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BETWEEN PUBLIC AND PRIVATE MOBILITY
EXAMINING THE RISE OF TECHNOLOGY-ENABLED TRANSPORTATION SERVICES

Taxi, Sedan, and Limousine Industries and Regulations

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Appendix B

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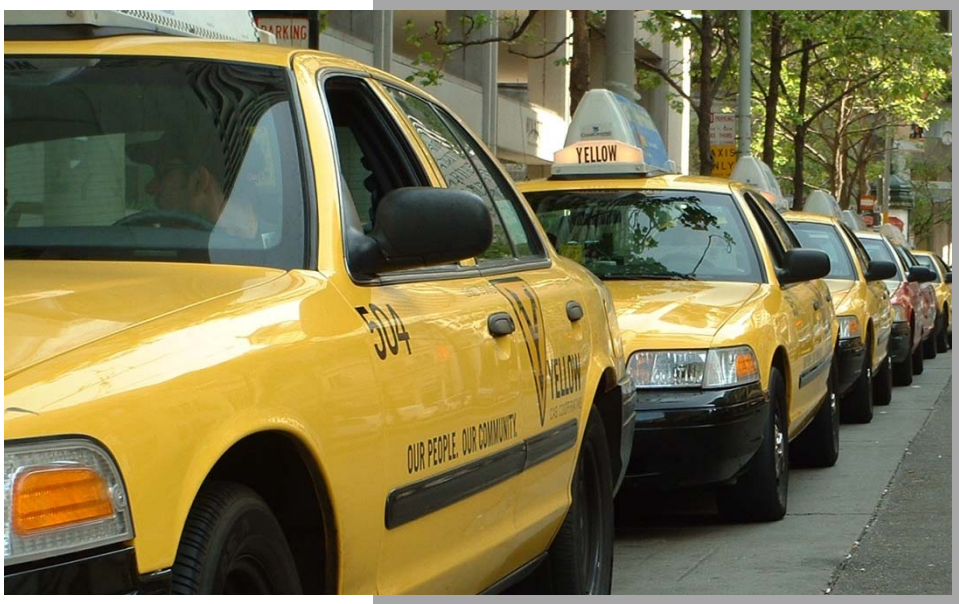

Transportation Research Board
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INTRODUCTION

The Committee for Study of Innovative Urban Mobility Services requested several white papers be prepared. This paper provides an overview of the current state of the taxi and limousine industry. The paper describes the scale of the taxi industry; variations in insurance requirements, pickup standards, and driver background checks that exist among the many regulatory jurisdictions; and the complex world of barriers to entry, rate setting and operating practices. The discussion pays particular attention to aspects of industry and regulatory structure and of the dynamic among industry players, the market for taxi service, and regulatory provisions that can inform governmental response to Transportation Network Companies (TNCs), a key focus of the committee's work.

This paper is based primarily on existing data sources and reports. In addition, an online survey of taxicab regulators was conducted to obtain information on recent trends and regulatory requirements. A sample of 34 taxicab and sedan regulators representing a cross-section of the industry was asked to participate; 18 responded and completed the survey.

A note on terminology: this paper uses the words "taxi and limousine" to describe the full range of for-hire services that offer on-demand, exclusive ride, point-to-point transportation services to the general public in exchange for a fare. These services are commonly described as taxi, livery, sedan, and limousine. At times, and as context should make clear, the paper uses the term "taxi" as shorthand for "taxi and limousine." The paper also uses the term "taxi and sedan/livery" to refer to those services to the exclusion of limousine services, which are on the luxury end of the market and in those instances not relevant to the discussion.

SCALE OF THE TAXI INDUSTRY

It is surprisingly difficult to quantify the overall scale and structure of either taxi providers, even given the highly decentralized and fragmented character of the taxi industry. There is no authoritative accounting of even simple metrics such as the number of taxicabs nationally, the number of trips provided, or total revenues to the industry. The industry is not overseen by any federal agency, so there is no equivalent of a National Transit Database or Highway Statistics Series.

Nevertheless, it is important to quantify such metrics as industry revenues, establishments, employees, taxicab vehicles and drivers and customer trips to the extent that data are available, and to make reasonable estimates where necessary based on cross-referencing of existing data sources.

Establishments and Revenues

The most comprehensive data for key measures of industry size come from federal data on businesses (or in federal parlance "establishments"), which are reported separately for establishments that have employees and for non-employee establishments.

Both types of firms -- employee and non-employee -- are important parts of the taxi industry. Employee establishments include several thousand fleet or base operations of substantial size, in some cases operating several hundred vehicles and employing or leasing to hundreds of drivers. These businesses typically employ trip dispatchers, auto mechanics,

administrative staff, managers and supervisors. Drivers may be either employees (most common among limousine companies) or lease drivers, who are not considered employees for most purposes. These businesses with employees are captured in the Department of Commerce's Economic Census, based on a survey conducted every five years.

At the same time, many taxi owners and drivers are small or solo entrepreneurs, with no more than a few cars and no employees. These are covered in the non-employee data. The business may be comprised simply of one driver and one vehicle, a particularly common arrangement among independent taxi owner-operators in large cities and limousine operators in cities large and small. Or the business may be comprised of an owner of several vehicles which he or she leases to drivers.

