EFFICIENCIES AND REGULATORY SHORTCUTS: HOW SHOULD WE REGULATE COMPANIES LIKE AIRBNB AND UBER?

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I. Introduction

New software platforms use modern information technology, including full-featured web sites and mobile apps, to allow service providers and consumers to transact with each other without costly intermediaries. Platform operators typically provide information about service providers (e.g., drivers) and services offered (e.g., short-term rentals), as well as online payment facilities, reputation mechanisms to assure quality, and assistance with dispute resolution. The resulting systems offer differentiated products previously not readily available (such as short-term rentals more spacious than hotels), as well as lower prices.

Despite significant interest from consumers, these platforms tend to be in tension with existing regulatory frameworks. On one view, some regulations are outdated or protectionist, benefiting incumbents more than consumers. Others counter that software platforms breach important laws and impose a variety of costs on the public at large. Looking at the radical positions taken in discussions about, for instance, Airbnb and Uber, we sense that many people fail to see the whole picture. Even the toughest critics of these platforms tend to recognize that software platforms provide massive efficiencies, including facilitating more intense use of assets as well as improved convenience, information, better pricing, and more. Moreover, there is no proper basis for prohibiting entry into the markets at issue. Certain activities nonetheless raise genuine concerns, particularly if they breach laws and regulations that address externalities and other important policy objectives.

In our view, enlightened policy towards software platforms, such as Airbnb and Uber, requires a regulatory framework that simultaneously allows the key efficiencies the platforms seek to offer and assures that they adequately address the rights of consumers and third parties. Policymakers should embrace the efficiencies these platforms provide, including removing unnecessary requirements and protectionist rules that primarily benefit incumbents. Yet, platforms must be

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prepared to comply with regulatory requirements that genuinely protect customers, as well as requirements to avoid harm to noncustomers.[1]

A note of caution on the terminology: we observe that many platform operators advertise their services as "sharing." For example, short-term property rental service Airbnb says its service lets hosts "share …. homes with guests"[2] while transportation service Lyft says it offers "ridesharing."[3] The term "sharing" partially captures some aspects of these companies' activities, e.g., employing a single resource for multiple purposes, such as using a vehicle both for an owner's personal needs and to transport paying passengers, but it can also be misleading as online platforms mediate an "economic exchange" not entirely unlike longstanding commercial relationships.[4] Moreover, the key efficiencies generally do not come from "sharing" but from the market structure that platforms facilitate, including casual service providers who avoid the fixed cost and, often, regulation associated with traditional service. Given the limited importance of "sharing" as well as the associated disputes and subjectivity associated with the use of this term, we largely avoid it. In the discussion below, we favor the term "software platform" to reference the services that connect consumers to service providers—though even this term is imperfect, as a literal interpretation would encompass myriad other platforms not raising the policy challenges we explore.

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1 There is a burgeoning literature addressing the ways in which online platforms should be regulated, but our paper is the first systematic attempt to identify both the efficiencies generated by such platforms, as well as the instances in which market failures may require regulatory intervention. The existing literature includes, Daniel E. Rauch & David Schleicher, *Like Uber, But for Local Governmental Policy: The Future of Local Regulation of the 'Sharing Economy*,' (forthcoming 2015) (manuscript), http://ssrn.com/abstract=2549919; Christopher Koopman et al., *The Sharing Economy and Consumer Protection Regulation: The Case for Policy Change*, 8 J. BUS. ENTREPRENEURSHIP & L. (forthcoming 2015) (manuscript at [p#]), http://ssrn.com/abstract=2535345; Andrew T. Bond, *An App for That: Local Governments and the Rise of the Sharing Economy*, 90 NOTRE DAME L. REV. 77 (2015); Brishen Rogers, *The Social Costs of Uber*, 82 U. CHI. L. REV. DIALOGUE 85 (2015).

2 Patrick Robinson, *Queen Signs Home Sharing into UK Law*, AIRBNB (Mar. 25, 2015), http://publicpolicy.airbnb.com/queen-signs-home-sharing-uk-law/.

3 Logan Green & John Zimmer, *Lyft Community Update: October 8, 2012*, LYFT BLOG (Oct. 8, 2015) blog.lyft.me/post/33165777110/lyft-community-update [https://web.archive.org/web/20121010232053/http://blog.lyft.me/post/33165777110/lyft-community-update]; See also Comments of Zimride, Inc. (Lyft), to Public Utilities Commission of the State of California, Rulemaking 12-12-011, 6-8 (Jan. 28, 2013), http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M042/K155/42155832.PDF.

4 Giana M. Eckhard & Fleura Bardhi, *The Sharing Economy Isn't About Sharing at All*, HARV. BUS. REV. ONLINE (January 28, 2015) https://hbr.org/2015/01/the-sharing-economy-isnt-about-sharing-at-all ("Sharing is a form of social exchange that takes place among people known to each other, without any profit. Sharing is an established practice, and dominates particular aspects of our life, such as within the family. By sharing and collectively consuming the household space of the home, family members establish a communal identity. When 'sharing' is market-mediated — when a company is an intermediary between consumers who don't know each other — it is no longer sharing at all. Rather, consumers are paying to access someone else's goods or services for a particular period of time. It is an economic exchange, and consumers are after utilitarian, rather than social, value.")

This paper proceeds in three sections. In Section II, we enumerate the various forms of efficiencies that software platforms provide, including reducing transaction costs, improving allocation of resources, and information and pricing efficiencies. We observe that these efficiencies are also available to incumbents as software platforms use standard technologies that are widely available, and nothing prevents service providers and consumers from "multi-homing" to use multiple systems. In Section III, we explore regulatory frameworks. On the one hand, we suggest a need for adapting law and regulations to allow software platforms to operate legally so that both service providers and consumers can enjoy the efficiencies these platforms seek to offer. At the same time, software platforms should not be above the law. In particular, they should comply with regulatory requirements that are needed to correct genuine market failures, and these requirements should remain in force. Thus, we do not favor "deregulation," but rather an updated regulatory framework that is sufficiently flexible to allow software platforms to operate and deliver their efficiencies, while ensuring that service providers, users and third parties are adequately protected from harms that may arise from services provided through these platforms. Section IV concludes.

II. Efficiencies

We are struck by the range of efficiencies potentially delivered by software platforms and the transactions they facilitate. In this section, we explore key advantages, focusing on mechanisms that give these platforms the largest advances over incumbents.

A. Main efficiencies from software platforms

Software platforms deliver a variety of efficiencies, including reducing transaction costs, improving allocation of resources, and information and pricing efficiencies.

1. Reducing transaction costs

Modern software platforms lower the cost of finding a suitable transaction counterpart.[5] Historically, a property owner might have mailed photographs to be printed in listings which a broker would mail to prospective guests, with high costs at every turn. Self-service uploads and electronic distribution reduce broker costs, improve speed, and make the process more broadly palatable. In transportation services such as Uber and Lyft, cost efficiencies include removing dispatchers and eliminating specialized equipment (such as purpose-built radios and credit card processors) as the service can be provided through mass-produced smartphones.

Lower communication costs in turn allow distribution of more information. With direct communication between host and guest, both before and after booking, Airbnb can facilitate detailed discussions about unusual requirements or property characteristics—discussions that

[5] On the notion of transaction costs, see Ronald H. Coase, *The Nature of the Firm*, 4 ECONOMICA 386 (1937).

would be less convenient if mediated by a broker relaying messages back and forth. Similarly, a transportation platform can show a driver's face, vehicle, and license plate to a passenger, and the passenger's photo to a driver, helping both parties to recognize each other. Where a taxi passenger concerned by a delayed vehicle might have called a phone dispatcher to inquire and receive potentially inaccurate information about vehicle location, transportation platforms provide continuous GPS-based updates, reducing the uncertainty and anxiety associated with waiting for a taxi.

These efficiencies apply to myriad other software platforms. Uber's success spawned interest in an "Uber for X" in other sectors, such as Handy for home cleaning,[6] Instacart for grocery shopping and delivery,[7] Medicast for in-home doctor visits,[8] Shyp for packing and shipping services,[9] and YourMechanic for car repair.[10] Each of these services places the entire transaction (including search, pricing, payment, and evaluation) onto the platform, reducing transaction costs in both finding a service provider and in completing a purchase.

2. Improved allocation of resources

Software platforms also improve allocative efficiency.[11] Historically, a property owner would be unlikely to rent a residence while away for a weekend; only an absence of weeks (or more likely, months) would justify a listing with a broker in light of the effort required for both property owner and broker, and the cost associated with the transaction. Yet in desirable and high-priced regions, the foregone income could be hundreds of dollars per day. Similarly, platforms such as Turo[12] promise similar value for a vehicle not otherwise in use, and JustPark[13] and Parking

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6 See HANDY, https://www.handy.com (last visited Nov. 17, 2015) (allowing users to book home cleaners and handymen "at a moment's notice").

7 See INSTACART, https://www.instacart.com (last visited Nov.17, 2015) (delivering groceries to customer homes within an hour).

8 See MEDICAST, http://www.medicast.com (last visited Nov. 17, 2015) (online platform for on-demand care delivery).

9 See SHYP, https://www.shyp.com (last visited Nov. 17, 2015) (on-demand courier pickup and professional packaging).

10 See YOUR MECHANIC, https://www.yourmechanic.com (last visited Nov. 17, 2015) (online booking allowing customers to book car repair services).

11 On the notion of allocative efficiency, see Richard S. Markovits, *A Constructive Critique of the Traditional Definition and Use of the Concept of "the Effect of a Choice on Allocative (Economic) Efficiency": Why the Kaldor-Hicks Test, the Coase Theorem, and Virtually All Law-and-Economics Welfare Arguments Are Wrong*, 1993 U. ILL. L. REV. 485 (1993).

12 See TURO, https://turo.com (last visited Nov. 17, 2015) (allowing users to rent cars from Turo's nationwide community of local car owners, or make extra money renting out their car).

13 See JUSTPARK, https://www.justpark.com (last visited Nov. 17, 2015) (online parking service providing drivers with mobile and web applications to find parking, as well as helping parking garage owners manage their inventory).

Panda[14] for an excess parking spot. Software platforms thus tend to promote the efficient use of resources by assuring that expensive assets remain active.

A separate source of allocative efficiency comes from putting the same vehicle to multiple uses. A driver can use a vehicle for personal obligations at some times of day, then for business at other times, without the potential embarrassment of conducting personal activities in a taxi. Relatedly, drivers avoid a commute, by personal vehicle or public transit, to pick up a dedicated vehicle from a depot. Instead, a driver can begin service from home or any other location. This reduces commuting time and costs for the driver, increases service availability to customers, and helps lessen congestion.

The replacement of advance bookings with real-time adjustments also offers potential efficiencies. Previously, a driver had to decline a booking too close to a future commitment, but on-demand platforms allow for continuous adjustments. Similarly, where a driver previously had to drive without a passenger to a predetermined origin for a prescheduled next journey, transportation platforms now accommodate drivers in any location. These improvements can permit greater utilization of vehicles, including less time driving without a passenger (saving time and fuel) and less time waiting, both of which can reduce prices to consumers while maintaining payment to drivers.

