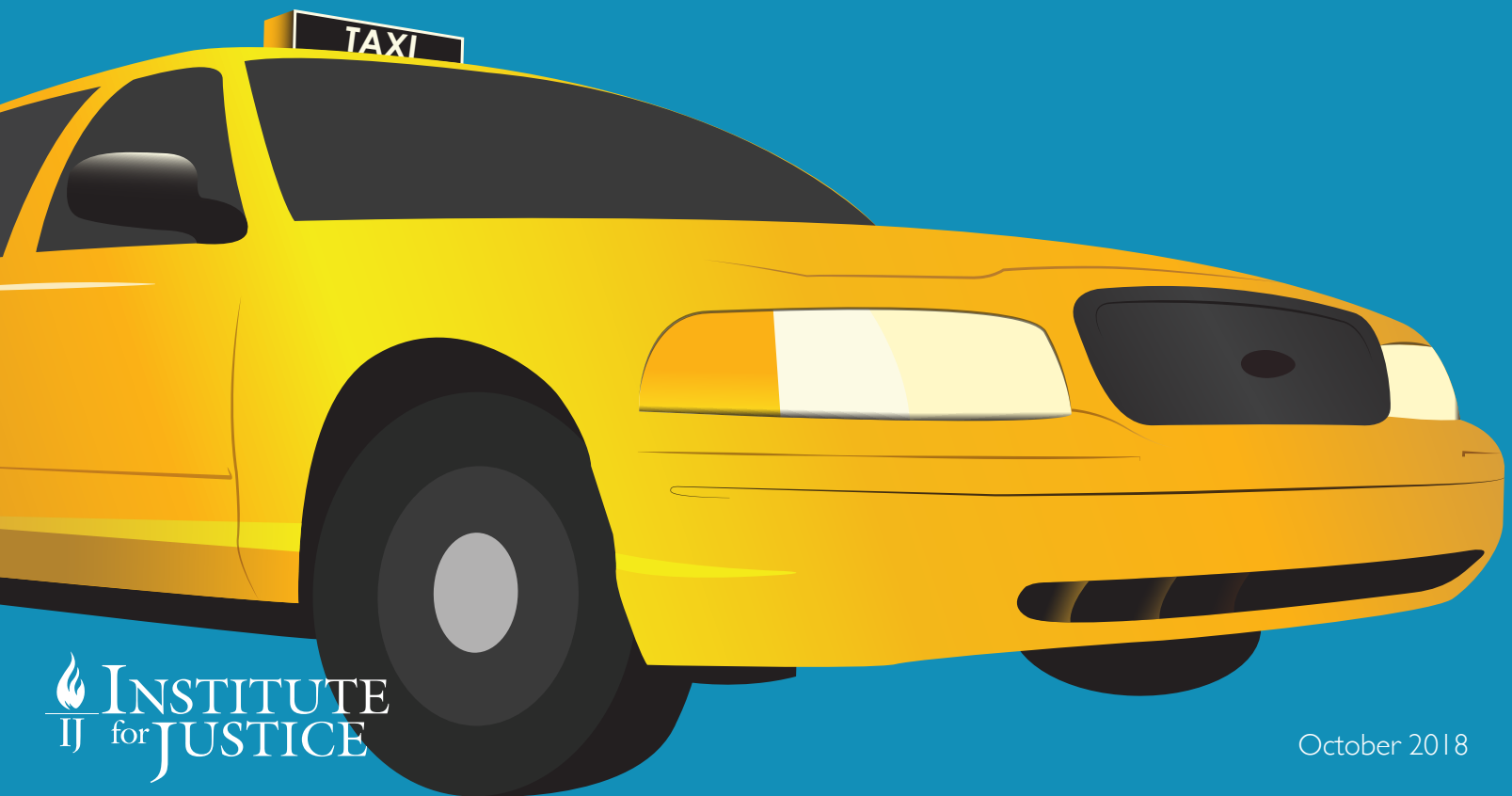# Regulatory Overdrive

Taxi Regulations, Market Concentration and Service Availability

by Samuel R. Staley, Ph.D., Catherine Annis and Matthew Kelly

INSTITUTE
IJ for JUSTICE

Regulatory Overdrive

Taxi Regulations, Market Concentration and Service Availability

Executive Summary

Traditional taxis are highly regulated in most American cities, with local regulators determining everything from how many taxis can be licensed to the types of services they can provide to the fares they can charge to where they can pick up customers. Ridesharing apps like Uber and Lyft, meanwhile, operate with comparatively few regulatory constraints, and there is little reason to believe consumers are faring any worse for it. In fact, consumers are increasingly voting with their feet—or phones—and choosing ridesharing services over taxis. This prompts an important policy question: Does traditional taxi regulation make sense in a world with ridesharing?

To begin to answer this question, this study reviews the taxi regulations and market characteristics of 44 major U.S. cities. Specifically, it explores (1) the relationship between taxi regulations and concentration of ownership within a city's taxi industry and (2) the relationship between concentrated ownership and taxi availability.

Key findings include:

- All 44 cities studied regulate taxis tightly, adopting five of 10 major regulatory provisions on average, but the specific regulations they use vary widely. This suggests cities are making taxi policy absent a common understanding of what regulatory provisions, if any, are necessary to protect consumers.

- Taxi markets tend to be highly concentrated. In the average city, the top three taxi firms control about 61 percent of the taxi vehicles operating there. In comparison, the top four fast food firms together enjoy only about 35 percent market share.

- Taxi regulations likely contribute to lower levels of competition in taxi markets, with some regulations—specifically, permitting schemes for taxi companies and rules explicitly requiring permit applicants to prove public need for their proposed services—being associated with more concentrated ownership of taxi vehicles.

- Higher levels of market concentration are associated with lower availability of taxis. In the typical city, a 10 percent increase in ownership concentration is associated with 222 fewer vehicles and 18 fewer taxi companies to serve consumers.

These findings suggest taxi regulations may limit competition within the traditional taxi industry and may result in worse outcomes for consumers—less choice among taxi companies and fewer taxis on the streets. To the extent cities continue to heavily regulate traditional taxis, ridesharing services will likely further erode the economic viability and market share of traditional taxis. To increase competition and choice, cities should eliminate taxi regulations that serve only to thwart competition. They should also take lessons from their experiences with taxis to avoid making the same mistakes when it comes to regulating ridesharing and other innovative transportation services.

Introduction

When the Uber ridesharing app launched in 2010,[1] it sparked a revolution in the taxi industry in the United States and abroad. Uber and other ridesharing services like Lyft are peer-to-peer services that use smartphone technology to match riders with drivers. Ridesharing services also allow riders and drivers to rate each other, a feedback mechanism designed to incentivize good behavior on the part of both parties. Consumers have responded to this market innovation enthusiastically. In 2017, Uber and Lyft accounted for 68 percent of business travelers' ground transportation transactions. Traditional taxis accounted for only 7 percent.[2]

The reasons ridesharing services are outcompeting traditional taxis are likely numerous, but one of those reasons is almost certainly taxi regulation. While ridesharing services operate with relatively few regulatory constraints,[3] traditional taxis continue to be highly regulated in most American cities. Local regulators determine everything from how many taxis can be licensed to the types of services they can provide to the fares they can charge to where they can pick up customers. Such rules not only likely hinder taxis' ability to compete with ridesharing services, they also likely hinder competition within the taxi industry. Ken Leininger's story is illustrative.

After years working as a driver for Yellow Cab—Little Rock's only taxi company—Ken decided it was time to strike out on his own. In 2015, he founded Ken's Cab, a green taxi company that would use only hybrid vehicles and offer friendly, reliable service in and around Little Rock. There was only one problem: When he applied for taxi permits in Little Rock, Ken learned that Yellow Cab's monopoly on the city's taxi market was guarded by the government's "public convenience and necessity" (PCN) law.

Little Rock's PCN law—like PCN laws in other cities—blocked new taxi companies from entering the city's transportation market unless they could prove that (1) there was unmet demand that could only be satisfied by giving them—and not Yellow Cab—permits and (2) the added competition would not harm Yellow Cab's bottom line. Any objection from Yellow Cab meant a permit application would be rejected. Thus it was for Ken.[4] Ken's Cab was

shut out of Little Rock, preserving Yellow Cab's monopoly. This result was clearly a loss for Ken and his fledgling company; it was also a loss for existing and prospective taxi drivers who still had only one choice of taxi company employer and for consumers who still had only one choice of taxi service provider.[5] It was arguably even a loss for Yellow Cab: In the absence of competitive pressure from other taxi companies, it had for years faced little incentive to improve its services, likely leaving it unprepared for the competition posed by Uber when it entered the Little Rock market in 2014.[6]

Despite the costs of traditional taxi regulation, proponents often justify it with appeals to consumer protection. But there is little reason to believe the relative lack of regulation of ridesharing services is harming consumers of those services. On the contrary, surveys of Uber customers show they often choose ridesharing services because of shorter wait times and greater reliability and consistency.[7] The success of ridesharing therefore prompts an important policy question: Does traditional taxi regulation make sense in a world with ridesharing?

To more fully understand the nature of traditional taxi regulation and its relationships to competition and service availability, we examined the relationship between taxi regulations in 44 major U.S. cities and market concentration within the taxi industry and, in turn, the relationship between concentration and the availability of taxis in a market. Key findings include:

- Taxi regulations vary widely, suggesting cities are making taxi policy absent a common understanding of what regulations, if any, are necessary to protect consumers.

