the Roundtable on Regulating App-Based Mobility Services are available at:
www.itf-oecd.org/regulating-app-based-mobility-services-roundtable