With superior IT, software platforms are also positioned to offer services that would otherwise be unworkable. A notch beyond the standard Uber service for which that company is known, UberPool uses the company's dispatch platform to identify two or more passengers headed in the same direction who might efficiently share a ride.[15] In a subsequent improvement, Uber's "perpetual ride" assigns drivers to pick up and drop off a series of riders without a particular notion of a "start" or "end" of the journey as a whole, and with the driver's route adjusted as requests arrive.[16] In contrast, it is difficult to imagine radio dispatchers collecting and organizing sufficient data about customer requirements and vehicle locations to offer a similar service.

Software platforms may also help increase investment. A person anticipating providing a property on Airbnb may find it attractive to add space or amenities that would be unwarranted solely for personal use. For example, without Airbnb, a frequent traveler might choose to reside in a basic apartment in order to avoid paying for premium amenities he cannot enjoy when out of town. In contrast, with Airbnb, the traveler would anticipate capturing the value of those amenities through higher-prices when listing the property on Airbnb—allowing him to justify the

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[14] See PARKING PANDA, https://www.parkingpanda.com (last visited Nov. 17, 2015) (matching drivers with parking spaces).

[15] UBERPOOL, https://get.uber.com/cl/uberpool/ (last visited Nov. 17, 2015).

[16] Sarah Buhr, *Lyft Line Gets Into Perpetual Ride Territory With Triple Match Service*, TECHCRUNCH (July 29, 2015), http://techcrunch.com/2015/07/29/lyft-line-gets-into-perpetual-ride-territory-with-new-triple-match-service/.

premium property. In principle, transportation platforms could similarly motivate car purchases or upgrades. It is difficult to confirm the size of these effects,[17] and there could be offsetting disinvestment (such as hotels not built or taxi fleets not purchased or updated), but on the whole our sense is that software platforms generally increase investment.

3. Information efficiencies, reputations, and accountability

Information efficiencies include making better allocation decisions, as well as uncovering and discouraging unwanted behavior.

In transportation, a first type of information efficiency comes from dispatching the optimal vehicle. Historically, radio dispatchers asked drivers, one by one, to report their availability and location. A software platform can collect this information from drivers' smartphones instantaneously and automatically, making it easy to dispatch the nearest driver. Software platforms thus offer a major improvement in the dispatch task, improving both speed and accuracy.

In addition, most software platforms collect and process information to better assess the staff and systems that provide service. In short-term property rentals, customers evaluate properties and submit information to inform future customers. In transportation platforms, passengers evaluate driver courtesy and vehicle condition—serving both to collect information for platform operators and to deter opportunistic driver behavior. Notably, these methods collect information that is otherwise difficult to observe both because it is decentralized (in numerous geographic locations) and because service providers have every incentive to conceal low-quality activities. In contrast, platforms can easily ask customers about the experiences they just completed, and collect information about most or all transactions rather than the few checked by a random inspection. With this information, platforms can eliminate low-quality service providers and target others for remediation.

Platforms can use similar systems to assess customers. If a passenger is boisterous or unhygienic, or a tenant damages property, platforms can issue a warning, alert future service providers, or even disable the customer's account. A banished customer might start over with a new profile,[18] but platforms are well-positioned to recognize duplicate accounts based on similarity in name, linked social network accounts, payment cards, phone serial number or computer characteristics, and other factors. Whatever the limits of these efforts, they are surely better than any taxi driver

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[17] Airbnb cites surveys of hosts who report using Airbnb funds in part to pay rent or mortgage. *Airbnb Economic Impact*, AIRBNB BLOG (2015), http://blog.airbnb.com/economic-impact-airbnb/. But the fungibility of money makes these responses vacuous.

[18] Eric J. Friedman & Paul Resnick, *The Social Cost of Cheap Pseudonyms*, 10 J. ECON. & MGMT. STRATEGY 173 (2001).

effort to ban passengers by sight, an approach bound to make both false-positive and false-negative errors.

By all indications, reputation systems are serving the intended purpose. Passengers widely report a higher level of courtesy from Uber drivers than from taxicabs,[19] an outcome which is probably not surprising in light of available incentives and remedies. A passenger dissatisfied with a taxi driver could attempt to note the medallion number or license plate number, then try to lodge a complaint with a fleet owner or local regulator—but most passengers anticipate (we sense correctly) that such complaints usually have limited effect. Submitting a negative assessment to Uber is both easier and, it seems, significantly more likely to yield a response.[20]

Along the way, software platforms potentially increase accountability by blocking certain opportunistic behavior. For example, some taxi drivers report that telephone dispatchers direct preferred rides to drivers who pay bribes.[21] While a transportation platform could similarly favor some drivers over others, analogous to some web sites claiming favored treatment from Google, any such efforts would be embodied in algorithms potentially more readily subject to discovery and dispute resolution.

4. Pricing efficiencies

With real-time information about market conditions and with easy communication between all parties, software platforms can adjust prices as circumstances warrant. In transportation, pricing efficiencies come from both supply and demand responses. In times of high demand, higher prices motivate drivers to postpone other activities and join the platform. Meanwhile, higher prices simultaneously motivate passengers to defer low-value trips.[22] Similarly, high prices from

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[19] See, e.g., Jonathan Lemire, *Uber Growth Unhampered in Surprise Deal with NYC*, ASSOCIATED PRESS (July 23, 2015), http://bigstory.ap.org/article/bb9d8040cfd54235a83b522948346b35/uber-growth-unhampered-surprise-deal-nyc (quoting a Uber user praising Uber drivers as more courteous and polite than taxi drivers).

[20] Mark Perry, *Big Taxi vs. Uber. What about Complaints?*, NEWSWEEk (June 18, 2015), http://www.newsweek.com/big-taxi-v-uber-what-about-complaints-344661. Indeed, some drivers report harsh sanctions—including removal from transportation platforms—if their ratings drop even slightly. For example, Scott Banks, a former driver for Uber, reports that a rating of 4.6 out of 5 is grounds for termination from that service. Scott Banks, *What's the convention for rating an Uber driver?*, QUORA (Jan. 1, 2014), https://www.quora.com/Whats-the-convention-for-rating-an-Uber-driver. This harsh sanction in turn reflects that most passengers give 5's. Perhaps some rating systems are ripe for improvement, but on the whole it seems that transportation platforms provide higher quality service with ratings and accountability mechanisms more effective than traditional oversight of taxis.

[21] Megan McArdle, *Why You Can't Get a Taxi*, THE ATLANTIC (May 2012) (noting that taxi cab drivers often have to bribe dispatchers); *For Boston Cabbies, a Losing Battle against the Numbers*, THE BOSTON GLOBE (Mar. 31, 2013), https://www.bostonglobe.com/metro/2013/03/30/spotlight/9e VWW7Y6RaOIqII62n2XlI/story.html.

[22] Liran Einav, Chiara Farronato, & Jonathan Levin, *Peer-to-Peer Markets* (NBER Working Paper 21496, 2015), http://www.nber.org/papers/w21496.

peak demand (such as conferences and special events) were the original impetus for short-term rentals from Airbnb.[23]

In the context of transportation platforms, so-called "surge pricing"[24] has proven controversial.[25] Certainly some passengers may be surprised by a price change, particularly if they were not previously warned about the prospect of adjustments or if they did not expect an adjustment at that time and place. In principle, a user interface might allow a customer to "accept" a surge price by accident, e.g., by tapping quickly, without noticing an on-screen mention of higher prices, but the efficiencies of adjustable prices appear to vastly outweigh the harms from accidents when some users accept a price unknowingly.[26] In any event, consumers should become more familiar with price adjustments as they gain experience with transportation platforms. In other contexts, including short-term accommodations and, to be sure air travel and myriad longstanding markets,[27] consumers correctly anticipate that prices fluctuate, sometimes significantly, and in the long run such fluctuations are rarely the source of surprise.

A related concern comes from the consumers who might have anticipated (or at least hoped for) the occasional "good luck" of getting a vehicle at a normal price during times of peak demand, an outcome that will not occur under surge pricing. While we credit their disappointment, their losses are more than offset by gains to others and perhaps by the lower prices they enjoy at off-peak times. On the whole we credit price adjustments as increasing efficiency despite some surprises or disappointments along the way.[28]

B. Availability to incumbents

The efficiencies brought by software platforms are generally available to incumbents, which can embrace broadly comparable platforms. Hotels—the established providers of short-term

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[23] Morgan Brown, *Airbnb: The Growth Story You Didn't Know*, GROWTH HACKERS, growthhackers.com/growth-studies/airbnb (last visited Nov. 17, 2015).

[24] *What is Surge Pricing?*, UBER, https://help.uber.com/h/6c8065cf-5535-4a8b-9940-d292ffdce119 (last visited Nov. 19, 2015); Jonathan Hall, Cory Kendrick, & Chris Nosko, *The Effects of Uber's Surge Pricing: A Case Study*, CHI. BOOTH (Sept. 2015), http://faculty.chicagobooth.edu/chris.nosko/research/effects_of_uber's_surge_pricing.pdf.

[25] Connor Simpson, *Uber Busted for Intentionally Surging Prices*, THE WIRE (Feb. 26, 2014 12:25PM), www.thewire.com/technology/2014/02/uber-busted-intentionally-surging-prices/358555/.

[26] See *Pricing the Surge: The Microeconomics of Uber's Attempt to Revolutionise Taxi Markets*, THE ECONOMIST (Mar. 27, 2014), http://www.economist.com/news/finance-and-economics/21599766-microeconomics-ubers-attempt-revolutionise-taxi-markets-pricing-surge.

[27] See, e.g., Scott McCartney, *What's the Sweet Spot for Buying International Airline Tickets?*, WSJ BLOGS (June 28, 2012 12:43PM), http://blogs.wsj.com/middleseat/2012/06/28/whats-the-sweet-spot-for-buying-international-airline-tickets/.

[28] James Surowiecki, *In Praise of Efficient Price Gouging*, MIT TECH. REV. (Aug. 19, 2014), http://www.technologyreview.com/review/529961/in-praise-of-efficient-price-gouging/.

accommodations—have been diligent in implementing modern IT and indeed began to use electronic reservation systems decades before the rise of Airbnb. Reservation systems easily accommodate hotel prices that change from night to night for each type of room at each property.

Similar benefits are available in transportation. Fleet owners can use modern technology to improve dispatch of drivers. With GPS in each vehicle, dispatchers can see vehicle locations and availability, and electronic messaging systems allow dispatchers to send instructions to drivers more quickly and more accurately than by radio. Furthermore, modern IT systems then allow passengers to submit requests directly into dispatch, and an algorithm replaces a human dispatcher.[29] Many taxi fleets have implemented these methods,[30] and in some cities, groups of fleet owners share common tools for customers to request vehicles.[31] Fleet owners can also obtain the information and reputation benefits of software platforms. For decades, many commercial vehicles have presented placards asking nearby drivers "How's my driving?" with a phone number and code. With modern IT, passengers can similarly rate vehicles and drivers. Indeed, South American taxi dispatch company SaferTaxi began with exactly this concept, rating drivers by SMS, not needing cooperation from drivers or fleet owners.[32]

In most sectors, dynamic pricing is broadly possible. Certainly hotels and airlines have been unabashed in altering price by day, advance purchase, and other factors.[33] Restaurants similarly implement prices at different times of day and, for some locations, by day of week or even ad hoc adjustments on a chalkboard or signboard. In a printed booklet of short-term rentals, prices can vary by season. In all these environments, limits to dynamic pricing come primarily from information availability, mechanisms to alert customers to changed prices, and limited complexity permitted in low-tech environments such as paper catalogs. As incumbents move to electronic contracting environments, they can typically adjust prices just as readily as the newest software platforms.