- Taxi regulations likely contribute to lower levels of competition in taxi markets, with some regulations being associated with more concentrated ownership of taxi vehicles.

- Ownership of taxi vehicles tends to be concentrated in the hands of a few companies, and higher levels of market concentration are associated with lower availability of taxis.

These findings suggest taxi regulations limit competition within the traditional taxi industry and therefore the ability of taxis to compete with ridesharing services. Taxi regulations also likely result in fewer taxis on the streets to serve consumers. To increase competition and choice, cities should eliminate any and all taxi regulations that serve only to thwart competition.

Taxi Regulation in the United States

Public convenience and necessity (PCN) laws are just one of the many regulations governing traditional taxis in major U.S. cities. For example, although Little Rock's PCN law was struck down as unconstitutional after Ken joined with the Institute for Justice (IJ) to sue the city in 2016,[8] a number of other taxi regulations remain on the books. The city imposes a number of fees as well as airport surcharges, sets the rates taxis can charge, and must approve all rate changes that fall within this designation.[9]

Little Rock's example illustrates the substantial regulatory barriers traditional taxis face in cities across the United States. To more fully understand the nature of taxi regulation, we reviewed a 2013 IJ catalogue of the municipal codes of 44 of the nation's 50 largest cities to identify specific regulations on taxi companies, vehicles and drivers.[10] The study identified scores of regulations, from detailed requirements on taxi signage to citywide caps on the number of taxi vehicles allowed to operate. (See Appendix B for details on data collection and methodology.)

Of these regulations, we identified 10 that are the most prevalent and, according to academic research, case studies and expert experience, the most likely to affect competition in the taxi market. (See Appendix A for a survey of studies on taxi regulation). These regulations, listed in Table 1, included permitting requirements, mandated fares and surcharges, caps on vehicles and companies, medallion entitlements, and PCN laws.

Results show that nearly all of the 44 cities in our sample regulate traditional taxis tightly. Of the 10 major regulatory provisions identified, the cities adopted five on average. Honolulu, Jacksonville (Florida) and Omaha (Nebraska) adopted the fewest with three, while Las Vegas and Oakland (California) adopted the most with eight. The specific regulations used in each city vary widely. Indeed, no single regulation is used in every city.

Some cities permit taxi companies, vehicles, drivers or any combination thereof. Others place caps on the number of taxi companies or vehicles that can operate. Still others allow vehicle permit holders to transfer or lease permits to others, often as part of a medallion system. Beyond permits, caps and medallion systems, most cities set fares based on distance traveled. Almost half of the cities studied require proof of public convenience and necessity before they will issue new taxi company or vehicle permits, and most of those cities either implicitly or explicitly allow existing companies to protest applications from aspiring new competitors. All told, we found:

- Eighty-six percent (38) required taxi drivers to operate with a permit.

- Eighty-six percent (38) fixed fares by statute.

- Seventy-seven percent (34) imposed surcharges on airport taxi rides.

- Sixty-six percent (29) required taxi vehicles to operate with a permit.

- Sixty-four percent (28) required taxi companies to operate with a permit.

- Forty-one percent (18) capped the number of taxi vehicles allowed to operate.

- Forty-one percent (18) required proof of public convenience and necessity.

- Twenty percent (9) required taxi operators to buy medallions—a transferable legal entitlement to operate a taxi.

- Sixteen percent (7) explicitly put the burden of proving public convenience and necessity on the applicant.

- Five percent (2) capped the number of taxi companies allowed to operate.

Table 1: Prevalence of 10 Major Types of Taxi Regulations in Large U.S. Cities

	Permit Companies	Permit Vehicles	Permit Drivers	Fixed Fare	Airport Surcharge/ Flat Fee/ Min. Fare/ Above Standard Rates	Cap on Companies	Cap on Vehicles	PCN	Proof of PCN Burden Borne by Applicant	Medallions
Albuquerque, N.M.	×				×			×	×	
Arlington, Texas	×			×	×			×		
Atlanta	×	×	×	×	×		×			
Austin, Texas	×			×	×	×			×	
Baltimore		×	×	×	×					
Boston		×	×	×	×		×			×
Charlotte, N.C.	×	×	×	×						
Chicago	×	×		×	×		×			×
Colorado Springs, Colo.	×		×		×			×		
Columbus, Ohio	×		×	×	×		×	×		
Dallas	×		×	×	×		×	×		
Denver	×		×		×			×		
District of Columbia	×	×	×	×	×					
El Paso, Texas	×		×	×	×			×	×	
Fort Worth, Texas	×		×	×	×					
Fresno, Calif.		×	×	×				×		
Honolulu		×	×	×						
Houston		×	×	×	×		×			
Indianapolis		×	×	×	×					
Jacksonville, Fla.		×	×							×
Kansas City, Mo.		×	×	×			×			
Las Vegas		×	×	×	×		×	×	×	×
Long Beach, Calif.	×		×	×				×	×	
Los Angeles	×	×	×	×	×					×
Louisville, Ky.	×	×	×	×	×					
Memphis, Tenn.	×		×	×	×			×	×	
Miami		×		×	×		×			×
Milwaukee		×	×	×	×		×			

(cont.)

Table 1: Prevalence of 10 Major Types of Taxi Regulations in Large U.S. Cities (cont.)

	Permit Companies	Permit Vehicles	Permit Drivers	Fixed Fare	Airport Surcharge/ Flat Fee/ Min. Fare/ Above Standard Rates	Cap on Companies	Cap on Vehicles	PCN	Proof of PCN Burden Borne by Applicant	Medallions
Minneapolis		×	×	×	×					
Nashville, Tenn.	×		×	×	×		×	×		
New York		×	×	×	×		×			×
Oakland, Calif.	×	×	×	×	×		×	×		×
Oklahoma City	×		×	×	×			×		
Omaha, Neb.	×		×	×						
Portland, Ore.	×	×	×	×	×		×			
Raleigh, N.C.		×	×	×	×					
Sacramento, Calif.	×	×	×				×			
San Antonio	×	×		×	×		×	×	×	
San Diego		×	×	×	×	×		×		
San Francisco		×	×	×	×		×			×
San Jose, Calif.	×		×	×	×			×		
Seattle	×	×	×	×			×			
Tulsa, Okla.	×	×	×		×					
Virginia Beach, Va.	×	×	×	×				×		
Number of Cities with Each Regulation	28 (63.6%)	29 (65.9%)	38 (86.4%)	38 (86.4%)	34 (77.3%)	2 (4.5%)	18 (40.9%)	18 (40.9%)	7 (15.9%)	9 (20.5%)

Such variation suggests cities regulate traditional taxis absent a common understanding of how taxi markets work and what regulations, if any, are necessary to protect the public, let alone a practical examination of the impact of regulations on market efficiency.

This inconsistency suggests a type of ad hoc policymaking that often develops from local political interests, as our case studies of Milwaukee and Minneapolis on pages 7 and 10 illustrate and as economic theory predicts.[11] Such policymaking too often results in regulations that do little to protect the public but plenty to protect incumbents from competition. Indeed, to return to our Little Rock example, proponents of that city's PCN law argued it was necessary for the "peace, health and safety of the public."[12] In practice, however, and as the city's Board of Directors has acknowledged,[13] the PCN law did little more than create and preserve a monopoly for Yellow Cab. This is because the law (1) left interpretation of the phrase "public convenience and necessity" to the city's Board of Directors and (2) provided for a hearing system that stacked the deck in favor of Yellow Cab, essentially giving it the power to veto prospective competitors. Yellow Cab had to be notified of hearings on any applications for new permits and allowed to testify about how the issuance of new permits would hurt it. And the Board of Directors was required to give heavy consideration to such objections.[14] This hurdle was practically impossible for applicants to clear.

Our case studies of Milwaukee and Minneapolis show that this problem is not unique to Little Rock. In both of those cities, taxi regulations stifled competition, allowing a small number of companies to dominate the market—and reducing service levels for customers. But are the experiences of Little Rock, Milwaukee and Minneapolis the exception or the rule? To begin to answer this question, we conducted an empirical analysis of the relationship between the 10 major taxi regulations on taxi vehicle ownership and, in turn, the relationship between concentrated taxi vehicle ownership and taxi availability.

Case Study: Milwaukee

Once a bottleneck on entry into a taxi market is lodged in place, incumbents fight tenaciously to keep it. Milwaukee's experience is compelling evidence of that. In the early 1990s, taxi company owners successfully lobbied officials to cap the number of taxi permits and make them transferable. Since the only way a new company or driver could obtain a permit was to buy one from an existing holder— who had no obligation to sell—the new law created a hard barrier to entry and, with it, a taxi cartel.

Not surprisingly—and as cap opponents foresaw—permit prices increased dramatically. By 2012, a permit that originally cost $85 was selling for $150,000 on the secondary market, more than the median Milwaukee house price. Drivers who could not afford permits were forced to lease permitted vehicles from one of the few existing holders, itself an expensive proposition: Milwaukee's largest taxi company, American United, charged drivers over $1,000 a week and required them to buy overpriced gas at a company-owned station. As one driver put it, "The rental rates are so high and the gas is so expensive, it's really hard to make a living. It's only after you pay the company that you make any money. Often, there is no extra." One county supervisor called it "basically a system of indentured servants." The cap also negatively impacted customers, who complained of slow and otherwise poor service.