Both data series utilize the federal government's standard industry classification for Taxi and Limousine Services, which are defined as follows (BLS 2015):

- *Taxicab service*: establishments primarily engaged in providing passenger transportation by automobile or van, not operated over regular routes and on regular schedules. Establishments of taxicab owner/operators, taxicab fleet operators, or taxicab organizations are included in this industry.
- Limousine service: establishments primarily engaged in providing an array of specialty and luxury passenger transportation services via limousine or luxury sedans generally on a reserved basis. These establishments do not operate over regular routes and on regular schedules.

Not included in these categories are special needs transportation services (except to and from school or work) for the infirm, elderly, or handicapped, and scheduled shuttle services between hotels, airports, or other destination points.

Table 1 shows that there were nearly 7,500 establishments with employees providing taxi and limousine service in the United States in 2012, with revenues of nearly $6.6 billion and 76,000 employees. Establishments averaged $885,000 in revenues and 10 workers. The averages are somewhat skewed by the presence of about 100 large firms with revenues of over $10 million each. Firms most typically had revenues between $100,000 and $500,000 and 3 to 7 employees.

The industry showed robust growth in the 1990s and early 2000s, with inflation-adjusted revenue increasing by 20% or more in each 5-year period between 1992 and 2007. Revenues for limousine services expanded much more rapidly than for taxicab services in this period. The two sectors went from having equal revenues to limousine services having more than twice the revenue of taxicab services. Since 2007, however, their fortunes have reversed. Taxi revenues increased 21% from 2007 to 2012, while limousine service revenue declined by 8% in the wake of the recession.

Moving from businesses with employees to those without, Table 2 shows results for non-employer taxi and limousine establishments. These data cover businesses without paid employees that are subject to federal income tax, and originate chiefly from IRS Form 1040, Schedule C.

TABLE 1 Establishments and Firms, Taxi and Limousine Services, 1992-2012

	Establishments			Revenues (millions)						Paid employees		
				Current dollars			2013 dollars					
Year	T&L	Taxi	Limo	T&L	Taxi	Limo	T&L	Taxi	Limo	T&L	Taxi	Limo
1992	5,767	3,337	2,430	$1,956	$992	$964	$3,248	$1,647	$1,601	47,077	26,338	20,739
1997	6,418	3,184	3,234	$3,155	$1,281	$1,874	$4,513	$1,832	$2,681	57,282	27,850	29,432
2002	6,988	3,141	3,847	$4,248	$1,602	$2,647	$5,421	$2,045	$3,378	66,086	29,571	36,515
2007	7,235	2,898	4,337	$5,914	$1,813	$4,101	$6,549	$2,007	$4,541	74,144	31,888	42,256
2012	7,446	3,015	4,431	$6,597	$2,425	$4,173	$6,597	$2,425	$4,173	76,220	33,721	42,499
Change:												
1992-97	11%	-5%	33%	61%	29%	94%	39%	11%	67%	22%	6%	42%
1997-02	9%	-1%	19%	35%	25%	41%	20%	12%	26%	15%	6%	24%
2002-07	4%	-8%	13%	39%	13%	55%	21%	-2%	34%	12%	8%	16%
2007-12	3%	4%	2%	12%	34%	2%	1%	21%	-8%	3%	6%	1%
1992-02	21%	-6%	58%	117%	61%	175%	67%	24%	111%	40%	12%	76%
2002-12	7%	-4%	15%	55%	51%	58%	22%	19%	24%	15%	14%	16%

Data cover establishments with employees.
Source: U.S. Department of Commerce and U.S. Census Bureau, *Economic Census, Transportation and Warehousing*

There were 202,000 non-employer taxi and limousine establishments in 2012, which reported $7.5 billion in revenue, a higher figure than the $6.6 billion for establishments with employees. The average non-employer firm had about $37,000 in revenue. This average is skewed by a large number of reporting establishments with revenue of under $10,000, presumably from part-time or part-year operations. Just under one-half the establishments had revenue over $50,000 in 2012.

Non-employer taxi and limousine services grew steadily over the last 15 years, averaging 26% to 29% increases during each 5-year period. Revenues were flat in 2001-02 and 2009 due to recessions, but otherwise grew every year. Growth over the last five years of 28% is far above that for establishments with employees, which showed only 1% in revenue growth.

Combining employer and non-employer data in Table 3 shows the highly variegated composition of the taxi and limousine industry. On one end of the spectrum are about 200 companies that each has revenue of $5 million or more. These firms generate 23% of industry-wide revenues. In the middle of the spectrum, 13,000 establishments with revenues of $100,000 to $4.9 million account for 34% of industry-wide revenues. Finally, there are nearly 200,000 establishments with revenues of less than $100,000, nearly all without employees, that account for 42% of all industry revenues.