Dynamic pricing is more difficult in the transportation sector, in part due to regulation seemingly motivated by information availability, the contracting environment, and the risk of opportunistic

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29 Voytek, *Optimizing A Dispatch System Using An AI Simulation Framework*, UBER NEWSROOM (Aug. 11, 2014), http://newsroom.uber.com/2014/08/semi-automated-science-using-an-ai-simulation-framework/.

30 Quinten Plummer, *Taxi Magic Now "Curb" As It Drives Back Into the Rideshare App Market*, TECH TIMES (Aug. 6, 2014), http://www.techtimes.com/articles/12325/20140806/another-mobile-app-drives-into-the-taxi-industry.htm.

31 Traditional taxi operators can use third party software platforms such as Hailo and Gett. HAILO, https://www.hailoapp.com (last visited Nov. 19, 2015); GETT, http://gett.com/nyc/ (last visited Nov. 19, 2015).

32 Epifanio Blanco, *SaferTaxi, Con Celular y SMS para Taxi Seguro*, PORTINOS (Sept. 9, 2010), www.portinos.com/6677/safertaxi-con-celular-y-sms-para-taxi-seguro.

33 On dynamic pricing in the airline and hotel industries, see, e.g., R. Preston McAfee & Vera te Velde, *Dynamic Pricing in the Airline Industry*, *in* HANDBOOK ON ECON. AND INFO. SYS., 1 (T.J. Hendershott & Elsevier Handbooks in Info. Sys. eds., 2007); Graziano Abrate et al., *Dynamic Pricing Strategies: Evidence from European Hotels*, 31 INT'L J. HOSPITALITY MGMT. 160 (2012).

behavior. If a driver was able to adjust the price for each passenger upon a curbside hail, prices might reflect the passenger's inconvenience in finding another vehicle rather than true supply and demand; and drivers might set prices in light of apparent customer willingness to pay. Similarly, if a telephone dispatcher quoted that minute's price, the communication between dispatcher, driver, and passenger would create disputes. Throughout, oral discussions leave no written record of agreement and invite disputes. In practice, software platforms are probably necessary to make frequent price adjustments and to respond to unexpected shocks. A fleet owner with electronic contracting can implement dynamic pricing, and many have done so,[34] though to be sure regulations largely disallow this approach for curbside hails, for the reasons noted in this paragraph, among others.

In addition, there is usually no restriction preventing "multi-homing" by either suppliers or consumers.[35] As a result, a given vehicle could accept requests both via a software platform and via longstanding mechanisms such as telephone dispatchers. Similarly, some hotels even list rooms on Airbnb.[36] Thus, if an incumbent wants to embrace the efficiencies of software platforms but for whatever reason cannot provide its own software (perhaps due to lack of technical capability, insufficient scale, or limited marketing prowess to alert customers to its service), it generally can use the software platforms discussed in this paper. Of course an incumbent using this strategy would then become subject to the rules of those platforms, including as to prices and fees as well as potential restrictions on future direct bookings. Similarly, nothing prevents a consumer from buying products and services from incumbents as well as new software platforms, or from multiple software platforms.

To date, the growth of software platforms seems to trigger few competition law concerns, and even where certain software platforms have come to dominate their respective sectors, we see little sign of market structure that would prevent entry or prevent incumbents from providing similar services in the ways they see fit. In many high-tech markets, a single firm enjoys a temporary or enduring monopoly, often grounded in technical compatibility, switching costs, or contractual restrictions.[37] Such barriers are not apparent in the markets discussed in this paper. Indeed, there are dozens of "Uber clones" competing vigorously in many markets, particularly in

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[34] Martin Romjue, *Getting Your Prices Right*, LIMOUSINE, CHARTER & TOUR (Oct. 7, 2013), http://www.lctmag.com/operations/article/42710/getting-your-prices-right.

[35] On multi-homing, see David S. Evans & Richard Schmalensee, *The Antitrust Analysis of Multi-Sided Platform Businesses* 15 (Coase-Sandor Inst. L. & Econ., Working Paper No. 623, 2012) ("An economic agent single-homes if she uses only one platform in a particular industry and multi-homes if she uses several. In the cases of payments, consumers and merchants both generally use several payment platforms and therefore multi-home in this sense").

[36] Alicia Hoisington, *Hoteliers Learn from Airbnb, HomeAway*, HOTELNEWSNOW (Feb. 12, 2014), http://www.hotelnewsnow.com/Article/13105/Hoteliers-learn-from-Airbnb-HomeAway.

[37] For example, Microsoft faced such allegations in the operating systems market. See ANDREW I. GAVIL & HARRY FIRST, THE MICROSOFT ANTITRUST CASES: COMPETITION POLICY FOR THE TWENTY-FIRST CENTURY (2014).

Asia.[38] One might also imagine barriers resulting from scale—that a new transportation platform would struggle to match Uber's number of vehicles (hence reducing dispatch efficiency and increasing customer wait times), or a new short-term booking platform would struggle to match Airbnb's breadth of choices. In principle this could impede entry, though we doubt that this alone would support a competition case.

C. Notable limits

Despite the significant efficiencies resulting from software platforms, we note limits to these businesses. In some respects incumbents may simply be more efficient. A single hotel front-desk clerk can provide check-in service for hundreds of units, whereas many Airbnb hosts struggle to provide keys to guests. The inconvenience of storing and securing a host's personal effects is similarly eliminated in the hotel model (where the room contains only property for the guest's use), and hotel staff can typically inspect for damage more readily than a distant Airbnb host. Perhaps Airbnb and hosts will devise further mechanisms to match these efficiencies or to eliminate the problems. For example, for a time RelayRides installed devices facilitating keyless entry to car-owners' vehicles, letting car owners offer access to their vehicles without needing to meet a renter in person. Airbnb hosts could surely install similar technology, and modern buildings often use electronic access-control systems rather than mechanical locks, making remote admission increasingly feasible. One might even imagine a wheeled robot inspecting a property for damage upon departure. Notably, RelayRides abandoned its remote-entry devices, finding the equipment cost too expensive relative to usage.[39]

Uber faces similar limits. At present, an Uber vehicle cannot pick up a passenger who is on the street waiving his hand—both because the prevailing legal environment does not allow it (allowing only licensed taxis to pick up roadside "hails") and because Uber's systems do not support this workflow. Furthermore, an Uber passenger needs a smartphone and data plan—to date, a poor fit for international travelers facing high roaming charges. That said, neither of these limitations appears to be significant at present. It is not clear that roadside hails would fit Uber's business model, and Uber seems to have plenty of other opportunities to expand. Meanwhile, roaming costs are decreasing on the whole, and transportation apps consume modest amounts of data.

D. The promise of these efficiencies

We are struck by the breadth of these efficiencies and their potential importance for both service providers and users. They promise better utilization of limited resources and overall benefits that

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[38] Jennifer Booton, *Sick of Uber? Here Are 27 Alternatives*, MARKET WATCH (Nov. 21 2014), http://www.marketwatch.com/story/dont-want-to-call-an-uber-this-weekend-try-these-instead-2014-11-21.

[39] Marcus Wohlsen, *When Sharing Doesn't Make Sense in the Sharing Economy*, WIRED (Oct. 1, 2013), http://www.wired.com/2013/10/relayrides-drops-hourly-rentals/.

easily exceed the harms to certain groups. Sensible policy should thus allow software platforms to operate legally and to provide these benefits. As will be seen in subsequent sections, the key challenge is facilitating this market entry and obtaining these efficiencies while ensuring that entrants compete fairly with existing providers and implement the protections necessary to prevent market failures.

III. Proper scope for regulatory intervention

Despite the efficiencies and benefits enumerated in Section II, critics—including incumbent firms as well as skeptical consumers and some others—have raised a variety of concerns from safety to tax to the rights of third parties. Some allegations have gained traction and create the very real possibility that certain software platforms may not be allowed to operate in some jurisdictions. For example, Uber has been banned in in at least ten countries, has suspended operations in three others (including six US cities),[40] and in at least one country, has faced criminal prosecution of its senior managers.[41]

In this section, we offer a mixed assessment. On one hand, we are skeptical of regulatory restrictions that are not needed to protect market failures or achieve important genuine policy objectives; it seems some such regulations apply in various jurisdictions, and these should be eliminated as they have no valid purpose. On the other hand, software platforms should not be above the law, and we explore regulatory interventions that may be appropriate and indeed necessary to correct market failures and achieve legitimate policy objectives.

A. Ending "protectionist" regulation

It is well-known that regulatory schemes sometimes benefit the regulated firms rather than consumers or the public as a whole.[42] For one, regulators may become closely linked to the firms they regulate, often through extended discussions, career trajectories, or a desire to maintain the status quo. Furthermore, companies subject to regulation have a strong incentive to attempt to influence applicable regulations which, if favorable, could increase their profits substantially. In contrast, few or no individual members of the public have much to gain from attempting to influence regulation of any given sector, as even a large improvement in that sector would yield small benefits to an individual consumer. We use the term "protectionist" regulation to encompass these regulations whose primary purpose is to protect "incumbents" at the expense of new entrants.

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[40] Simran Khosla & Eva Grant, *Here's Everywhere Uber is Banned Around the World*, BUSINESS INSIDER (Apr. 8, 2015), http://www.businessinsider.com/heres-everywhere-uber-is-banned-around-the-world-2015-4.

[41] Sam Schechner, *Uber Executives Detained by Police in Paris*, THE WALL STREET JOURNAL (June 29, 2015), http://www.wsj.com/articles/uber-executives-detained-by-police-in-paris-1435595947.

[42] On the theory of regulatory capture, see Georges Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. REG. 3 (1971), and Sam Peltzman, *Toward a More General Theory of Regulation*, 19 J. L. & ECON. 211 (1976).

Consumer experience seems to confirm the possibility of regulatory capture. For example, customers often struggle to understand why the number of taxis is limited to a fixed quantity creating shortages at peak times.[43] In contrast, incumbent taxis clearly benefit from this scheme, as it allows higher prices for those drivers who have the required licenses, as well as higher prices when licenses are sold on the secondary market.

The effects of licensing are similarly mixed. A licensing scheme may be an effective means to impose minimum quality standards that protect consumers from low-quality service providers. However, licensing also invites license-holders to pressure public authorities to exclude new entrants from the market, as such market entry would create new competition and reduce the value of their licenses.