But not all Milwaukeeans were unhappy about the cap. A few profited from it, namely the taxi company owners who had lobbied for its adoption. The cap allowed them to consolidate their control over the market. Indeed, by 2011, American United controlled more than half the city's permits.

Fed up, three drivers teamed up with the Institute for Justice (IJ) to sue the city. They won, with a Milwaukee County judge ruling the cap unconstitutional. But when the City Council raised the cap and then later when it repealed it altogether, legacy taxi companies sued. They argued they had a property right in the permits' inflated value—caused by the cap they lobbied for—and claimed officials were therefore seizing their property without just compensation. And after losing those legal battles, they appealed, losing again. As one city alderman put it, "If existing cab companies feel their monopoly is threatened, perhaps they should focus more on improving their customers' satisfaction instead of trying to throw up judicial roadblocks to progress."

Since Milwaukee eliminated its cap, the city's taxi industry has seen major changes. To start, the number of permitted taxis has increased, the share of permits controlled by the city's worst taxi monopolist has decreased, and the price of a permit has fallen to $400. According to one of the drivers who joined with IJ to oppose the taxi companies' lawsuits, most drivers now own their own taxis and "are stress free since they don't have to pay rent." The same driver also reports that "[c]ustomers are happy because of the good service and nice, neat, and clean vehicles. Since [the drivers] are all owners, we would like to provide the best service possible."

Sources: Mellor, W., & Carpenter, D. M. (2016). *Bottleneckers: Gaming the government for power and private profit*. New York, NY: Encounter Books; Staley, S. R. (2012). Economic effects of taxi vehicle caps in Milwaukee. On file with the Institute for Justice; Milwaukee taxis. (n.d.). http://ij.org/case/milwaukee-taxis/; Milwaukee taxis 2. (n.d.). http://ij.org/case/milwaukee-taxis-2/; Official Website of the City of Milwaukee. (n.d.). License and permit applications. http://city.milwaukee.gov/cityclerk/license/LicensesPermits#.Wuhf4qQvyCg

Regulations Likely Contribute to Concentrated Ownership of Taxi Vehicles

To examine links between taxi regulations and taxi vehicle ownership in the 44 cities studied, we began by calculating the market concentration ratio (MCR) for each city as of 2013. A city's MCR is the share of taxi vehicles owned by the three largest taxi companies in the city. If one company, or the three largest companies, controls all the vehicles in a given city, the city's MCR would be 1. MCRs lower than 1 indicate less market concentration. A city's MCR therefore provides an indication of how competitive the city's taxi market is.

We found MCRs ranging from 1 to 0.003. Three cities—Austin (Texas), Colorado Springs (Colorado) and Long Beach (California)—are monopoly markets with MCRs of 1. The city with the lowest MCR by far, 0.003, is New York. New York City, however, is an outlier. The concentration ratios for the other cities continue along a relatively smooth continuum. The cities with the next lowest MCRs after New York City's are San Diego with 0.21 and Boston with 0.25. Five cities have concentration ratios above 0.20 and below 0.30. Four cities have ratios between 0.30 and 0.40, four between 0.40 and 0.50, and eight between 0.50 and 0.60. (See Appendix D for the MCRs of all 44 cities.)

The median MCR (i.e., the MCR of the city ranked 22nd out of 44) was 0.61, which means the three largest taxi companies controlled 61 percent of the taxi vehicles in the city at the midpoint of the sample when ranked. (The mean MCR for the sample was also 0.61.) These results indicate that taxi markets tend to be highly concentrated. In comparison, the top four firms in the fast food industry (McDonald's, Yum Brands, Wendy's/Arby's Group and Starbucks) have about 35 percent market share.[15] The top four firms in the retail trade and automobile dealer industries control even smaller shares of their markets: 12 and 6 percent, respectively.[16]

The next step was to explore the effects of individual taxi regulations on MCR using regression analysis. Our results suggest that some taxi regulations likely contribute to market concentration. (See Appendixes B and C.) Specifically, we found statistically significant effects for cities that required taxi companies to operate with a permit, cities whose statutes explicitly put the burden of proving public convenience and necessity on applicants for new permits, and cities that required permits for new vehicles.

Requiring permits for companies and explicitly placing the burden of proving public convenience and necessity on applicants increase market concentration in cities. Requiring permits for vehicles, however, is associated with lower market concentration. This latter result suggests that the permitting process for vehicles (independent of the effect of caps on the total number of vehicles) may not be as burdensome as we might expect. Most vehicle permitting conditions in local statutes appear to focus on vehicle safety, cleanliness and public health, not potentially self-serving policy questions such as whether competitors will negatively impact the profitability of existing companies. Vehicle permitting requirements are largely administrative in nature and typically include things like passing a safety inspection, having signage consistent with statute, and demonstrating compliance with other transparent statutory requirements. A major exception is, of course, when permits are tied to such nonadministrative requirements as caps on the number of vehicles allowed to operate.

While our analysis identifies regulations as predictors of MCR, it is possible that relationships go in the opposite direction (or in both directions)—that players in more concentrated markets demand such regulations in order to shore up their hold on the market. Indeed, this is what we saw in our Minneapolis case study. Whatever the direction, these relationships are largely in line with what we would expect given the evidence from our case studies.

We did not find statistically significant relationships for the other regulations studied. This does not mean, however, these regulations have no relationship to market concentration. Instead, these results likely reflect the relatively small size of our sample—just 44 cities—and the politically idiosyncratic nature of taxi regulations. Put differently, with a limited sample size, it is difficult to detect patterns necessary to find statistical significance. For example, if a city mandates a certain type of vehicle (e.g., hybrid or electric) or limits the mileage of a new taxi vehicle (e.g., under 50,000 miles), this will increase the burden on taxi companies and drivers and raise the barriers to entry. But if only a handful of cities have such regulations, a statistical pattern often will not be discernable, making quantitative analytical tools such as multiple regression unreliable.

Case Study: Minneapolis

Another example of how incumbents fight to maintain barriers to entry comes from Minneapolis, which had a public convenience and necessity law that effectively capped taxi permits at 343. While the law provided for biennial hearings on raising the cap, the city held no such hearings for years.

Like Milwaukee's cap, Minneapolis' caused the price of permits to skyrocket: A permit with a face value of $500 could go for $25,000 on the secondary market. Worse, the law required permit holders to join an association for coordinated dispatching services, and the existing associations refused to admit new members. Drivers and companies frozen out by the city's taxi cartel could start their own associations, but only if they secured 15 permits—at a cost of roughly $400,000—from existing holders.

In addition to hamstringing entrepreneurs, the cap hurt consumers. Forty-four hotel managers wrote letters to the city, complaining of poor taxi service: Guests' taxis were late or never came at all. Even the City Council president noted, "Trying to get a cab to the North Side is like trying to get to the moon in a Model-T Ford."

Following a 2005 incident in which a blind woman, Blanca Prescott, was left stranded when her taxi driver was cited for operating without a Minneapolis permit, the City Council finally held a hearing on raising the cap or even lifting it entirely. But the taxi cartel would not go down without a fight: 27 permit holders testified against raising the cap, with one arguing they were counting on their permits' inflated value for retirement and claiming there were already too many taxis in Minneapolis. Others testified that issuing more permits would jeopardize their incomes.

But the permit holders could not overcome the mountain of evidence showing drivers and consumers alike would benefit from more taxis. In late 2006, the City Council voted to add 45 new permits a year until 2011, when the cap would be—and was—eliminated.

In response, legacy taxi companies formed the Minneapolis Taxi Owners Coalition and filed a federal lawsuit arguing the cap's repeal deprived them of property without just compensation by reducing the value of their permits to zero. The Institute for Justice intervened in the case on behalf of Blanca Prescott and the owner of the A New Star taxi company. The judge dismissed the coalition's case, agreeing with an earlier ruling that the city's system "d[id] not guarantee that the City would indefinitely limit the number of taxi licenses issued."

The coalition appealed the decision, losing again as the appeals court judge ruled the system did not "provide an unalterable monopoly over the Minneapolis taxicab market." The matter was finally settled in 2010 when the U.S. Supreme Court declined to hear the coalition's final appeal.

In the years following the cap's repeal, the total number of taxis operating in Minneapolis peaked at 956 in 2013—a 179 percent increase over the 2005 total. The number of taxi companies grew, too: In 2005, the city had only 10, but by 2013 there were 38. These numbers have since declined, but they remain much higher than when the cap was in force. Today, 533 taxis and 27 taxi companies serve Minneapolis.

Sources: Mellor, W., & Carpenter, D. M. (2016). *Bottleneckers: Gaming the government for power and private profit.* New York, NY: Encounter Books; Minneapolis taxis. (n.d.). http://ij.org/case/minneapolis-taxi-owners-coalition-inc-v-city-of-minneapolis/; Complete case timeline (Taxi license deregulation in Minneapolis: Timeline). (2018). Arlington, VA: Institute for Justice. https://ij.org/wp-content/uploads/2007/05/taxi-cab-timeline-as-of-02-01-2018.pdf; Cervantes, M. E. (2018, July 12). Re: Request for information as of December 31, 2017 about (1) number of licensed taxis and (2) number of taxi companies in Minneapolis [Email to L. McGrath].