Taxicab Vehicles

Data on the number of vehicles used in taxi service is available primarily from industry sources. The Taxi, Livery and Paratransit Association (TLPA) conducts an annual survey of its members to collect operational and fare data. Results are published in a series of Fact Books. The 2013 TLPA Taxicab Fact Book counted 95,037 licensed taxicabs operated by TLPA members in 247

TABLE 2 Non-Employer Establishments and Revenue, Taxi and Limousine Services, 1997-2012

		Value of sales, shipments, receipts, revenue, or business done (millions)				
		Total			Per establishment	
	# Non-employer establishments	Current dollars	2013 dollars	Annual change, 2013 dollars	2013 dollars	Annual change, 2013 dollars
1997	100,553	$2,506	$3,584,783		$35,651	
1998	107,283	2,760	3,887,310	8%	36,234	2%
1999	116,732	3,098	4,269,661	10%	36,577	1%
2000	122,865	3,412	4,549,860	7%	37,031	1%
2001	129,572	3,501	4,538,477	0%	35,027	-5%
2002	129,553	3,540	4,518,249	0%	34,876	0%
2003	134,533	3,784	4,721,501	4%	35,095	1%
2004	139,784	4,112	4,997,776	6%	35,754	2%
2005	146,736	4,487	5,275,353	6%	35,951	1%
2006	151,567	4,803	5,470,276	4%	36,091	0%
2007	161,436	5,270	5,835,614	7%	36,148	0%
2008	166,801	5,726	6,105,708	5%	36,605	1%
2009	170,522	5,684	6,083,447	0%	35,675	-3%
2010	176,438	6,107	6,429,942	6%	36,443	2%
2011	191,565	6,858	6,999,938	9%	36,541	0%
2012	202,320	7,481	7,480,920	7%	36,976	1%
Change from:						
1997-2002	29%	41%	26%		-2%	
2002-2007	25%	49%	29%		4%	
2007-2012	25%	42%	28%		2%	
2002-2012	56%	111%	66%		6%	

Breakout for taxi and limousine services is not available from this data source.
Source: U.S. Department of Commerce and U.S. Census Bureau, *Nonemployer Statistics*

U.S. cities. Adding in the number of green cabs and car services in New York City, which are best classified as offering taxicab service, brings the count of taxicabs to 126,000.
Although most major cities are represented in the TLPA data, by its nature the survey does not have complete coverage. Using results from a published, peer-reviewed paper based on 2002 data (Schaller 2005) it can be estimated that in 2002 there were 152,000 taxicabs licensed in the United States. Since 2002, the number of taxicabs has most likely grown by at least 20%, based on growth in taxi firms with employees and the survey of taxicab regulators that was conducted for this paper. With this rate of growth, it can be estimated that there were approximately 180,000 taxicabs in the United States in 2012.

The number of sedans and limousines can be estimated based on revenue figures from the establishment data series, combined with TLPA survey results for revenue per vehicle, yielding an estimate of 60,000 sedans and limousines in operation at any snapshot in time in 2012. This

TABLE 3 Number of Establishments and Revenues by Establishment Size, 2012

			Pct of total	
	Establish-ments	Revenues (millions)	Establish-ments	Revenues (millions)
All establishments	209,766	$14,078	100.0%	100.0%
$5 million or more in revenue	237	3,288	0.1%	23.4%
$100,000 to $5 million in revenue	13,537	4,862	6.5%	34.5%
Under $100,000 in revenue	195,992	5,918	93.4%	42.0%
Establishments with employees	7,446	$6,597	3.5%	46.9%
$5 million or more in revenue	237	3,288	0.1%	23.4%
$100,000 to $5 million in revenue	4,887	3,204	2.3%	22.8%
Under $100,000 in revenue	2,322	104	1.1%	0.7%
Non-employee establishments	**202,320**	**7,481**	**96.5%**	**53.1%**
$5 million or more in revenue	-	-	0.0%	0.0%
$100,000 to $5 million in revenue	8,650	1,658	4.1%	11.8%
Under $100,000 in revenue	193,670	5,813	92.3%	41.3%

Note: Distribution of establishments by size for establishments with employees is estimated based on 2007 data. Comparable data for 2012 are not available.

Sources: U.S. Department of Commerce and U.S. Census Bureau, *Economic Census, Transportation and Warehousing* and *Nonemployer Statistics*

figure is also consistent with the number of licensed sedans and limousines known to be licensed in California, New York City and several jurisdictions that responded to the on-line survey. Together with 180,000 taxicabs, the total industry size is estimated at 240,000 vehicles.

Taxicab Drivers

According to the U.S. Census Bureau's American Community Survey (the successor to the decennial Census for detailed demographic and economic data), there were 302,960 taxi drivers and chauffeurs in the United States in the years 2006 to 2010 (data are published for a 5-year average). The Census definition includes workers who "drive automobiles, vans, or limousines to transport passengers" and thus is broadly consistent with the industry classification for taxi and limousine services.

The number of drivers grew 32% from the 230,222 taxi drivers and chauffeurs counted in the 2000 Census. Table 4 shows that the number of drivers has been growing since 1970 after shrinking in the first two decades after World War II. The most rapid growth has occurred since 2000.

Passenger Trips and Miles Traveled

Passenger trips can be estimated based on industry data on trip volumes and also based on results from travel surveys.

Starting with industry-derived data on the number of taxicabs (estimated above) and annual trip volumes from TLPA survey data, it can be estimated that there were 890 million taxi

TABLE 4 Number of Taxi Drivers and Chauffeurs in the United States, 1950-2010

	# Drivers	Change
1950	203,910	
1960	159,621	-22%
1970	152,162	-5%
1980	175,411	15%
1990	194,302	11%
2000	230,222	18%
2006-10	302,960	32%

Source: U.S Census Bureau, *Decennial Census* and *American Community Survey*

and limousine trips in 2009. These trips carried 1.16 billion passengers (based 1.3 passengers per trip). About 90% of trips and passengers were carried by taxis and the remaining 10% by sedan and limousine services.