In some instances, regulation seems to be designed to block the development of software platforms (or other new entrants) in order to protect incumbents. For instance, in France, Uber's growth brought demonstrations and violence, and in an October 2014 response, the French Parliament passed the so-called *Loi Thévenoud*. This law imposed a series of regulations that do not seem to be justified by genuine consumer protection concerns. For one, *Loi Thévenoud* prohibits so-called "transport vehicles with drivers" (a category intended to cover transportation platforms including Uber) from being geo-localized by users before reservation, for instance through the use of a smartphone.[44] The law also requires each covered driver to return to his base between rides if he does not have a reservation booked when dropping off a passenger—preventing drivers from traveling to areas where they anticipate customer demand. Finally, the law requires informing a passenger of the price of a ride when the passenger makes a reservation, which is incompatible with typical transportation platform pricing and with the flexibility software platforms anticipate.[45] These requirements seem to do little to protect users from market failures. For example, passengers are helped, not harmed, when drivers move towards areas of high demand. But these rules deprive users of some key efficiencies provided by transportation platforms.

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[43] For instance, the medallion system that prevails in New York results from the 1937 Haas Ordinance, which limited the number of taxis to roughly 16,900. The rationale of limiting the number of licenses was that too many cabs chased too few passengers during the Depression years. The number of medallions total dwindled to 11,787 in the years that followed, as some license owners failed to renew their licenses, then stayed constant until the mid-1990s where it grew to 13,437 as of 2014. See Lawrence Van Gelder, *Medallion Limits Stem From the 30's*, THE NEW YORK TIMES (May 11, 1996); *2014 TaxiCab Fact Book*, N.Y.C. TAXI & LIMOUSINE COMM'N (2014), http://www.nyc.gov/html/tlc/downloads/pdf/2014_taxicab_fact_book.pdf.

[44] LOI n° 2014-1104 du 1er octobre 2014 relative aux taxis et aux voitures de transport avec chauffeur [Relating to taxis and Chauffer-driven transport], JORF n°0228 15938 (Oct. 2, 2014), legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000029527162&categorieLien=id.

[45] Uber challenged these provisions before the French Constitutional Court, which confirmed the constitutionality of the first two provisions described above. However, the Court struck down the requirement that drivers inform clients of the price of the ride when they make the reservation, thereby allowing transportation platforms to charge based on time and distance, just as taxis do. See Inti Landauro & Sam Schechner, *Uber Dealt Fresh Blow by French Court*, WALL STREET JOURNAL (May 22, 2015).

While some regulation may not be specifically intended to block software platforms, they may have the same effect. For instance, the Washington Administrative Code requires that for-hire vehicles be prearranged at least fifteen minutes before a passenger is scheduled to be picked up.[46] Perhaps this helps to distinguish prearranged transportation from street hails, but it notably impedes efforts to dispatch drivers to passengers on short notice. However, such restrictions appear to be limited and indeed shrinking. For example, the California Public Utilities Commission considered and rejected this approach, agreeing that a ride is prearranged no matter how brief the period between a passenger's request and the vehicle's arrival.[47]

Wise policy should ensure that the activities of software platforms are not prohibited or made unnecessarily difficult by restrictions which have little purpose beyond protecting incumbents. Such impediments would block the efficiencies described in the preceding section. Furthermore, it seems that consumers are likely to continue to use these platforms whether or not they are technically unlawful. Such large-scale rule-breaking undermines respect for the law and impedes dispute resolution when the inevitable problems occur.

Of course removing such restrictions will often prove difficult. Incumbents seek to maintain and even expand them, pointing out the distortions resulting from asymmetric regulation that burdens incumbents more heavily. One possible strategy is to lessen the overall regulatory scheme, for both incumbents and entrants, e.g., by waiving or rescinding certain requirements for both groups. Still, any such changes are likely to call for consensus on the purpose and effect of each requirement. On controversial topics such as insurance, safety, and zoning, such consensus may be difficult to reach.

Whatever the difficulty of revisiting applicable regulation, the task appears to be compulsory. Innovation is ongoing, and the industries we discuss in this paper are bound to face further changes. For instance, the impending arrival of driverless cars will clash with regulations adopted decades earlier, imposing restrictions that make no sense when vehicles are driven by machines rather than humans.[48] Regulation ought not impede the launch of these and other valuable services, which offer large efficiencies and other benefits to consumers and others, so updates are unavoidable.

Despite the risk of regulatory capture and significant evidence supporting that interpretation of some regulations, we note that regulatory schemes are often more nuanced. Consider efforts to

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46 WASH. ADMIN. CODE § 308-83-200 (2014).

47 Decision Adopting Rules and Regulations to Protect Public Safety While Allowing New Entrants to the Transportation Industry, PUB. UTIL. COMM'N OF THE STATE OF CAL. 20 (Sept. 23, 2013), http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M077/K192/77192335.PDF.

48 For instance, Volvo has predicted that driverless cars will reach Australian roads by 2020. See *Driverless Cars 'Could Be on Roads by 2020', Volvo Predicts Ahead of First Australian Trial*, ABC NEWS AUSTRALIA (Nov. 6, 2015).

provide universal transportation service at all times of day, in all regions, even to passengers with limited mobility. Each of these aspirations entails service that might not be commercially viable on a standalone basis. To make the bundle of service viable for fleet operators and drivers, policy may grant benefits on a portion of service (e.g., supra-competitive prices for desirable, easy customers) while other customers are served at a loss (e.g., wheelchair-capable vehicles and service to outlying areas). This may or may not be wise policy—there might be other ways to assure comprehensive service, and when regulations keep costs off a government's budget, it may be difficult to see the true cost of providing universal service (potentially impeding political decisions about the costs and benefits).

However, the mere existence of regulatory benefits, providing certain rewards to service providers in certain circumstances, does not in itself imply regulatory capture. Even when benefits are entirely placed on one side of a market, e.g. impeding entry, the benefits may sometimes be better understood as a political balance rather than regulatory capture. For example, medallion systems were initially designed to protect both drivers and the public from excessive drivers pushing prices to an unreasonably low level.[49] Of course the subsequent effect of a medallion system or similar scheme may actually be to enrich those who later come to own medallions, not to help drivers.[50] But at least at the start of the regulatory scheme, drivers are likely to benefit, and it would be mistaken to indict all such regulations as pure protectionism.

B. Addressing market failures

The first and most convincing reason for regulatory intervention is the prospect of market failure—some set of interactions and relationships that prevent market transactions from adequately serving the interests of everyone concerned.[51]

1. Externalities

An important set of legal interventions seeks to address circumstances in which companies impact noncustomers and the public at large.[52] Noncustomers systematically lack contractual relationships with software platforms or service providers, and thus cannot rely on contracts to shape platforms' behavior. Furthermore, as noncustomers, they also cannot invoke market incentives (such as withholding their patronage) to shape platforms' behavior. For example, a pedestrian concerned about an uninsured or underinsured Uber driver cannot take his business

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[49] Paul Stephen Dempsey, *Taxi Industry Regulation, Deregulation & Reregulation: The Paradox of Market Failure*, 24 TRANSP. L. J. 73 (1996).

[50] Chris Isidore, *New York City's Yellow Cab Crisis*, CNN MONEY (July 22, 2015).

[51] On the notion of market failure, see John O. Ledyard, *Market Failure*, *in* 5 THE NEW PALGRAVE DICTIONARY OF ECON. 300 (2d ed. 2008).

[52] On the notion of externalities, see Jean-Jacques Laffont, *Externalities*, *in* 3 THE NEW PALGRAVE DICTIONARY OF ECON. 192 (2d ed. 2008).

elsewhere; a pedestrian faces the same risk from Uber even if he never uses Uber at all. Similarly, if an Airbnb host is willing to provide an apartment and a guest wants to stay there, Airbnb would not ordinarily need to consider any incidental impact on neighbors. Addressing these externalities requires a mechanism for noncustomers to influence software platforms.

a) Externalities in transportation platforms

In the context of transportation platforms, a first set of externalities arises from the prospect of unsafe drivers or unsafe vehicles. In general, transportation platforms check that each driver has a valid driver's license, but they do not require that a license carry a commercial endorsement, nor do they require the special permits or training ordinarily required of commercial drivers. These omissions create possible safety concerns. One might imagine, for example, that commercial driver training increases safety, perhaps by alerting drivers to risks of which they would otherwise be unaware, or by advising them of precautions they might not otherwise follow. Similarly, one might imagine that periodic inspections of commercial vehicles would uncover problems that drivers and passengers might overlook. While these effects are intuitive, we know of no attempts to confirm their existence or their size.

In principle, insurance rates and experience from other types of drivers could offer insight on the relative risk of transportation platform drivers. But there too, data is imperfect. Most insurance is priced on a periodic basis, e.g., per year, whereas the externalities of transportation safety are more logically assessed relative to distance, e.g., accidents per million miles driven. Commercial drivers face higher insurance rates per period,[53] but that seems to result in large part from greater distance traveled[54] and from more people in the vehicle (hence greater scope for injuries in an accident). For instance, a study of New York City taxi drivers found their accident rates to be significantly lower than noncommercial drivers, on a per-mile basis,[55] a difference attributed to experience as well as the additional precaution created by the prospect of accidents forcing a driver to find other employment.[56] Newfound and part-time transportation platform drivers typically lack the heightened experience of taxi drivers, but crashing a personal vehicle would often yield personal losses, especially given the prospect of various insurance gaps. Ultimately, the accident frequency is an empirical question calling for measurement.

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53 *How Much Does Commercial Vehicle Insurance Cost?*, TRUSTED CHOICE, https://www.trustedchoice.com/commercial-vehicle-insurance/compare-coverage/rate-cost/. (last visited Nov. 20, 2015).

54 *2014 TaxiCab Fact Book*, N.Y.C. TAXI & LIMOUSINE COMM'N 1 (2014), http://www.nyc.gov/html/tlc/downloads/pdf/2014_taxicab_fact_book.pdf.

55 See, e.g., *Taxi and Livery Crashes in New York City*, SCHALLER CONSULTING (Apr. 27, 2006), http://www.schallerconsult.com/taxi/crash06.pdf (reporting that taxis crash 32% less than other vehicles in New York City, per mile driven, and attributing that advantage to driver experience and incentives). So far as we know, there is to date no similar analysis of transportation platform driver performance.

56 Id.

Pending such data, we cannot disagree with the approach, embodied in longstanding policy in many jurisdictions, to hold commercial drivers and vehicles to higher standards of training and inspection. For example, New York City requires that taxi drivers take a defensive driving course as well as undergo a medical exam and yearly drug test.[57] The San Francisco Municipal Transportation Agency requires that a driver submit a ten year printout of driving records from the Department of Motor Vehicles,[58] and the City of Chicago requires inspection of taxis as often as every six months, depending on vehicle age.[59] Higher regulatory requirements for commercial driving match the basic sense that such drivers carry higher risk of causing harm (e.g., because they have more passengers in the vehicle, increasing the scope of injuries if an accident occurs, drive for longer durations, or receive imprecise passenger instructions), and that extra precautions can appropriately reduce that risk.[60]

It is an empirical question whether additional precautions for commercial drivers yield benefits larger than their costs. The precautions entail various costs (such as time and tuition for classes, and vehicles removed from service for inspection), and there is little apparent measurement of their benefits. If benefits are only a bit larger than costs, the investment may be best focused on those with substantial commercial driving, perhaps eschewing the investment for those who drive commercially only briefly or intermittently. But with the costs incurred entirely by transportation platforms and drivers, and the benefits accruing to the general public, this is a classic externality.