Concentrated Ownership of Taxi Vehicles Is Linked to Lower Service Availability

Our statistically significant results largely confirm the intuition that some of the most draconian taxi regulations are related to more concentrated ownership of taxi vehicles. But is market concentration actually a problem? To more rigorously examine this question, we examined the relationship between taxi market concentration and service availability. In line with what was observed in Milwaukee and Minneapolis, we would expect cities with higher concentrations of vehicle ownership to have fewer taxis on the streets.

To explore this question, we collected data current as of 2013 on the number of taxi companies, vehicles and drivers, as well as other factors that might influence the size of the market (e.g., population income, unemployment), in each of the 44 cities studied. We found an average taxi fleet size of 1,421 vehicles, with a median of 682, suggesting a small group of large cities—New York, Dallas, Los Angeles and Miami—dominate the sample.

Using regression analysis and controlling for, among other things, metropolitan area size, we found that cities with higher MCRs did, in fact, have fewer vehicles on average than those with lower MCRs. (See Appendixes B, C and D.) The impact of concentration on service availability can be large: A 10 percent increase in concentration in vehicle ownership in the "typical" city is associated with 222 fewer taxi vehicles (a reduction of 15.6 percent) and 18 fewer taxi companies (a reduction of 7 percent) operating in that city.[17]

Economic Theory Predicts These Results

Taken together, our findings suggest (1) a relationship exists between taxi regulation and concentrated ownership of taxi vehicles and (2) market concentration is significantly related to fewer taxi companies in the market and fewer taxis on the road, both of these arguably producing worse outcomes for consumers. Not only are these results in line with what has been observed on the ground in Milwaukee and Minneapolis, but they are also in line with what economic theory would predict.

Economic theory proposes that barriers to entering an industry restrict supply, reducing competition in a market. Fewer competitive pressures allow incumbents to charge more for their services than they could otherwise while also providing them with less incentive to keep quality high or innovate. Thus, consumers may pay more for worse service. And those unable to pay higher prices may be forced to do without.[18]

Recognizing the potential benefits to themselves, incumbents in many industries have demanded to be regulated.[19] But why do policymakers indulge them? Economic theory has an explanation for this, too. Competition is good for consumers, but the benefits are broad and dispersed. Moreover, it is costly and difficult to mobilize consumers—a heterogeneous group—to influence public policy in favor of competition. It is much easier to organize industry incumbents, necessarily a smaller group, in favor of protectionism—the benefits of which are much more concentrated and readily apparent.[20] Incumbents can thus form highly motivated voting blocs that can donate to, volunteer for or otherwise help deliver elections to politicians who give them patronage.[21]

This behavior is what economists call "rent-seeking,"[22] and the historical record gives reason to believe that it has been going on in the taxi industry for decades. To give just one example beyond our case studies, in 1930, Mayor Jimmy Walker appointed a commission to study New York City's taxi system. The commission recommended the city award a monopoly franchise for the exclusive right to operate taxis in the Big Apple.

Perhaps not coincidentally, Walker had accepted a bribe from the Parmelee Company, New York's largest taxi company. After this corruption came to light, the proposal was shelved. Walker resigned in 1932.[23] As the U.S. Federal Trade Commission (FTC) put it in a 1984 report, "[N]o persuasive economic rationale is available for some of the most important regulations." Instead, "[i]t appears that taxi regulations have often been designed to protect … existing taxi firms from competition."[24]

Such rent-seeking is destructive for at least three reasons. First, and as discussed above, government-created bottlenecks on entering an industry shut some people out and lead to higher prices for consumers. And, as the FTC's 1984 report notes, "Restrictions on the total number of firms and vehicles and on minimum fares … impose a disproportionate burden on low income people."[25] Second, resources spent on rent-seeking are, from the point of view of the economy as a whole, wasted because they do not create additional value for society. Such resources are not being reinvested in quality improvement or innovation. Instead, they lead to zero-sum gains for incumbents at the expense of consumers.[26] Third, rent-seeking can beget ever-more rent-seeking in what has been called a "political 'vicious cycle.'"[27] When gains from rent-seeking fall short of expectations, incumbents may redouble their efforts to recoup their investments. Equally, when rent-seeking is successful, incumbents may engage in additional rent-seeking behavior to increase or preserve those gains.

And, some economists contend, incumbents in more concentrated markets may find it even easier to effectively organize because the benefits of protectionism are even more obvious and there are fewer parties to coordinate.[28] In other words, cities with higher degrees of market concentration may be more likely to have anticompetitive regulations because rent-seeking becomes easier when there are fewer players to rally.[29] This is what we see in our case studies and what we suspect may be going on in our results.

Conclusion

Our results reveal taxi regulations vary widely, suggesting cities are making taxi policy absent a common understanding of what regulations, if any, are needed to protect the public. As our case studies of Milwaukee and Minneapolis attest, such a policymaking process is susceptible to capture by local political interests, resulting in policies that pick economic winners and losers instead of making consumers safer. Our results also suggest taxi regulations may limit competition within the traditional taxi industry and result in worse outcomes for consumers—less choice among taxi companies and fewer taxis on the streets. To the extent cities continue to overregulate traditional taxis, ridesharing services will only further erode taxis' economic viability and market share. Customers will abandon unresponsive and poor-quality services in favor of more nimble, customer-focused competitors that provide superior service with more transparent operations and pricing. To give the taxi industry its best fighting chance, cities should ignore industry demands for protection from competition and instead roll back regulations that protect incumbents at the expense of newcomers and consumers. In so doing, they will also promote innovation and expand consumer choice.

Cities should also heed our results and take lessons from their experiences with taxis more broadly to avoid making the same mistakes when it comes to ridesharing and other innovative transportation services. This means maintaining a healthy skepticism about calls for regulation even when—especially when—they come from the industry itself. To avoid adopting regulations that serve only to protect and enrich the few, cities should demand credible proof of systemic harm that would justify government intervention and choose the least restrictive means of addressing the problem. In this way, they can protect the public from real harms without creating new transportation cartels that choke competition and innovation.

Appendix A

A Survey of Studies on Taxi Regulation

The academic literature on the taxi industry and taxi regulation spans several decades, with a significant amount of research appearing in academic journals in the 1980s and 1990s and then tapering off until the mid-2000s.[30] The conclusions of this research have been mixed. While some studies have concluded deregulation in several cities during the late 1970s led to an oversupply of taxi services, other studies have documented largely positive experiences. Most of the recent research has focused on regulation in non-U.S. cities, with case studies and evaluation of taxi markets in China, Japan, Turkey, London, Dublin, Stockholm and other cities.[31] In addition, several analysts have focused on the economics of taxi regulation in New York City, the largest market in the United States and a regulatory framework many other cities turn to as a model.[32] In particular, New York's medallion system—where the city issues a legal entitlement to operate a taxi in the city—is often considered a viable and preferred mechanism for regulating the supply of taxis. More recently, several studies have examined the impact of Uber and the implications of the "transportation network company" (TNC) business model on taxi services, as well as labor supply, mobility, optimal supply levels and the use of dynamic "surge pricing," and the implications of TNCs for local government budgets.[33]

Studies on Regulatory Effectiveness

For the most part, economists agree that regulations have not improved outcomes in the traditional taxi market.[34] In one of the earlier studies, economists at the Federal Trade Commission concluded that "no persuasive economic rationale is available for some of the most important regulations. Restrictions on the total number of firms and vehicles and on minimum fares waste resources and impose a disproportionate burden on low income people."[35]

One commonly cited market failure used to justify entry and fare regulation is the oversupply of taxis and price-gouging that supposedly result from not knowing the price before hailing a taxi. Riders are unlikely to wait for another taxi when faced with a high price, and too many taxis may cruise a city in pursuit of high-priced fares.[36] In principle, on-call radio dispatched taxis, which are the largest market segment and the one most used by low-income people,[37] would appear less susceptible to this problem than cruising taxis since customers can glean more information from the dispatcher, including an estimated fare. But taxi consultant Bruce Schaller examined regulatory variables on the supply of taxi service levels in 43 communities and found areas with a greater share of dispatch taxis experienced lower than optimal supply of taxis when entry limits were present.[38] As we have discovered with taxi drivers and company owners, even in the cruising taxi market, companies can and have advertised with distinct paint and logos to build reputations around predictable fare schedules and service levels.