The most comprehensive national travel survey is the National Household Transportation Survey (NHTS), conducted every five years by the U.S. Department of Transportation. The NHTS estimated a total of 738 million taxi trips in 2009, a figure one-third lower than the estimate based on industry data. In the author's experience with regional travel surveys, taxi and limousine trips are undercounted, most likely due to a combination of sampling bias in the survey and incomplete self-reporting of trips. The industry-based figure is likely to be a better estimate of overall trip-making, although NHTS is a valuable data source for trip characteristics and is used for that purpose in the next section.

Several sources including TLPA industry surveys and NHTS show an average trip length of five miles. Using the earlier estimate of 1.16 billion passenger trips, it can be estimated that passengers traveled 5.8 billion person miles in 2012. Vehicle miles traveled is estimated at 4.5 billion "live" miles (with passengers) and approximately 11 billion miles when non-passenger mileage is included.

Using trips and mileage for all modes from the NHTS as the denominator, taxi and limousine service represent 0.30% of person trips, 0.20% of household vehicle miles traveled and 0.16% of person miles of travel in the United States. These figures are higher in larger metropolitan areas and lower in smaller metro and non-metropolitan areas. The NHTS data show that taxi and limousine trips comprise 0.39% of all trips in metro areas with populations of 1 million or more, compared with less than 0.1% in metro areas with less than 500,000 population.

Summary

Measures of the taxi industry's size and growth trajectory need to be assembled from a variety of data sources. Table 5 brings together the data and estimates discussed in this paper and detailed in Tables 1-4. It is evident that taxicab service is provided by a very substantial industry involving several hundred thousand workers, over $14 billion in revenue and serving over 1 billion passenger trips per year.

It is also evident that the industry has grown substantially over the past two decades and particularly since the turn of the century. Within the last 10 years, revenues have grown by 42%, the number of establishments providing taxi and limousine service has grown by 54% and the number of drivers by 32%.

While much of the growth over the last two decades has been in the sedan and limousine sector, it appears that the locus of growth shifted to taxicab services in recent years.

The growth of the taxi and limousine industry in recent years is consistent with overall transportation trends, in particular, the growth in public transit ridership. Although these modes may compete for a particular trip, they are fundamentally complementary, providing transportation options that are independent of the private automobile. NHTS results show that both have grown rapidly in the current century; taxi usage has grown by 21% and public transit by 16% from 2001 to 2009. The growth is particularly strong in large metro areas with a population of 3 million or more, where taxi usage rose 32% in this period.

The size and growth of taxi services is quite important when considering Transportation Network Companies. TNCs are entering a substantial and growing business, a quite different context from the last great era of change in which a number of cities experimented with deregulation of taxi services in the 1970s and early 1980s. At that time, the industry was stable or declining in size. Growth of taxi demand, concentrated in dense urban areas, thus presents a natural business opportunity for new services such as TNCs, at least to the extent that they can compete effectively with the incumbent taxi and limousine services.

TABLE 5 Summary of Industry Characteristics and Trends

	Annual volumes	5-year change	10-year change
Revenues	$14.1 billion	+14%	+42%
Establishments with employees	$6.6 billion	+1%	+22%
Establishments without employees	$7.5 billion	+28%	+66%
Number of establishments	209,766	+24%	+54%
With employees	7,446	+3%	+7%
Without employees	202,320	+25%	+56%
Taxi and limousine drivers, 2006-10	302,000	n/a	+32%
Vehicles	240,000	n/a	n/a
Taxicabs	180,000	n/a	n/a
Limousines/sedans	60,000	n/a	n/a
Trips with passengers	890 million	n/a	n/a
Passengers	1,160 million	n/a	n/a
Vehicle miles traveled (with passenger)	4.5 billion	n/a	n/a
Passenger miles traveled	5.8 billion	n/a	n/a

All figures for 2012 except Taxi and Limousine driver data are for 2006-10 (5-year average) and the change from the 2000 Census.

Changes in revenues use inflation-adjusted dollars.

This table is a summary of Tables 1-4.

CUSTOMERS

The National Household Transportation Survey (NHTS) is the most comprehensive source for profiling taxi trips in the United States. Survey results show daily trip-making by mode and other trip characteristics for households and individuals in a 24-hour period. The survey covers both local travel and long-distance travel, although the latter make up a small portion of total travel in the survey. Results for 2009 are based on 1,041 taxi trips, which are defined as the use of an automobile by a passenger for fare. The category includes traditional taxis, sedan services and limousines.

Tables 6 to 15 show NHTS results for metropolitan area and traveler characteristics, detailed by mode so that one can see how taxi trips compare with trip characteristics of other modes.

The most distinguishing feature of taxi trips is their concentration in large, dense urban areas, particularly metro areas with rail transit. Seventy-two percent of taxi trips in 2009 were taken by people living in metropolitan areas of 1 million or more that have rail systems, compared with 29% of all trips. In a similar vein, 80% of taxi trips are taken by people living in census tracts with 4,000 or more population per square mile, compared with just 30% of all trips. By contrast, only 5% of taxi trips are taken by rural residents, compared with 23% of all trips. (See Tables 6-8.)

As would be expected, non-car households use cabs more often than those with one or more vehicles available to them. However, because there are relatively few non-car households, the trip distribution is almost evenly split; 53% of taxi trips are taken by people in no-car households while 47% are taken by people with a vehicle available. (See Table 9.)