A second set of externality concerns arises from the prospect of uninsured or underinsured drivers. In every US state except New Hampshire and in most countries, all drivers are required to have a basic level of liability insurance to cover harm they may cause, both in injuring others and in damaging property.[61] Transportation platforms like Uber and Lyft typically provide

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57 *Driver New Application and Checklist Requirments (Part B)*, N.Y.C. TAXI & LIMOUSINE COMM'N (2015), http://www.nyc.gov/html/tlc/downloads/pdf/driver_new_app_checklist_partb.pdf.

58 *SFMTA: How To Become A Taxi Driver*, S.F. MUNICIPAL TRANSP. AGENCY (2015), https://www.sfmta.com/services/taxi-industry/become-taxi-driver.

59 *Longer Life & Reduced Inspections for Chicago Taxicab Vehicles*, CITY OF CHI. DEP'T OF BUS. AFFAIRS & CONSUMER PROTECTION (2014), http://www.cityofchicago.org/content/dam/city/depts/bacp/publicvehicleinfo/medallionowners/newtaxilaws07242014.pdf.

60 *Commercial Driver License Medical Eligibility*, CAL. DEPT. OF MOTOR VEHICLES, https://www.dmv.ca.gov/portal/dmv/detail/dl/driversafety/cdl_guidelines (last visited Nov. 20 2015) (citing "increased risk to public safety" as a reason for higher medical standards for commercial drivers).

61 *The AAA Digest of Motor Laws*, AAA (2015), http://drivinglaws.aaa.com/laws/liability-laws/.

insurance, usually including significant coverage for passengers[62] (often more than required for taxis), as well as some coverage for drivers.[63]

Although transportation platforms provide certain insurance, in many jurisdictions there have been widespread "insurance gaps" in which drivers were covered neither by personal insurance nor by transportation platforms. Best known is the so-called Period 1 in which a transportation platform driver is hoping for a passenger but does not yet have a specific request. (The nomenclature continues: In Period 2, a driver is *en route* to a specific passenger, and in Period 3 period a passenger is aboard.) If a driver causes harm during Period 1, the driver's personal insurance would typically deny coverage, arguing that the journey was for the commercial purpose of providing commercial services beyond the scope of standard noncommercial insurance.

Several factors compound the seriousness of the Period 1 insurance gap. First, Period 1 appears to cover a significant proportion of driving. For vehicles to be available promptly upon a passenger's request, there must be vacant vehicles in the platform; if every vehicle were occupied substantially all the time, waits would be unacceptable. Indeed, at the busiest time of day on the busiest day of the week, 30% of New York City taxis are vacant.[64] Even if transportation platforms' improved dispatch systems reduce vacancies dramatically, substantial unoccupied vehicles would remain, and indeed vacancies are necessary to promptly satisfy passenger requests. Second, driving during Period 1 is likely to be especially haphazard. During Period 1, a driver must respond to on-screen passenger requests, and Uber provides just fifteen seconds for a driver to do so (too little time to pull off the road or wait for a red light). [65] Other aspects of transportation platforms may compound distraction: Drivers in Period 1 have an incentive to check their phones for the location and amounts of surge pricing, reducing their attention to road conditions.

Insurance gaps cause at least two types of externalities. First, harmed parties may be unable to recover their losses from transportation platforms, drivers, or drivers' noncommercial insurance coverage. Drivers and transportation platforms will not consider these unrecoverable losses when assessing their activity and precautions. Second, transportation platforms historically encouraged

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62 Nairi Hourdajian, *Insurance For UberX With Ridesharing*, UBER NEWSROOM (Feb. 10, 2014), https://newsroom.uber.com/2014/02/insurance-for-uberx-with-ridesharing/.

63 Christian Denmon, *Ride Sharing vs. Traditional Taxis: How do Injury Insurance Claims Compare?*, HUFFINGTON POST (July 7, 2014), http://www.huffingtonpost.com/christian-denmon/ride-sharing-vs-tradition_b_5273964.html.

64 *2014 TaxiCab Fact Book*, N.Y.C. TAXI & LIMOUSINE COMM'N (2014), http://www.nyc.gov/html/tlc/downloads/pdf/2014_taxicab_fact_book.pdf.

65 Matt Richtel, *Distracted Driving and the Risks of Ride-Hailing Services Like Uber*, NEW YORK TIMES (Dec. 21, 2014), http://bits.blogs.nytimes.com/2014/12/21/distracted-driving-and-the-risks-of-ride-hailing-services-like-uber/.

drivers to file Period 1 claims on personal insurance. Such claims increase insurance premiums for all other drivers, as premiums are calculated from average loss rates inflated by the extra driving of transportation platform drivers.[66] Both these circumstances are externalities that harm nonparties, including drivers with no affiliation with Uber as well as pedestrians and bystanders.

A natural response to the "insurance gap" is to require that the gap be closed—assuring that all drivers be properly insured at all times, with no gaps in coverage likely to yield disputes or uncovered driving; and unambiguously disallowing transportation platform drivers from filing claims on noncommercial insurance. Indeed, in some countries (including at least Australia, India, and Singapore), Uber has long required that drivers obtain commercial insurance. Furthermore, during 2014 and 2015, several states passed legislation specifically disallowing noncommercial insurance plans from paying any claims resulting from transportation platform activity.[67] In response, in July 2015, both Uber and Lyft changed their policies to cover California drivers' liability claims during Period 1.[68] The gap, in short, appears to have resulted from transportation platforms' policies—but was readily closed, in California, when regulation so required. In our view, this is a successful policy intervention—straightforward regulation preventing a clear externality, and doing so at modest cost with no apparent side effects.

b) Externalities in short-term rentals

In the context of short-term rentals, the clearest externalities come from changes to a neighborhood. Neighbors sometimes complain about Airbnb tenants, and it is plausible that Airbnb tenants create negative externalities such as being lost and asking for assistance, consuming rivalrous public resources (such as parking spaces), failing to care for shared resources, and generally perceiving that they are unaccountable for their actions because they are not staying in the community.[69]

In condominium associations and apartment buildings, considerable private self-ordering appears to be possible: an association or building manager can set rules to limit short-term tenants. Following the classic Tiebout result,[70] these private decisions should broadly coordinate

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66 Letter from Dave Jones, Cal. Ins. Comm'r, to Michael R. Peevey, President, Cal. Pub. Util. Comm'n (Apr. 7, 2014), http://sfcda.org/CPUC/4.7.14_LettertoCPUCfromCDI.pdf.

67 CAL. PUB. UTIL. CODE § 5430 et al. (West 2015); S.B. 125, 2014 Gen. Assemb., Reg. Sess. (Colo. 2014); S.B. 5550, 64th Leg., Reg. Sess. (Wash. 2015).

68 Davey Alba, *California Forces Uber and Its Rivals to Bolster Insurance*, WIRED (July 1, 2015), http://www.wired.com/2015/07/california-forces-uber-rivals-bolster-insurance/.

69 See, e.g., John J. Horton, *The Tragedy of Your Upstairs Neighbors: Is the Airbnb Negative Externality Internalized?* (forthcoming 2014)(manuscript), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2443343; Erich Eiselt, *Airbnb: Innovation and Its Externalities*, THE MUNICIPAL LAWYER MAGAZINE 6 (Nov./Dec. 2014), www.imla.org/images/links/IMLA%20ML%20Airbnb%20Article%20Updated3.pdf.

70 Charles Tiebout, *A Pure Theory of Local Expenditures*, 64 J. POL. ECON. 416 (1956).

preferences, yielding "Airbnb-friendly" and "non-Airbnb" buildings with tenants sorted accordingly. That said, we note challenges and costs during transition. For example, residents would incur considerable inconvenience and expense to move to residences that match their preferences. Defaults can shift these costs. If the default is to permit Airbnb everywhere, a tenant would need to move to a new building (that bans Airbnb) to avoid having Airbnb guests as neighbors. Conversely, if the default is to ban Airbnb unless all stakeholders agree, a host using Airbnb must obtain permission from neighbors—potentially so onerous, with such risk of high demands, that Airbnb hosting becomes virtually impossible. Both approaches ultimately yield a private self-ordering where people sort themselves on this dimension, but they offer divergent implications for who gains and loses.

In freestanding dwellings or other contexts without a private authority, self-ordering may be infeasible, effectively requiring opponents of short-term rentals to seek government assistance, most often through zoning or in principle through private litigation. On this subject we have mixed views. On one hand, the negative externalities seem modest—perhaps a bit of extra traffic or strangers walking by. These intrusions primarily affect public spaces where an aggrieved neighbor has a limited interest, and separation between freestanding homes reduces these externalities in most circumstances. Furthermore, there may be offsetting positive externalities, e.g., visitors patronizing local establishments which expand local amenities. Meanwhile, a prohibition on occasional short-term rentals would be in tension with a notion of personal autonomy that includes the freedom to resell valuable housing, at least on a limited basis incidental to a primary occupant's substantial use. That said, conditions vary across regions, and in some places Airbnb's effects on neighbors may be more acute. Consider neighborhoods where street parking is limited and where Airbnb guests often consume parking spaces—inconveniencing neighbors and providing little offsetting benefit.

A separate externality from short-term rentals is the risk of removing housing inventory from long-term markets. This claim is particularly common in San Francisco,[71] where critics allege that Airbnb exacerbates a shortage of rental housing and increases rents even further. Economic theory suggests a host or property owner should compare Airbnb rental revenue to rent from a long-term tenant. But there might be secondary effects such as changing neighborhood characteristics, reducing affordable housing, or otherwise causing harms not considered in the property owner's decision.

Our sense is that there may be circumstances in which regulatory intervention is needed to address the externalities created by short-term rentals. The need for such intervention may depend on the geographic location (e.g., cities versus rural areas) and the type of property (multi-

[71] Rachel Monroe, *More Guests, Empty Houses*, SLATE (Feb. 13, 2014), http://www.slate.com/articles/business/moneybox/2014/02/airbnb_gentrification_how_the_sharing_economy_drives_up_housing_prices.html.

family dwellings versus freestanding houses). In some jurisdictions, discussions seem to reflect this level of nuance, though to be sure in others, the focus has been more on black-letter law rather than the principles that motivate those requirements.

2. Information asymmetries

Information asymmetries provide a separate basis for regulatory intervention.[72] In the context of software platforms, there are potential asymmetries in both directions among all groups—platforms, consumers, and service providers—but in practice the largest problems tend to result from information unavailable to consumers or service providers. Consider a consumer who does not know what safety risks are associated with Uber service or an Airbnb property. A minimum level of precautions or protections might then increase consumer welfare, such as by requiring all drivers to have a certain level of training or all properties to install certain fire-suppression equipment.

In general, regulatory schemes have set minimum service requirements when there is no other apparent mechanism to assure quality. For example, taxi regulations often require that every vehicle have climate control[73] or a certain maximum mileage.[74] Some cities approve only specific vehicle models as permissible for taxi services.[75] This approach reduces uncertainty for consumers, but it carries costs as the regulations might be poorly matched to customer requirements. Indeed, some customers may happily accept an older or less comfortable vehicle in exchange for a lower price—but regulations may remain in place long after customer needs have changed. Without an explicit price on each requirement, regulators and consumers may not see the true costs of the rules.