Studies on "Optimal" Taxi Regulation

One of the more significant themes running through the academic literature is what can be termed "optimal" taxi regulation. Studies on this theme, many of them theoretical, explore how cities can determine the "optimal" number of taxis, drivers and companies and use regulation to achieve that number. These comprehensive regulatory frameworks are often developed within empirical models that estimate demand for taxi services and then use inferential statistics to predict what levels of taxi service are necessary to serve the demand in the local market. Schaller, for example, uses regression analysis to identify the factors that determine the number of taxis in U.S. cities and provide guidance to regulators on deciding the proper level of taxis in cities. Drawing on a sample of 118 cities, Schaller found the number of commuters traveling by subway, the number

of households without private vehicles available and the number of airport taxi trips were most important in determining the number of taxis in a city.[39] Consultants have taken these models and applied them to specific cities and urban areas, estimating service levels for different parts of the local taxi market.[40]

Demand is not the only interest researchers (and policymakers) take into account in considering optimal taxi regulation. Other concerns include improving service quality and promoting industry stability, even though prioritizing industry stability could mean accepting lower levels of service. Indeed, some studies have concluded that restrictions on new taxis are necessary to protect and promote economic stability in the taxi industry when cities have more taxis than their models predict would be optimal.[41] Industry stability has also been used to justify other entry restrictions, such as public convenience and necessity (PCN) rules that limit the ability of new entrants to undermine the profitability of existing companies as well as outright caps on the number of vehicles that can operate as taxis. For example, Los Angeles adopted PCN rules, among other regulations, in 1925 in response to rate competition that was creating conflict among the city's taxi operators. In 1931, again to regulate competition, the city promulgated new PCN rules that applied only to new entrants.[42] In another example, New York City adopted its system of taxi medallions during the Great Depression, when demand for taxis crashed leading to oversupply and "'underhanded tactics' such as drastically lower[ed] fares."[43] The number of medallions was capped at 16,900 but soon fell, through attrition, to 11,787, at which level it remained for decades.[44]

Consumers and drivers may be the biggest losers from taxi regulation. Many local regulations explicitly justify limits on the numbers of drivers and vehicles to boost wages and protect profits. Some cities even gear their limits and permitting practices toward preserving a target profit margin for existing taxi firms. Most studies agree that whatever benefits might come from higher wages resulting from restricted competition are offset by fare regulations that limit prices during peak hours. In fact, some have argued that taxi regulations are regressive because they benefit the wealthy over low-income drivers. Indeed, many cities have regulations that create offsetting effects on supply and income.[45] For instance, Charlotte, North Carolina, caps the number of taxis but also imposes airport surcharges, which incentivize drivers to enter the market. While these regulations offset each other's effects on the number of taxis, they do increase companies' profits. Whatever the "optimal" supply level is for American cities, the amalgam of regulations currently present appears not to be the result of economic optimization for the public's benefit.

Appendix B

Data Collection and Methodology

The first step in data collection was to identify the regulations that directly affected taxis service provision in each of the cities. However, not all regulations are necessarily used or applied in every city. For example, one Ohio study examining city taxi ordinances found 18 major regulations imposed on taxi companies and drivers in eight major cities, but none of these was required in every city.[46]

In 2013, the Institute for Justice (IJ) conducted a survey of the municipal codes of the nation's 50 largest cities to identify specific regulations on taxi companies, vehicles and drivers. From the dozens of taxi regulations IJ identified, researchers at the DeVoe L. Moore Center used academic research, case studies and expert experience to narrow the list to the 10 most prevalent and likely to affect competition:

- Permits for taxi companies.

- Permits for taxi vehicles.

- Permits for taxi drivers.

- Fares fixed by statute.

- Airport surcharges above the statutory fare.

- Cap on the number of taxi companies.

- Cap on the number of taxi vehicles.

- Public convenience and necessity (PCN) requirement.

- Burden of proof for PCN borne by applicants.

- Medallions.

The DeVoe L. Moore Center's next step was to collect data on taxi companies, vehicles and drivers operating in the cities. These data were obtained directly from the cities after the center's researchers contacted the primary regulatory authority. Three Arizona cities (Mesa, Tucson and Phoenix) were excluded because taxi regulation in Arizona is imposed at the state and not city level. The center contacted each of the remaining 47 cities for data on the number of taxi companies, licensed vehicles and licensed drivers operating within their jurisdiction. Several rounds of inquiries, including Freedom of Information Act (FOIA) requests,[47] allowed us to collect complete data for 44 cities. These cities make up the database used for this report.[48] All taxi data are current through December 31, 2013, prior to the rise of ridesharing services such as Uber, Lyft and Sidecar.[49]

Market Concentration and the Taxi Market

This study primarily examines the concentration of taxi ownership and its relationship with taxi regulations. Secondarily, it examines the relationship between market concentration and level of service available to customers. As a first step, we calculated the share of taxi vehicles in a city owned by the three largest companies in that city to arrive at a market concentration ratio (MCR).[50] Higher MCRs indicate higher levels of concentrated ownership in a city's taxi market. For example, three cities—Austin (Texas), Colorado Springs (Colorado) and Long Beach (California)—are monopoly markets, meaning that one company or individual owner controls 100 percent of their taxi vehicles. This results in an MCR of 1. MCRs of less than 1 indicate more competitive markets. The average city has a market concentration ratio of 0.61, which means about 61

percent of city's taxi vehicles are owned by the three largest companies.

Cities' MCRs were used to explore the relationship between a city's individual taxi regulations and the concentration of the local taxi market. We used MCR as the dependent variable and applied our multiple regression framework to each of the regulations in our analysis.

Regulatory Variables

Regulatory variables, including constraints on who can start a taxi company and how taxis can operate, will influence the size and vibrancy of a taxi market. As noted above, while U.S. cities have adopted a diverse and broad-ranging set of regulations to impose on taxi companies, this study examines the effects of only the 10 regulations identified as representing the most common and potentially most onerous barriers to entry and competition in the urban taxi market. We coded each of the 10 regulations as 0 or 1 in the database (i.e., as dummy variables), with 1 representing the existence of the regulation and 0 the absence.

We also created cumulative subindexes for the existence of groups of related regulations in cities (summarized in Table C1 on page 21). Subindexes were created for permitting (i.e., whether a city permitted any combination of companies, vehicles or drivers), fare regulation and caps. In principle, a city's regulatory environment can be considered more restrictive if it requires permits for companies, vehicles and drivers as opposed to for just one or none of these.

Finally, we created an additive Regulatory Index with values between 0 and 10 for any given city.

Supply Variables

The analysis included three key variables to represent the effects of supply and, by implication, service levels: **Vehicles**, **Drivers** and **Companies**. We obtained data on the number of taxi vehicles, drivers and companies in each city by calling regulators and company representatives. **Vehicles** and **Drivers**, respectively, represent the number of taxis and taxi drivers legally operating in the city, an indicator of taxi supply. More permitted vehicles or drivers should imply more availability of taxis in a city, all else being equal. The variable **Companies** is more problematic because taxi companies vary in size along a spectrum, from the very large to the very small. Nevertheless, we examined it as a supply indicator. Because higher concentrations of ownership suggest less competition and lower service levels, we would expect to find a negative correlation between MCR and these supply variables.

Table B1 summarizes the expected impact of the 10 regulations and the MCR on supply in the taxi market. In general, markets are likely to have lower overall service (fewer companies, vehicles and drivers) when they are more concentrated or centralized. The effects of fare regulations are more ambiguous, however. Since most fares are set by local regulators, the price per trip could be set above or below the market price based on local demand.

Table B1: Expected Impact of Regulation on the Number of Companies, Vehicles and Drivers

Regulation	Companies	Vehicles	Drivers
Higher market concentration of vehicle ownership (MCR)	Negative (-)	Negative (-)	Negative (-)
City permits taxi companies	Negative (-)	Negative (-)	Negative (-)
City permits taxi vehicles	Negative (-)	Negative (-)	Negative (-)
City permits taxi drivers	Negative (-)	Negative (-)	Negative (-)
Permit Subindex	Negative (-)	Negative (-)	Negative (-)
Fares fixed by statute	Negative (-)	Negative (-)	Negative (-)
Airport surcharges	Positive (+)	Positive (+)	Positive (+)
Fare Regulation Subindex	Unknown (+/-)	Unknown (+/-)	Unknown (+/-)
City caps the number of taxi companies	Negative (-)	Negative (-)	Negative (-)
City caps the number of taxi vehicles	Negative (-)	Negative (-)	Negative (-)
Cap Subindex	Negative (-)	Negative (-)	Negative (-)
Proof of public convenience & necessity required	Negative (-)	Negative (-)	Negative (-)
Proof of PCN burden borne by applicant	Negative (-)	Negative (-)	Negative (-)
City regulates taxi supply with medallions	Negative (-)	Negative (-)	Negative (-)
Regulatory Index (additive)	Negative (-)	Negative (-)	Negative (-)

Control Variables

The last set of variables included in the analysis are our control variables—a set of factors other than regulatory ones that might influence the size of a taxi market. Demand for taxi services is one such nonregulatory factor, for example. We would expect larger urban areas to have a larger number of taxis, so metropolitan population can stand as a measure of demand. Unfortunately, detailed data on the specific characteristics of taxi markets were unavailable, in part because of the complexity of taxi markets. Since our analysis attempts to determine factors that are consistent across cities, we focused on widely available data. As a practical matter, we therefore limited the analysis to demographic and economic data collected by the U.S. Census Bureau.[51]

We included the following nonregulatory variables in the regressions because they added the most value to the model's ability to explain the changes in the dependent variables:

- **Metropolitan area population**, as a measure of the demand for taxi services. Larger populations should have higher demand for taxi services.

- **Metropolitan area population density**, because more urban areas with higher densities tend to have higher transit use and demand for specialized transportation services such as taxis, resulting in more drivers, more vehicles and more companies.

- **Metropolitan area median household income**, as an indicator of the attractiveness of the taxi market as a source of potential employment.