The concentration of trips in large metro areas and dense census tracks is virtually identical for transit as for taxi trips, reflecting the complementary nature of taxicab and transit ridership.

The second area of major difference between taxi trips and other travel is in household income. Taxi users are concentrated at the lower and upper ends of the income distribution. Households with incomes under $25,000 account for 41% of taxi trips compared with 17% of all trips. Households with incomes over $100,000 account for 33% of all taxi trips compared with 22% of all trips. (See Table 10.)

A further dissection of the data for car ownership and income shows that at the lower end of the income spectrum, taxi use is heavily concentrated among non-car households, whereas the opposite is true among upper-income taxi riders, most of whom have a vehicle available to their household. (See Table 11.)

In most other respects, as shown in Tables 12-15, taxi users resemble non-taxi travelers, with some differences based on age, gender and trip purpose:

- Taxi trips skew somewhat female (61% compared to 51% for all trips).
- Age is somewhat concentrated in the middle of the spectrum; with 46% of taxi trips by people age 25 to 44 compared with 32% of total trips. Seniors are no more or less likely to use a cab than other forms of transportation.
- Trip purposes generally mirror overall trip purposes, except cabs are more often used for medical trips (11% compared with 2% of all trips) and less often for work, shopping and errands.

- Taxi trips typically last 10 to 39 minutes (82%), straddling the typical length of auto trips (5-29 minutes) and transit trips (30+ minutes).

TABLE 6 Distribution of Trips by MSA Category for the Household Home Address and Mode

Metro area size	Taxi	Public Transit	Motor vehicle	Bicycle	Walk	All trips
MSA of 1 million or more, with rail	72%	73%	26%	27%	43%	29%
MSA of 1 million or more, and not in 1	11%	17%	30%	30%	26%	29%
MSA less than 1 million	11%	8%	24%	27%	18%	23%
Not in MSA (CMSA)	6%	1%	20%	16%	13%	18%
Total	100%	100%	100%	100%	100%	100%

TABLE 7 Distribution of Trips by Population per Square Mile and Mode

Pop. density	Taxi	Public Transit	Motor vehicle	Bicycle	Walk	All trips
0-99	2%	0%	14%	11%	9%	13%
100-499	4%	2%	15%	13%	9%	14%
500-999	2%	2%	10%	8%	7%	9%
1,000-1,999	4%	3%	13%	13%	10%	13%
2,000-3,999	9%	11%	20%	22%	18%	20%
4,000-9,999	29%	21%	21%	22%	23%	21%
10,000-24,999	15%	21%	5%	6%	11%	6%
25,000-999,999	36%	40%	1%	4%	13%	3%
Total	100%	100%	100%	100%	100%	100%

TABLE 8 Distribution of Trips by Household in Urban/Rural Area and Mode

Urban or Rural	Taxi	Public Transit	Motor vehicle	Bicycle	Walk	All trips
Urban	95%	97%	76%	83%	86%	77%
Rural	5%	3%	24%	17%	14%	23%
Total	100%	100%	100%	100%	100%	100%

TABLE 9 Distribution of Trips by Number of Household Vehicles and Mode

Household vehicles	Taxi	Public Transit	Motor vehicle	Bicycle	Walk	All trips
None	53%	48%	1%	10%	16%	4%
1	18%	30%	21%	25%	26%	21%
2+	28%	22%	78%	65%	58%	74%
Total	100%	100%	100%	100%	100%	100%

TABLE 10 Distribution of Trips by Household Annual Income and Mode

Household Income	Taxi	Public Transit	Motor vehicle	Bicycle	Walk	All trips
<$25k	41%	44%	15%	18%	25%	17%
$25-49k	10%	22%	24%	25%	21%	23%
$50-74	4%	10%	18%	18%	15%	17%
$75-99	7%	7%	16%	13%	13%	15%
$100+	33%	13%	23%	23%	22%	22%
Not available	6%	5%	5%	4%	4%	5%
Total	100%	100%	100%	100%	100%	100%

TABLE 11 Distribution of Taxi Trips by Household Income and Number of Household Vehicles

	Household Vehicles		
Household Income	None	1+	Total
<$25k	32%	9%	41%
$25-49k	4%	6%	10%
$50-74	2%	1%	4%
$75-99	4%	3%	7%
$100+	7%	26%	33%
Not available	5%	2%	6%
Total	53%	46%	100%

TABLE 12 Distribution of Trips by Gender and Mode

Gender	Taxi	Public Transit	Motor vehicle	Bicycle	Walk	All trips
Male	39%	46%	48%	76%	49%	49%
Female	61%	53%	52%	24%	51%	51%
Total	100%	99%	100%	100%	100%	100%

TABLE 13 Distribution of Trips by Age and Mode

Age	Taxi	Public Transit	Motor vehicle	Bicycle	Walk	All trips
5-18	10%	15%	16%	43%	22%	18%
19-24	9%	13%	8%	7%	7%	8%
25-34	15%	17%	12%	8%	15%	12%
35-44	31%	19%	21%	15%	19%	20%
45-54	14%	17%	17%	12%	15%	16%
55-64	10%	11%	14%	8%	13%	14%
65+	13%	8%	12%	6%	10%	12%
Total	100%	100%	100%	100%	100%	100%