In contrast, software platforms largely attempt to assure quality through reputation systems. For example, a deficient vehicle is likely to be rated poorly and removed from the platform or brought to the platform administrator's attention. Similarly, Airbnb guests review hosts, alerting others to potential deficits. This approach tends to be more flexible: If a given attribute is irrelevant, service providers may recognize it as such without suffering in ratings—making ratings more responsive to actual customer needs.

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[72] On the general problems associated with information asymmetries, see George A. Akerlof, *The Market for 'Lemons': Quality Uncertainty and the Market Mechanism*, 84 Q. J. ECON. 488 (1970).

[73] *Regulations of the Orange County Taxi Administration Program*, ORANGE CNTY TAXI ADMIN. PROGRAM (July 19, 2014), http://octap.net/regulations.pdf.

[74] Kim Lyons, *Yellow Cab Not Happy with Pennsylvania PUC's New Mileage Rule*, PITTSBURGH POST-GAZETTE (Jan. 29, 2015), http://www.post-gazette.com/business/pittsburgh-company-news/2015/01/29/Yellow-Cab-not-happy-with-new-mileage-rule/stories/201501290115.

[75] *Understanding the For-Hire Vehicle Industry*, N.Y.C. TAXI & LIMOUSINE COMM'N (2015), http://www.nyc.gov/html/tlc/downloads/pdf/fhv_base_fact_sheet.pdf.

One key question is how well ratings actually work. By all indications, customers hesitate to provide negative ratings, and Uber itself has indicated that in San Francisco, only 1% of Uber drivers received one or two stars—a statistic which Uber ascribed to the high quality of rides.[76] But in fact Uber's system discourages anything less than five stars, as consumers recognize the significant penalties that a low rating can inflict.[77] Moreover, when ratings are optional, they may be unrepresentative: Airbnb's analysis indicates that non-reviewers tend to have worse experiences than customers who submit reviews.[78] Some users seem to fear retaliation through a review platform; at Airbnb, that was indeed possible for a time under historic rules,[79] though it is no longer possible under most platforms' current rules. Finally, consumers seem to find it unpleasant or otherwise costly to leave a negative rating, perhaps reflecting that hosts may know them and may be able to retaliate outside the platform (not unrealistic given the interaction between customers and software platform service providers who often learn a customer's name, home address, and more). Truthful negative information is a public good, available to all, but with no direct benefit to a contributor. These problems somewhat call into question the efficacy of rating systems.

Nonetheless, on the whole we sense rating systems are probably more effective than a quality minimum with purported centralized enforcement. If a taxi driver is rude, a passenger is unlikely to complain to a responsible regulator, not to mention achieve any follow-up or remediation. In contrast, in a transportation platform, flagging the problem can be as quick as a tap in the compulsory post-ride rating, and by all indications platforms respond with actions including in-person trainings at the driver's expense[80] as well as termination. Notably, in the areas covered by platforms' rating systems, there has been little regulatory interest and little dispute. Nor have

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76 Nairi Hourdajian, *Feedback Is A Two-Way Street*, UBER NEWSROOM (Apr. 23, 2014), https://newsroom.uber.com/2014/04/feedback-is-a-2-way-street/.

77 Olivia Ferguson, *Uber's 5-Star Inflation*, CONSUMER'S RESEARCH (Aug. 15, 2014), http://consumersresearch.org/ubers-5-star-inflation/; See Kate Kane, *The Big Hidden Problem with Uber? Insincere 5-Star Ratings*, WIRED (Mar. 19, 2015), http://www.wired.com/2015/03/bogus-uber-reviews/. As regards user ratings on Airbnb, see Georgios Zervas et al., *A First Look at Online Reputation on Airbnb, Where Every Stay is Above Average*, (forthcoming 2015)(manuscript), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2554500 (authors observing that based on their analysis of ratings they collected for over 600,000 properties listed on Airbnb worldwide, nearly 95% of Airbnb properties boast an average user-generated rating of either 4.5 or 5 stars (the maximum) with virtually none have less than a 3.5 star rating).

78 Andrey Fradkin et al., *Bias and Reciprocity in Online Reviews: Evidence From Field Experiments on Airbnb* (Sept. 7, 2015), http://andreyfradkin.com/assets/reviews_paper.pdf.

79 Harrison Weber, *Airbnb Tweaks Review Systems So Guests Don't Fear Retaliation from Hosts*, VENTUREBEAT (Aug. 11, 2014), http://venturebeat.com/2014/08/11/airbnb-tweaks-review-system-so-guests-dont-fear-retaliation-from-hosts/.

80 Jack Smith IV, *Uber Drivers: The Punishment For Bad Ratings Is Costly Training Courses*, THE OBSERVER (Feb. 3, 2015), http://observer.com/2015/02/uber-drivers-the-punishment-for-bad-ratings-is-costly-training-courses/.

regulators sought to impose on transportation platforms the requirements that vehicles be of certain makes, mileages, or ages, even where such rules plainly apply to taxis.

Yet we are struck by the divergence between requirements of standard commercial service providers and software platforms. Where a hotel must install automatic fire suppression systems such as sprinklers,[81] most private homes lack this equipment, as do many apartments. Where a hotel must install nonflammable bedding,[82] Airbnb hosts need not. Airbnb profile pages now post certain information about hosts' fire safety arrangements, giving guests information about protections in that area, but page layout makes it easy to overlook this information. As customers and platforms learn more about possible problems, platforms can share this information with prospective customers, as on Airbnb's increasingly-detailed reporting of each property's safety features. But on the whole, information remains limited, and even with increasing disclosures some customers might be better served by strong regulatory requirements rather than lengthy disclosures.

Software platforms' rating systems are likely to be effective in ensuring quality of service as to dimensions noticed by typical consumers. For example, a rude or dangerous driver is likely to be removed from a transportation platform, and a dreadful property removed from Airbnb. However, rating systems may be ineffective in protecting users against problems they cannot or do not see. For example, if a vehicle's brakes are in poor condition, they might nonetheless suffice during routine driving for numerous passengers—only to fail when most needed. Similarly, a residence's poorly-maintained heating system might suffice when temperature is mild, but could poison occupants by leaking toxic gas on a day needing substantial heat. In these cases, early consumers' experiences provide insufficient information to assess the likelihood of subsequent problems. Regulation can usefully set minimum standards to protect consumers who fail to recognize potential problems and to protect against problems prior consumers could not notice.

3. Cognitive biases

Even when users have access to relevant information, their assessment of risk may be impaired by cognitive biases which may lead them to make irrational decisions.[83] Cognitive biases may result from a variety of factors including ignoring relevant information, relying on irrelevant information, or giving excessive weight to an unimportant but salient feature of a problem. As a result of these biases, users may be pre-occupied by possibilities that, although catastrophic, are

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81 See, e.g., CAL. CODE REGS. Tit. 19, § 902 (2015).

82 See e.g. CAL. CODE REGS. Tit. 19, § 1292.1 (2015)

83 Daniel Kahneman & Amos Tversky, *On the Reality of Cognitive Illusions*, 103 PSYCHOL. REV. 582 (1996); Martie G. Haselton, Daniel Nettle & Paul W. Andrews, *The Evolution of Cognitive Bias*, *in* THE HANDBOOK OF EVOLUTIONARY PSYCHOL. 724 (2005) pp.724-746.

exceptionally unlikely (e.g., being murdered by a serial-killer driver), while users may ignore or underweight risks that are more frequent (such as injuries from unsafe driving). Similar concerns may arise in the short-term rental sector where the guests may focus their attention on problems that are salient (perhaps trying to avoid certain neighborhoods believed to have a high crime rate), while ignoring risks that are concealed (such as fire exits and heating and cooking systems).

Regulatory intervention may be desirable in such cases as users or service providers may be unable to properly assess the risks and may thus fail to take appropriate precautions. Many longstanding transportation requirements address aspects of safety that customers would struggle to assess even after a ride—for example, requiring vehicle inspection with heightened frequency or rigor. In the context of short-term lodging, regulations typically require that property owners acquire a permit verifying that a unit meets heightened requirements for short-term housing[84] such as extra exits,[85] sprinklers,[86] fire-resistant textiles,[87] and the like, as well as other safety precautions such as a deadbolt on each door, to protect a customer from an outside intruder.[88] Most consumers would struggle to assess the probability of benefiting from any of these protections. Given their lifesaving potential, it is difficult to rule out the possibility that these benefits are on net highly desirable, yet the cognitive biases literature suggests consumers are likely to underweight these benefits and forego them for small savings.

4. Providing full service including to disfavored groups

Most regulatory regimes require full service to disfavored groups, including racial minorities, low-income users, and low-income regions. Software platforms tend to circumvent these requirements, either through decentralized decision-making that favors individual preferences over government mandates, or through software implementations that otherwise do not require compliance.

A first challenge is ensuring service is available for all origins within a service region. Taxis and software platforms take notably different approaches to this task, yielding different problems. If a passenger is in a neighborhood with few taxis available on the street, most regulatory schemes require a dispatcher to send a taxi at the passenger's request. This is not necessarily a panacea: The vehicle may arrive after considerable delay or not at all. Furthermore, a driver seeing another customer along the way may have little incentive to continue to the location specified by telephone. In addition, drivers may be particularly hesitant to proceed to the dispatched location

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84 See, e.g., Portland Zoning Code § 33.207 (2015).

85 OR. FIRE CODE § 4604.18.3 (2010).

86 Portland Zoning Code § 33.207.040.

87 OR. FIRE CODE § 4604.17.5.

88 Id. at § 4601.

if they anticipate that the passenger will already have found another option or given up. But at least it is a legal entitlement, giving the passenger grounds for complaint if service falls short. In contrast, transportation platforms typically do not assure that vehicles are available in any particular area. If a passenger opens the Uber app and is told no cars are available in his area, Uber's current systems give the passenger no way to submit a special request, wait, or even complain to get a car. We note, however, that transportation platforms could adjust this approach. For example, if local regulations so required, a transportation platform could always stand willing to dispatch the nearest vehicle, however distant, in order to be able to serve every part of a region. Furthermore, a recent audit study (albeit funded by Uber) found that Uber vehicles arrived more quickly than taxis even in low-income neighborhoods.[89]

A second challenge is ensuring that a driver transports a passenger to any destination the passenger specifies. Here, transportation platforms seem to have a significant advantage over taxis as electronic communication systems make it easy to reveal information in the desired sequence. As currently structured, first a passenger requests a ride; then driver accepts and begins to proceed to the passenger's location; and only after the driver accepts a request (typically through the app, or alternatively orally) does the driver learn the passenger's destination.[90] A driver might seek to reject the passenger's destination, but he would need some reason to do so—and pretextual reasons would typically be revealed as such, particularly given transportation platforms' expectation that substantially all rides will come to fruition. In contrast, a roadside hail makes it easy for a taxi driver to reject a request to a disfavored destination. A passenger complaining to a fleet owner or regulator could quote a driver's medallion number or license plate number, but there would be no written evidence to inform an investigation, giving drivers effective impunity to proceed as they wish.