- **Percentage of the metropolitan population with some college education**, because driving taxis is considered a low-skill, low-wage job and would likely be unattractive to more highly educated workers with higher wage expectations.

- **Metropolitan area unemployment**, as an indicator of the economic health of a city or metropolitan area.[52]

The analysis also considered the effect of **New York City** as an outlier that could affect the results. The city's taxi industry draws on a global center of finance in a metropolitan area of nearly 20 million people. The New York–Northern New Jersey–Southwest Connecticut metropolitan area is significantly more populated than either Los Angeles or Chicago, with the municipality of New York City occupying a much smaller space. Its highly concentrated office market (in Manhattan) is unusual in the United States and, combined with the nation's highest residential and commercial densities, creates a market that is uniquely suited for a large number of cruising taxis. In fact, New York accounts for 21.5 percent of the total licensed taxis and 28.5 percent of all drivers in our sample of 44 cities. The city legally registers over 13,000 taxis with medallions, nearly double the number in the cities with the next largest fleets (Chicago and the District of Columbia) and four and a half to six times the number of taxis in the next cohort of cities (Las Vegas, Los Angeles, Houston, Miami and Honolulu). Thus, its presence is significantly out of proportion with the rest of the sample.

New York City's taxi market appears statistically to be more fragmented than it really is because the city makes medallions transferable among individuals. This in theory enables entry into the market. However, the supply of medallions has not kept pace with the demand for taxi services in Manhattan or New York City as a whole, driving the market price to over $1 million at one point.[53] New York's unique combination of extremely high demand and transferable licenses has likely led to a very unconcentrated market relative to other American cities.

Table B2 provides descriptive statistics for the 44-city sample. The average taxi fleet size is 1,421, with a median of 682, suggesting a small group of large cities—New York, Chicago and the District of Columbia—dominate the sample (further justifying the inclusion of a control variable for metropolitan area size). The market concentration variable, **MCR**, suggests that the average taxi market is concentrated, with about 61 percent of a city's permitted taxis being owned by the top three companies in the city. Although the mean and median are nearly identical, the variation is significant, ranging from 0.003 in New York City to 1.0—the maximum—in three cities. The average metropolitan population in the sample is 3.8 million people, reflecting a range from 668,353 (Colorado Springs, Colorado) to nearly 20 million (New York City), a figure substantially higher than the median. The mean annual household income is $70,605, more than twice the estimated annual wage of a typical taxi driver in our sample (about $22,707).

Table B2: Summary Statistics (N=44)

	Mean	Median	Minimum	Maximum	S.D.
Companies	255	14	1	9,101	1,368
Vehicles	1,421	682	116	13,420	2,323
Drivers	4,068	1,045	58	50,967	9,042
MCR	0.605	0.605	0.003	1	0.244
MSA Population	3,777,113	2,215,243	668,353	19,831,858	3,865,703
MSA Population Density	5,633	4,097	1,695	31,251	5,018
MSA Median Household Income	$70,605	$67,100	$42,000	$105,900	$13,190
% of MSA Population With Some College	21.8%	21.9%	15.5%	26.5%	0.027
MSA Unemployment	6.2%	5.9%	3.8%	12.5%	1.549

Qualifications

This analysis is primarily meant to highlight correlations between regulation, market concentration and service levels in the taxi market. Since it is cross-sectional, the data are such that a determination of causality is not possible. To determine the causal effect of the presence of regulations on market concentration, the analysis would require data for multiple time periods (i.e., panel data) to observe how market concentration changes after changes in regulation are made and vice versa.

The simultaneity problem present in this analysis should also be kept in mind. Regulations would be expected to impact market concentration, but market concentration would also be expected to impact regulation since smaller groups of owners may find it easier to organize in pursuit of regulation to secure or increase monopoly rents. The problem is also present with regard to service levels: A regulation may come about due to service levels, and those service levels may also be influenced by regulations. The empirical results should add to a preponderance of the evidence of regulation's impact on the taxi market. Correlations among our variables of interest should aid an understanding of the role that rent-seeking plays in city-level political economy, whether regulations bring about or result from a level of market concentration. Other limitations to this data include an inability to distinguish between different types of markets for taxis (e.g., street hail services versus dispatch services).

Appendix C

Empirical Results

None of the 44 cities included in our final sample allowed a free market in taxi service provision. Indeed, cities adopted an average of five of the 10 regulations we identified as the most prevalent and likely to affect competition (see Table C1). The lowest number of regulations a city had was three—Honolulu, Jacksonville (Florida) and Omaha (Nebraska). The highest was eight—Las Vegas and Oakland (California).

Table C1: Taxi Regulatory Burden (N=44)

	Mean	Median	Minimum	Maximum	S.D.
Permit Subindex (3)	2.2	2	1	3	0.568
Fare Regulation Subindex (2)	1.6	2	0	2	0.574
Cap Subindex (2)	0.5	0	0	1	0.503
Regulatory Index (additive)	5.0	5	3	8	1.191

Table C2 summarizes the statistical results of our analysis of each individual taxi regulation's effect on MCR after adjusting for metropolitan area population, metropolitan area population density, metropolitan area median household income, percent of metropolitan population with some college education, metropolitan area unemployment, and the effects of New York City as an outlier. We found statistically significant relationships for three of the 10 regulations studied. Cities that permitted companies tended to have higher concentrations of vehicle ownership ($\beta = 0.168$; $t = 2.269$) as did those that explicitly put the burden of proving public convenience and necessity on applicants for new permits ($\beta = 0.187$; $t = 1.979$). Cities that issued permits for taxi vehicles, on the other hand, tended to have lower MCRs ($\beta = -0.213$, $t = -3.297$).

Table C2: Effects of Regulatory Variables on Market Concentration Ratio (Multivariate Regression Results)

Regulation	Beta Coefficient	T-Statistic	P-Value	Adjusted R^2
City permits companies*	0.168	2.269	0.029	0.256
City permits vehicles*	-0.213	-3.297	0.002	0.347
City permits drivers	-0.077	-0.752	0.457	0.163
Permit Subindex	-0.077	-1.254	0.218	0.185
Fares fixed by statute	-0.168	-1.580	0.123	0.205
Airport surcharges	-0.073	-0.822	0.416	0.166
Fare Regulation Subindex	-0.114	-1.682	0.101	0.212
City caps the number of taxi companies	-0.045	-0.273	0.787	0.152
City caps the number of taxi vehicles	-0.082	-1.144	0.260	0.180
Cap Subindex	-0.085	-1.231	0.226	0.184
Proof of public convenience & necessity required	0.037	0.486	0.630	0.155
Proof of PCN burden borne by applicant*	0.187	1.979	0.056	0.233
City regulates taxi supply with medallions	-0.097	-0.881	0.384	0.168
Regulatory Index (additive)	-0.043	-1.381	0.176	0.193

* denotes those variables that achieved statistical significance at the 95% level of confidence or higher, the standard threshold for social science research.

Our analysis of the relationship between market concentration and the number of taxi companies and vehicles serving a city found strong statistical support for the theory that higher market concentrations result in fewer taxi companies and vehicles and thus lower service levels for U.S. cities. Even controlling for the outlier effect of New York City, a 10 percent increase in concentration of vehicle owners in the average city would result in 18 fewer taxi companies (a reduction of 7 percent) and 222 fewer taxi vehicles (a reduction of 15.6 percent). Table C3 provides the full results of this analysis.

Table C3: Relationship Between Market Concentration and Companies/Vehicles

Control Variables	Number of Companies	Number of Vehicles
MCR	−180.234 (-2.61)**	−2220.98 (-2.48)**
Constant	108.442	3,011.71
MSA Population	−0.000005 (-0.74)	0.000190 (2.33)**
MSA Population Density	0.003669 (0.53)	−0.017978 (-0.20)
MSA Median Household Income	0.000886 (0.50)	0.011397 (0.50)
% of MSA Population With Some College	194.254 (0.28)	−5747.13 (-0.63)
MSA Unemployment	−6.06898 (-0.60)	−57.4785 (-0.44)
New York City	8934.67 (52.24)***	7913.93 (3.56)***
N	**44**	**44**
$F_{(7, 36)}$	**1319.71**	**17.45**
R^2	**.996**	**0.772**
Adj. R^2	**.995**	**0.728**