TABLE 14 Distribution of Trips by Trip Purpose and Mode

Trip purpose	Taxi	Public Transit	Motor vehicle	Bicycle	Walk	All trips
Home	38%	36%	34%	41%	36%	34%
Work	8%	20%	13%	7%	6%	12%
School/Daycare/Religious activity	5%	6%	5%	4%	5%	5%
Medical/Dental services	11%	3%	2%	0%	1%	2%
Shopping/Errands	8%	13%	19%	8%	11%	18%
Social/Recreational	12%	11%	10%	36%	25%	12%
Family personal business/Obligations	1%	2%	3%	1%	7%	3%
Transport someone	4%	2%	7%	1%	2%	6%
Meals	7%	2%	7%	2%	6%	7%
Other reason	6%	3%	0%	0%	1%	1%
Total	100%	100%	100%	100%	100%	100%

TABLE 15 Distribution of Trips by Duration of Trip and Mode

Trip duration	Taxi	Public Transit	Motor vehicle	Bicycle	Walk	All trips
0-4 min	2%	1%	9%	9%	16%	9%
5-9 min	5%	2%	22%	19%	22%	21%
10-19 min	45%	11%	37%	39%	37%	36%
20-29 min	17%	12%	14%	12%	11%	14%
30-39 min	20%	22%	9%	12%	8%	10%
40-49 min	7%	13%	4%	4%	2%	4%
50+ min	5%	40%	6%	6%	3%	6%
All	100%	100%	100%	100%	100%	100%

Source for Tables 6-15: National Household Transportation Survey, 2009

INDUSTRY ORGANIZATION AND STRUCTURE

Taxicabs

There are three essential elements to the provision of taxi service: the driver, the vehicle and the company that takes customer calls and dispatches drivers for pick-up. Traditionally, industry structure matched these elements. Fleets bought and maintained cars, hired drivers, dispatchers and auto mechanics, bought or bought access to a radio frequency for dispatching calls, and advertised in the yellow pages and at bars and grocery stores. Cab drivers listened to the dispatcher's radio frequency for calls, and frequented taxi stands at the local airport, downtown hotels, rail and bus stations and possibly grocery stores and other venues where customers would want a cab.

Fleets operating in this fashion can still be found throughout the country. They are not infrequently the largest cab company in town and the company that people call most often when they need a cab. These fleets were often established in the immediate post-World War II years

and have been passed down to second and third generations of the children and spouses of the founder or founders.

In the nation's largest cities, it is possible to make a living driving a cab without taking dispatch calls. Demand at airport and downtown taxi stands and perhaps by street hail is sufficient to keep a driver busy all day. Thus, at the other end of the highly-organized fleet and hired-driver end of the spectrum is the owner-driver, who plies the trade independently with his own car. Like the traditional fleet, owner-drivers remain a bedrock part of taxi industries in big cities such as New York, Boston, Chicago and San Francisco.

While fleets and owner-drivers are still central to the taxi industry, over time, this picture evolved and became more complex. Starting in the 1970s, nearly all fleets converted from employee drivers to lease drivers who pay a set amount for each shift and take home fares and tips in excess of the lease fee. Leasing converted drivers to the status of independent contractors, enabling fleets to shed costs associated with employees. It also transferred the economic risks of a slow day squarely onto drivers, who paid the lease fee regardless of the day's income. Drivers could lease by the shift, and over time, could also lease by the week. Leasing thus made drivers more independent of fleets in their daily routines, no longer having to start and end their shift at pre-set times at the fleet garage. In some cases, lease drivers provided their own vehicle. The fleet continued to provide radio-dispatched trips and in some cases owned the valuable medallion license required to operate.

Some drivers own both the vehicle and medallion license or permit and simply affiliate with a radio base that provides none of the other functions traditionally performed by fleets. Drivers sometimes buy a second or third or additional taxicab licenses and lease their cabs to other drivers. They became vehicle owners, separating that role from both driver and fleet. (This discussion draws on Gilbert 1982, Shaw 1983 and Schaller 2007, and the author's interviews with taxi operators; see Schaller 2007 Appendix A.)

Table 16 summarizes the different functions that fleets, dispatch bases, vehicle owners and drivers may take on. As highlighted in the table, fleets may perform a full range of functions from recruiting and training drivers to maintaining vehicles. Some of these functions may be taken by dispatch companies, which under this typology dispatch but do not own taxicab vehicles. Separately, vehicle owners may recruit drivers and by definition own vehicles but without themselves driving. And drivers, of course, drive and sometimes own and maintain the vehicle.

The TLPA survey found that about one-third of its members operate fleets within each of three size categories: less than 25 cabs, 25 to 99 cabs and 100+ cabs. However, of the taxicabs represented in the survey, 87 percent are operated by fleets of 100 or more cabs. (TLPA Taxicab Fact Book 2013) This probably overstates the concentration of the industry as large fleets are probably more likely to be TLPA members and respond to the organization's survey.

TABLE 16 Taxi Operational Functions and Responsibilities

	Driver recruitment	Driver training	Dispatch	Record keeping	Vehicle ownership	Vehicle maintenance
Fleets	✓	✓	✓	✓	✓	✓
Dispatch companies	✓	✓	✓	✓		
Vehicle owners	✓	✓		✓	✓	✓
Drivers				✓	✓	✓

In addition to the different ways that taxi service functions may be distributed among fleets, dispatch companies, vehicle owners and drivers, the relationships among them varies in important ways. In some cases, drivers' working days are tightly integrated with the fleet or dispatch operation. Drivers depend on the base to provide dispatch calls and dispatchers rely on drivers to service the calls. In other cases, while regulatory provisions may require that drivers affiliate with a fleet or radio group, aside from their payment of a weekly or monthly fee, drivers operate independently at taxi stands and picking up street hails.