Transportation platforms raise additional questions in the need to serve passengers with disabilities. In most cities, fleet operators are required to provide a proportion of vehicles that can accommodate wheelchairs. The costs of these accommodations are typically spread across all customers. For example, in New York City, a $0.30 surcharge on each taxi ride is intended to pay for the additional costs of 7,500 wheelchair-accessible vehicles by 2020.[91] In other cities, there may be no explicit surcharge, but fare adjustment discussions reflect the higher costs from

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89 Rosanna Smart et al., *Faster and Cheaper: How Ride-Sourcing Fills a Gap in Low-Income Los Angeles Neighborhoods*, BOTEC ANALYSIS CORP. (July 2015), http://botecanalysis.com/wp-content/uploads/2015/07/LATS-Final-Report.pdf.

90 Lucy, *Ride Like a Pro*, UBER NEWSROOM (Jan. 14, 2015), https://newsroom.uber.com/central-coast/2015/01/ride-like-a-pro/.

91 See Rules of the City of N.Y. tit. 35 § 82-26(a)(1)(i), http://rules.cityofnewyork.us/content/section-82-26-operations-rates-and-tolls (last visited Nov. 24, 2015). The posted rules have not been updated since the $0.30/ride surcharge was passed and implemented, but see *Important Notice Regarding Upcoming Taxicab and SHL Improvement Surcharges*, N.Y.C. TAXI & LIMOUSINE COMM'N (Oct. 30, 2014), http://www.nyc.gov/html/tlc/downloads/pdf/industry_notice_14_43.pdf

accessible vehicles.[92] In contrast, transportation platforms typically use drivers whose vehicles cannot accommodate wheelchairs.

Broadly similar questions arise in the context of short-term accommodations. Hotels are usually required to provide a certain proportion of wheelchair-accessible rooms[93] as well as other services for customers with disabilities.[94] By all indications these rooms are somewhat less profitable than others—hotels seem to build the minimum required, and where these facilities are not required, hotels may not provide them at all. Thus it is little surprise that Airbnb has few wheelchair-accessible properties.[95] Indeed, nothing guarantees that Airbnb will provide them at all, as short of any regulatory obligation, Airbnb and its hosts have no incentive to do so.

For each of these requirements, the fundamental question is whether software platforms should be subject to affirmative obligations to serve all customers (such as transportation from all origins to all destinations, or accommodating customers with disabilities), requirements which for brevity we refer to as "universal service."[96]

We see two distinct ways to assure universal service in the context of software platforms. First, regulation could require software platforms to provide their fair share of universal service, probably at the same proportion required of incumbents. This would end the price distortion between software platforms and incumbents, and it would assure full accessibility of software platforms to all interested customers. One notable challenge is implementing proportional requirements within the architecture of software platforms. If a fleet owner owns 20 taxis, it is easy to require that one be wheelchair-accessible; but a typical Uber driver drives only a single car, and a typical Airbnb host owns a single property, both indivisible. One might instead mandate that the software platform in some way achieve the specified proportion of accessibility, probably by incentive payments to providers. In fact, transportation platforms already offer bonuses of $500 or more to new drivers, so large bonuses for wheelchair-accessible vehicles are

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92 John Rawlins, *First Wheelchair Accessible Philadelphia Taxis Unveiled*, 6 ABC NEWS (July 2, 2015), http://6abc.com/travel/first-wheelchair-accessible-philadelphia-taxis-unveiled/824647/.

93 *ADA Checklist for New Lodging Facilities*, U.S. DEPT. OF JUSTICE, (Oct. 2, 2001), http://www.ada.gov/hsurvey.htm.

94 *A Guide to ADAAG Provisions*, U.S. ACCESS BOARD (2015), http://www.access-board.gov/guidelines-and-standards/buildings-and-sites/113-ada-standards/background/adaag/422-a-guide-to-adaag-provisions.

95 Bruce Golding, *Airbnb Spots Dupe the Disabled on Accessibility: Advocates*, NEW YORK POST (Nov. 3, 2014), http://nypost.com/2014/11/03/airbnb-spots-dupe-the-disabled-on-accessibility-advocates/.

96 This term matches longstanding obligations that utilities provide service at reasonable price and quality, throughout a given territory. While largely similar requirements sometimes apply in transportation, geographic coverage is unusual in the hotel sector, as hotels are typically free to decide where to operate, and at what price. Nevertheless, hotels are subject to other service requirements, notably including facilities to accommodate people with disabilities.

not out of the question.[97] Transportation platforms would spread the resulting costs across all customers, just as incumbent taxis and hotels spread their accessibility costs.

Alternatively, it might be equally viable for public authorities to designate a universal service provider and, to the extent needed, compensate that operator for the costs of providing that service. The costs of universal service can then either be funded through special taxes on the sector concerned or general taxation. "Paratransit" operators already assist customers with disabilities in many North American cities, and this might be a natural expansion for those operators.[98] We anticipate that some would find this approach less promising as it entails greater government intervention and seems less likely to capture technological advances and resulting efficiencies. But it might be necessary if software platforms prove incapable of accommodating customers with special needs.

Failing such an intervention, we note the distortions of asymmetric regulation. For example, a passenger who takes a New York City taxi pays a wheelchair surcharge on every ride, while a passenger who chooses a transportation platform for the same ride pays no such surcharge. As some passengers shift to transportation platforms, that leaves fewer to pay costs of wheelchairs—and if fixed wheelchair expenses then have to be spread across fewer taxis and fewer rides, there may even be pressure to increase the surcharge to achieve the required revenue. Notably, this regulatory environment could allow transportation platforms to take market share from taxis not because they are genuinely preferable or have a genuine cost advantage, but because they allow passengers to circumvent regulatory requirements that benefit others.

Moreover, economic incentives seem to discourage platforms and their service providers from accommodating disfavored groups. Suppose the cost of an accessible unit is 20% above the cost of a standard unit (due to wider doors and hallways implying a larger space, special fixtures, design consultants, and the like). When a wheelchair customer books a hotel, this cost is averaged across all guests at the hotel, making the wheelchair customer's share virtually zero. In contrast, at Airbnb the wheelchair user would pay the entire cost of the additional space and fixtures. If that cost exceeds Airbnb's cost advantage over the hotel, the wheelchair customer will rationally choose to use a hotel instead. So too for an Uber driver who would receive no additional compensation for buying a special (and more expensive) wheelchair-capable vehicle. Facing these incentives, hosts and guests have every reason to eschew costly efforts to accommodate customers with special needs.

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97 Alex, *We'll Bet $500 You'll Like Driving With Uber*, UBER NEWSROOM (May 1, 2014), http://newsroom.uber.com/2014/05/well-bet-500-youll-like-driving-with-uber/.

98 Richard Weiner, *Integration of Paratransit and Fixed-route Transit Services*, TCRP SYNTHESIS 76 (2008), http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_syn_76.pdf.

A final set of universal service concerns arise from the prospect of discrimination. By law, U.S. hotels cannot discriminate on the basis of race, color, religion, or national origin.[99] Hotel business processes embody this requirement by accepting customer reservations without regard to those factors. But software platforms decentralize decisions about a prospective guest's eligibility for accommodation—letting individual hosts screen individual guests in a way that has been shown to correlate with guest race.[100] Whatever the benefits of a host seeing a guest's name and photo, we wonder whether photos are necessary in light of the risk of discrimination. Airbnb already advises a host that a prospective guest has a certain reputation from prior stays, with certain level verification of phone number, address, social network identity, and the like. With this information, there may be little benefit from adding the guest's name and photo. Here too, we note that the electronic contracting environment can do much to fix longstanding problems: Some African Americans report great difficulty hailing cabs, whereas some report greater success with transportation platforms.[101] But even this is not guaranteed; if a transportation platform made a passenger's race salient (through name and face), it might facilitate the same discrimination passengers previously faced offline.

C. Raising revenue

Governments must raise revenue for required public functions. Among governments' revenue-raising strategies are taxes on most goods and services, and it is difficult to see a principled basis why transactions facilitated by a software platform (such as short-term accommodations and transportation) should be exempt. Yet decentralization of software platforms makes it easy to circumvent these obligations: If a software platform does not collect the tax itself and does not in some way compel its participants to pay, the tax is likely to go unpaid, and it will typically be infeasible for tax authorities to identify those who are required to pay.

This problem first played out in Airbnb in New York, when the city questioned whether or not Airbnb should be required to comply with the 5.875 percent hotel room occupancy tax, which accounts for about one percent of the city's tax revenue.[102] Similar issues erupted shortly thereafter in San Francisco, New Orleans, Malibu, Berlin, and Barcelona, among other cities.[103] In each instance, software platforms allowed hosts to provide rooms without collecting or remitting tax, until regulators noticed the problem and insisted that tax be paid. Airbnb now

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99 42 U.S.C.A, § 2000a (West 2015).

100 Benjamin Edelman, Michael Luca, & Daniel Svirsky, *Discrimination by Airbnb Hosts* (forthcoming).

101 Jenna Wortham, *Ubering While Black*, MEDIUM (Oct. 23, 2014), https://medium.com/matter/ubering-while-black-146db581b9db.

102 Roberta A. Kaplan & Michael L. Nadler, *Airbnb: A Case Study in Occupancy Regulation and Taxation*, 82 UNIV. CHI. L. REV. DIALOGUE 103 (2015).

103 Will Coldwell, *Airbnb's Legal Troubles: What Are the Issues?*, THE GUARDIAN (July 8, 2014), http://www.theguardian.com/travel/2014/jul/08/airbnb-legal-troubles-what-are-the-issues.

collects and remits tax in 16 cities.[104] That said, Airbnb's remittances notably omit host names and addresses to regulators, thereby impeding regulators' further investigations of zoning, safety, or other potential concerns.[105]

Similarly, transportation services are often taxed to raise revenue for public functions. Often, transportation permits serve not merely an administrative or oversight function, but also a means of raising revenue. For example, in 2014 New York City collected $359 million in revenue by selling 350 taxi licenses,[106] while other cities charge fees based on vehicle revenue.[107] Circumventing the need for such permits, transportation platforms thus withhold the corresponding revenue from cities. A notch closer to traditional taxes, some municipalities collect fees on each ride, as in the New York City $0.50 tax per trip for all trips originating in New York City.[108] The parties to a software platform-mediated transaction have every reason to applaud circumvention of governmental revenue-raising as they are willing buyers and sellers, with no particular incentive to pay tax. Yet there may be distinctive reasons to tax these sectors. First, transportation services appear to cause a negative externality through congestion. Each vehicle on the road slows the progress of others, and commercial vehicles are likely to distinctively frequent the congested city centers where this effect is largest. Congestion is a natural basis for taxation and an instance in which tax can, in principle, be particularly efficient as it both raises required government revenue and also reduces a negative externality. We note the limits to this argument. Taxing transportation platforms could reduce their operation and cause consumers to substitute downwards into mass transit, but these taxes could also cause consumers to retain private vehicles rather than switch to transportation platforms, probably increasing distance traveled and congestion. So far as we know, no empirical research compares these effects.