Notes: t-statistics in ( ); ** = significance at 95%; *** = significance at 98%

Appendix D

Summary of Cities, as of December 31, 2013

City	MCR	Companies	Vehicles	Drivers
Albuquerque, N.M.	0.99	4	116	167
Arlington, Texas	0.55	14	626	626
Atlanta	0.39	24	2008	4104
Austin, Texas	1	3	756	1263
Baltimore	0.65	14	1074	1617
Boston	0.25	12	1825	7000
Charlotte, N.C.	0.71	10	728	1014
Chicago	0.43	23	6955	23441
Colorado Springs, Colo.	1	2	182	290
Columbus, Ohio	0.45	368	530	1013
Dallas	0.58	12	2022	1831
Denver	0.83	4	1262	2333
District of Columbia	0.28	118	6205	7302
El Paso, Texas	0.72	6	240	263
Fort Worth, Texas	0.87	4	410	506
Fresno, Calif.	0.28	23	120	336
Honolulu	0.59	188	2086	2409
Houston	0.77	162	2238	3644
Indianapolis	0.46	31	815	710
Jacksonville, Fla.	0.93	6	623	3249
Kansas City, Mo.	0.79	14	537	800
Las Vegas	0.28	19	2,891	10,000
Long Beach, Calif.	1	1	166	285
Los Angeles	0.35	8	2361	4064
Louisville, Ky.	0.97	9	458	435
Memphis, Tenn.	0.7	6	172	250
Miami	0.54	39	2123	27112
Milwaukee	0.48	100	310	2158
Minneapolis	0.35	40	937	1346
Nashville, Tenn.	0.63	9	793	1100
New York	0.003	9101	13420	50967
Oakland, Calif.	0.56	73	314	425
Oklahoma City	0.73	10	161	349
Omaha, Neb.	0.74	5	258	299
Portland, Ore.	0.75	7	456	1076
Raleigh, N.C.	0.3	105	795	961
Sacramento, Calif.	0.51	10	512	569
San Antonio	0.69	25	894	2199
San Diego	0.21	499	1222	2771
San Francisco	0.61	26	1604	7444
San Jose, Calif.	0.7	15	635	742
Seattle	0.88	6	336	58
Tulsa, Okla.	0.6	8	188	174
Virginia Beach, Va.	0.52	36	166	286

Endnotes

1. Blystone, D. (2018, May 24). The story of Uber. *Investopedia*. https://www.investopedia.com/articles/personal-finance/111015/story-uber.asp

2. Car rentals accounted for the remaining 25 percent. Infographic – Certify SpendSmart™ story report Q4 2017. (n.d.). https://www.certify.com/Certify-SpendSmart-Report-Story-Infographic-Q4-2017.aspx

3. Cetin, T., & Deakin, E. (2017). Regulation of taxis and the rise of ridesharing. *Transport Policy*. https://doi.org/10.1016/j.tranpol.2017.09.002

4. See Little Rock taxis. (n.d.). http://ij.org/case/little-rock-taxis/; Ken Leininger. (n.d.). http://ij.org/client/ken-leininger/; *Ken's Cab, LLC v. City of Little Rock*, No. 60CV-16-1260, 2017 WL 1362047 (Ark. Cir. Jan. 25, 2017).

5. Taxi drivers are generally independent contractors who rent vehicles from taxi companies and pay for their own gas. Ken's Cab represented a better deal for drivers in at least two ways. First, it charged drivers lower rental fees than Yellow Cab. And second, its fleet was composed entirely of hybrid vehicles, meaning its drivers paid less in fuel charges. See Complaint, *Ken's Cab, LLC v. City of Little Rock*, No. 60CV-16-1260, 2017 WL 1362047 (Ark. Cir. Mar. 2, 2016), http://ij.org/wp-content/uploads/2016/03/Filed-Complaint_3.2.2016.pdf [hereinafter Complaint, *Ken's Cab, LLC*].

6. Kaufmann, J. (2014, November 6). Uber opens shop as Little Rock officials call the ride-sharing platform illegal. *FM 89.1 KUAR*. http://ualrpublicradio.org/post/uber-opens-shop-little-rock-officials-call-ride-sharing-platform-illegal

7. Rayle, L., Dai, D., Chan, N., Cervero, R., & Shaheen, S. (2016). Just a better taxi? A survey-based comparison of taxis, transit, and ridesourcing services in San Francisco. *Transport Policy, 45*, 168–178.

8. See Little Rock taxis, n.d.

9. Little Rock, Ark., Code §§ 34-88(c)(10); 34-43(b)(4); 34-43(1)(b), (2), (3); 34-42(c)(1) (2017), https://library.municode.com/ar/little_rock/codes/code_of_ordinances?nodeId=COOR_CH34TRCO_ARTIIIGRTRSEVE

10. Although the IJ study encompassed all 50 of the nation's largest cities, only 44 are in our sample. We did not include Mesa, Tucson or Phoenix in our statistical analysis because taxis in Arizona are regulated at the state and not the city level. Three other cities— Cleveland, Detroit and Philadelphia—could not be studied because they refused multiple requests for data, even after we submitted formal Freedom of Information Act requests with the assistance of IJ attorneys.

11. See, e.g., Olson, M. (1965). *The logic of collective action: Public goods and the theory of groups*. Cambridge, MA: Harvard University Press.

12. Little Rock, Ark., Ordinance 13,798 (Mar. 1, 1980), http://web.littlerock.state.ar.us/WebLink/0/doc/73748/Page1.aspx

13. See Complaint, *Ken's Cab, LLC* at 52, http://ij.org/wp-content/uploads/2016/03/Filed-Complaint_3.2.2016.pdf

14. See Little Rock, Ark., Code § 34-38(b)(4), (c)(11), https://library.municode.com/ar/little_rock/codes/code_of_ordinances?nodeId=COOR_CH34TRCO_ARTIIIGRTRSEVE; *see also* Complaint, *Ken's Cab, LLC*, http://ij.org/wp-content/uploads/2016/03/Filed-Complaint_3.2.2016.pdf

15. Zwolak, R. (2010, April). *IBISWorld industry report 72221: Fast food restaurants in the US*.

16. U.S. Census Bureau. (2007). 2007 economic census of the United States: Retail trade: Subject series – Estab and firm size: Summary statistics by concentration of largest firms for the United States: 2007 [Data file]. *American FactFinder*. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_44SSSZ6&prodType=table

17. An earlier analysis of 41 cities found that reducing market concentration by one standard deviation could increase the number of taxis by between 41 percent and 58 percent in the average city. Staley, S. R., & Douglas, B. (2014, April 15). *Market concentration and the supply of taxicabs in US cities*. Paper presented at the Annual Conference of the Association of Private Enterprise Education, Las Vegas, NV. https://drive.google.com/file/d/0B91jI1JihHpAWUFxdy12R05WQW8/view

18. The concept that increased competition improves efficiency is a staple of economic principles textbooks. For applications to transportation and transit, see Klein, D. B., Moore, A. T., & Reja, B. (1997). *Curb rights: A foundation for free enterprise in urban transit*. Washington, DC: Brookings Institution Press; Cox, W. (2001). Infrastructure provision in a market-oriented framework. In R. G. Holcombe & S. R. Staley (Eds.), *Smarter growth: Market-based strategies for land-use planning in the 21st century* (pp. 219–234). Westport, CT: Greenwood Press.

19. For a discussion of how and why incumbents in many industries pursue regulation of their industries, see Mellor, W., & Carpenter, D. M. (2016). *Bottleneckers: Gaming the government for power and private profit*. New York, NY: Encounter Books.

20. This well-recognized principle in economics was first rigorously pioneered by Mancur Olson in his 1965 classic *The Logic of Collective Action: Public Goods and the Theory of Groups*. Olson's theories were expanded to form a foundation for the "economic theory of regulation" developed by George Stigler, Sam Peltzman, and Gary Becker. For a summary, see Peltzman, S. (1989). The economic theory of regulation after a decade of deregulation. *Brookings Papers: Microeconomics*, 1–59. https://www.brookings.edu/bpea-articles/the-economic-theory-of-regulation-after-a-decade-of-deregulation/

21. There is also reason to believe that taxi regulators like market concentration and seek to promote it for their own reasons— namely, that it means less work for regulators. In a market in which one or only a few owners control all the taxis, enforcement actions against and conflict resolution among individual drivers are effectively outsourced to those owners. This was a major motivation behind Los Angeles' adoption of its taxi franchise system and PCN law in the 1920s: "Faced with legal institutions that eased market entry and with seemingly interminable conflict-resolution problems among so many operators, the Board [of Public Utilities and Transportation Commissioners] requested the City Council to expand its statutory authority. It found regulating so many taxi operators to be 'not very satisfactory' and advocated 'a new ordinance which it is hoped will improve the situation.'" Eckert, R. D. (1970). The Los Angeles taxi monopoly: An economic inquiry. *Southern California Law Review, 43*(2), 407–453, p. 412. This idea—that policymakers make policy for self-interested reasons—is also consistent with economic theory. See, e.g., Tullock, G., Seldon, A., & Brady, G. L. (2002). *Government failure: A primer in public choice*. Washington, DC: Cato Institute.

22. Tullock, G. (1967). The welfare cost of tariffs, monopolies, and theft. *Western Economic Journal, 5*(3), 224–232; Krueger, A. O. (1974). The political economy of the rent-seeking society. *American Economic Review, 64*(3), 291–303; Tullock et al., 2002, p. 43.

23. Van Gelder, L. (1996, May 11). Medallion limits stem from the 30's. *The New York Times*. http://www.nytimes.com/1996/05/11/nyregion/medallion-limits-stem-from-the-30-s.html

24. Frankena, M. W., & Pautler, P. A. (1984). *An economic analysis of taxicab regulation* (Bureau of Economics Staff Report). Washington, DC: Federal Trade Commission. https://www.ftc.gov/sites/default/files/documents/reports/economic-analysis-taxicab-regulation/233832.pdf, pp. 1, 6–7.