Variations in industry structure and operations reflect, in part, differences in customer markets. Where pre-arranged trips predominate, fleets and drivers tend to be more tightly integrated. Where there is abundant taxi stand and street hail activity, drivers tend to be more independent.

Regulatory history also plays an important role. Cities that deregulated in the 1970s and 1980s often issued new licenses to drivers individually. Over time, these drivers either came together to form radio bases or joined existing radio services. As the drivers aged, many kept ownership of the medallion or permit but leased their cabs to other drivers. Some leased the medallion license without a vehicle. Thus arose in cities such as San Diego and San Francisco radio services separate from fleets and medallion owners separate from both fleets and drivers.

Industry structure and customer market characteristics have hugely influenced the industry's response to regulatory issues. In large cities such as New York, Chicago, Boston and San Francisco, with abundant taxi stand and street hail activity and large numbers of independent owner-drivers, proposals to expand industry size were for many years stoutly resisted. Medallion owners feared that issuance of new medallions would reduce their daily earnings, assuming a fixed pie of taxi demand. When New York City issued additional licenses in the 1990s, driver incomes were little impacted and medallion values rose. The fears of medallion owners were thus shown in this case to be unfounded and cities including New York and Chicago issued additional licenses.

In contrast, where most trips are dispatched and the industry is primarily large fleets, the fleets have often supported industry expansion. A process of data collection and regular review of demand conditions has led to periodic issuance of additional operating authority in places as diverse as Las Vegas, Nev. and Arlington and Fairfax Counties in Virginia. As one might expect, the process has gone smoothly provided that the new licenses or operating authority go to existing companies and are awarded in a manner they consider equitable within the industry.

Limousines and Sedans

Traditionally, limousines provided a luxury service, often if not exclusively using stretch vehicles. Limo services charged by the hour rather than by the trip, often with a minimum number of hours per engagement. Limousine services were provided by companies that owned vehicles and employed drivers, or by drivers with their own business. The business was heavily oriented toward special events such as proms and weddings.

Over time, a complementary sedan business grew up, primarily to serve corporate clients making business-related trips, and possibly for employee trips during the day or going home late at night.

In some cities, sedan services arose as a result of constraints on medallion issuance. New York City's black car industry was created in the early 1980s when the regulatory authority mandated that medallion cabs remove their two-way radios and devote themselves to street hails.

The car service industry grew up in the late 1960s and 1970s in New York's outerboroughs due to lack of medallion services. Sedan services are a significant presence in Boston, which has a relatively low cap of 1,600 on the number of licensed cabs.

Sedan services now comprise the majority of the sedan/limousine sector. Two-thirds of sedan/limo company trips are provided in sedans and SUVs, while only 1.4% utilize stretch limousines, according to TLPA's survey of sedan and limousine operators. (Remaining trips are in passenger vans seating fewer than 15 passengers and minibuses seating fewer than 35 passengers and the larger motor coaches.) (TLPA 2012b)

Trip purposes have also shifted toward everyday business needs. TLPA survey respondents reported that 47% of their revenue was from airport transfers and 26% for corporate work other than airport transfers. About one-third of revenue is from proms, weddings, night on the town, hotel/resort work and for a variety of other occasions such as sporting events and wine tours.

The lines between the sedan/limo and taxi sectors have blurred somewhat in recent years. Taxicab companies have sometimes created sister sedan companies offering a premium service, and some have voucher accounts served by their taxi fleets. As another example, car service companies in New York City have developed corporate voucher accounts that were once the exclusive province of black cars.

REGULATORY STRUCTURE

Particularly in large American cities, taxi drivers, owners and fleets are governed by extensive regulations that cover nearly every aspect of taxi service. The breadth and specificity of regulations have accreted over decades as regulators sought to address documented problems and abuses in the industry. The thicket of regulations is a product of practical experience and problem-solving much more than economic or regulatory theory. As a result, cities have developed quite a range of regulatory provisions, many of them a product of particular local circumstances.

Taxicabs are most often regulated by local governments, primarily by municipal governments. Cabs are regulated at the county level, however, in states including Florida, Maryland and Virginia. In Colorado and Nevada, a state with a heavy reliance on tourism, cabs are regulated by state agencies. Sedan services are also predominantly regulated by municipal or county agencies, with notable exceptions such as California, Pennsylvania and Colorado, where state agencies regulate sedans as passenger carriers.

Public Safety Regulations

Some aspects of regulation are quite straightforward and applied in similar fashion across the country. Most obvious in this category are provisions for background checks of drivers and fleet or vehicle owners and vehicle insurance requirements and safety inspections. There has been little question that government has a responsibility for ensuring that felons are not unknowingly licensed as taxi drivers or owners and that cars have working brakes and valid liability insurance. Even at the height of their influence in the 1970s and early 1980s, advocates of deregulation focused on entry and economic regulation and never proposed privatizing responsibility for public safety. (Frankena 1984, PriceWaterhouse 1993) In a post-9/11 world, the breadth and

involvement of public safety concerns has deepened as taxi regulators work with anti-terrorism personnel who are concerned about the possible use of cabs as part of terrorist plots. These concerns are particularly acute at airports.