In addition, both short-term accommodations and transportation platforms face taxes that resonate with a fee-for-service model of taxation. Taxing short-term accommodations lets cities collect revenue from tourists who consume local amenities that are publicly financed. Similarly, transportation platform vehicles use shared roadways, and fuel tax covers only a portion of roadway construction and maintenance costs,[109] additional charges help to cover the service

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104 *In What Areas is Occupancy Tax Collection and Remittance by Airbnb Available?*, AIRBNB, https://www.airbnb.com/help/article/653/in-what-areas-is-occupancy-tax-collection-and-remittance-by-airbnb-available (last visited Nov. 20, 2015).

105 Ari Levy & Henry Goldman, *Airbnb: To Tax or Not Tax a Rented Bed*, BLOOMBERG BUSINESS (Sept. 27, 2012), http://www.bloomberg.com/bw/articles/2012-09-27/airbnb-to-tax-or-not-tax-a-rented-bed.

106 Thomas DiNapoli & Kenneth Bleiwas, *Review of the Financial Plan of the City of New York*, STATE OF N.Y. COMPTROLLER 16 (July 2011).

107 See, e.g., Santa Rosa Cal. Ordinance No. 3964 (2011) (setting a 2% franchise fee).

108 N.Y. TAX LAW § 1280 (McKinney 2015).

109 Angie Schmitt, *Updated: Drivers Cover Just 51 Percent of U.S. Road Spending*, STREETSBLOG USA (Jan. 23, 2013), http://usa.streetsblog.org/2013/01/23/drivers-cover-just-51-percent-of-u-s-road-spending/.

used. Whatever one thinks of this rationale for tax, it is hard to see why software platforms alone should be exempt.

D. The feasibility of regulating software platforms

A possible objection to any regulation of software platforms is that they either cannot be regulated or as a matter of law should not be liable for conduct of others. In our view, neither concern importantly impedes legal interventions that are otherwise appropriate.

Software platforms tend to provide service through electronic interfaces without significant physical facilities. That said, most platforms nonetheless seek to provide some staff in each region where they operate—for example, Uber country managers and city managers who oversee local advertising, recruit drivers, and otherwise implement the company's strategy. These staff, along with supporting office space, local bank accounts, and other company assets in each city and country, provide a natural basis for jurisdiction as well as an immediate means to enforce a judgment. Indeed, France used exactly this approach, including arresting Uber France's CEO and Uber Europe's General Manager.[110] One might debate the propriety of an arrest under these circumstances, but certainly Uber does not seem to be able to escape French law by reason of being headquartered in another country.

A separate question is whether platform operators are, or should be, liable for the activities their platforms coordinate or facilitate. If platforms' service providers were deemed to be employees (as various litigation has alleged,[111] though with no major rulings to date), platforms would be responsible for employees' activities under the well-established principle of *respondeat superior*.[112] Otherwise, in principle this could be a question of secondary liability.[113] For example, Uber has argued that it is no more liable for its drivers' conduct than an online travel agent is liable for problems at a hotel it markets.[114] But in practice, applicable laws seem to be broad enough to encompass a software platform's efforts to connect consumers to service providers. For example, the California Public Utilities Commission found that it has jurisdiction to regulate passenger transportation over public roadways even when that service is facilitated

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[110] Claire Groden, *Two Uber Executives Arrested in France*, FORTUNE (June 29, 2015), http://fortune.com/2015/06/29/uber-executives-arrested/

[111] See, e.g., O'Connor v. Uber Technologies Inc., 82 F.Supp.3d 1133 (N.D. Cal. 2015).

[112] *Respondeat superior* is a common-law doctrine that makes an employer liable for the actions of an employee when the actions take place within the scope of employment. In the context of transportation, see 41 AM. JUR. PROOF OF FACTS 2D 239 § 3 (1985).

[113] Secondary liability arises when a party materially contributes to, facilitates, induces, or is otherwise responsible for infringing acts carried out by another party. See Giuseppe Dari Mattiacci & Francesco Parisi, *The Cost of Delegated Control: Vicarious Liability, Secondary Liability and Mandatory Insurance*, 23 INT'L REV. L. & ECON. 453 (2003).

[114] *Comments of Uber Technologies Inc.*, Pub. Util. Comm'n of the State of Cal. Rulemaking 12-12-011, 7 (Jan. 28, 2013), http://www.taxi-library.org/cpuc-2013/uber.pdf.

through a software platform[115] and that transportation platforms are *directly* subject to its jurisdiction because they allow consumers to request rides and because they collect funds from customers.[116] Nor has any other applicable regulator declared itself unable to oversee activity mediated by a software platform, and no court has so held.

Finally, we note that software platforms need not be in any important sense "above the law," and in some ways they facilitate implementation and enforcement of the law. With comprehensive electronic records of who did what—for example, every Uber ride and every Airbnb stay—platforms create a virtual roadmap of users' activity. Indeed, platforms' records tend be both granular and well-organized. For example, Uber records about a driver report the number of pickups, total amount earned, starting locations, ending locations, and even rates of speed, facilitating all manner of legal investigations and proceedings. In contrast, offline intermediaries typically receive much less information about the activities of suppliers and customers. The organizer of a "flea market" might know the names of participating sellers, but it would be unlikely to have records—not to mention systematic databases—of who sold what.[117] Platforms similarly offer the promise of greater control. A fleet operator would struggle to limit where drivers pick up passengers, but a software platform can easily declare certain areas off-limits—then enforce that rule through GPS and software logic. Similarly, software platforms tend to call for electronic transactions which are easily tracked and totaled, in contrast to cash payments which can easily be underreported to avoid tax. On the whole, software platforms are likely more amenable to regulation, not less.

IV. A Way Forward

The time is right to remove arbitrary legal interventions and the requirements they impose on both service providers and software platforms. Removing these requirements will allow service providers and users to benefit from the many efficiencies generated by modern software platforms. This will in turn trigger the development of new and improved services with better quality and convenience at reduced cost. At the same time, regulatory requirements should be maintained (or, indeed, created) when they are necessary to correct market failures or promote important public policy objectives.

Furthermore, if software platforms are *de facto* exempt from requirements that apply to longstanding providers, market activity will predictably move to the new, unregulated sphere—making the requirements simultaneously irrelevant and ineffective. We are skeptical of any

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[115] Decision Adopting Rules and Regulations to Protect Public Safety While Allowing New Entrants to the Transportation Industry, PUB. UTIL. COMM'N OF THE STATE OF CAL. (Sept. 23, 2013), http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M077/K192/77192335.PDF; Id. at 13.

[116] *Id.* at 15-16.

[117] Fonovisa, Inc. v. Cherry Auction, Inc., 76 F.3d 259 (9th Cir. 1996).

requirement that exists only as black-letter law without political will for enforcement; with only law but no enforcement, complying becomes a sucker's game, and firms naturally react by ignoring unenforced rules.

There is likely to be more disagreement as to the requirements we enumerated in Section IV. For each of these requirements, opponents will find the rule unduly burdensome, impractical or irrelevant, and these critiques may ring true if the requirements are not properly calibrated. The status quo for software platforms may be to ignore these rules, and platforms will likely resist any requirements that limit their options or increase their costs. But if software platforms find that they cannot compete successfully when rules are evenhandedly enforced on all firms, perhaps they should not in fact prevail in the marketplace.

Whereas many complaints about other software platforms have been grounded in dominance of one large firm,[118] to date the platforms here at issue appear to be relatively competitive. Uber may be well-known, but Lyft provides a viable number two in many US cities, and similar services are relatively strong in other countries. In addition, nothing prevents taxi companies from embracing the dispatch and billing technologies that are used by Uber and Lyft, and they have done so in some cities. Similarly, Airbnb faces VRBO and HomeAway, among others. In principle, both consumers and service providers can use multiple services (multi-homing), which suggests that multiple services should remain viable over time.[119] In that case, competition among services may dissipate some of the profits that would otherwise accrue to a dominant platform.

Notably, even the harshest critics of software platforms seem to embrace certain services. When a software platform provides only the efficiencies we describe in Section II, but does not generate the type of negative externalities discussed in Section III, the platform is positioned for adoption with little or no objection. For example, RelayRides lets anyone rent a car when not needed. With insurance properly provided, it is difficult to see who is harmed. Indeed, if these services reduce the number of vehicles and parking spots, it is easy to see how everyone is made better off. Similarly, InstaCart and TaskRabbit let almost anyone provide shopping or miscellaneous services; Kitchensurfing helps dinner party hosts find private chefs; LawnStarter books gardeners; Handybook, home repair; Uship, packers and movers; and the list goes on. These services raise questions about classification of workers as employee versus independent contractor,[120] and about the relationship between worker and booking service (such as disputed

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118 See, e.g., Commission Decision COMP/C-3/37.792 Microsoft, C(2004)900, http://ec.europa.eu/comm/competition/antitrust/cases/decisions/37792/en.pdf.; COMP/C-3/39.740 Foundem and others, http://ec.europa.eu/competition/antitrust/cases/dec_docs/39740/39740_502_8.pdf (as to conduct of Google).

119 Toker Doganoglu & Julian Wright, *Exclusive Dealing with Network Effects*, 28 INT'L J. INDUS. ORG. 145 (2010).

120 *O'Connor*, 82 F.Supp.3d 1133.

opportunity for advancement).[121] But these services present few possible harms to others, and it is appropriate that they have prompted correspondingly few serious critiques.

Disputes are far more likely when a service combines efficiencies with regulatory runaround. Airbnb may be handy—but when it flouts zoning rules and short-term occupancy taxes, detractors are inevitable. Similarly, Uber or Lyft may offer low-cost, polite, and reliable service—but if drivers are underinsured or committing insurance fraud, anyone harmed is likely to cry foul. Notably, when these services take regulatory shortcuts, it is difficult to know whether the services gain traction through genuine excellence and efficiency, or through regulatory arbitrage. A consumer may praise Airbnb and cite its lower prices—but if Airbnb is only 10% cheaper than a hotel room in a city with 15% occupancy taxes that Airbnb does not collect, Airbnb's supposed cost advantage would more than disappear if regulations were applied equally to all. That said, in important respects, both Uber and Airbnb are closing these gaps, including Uber's ending of the insurance gap and Airbnb remitting tax in increasingly many cities. To truly prove their excellence, these services should compete on a level playing field—which means foregoing advantages grounded in ignoring the law.

A final rationale for a level playing field, including equal enforcement of rules no matter a service's architecture, is the ultimate importance of the rule of law in structuring economic relationships. What is a legally-licensed and properly-insured driver to think when an Uberized competitor undercuts his prices by foregoing those precautions and the associated expenses? Will that driver then respect the rule of law when it comes time to pay income tax, to serve on a jury, or to live up to his numerous other duties under law? We have our doubts. Here, the injury occurs both at the hand of the firm that flouts the law, and at the hand of the regulator that allows it. We see ample reason for some laws to be liberalized, or for enforcement to be officially suspended. But if so, let that be done across the board and subject to the proper democratic processes. In contrast, if regulatory inaction creates a *de facto* exemption for software platforms that ignore longstanding laws, the ultimate victim is the legal system itself.

[121] Umair Haque, *The Servitude Bubble*, MEDIUM (June 8, 2015), https://medium.com/bad-words/the-servitude-bubble-c9e998c437c6.