25. Frankena and Pautler, 1984, p. 155.

26. Ikeda, S. (2003, November 1). *Rent-seeking: A primer*. Atlanta, GA: Foundation for Economic Education. https://fee.org/articles/rent-seeking-a-primer/. See also the classic contributions to this literature: Posner, R. A. (1971). Taxation by regulation. *The Bell Journal of Economics and Management Science, 2*(1), 22–50; Peltzman, S. (1976) Toward a more general theory of regulation. *The Journal of Law and Economics, 19*(2), 211–240; Becker, G. (1983), A theory of competition among pressure groups for political influence. *The Quarterly Journal of Economics, 98*(3), 371–400.

27. Krueger, 1974.

28. See, e.g., Olson, 1965.

29. Empirical studies support many of the predictions of rent-seeking theory. For just a few examples, see Lopez, R. A., & Pagoulatos, E. (1994). Rent seeking and the welfare cost of trade barriers. *Public Choice, 79*(1/2) 149–160; Pincus, J. J. (1975). Pressure groups and the pattern of tariffs. *Journal of Political Economy, 83*(4), 757–778; Marvel, H., & Edward Ray, R. (1983). The Kennedy round: Evidence on the regulation of international trade in the United States. *American Economic Review, 73*(1), 190–197; Iqbal, N., & Daly, V. (2014). Rent seeking opportunities and economic growth in transition economies. *Economic Modeling, 37*, 16–22.

30. For a review of the literature, see Moore, A.T., & Balaker, T. (2006). Do economists reach a conclusion on taxi deregulation? *Econ Journal Watch, 3*(1), 109–132.

31. See, e.g., the studies review in Moore and Balaker, 2006; Cetin and Deakin, 2017; Barrett, S. D. (2010). The sustained impacts of taxi deregulation. *Economic Affairs, 30*(1), 61–65; Slavnic, Z., & Urban, S. (2018). Meandering rides of the Swedish taxi industry: Flourishing entrepreneurship or ethnic segmentation? *International Journal of Sociology and Social Policy, 38*(5–6), 444–458.

32. Schaller, B. (2007). Entry controls in taxi regulation: Implications of US and Canadian experience for taxi regulation and deregulation. *Transport Policy, 14*(6), 490–506; Cumming, C. (2009). Why has the price of taxi medallions increased so dramatically? An analysis of the taxi medallion market. *The Park Place Economist, 17*, 12–17.

33. Ngo, V. (2015). *Transportation network companies and the ridesourcing industry: A review of impacts and emerging regulatory frameworks for Uber* (Public Report). Vancouver, Canada: The University of British Columbia, School of Community and Regional Planning. https://open.library.ubc.ca/media/stream/pdf/42591/1.0220795; Hall, J. V., & Krueger A. B. (2016). *An analysis of the labor market for Uber's driver-partners in the United States* (NBER Working Paper No. 22843); Rayle et al., 2016; Lam, C. T., & Liu, M. (2017). *Demand and consumer surplus in the on-demand economy: The case of ride sharing* (Working Paper); Schiller, Z., & Davis, C. (2017). *Taxes and the on-demand economy*. Washington, DC: Institute on Taxation and Economic Policy.

34. See Moore and Balaker, 2006. See also Frankena and Pautler, 1984.

35. Frankena and Pautler, 1984, p. 1.

36. Shreiber, C. (1981). The economic reasons for price and entry regulation of taxicabs: A rejoinder. *Journal of Transport Economics and Policy, 15*(1), 81–83.

37. Radio dispatched taxis can make up as much as 75 percent of a cab market. Frankena and Pautler, 1984. In all likelihood, transportation network companies, which operate almost exclusively in the radio-dispatched segment using cell phones and internet technology to match drivers with customers, have expanded this segment in volume and share of total trips. There are three other major segments of the taxi market according to most analysts: cruising cabs looking for street hails, cabs that wait at stands near major drop-off and pick-up places such as hotels and airports, and cabs that provide service under contract.

38. Schaller, 2007.

39. Schaller, B. (2005). A regression model of the number of taxicabs in U.S. cities. *Journal of Public Transportation, 8*(5), 63–78.

40. Schaller, 2007.

41. Teal, R. F., & Berglund, M. (1987). The impact of taxi deregulation in the USA. *Journal of Transport Economics and Policy, 21*(1) 37–56.

42. Eckert, 1970. Combined with lowered demand for taxis during the Great Depression, L.A's PCN and other restrictive taxi regulations allowed one firm, Yellow Cab, to consolidate control over the market.

43. Regulation and prosperity: 1935–1960. (n.d.). *Taxi of tomorrow*. http://www.nyc.gov/html/media/totweb/taxioftomorrow_home.html

44. Van Gelder, 1996. Analysis of changes in the price of taxi medallions in New York City has found that increases could be attributed to an essentially fixed supply of medallions for 50 years. Cumming, 2009.

45. Frankena and Pautler, 1984.

46. Buckeye Institute for Public Policy Solutions. (1996). *Taxicab regulation in Ohio's largest cities* (Policy Report). Dayton, OH. See also Staley, S. R., Husock, H., Bobb, D. J., Burnett, H. S., Creasy, L., & Hudson, W. (2001). *Giving a leg up to bootstrap entrepreneurship: Expanding economic opportunity in America's urban centers* (Policy Study No. 277). Los Angeles, CA: Reason Foundation, pp. 8–20

47. That we submitted a FOIA request to a city does not necessarily imply obstruction on the part of city staff. A few cities requested that we submit formal FOIA requests to expedite release of their data.

48. Cleveland, Detroit and Philadelphia refused multiple requests for data, even after we submitted formal FOIA requests.

49. The first ridesharing service, Sidecar, has since closed down. Said, C. (2015, December 29). Ride-sharing pioneer Sidecar to shut down ride, delivery service. *SFGate*. https://www.sfgate.com/business/article/Ride-sharing-pioneer-Sidecar-to-shut-down-ride-6726144.php/

50. MCR likely underestimates the effect of concentration in cities because the primary data is the physical vehicle, not the taxi permits owned by an individual or company. Many cities have taxi companies that control substantial numbers of permits through personal, family and business relationships, and some of these relationships overlap onto multiple companies. These influences are difficult to detect without detailed knowledge of individual cities and taxi markets. Conversely, illegal taxi operators may add to supply and decrease the wages of legal competitors but go undetected.

51. Another category would be nonregulatory variables that might affect taxi supply. Workers have choices about where they will work. Even with very high demand, if jobs other than driving a taxi pay higher wages or provide higher compensation along other measures (e.g., quality of life, flexibility), potential drivers will

pursue other avenues. Thus, the analysis examined the effects of unemployment, median wages and income on the regional and city level as well. Factors such as access to capital to start new taxi businesses would have been helpful, but these data were not available at the city and regional level.

52. The average wage of taxi drivers is only about $10–12 per hour according to the Bureau of Labor Statistics, so cities with higher unemployment rates (and less robust local economies) are more likely to incentivize driving taxis. While some research suggests the economic health of a central city and metropolitan economy are linked, the hypothesized relationship between metropolitan area unemployment and the number of taxi drivers and vehicles is positive because the labor market effects of increasing the supply of drivers likely outweighs the economic effects of linked growth in the context of this research.

53. Staley, S. (2011b, October 20). The social cost of taxi regulation: $1 million per license. *Reason Foundation*. https://reason.org/commentary/the-social-cost-of-taxi-regulation/. Such inflation is common in cities with medallion systems for regulating entry. Staley, S. (2011a, April 1). A cab medallion system in D.C.? The neighborhoods will pay the price. *The Washington Post*. https://www.washingtonpost.com/opinions/a-cab-medallion-system-in-dc-the-neighborhoods-will-pay-the-price/2011/03/31/AFLIGcJC_story.html

About the Authors

Samuel R. Staley is the director of the DeVoe L. Moore Center, a research center focusing on state and local policy issues in the College of Social Sciences and Public Policy at Florida State University. His research and policy analysis on the taxi industry dates back to the 1990s, and his academic expertise is in economic development, transportation, regulation and policy impact. Dr. Staley is the author of more than 100 professional articles, reports and research studies, as well as seven books on public policy including *Mobility First: A New Vision for Transportation Policy in a Globally Competitive 21st Century* (Rowman & Littlefield). He earned his Ph.D. in public administration from The Ohio State University, his M.S. in applied economics from Wright State University, and his B.A. in economics–public policy from Colby College.

Catherine Annis is a Ph.D. student in the Maxwell School of Citizenship and Public Affairs at Syracuse University, where her research focuses on citizen engagement and data-driven management. Prior to entering the doctoral program at Syracuse, she earned an MPA from Florida State University and served as the policy research manager for the university's DeVoe L. Moore Center.

Matthew Kelly is a research fellow at the Colloquium for the Advancement of Free-Enterprise Education and a graduate student in finance at the Naveen Jindal School of Management at the University of Texas at Dallas. Prior to joining the Colloquium, he was a policy analyst and online content manager for the DeVoe L. Moore Center at Florida State University. He earned his B.S. in economics from Florida State University.

Acknowledgments

About IJ

The Institute for Justice is a nonprofit, public interest law firm that litigates to secure economic liberty, educational choice, private property rights, freedom of speech and other vital individual liberties and to restore constitutional limits on the power of government. Founded in 1991, IJ is the nation's only libertarian public interest law firm, pursuing cutting-edge litigation in the courts of law and in the court of public opinion on behalf of individuals whose most basic rights are denied by the government. The Institute's strategic research program produces social science and policy research to inform public policy debates on issues central to IJ's mission.