Background checks typically involve checks of criminal records, based either on fingerprint matching of drivers, vehicle and fleet owners or matching using name and date of birth. Fingerprints or name and DOB information are forwarded to a state agency to check for matches against criminal records. Results are returned to the taxi regulatory agency for use in the licensing process. Some regulators also check against FBI records, which provide information on serious out-of-state criminal records. The International Association of Taxicab Regulators (IATR) is working on setting up a clearinghouse function that would enable regulators to check fingerprints on state databases outside their home state.

Taxi regulators also typically conduct vehicle inspections that are more detailed and/or more frequent than state requirements for passenger vehicles. All agencies responding to the survey conducted for this paper and a 2012 IATR survey of taxi regulators (IATR 2012) have periodic mandatory inspections of taxicabs, and nearly all of the agencies that regulate limousines have mandatory inspections. Inspections are typically conducted annually, although a few jurisdictions have semi-annual inspections, and New York City cabs are inspected three times a year.

On the important issue of auto liability insurance requirements, the most comprehensive data currently available was obtained in TLPA surveys of taxi and limousine operators. Insurance requirements range from $35,000 Combined Single Limits (CSL) to $2 million in CSL coverage. The median state limits were reported to be $300,000 CSL and median local limits were reported as between $300,000 and $1 million CSL. The survey found that the average company premium, per car, was $5,632 for fleets with fewer than 25 vehicles, $6,475 for fleets with 25 to 99 vehicles and $8,192 for fleets with 100 or more vehicles in 2013. (These figures exclude companies that were self-insured.) (TLPA 2013a)

The insurance picture was similar for sedan/limo companies. Median state limits were $1 million CSL and median local limits were $300,000 CSL. Median company coverage was higher than required, at $2 million for sedan companies. The average company premium, at $4,417 per car for non-self-insured fleets, was somewhat lower for sedans than for taxi operators, reflecting differences in annual mileage (TLPA 2013b).

The large majority of jurisdictions also have age limits for taxicabs, ranging from 5 to 10 years with a median of 8 years, based on the IATR survey and the survey conducted for this paper. About one-half have age limits for limousines, also in the 5 to 10 year range where they exist. Complementing retirement age requirements, most agencies have age limits, typically of 5 years, or mileage limits, which vary widely, for vehicles entering service as cabs, and about one-half have age limits for newly-licensed limousines (IATR 2012).

Fare Regulation

In nearly all cities, taxicab fares are set by regulation. Fare regulation is designed to ensure that the rate of fare is fair to both customers and drivers, to eliminate gouging and overcharging, and to provide predictability in the amount customers will be charged.

Regulations most commonly set a fixed rate of fare that applies uniformly across the taxi industry. A few cities have set maximum fares, most notably San Diego after re-regulation in the

1980s. Few companies sought to compete on price, however, and the result was equivalent to a uniform fare.

Following federal standards for taximeter devices, fares are calculated based on an initial charge (the "drop"), and mileage and time charges. When the cab is stuck in traffic, the time charge applies; otherwise the mileage charge applies. There may also be a variety of surcharges applied, most commonly for additional passengers, luggage, and based on time of day. Cities have increasingly adopted flat-rate fares for trips between regional airports and the central city downtown to make the fare predictable and guard against overcharging. Aside from a few peak-time surcharges, taxi rates of fare are rarely set to vary in response to changing levels of demand for service.

New York City car services, which provide taxi-like pre-arranged service, charge flat per-trip fares that are not regulated. However, the recently-created "green cabs" that are allowed to pick up street hails outside the Manhattan core have taximeters, which are used for trips that start as street hails and cab stands. Flat fares continue to be used for green cab dispatch trips.

Rate-making processes are somewhat varied. Current rates may be reviewed periodically or at the request of the industry. Whether to even conduct a review can become a politically charged issue. The need for rate increases can be evaluated against standardized measures such as the consumer price index or price indexes specially calculated to reflect taxi industry costs. Fares may be increased with the purpose of raising driver earnings, and are sometimes accompanied by caps on lease fees that fleets can charge the drivers. Regulators often conduct surveys of peer cities to assess where they fall relative to others, with a particular eye on how business and leisure travelers will perceive taxi fares.

The situation is quite different for sedans and limousines, which are generally allowed to set their own fares without any regulatory constraints. However, a few locales set a minimum fare, historically designed to ensure that sedans and limousines to serve a premium or luxury market that is distinct in service quality and pricing from taxi service, and thus prevent sedan services from circumventing taxi entry controls. Examples are San Antonio ($67.50 minimum), Portland, Ore. ($50 minimum), Nashville, Tenn. and Miami, Fl. (each pegged to a multiple of the taxi fare), and until recently, Houston ($70 minimum) (City of Houston 2014).

Regulating Entry and Service Quality

Two of the most controversial aspects of taxi regulation are entry and economic regulations, both of which move beyond the realm of public safety. These types of regulations first became commonplace in the 1920s and particularly during the Great Depression, when entry restrictions were adopted in New York City, Chicago, Boston, Baltimore, Toronto, Montreal, Quebec, Winnipeg, and Vancouver, B.C. With jobs short and wages falling, unemployed workers flocked to the taxi industry. The result was an oversupply of drivers, particularly at cab stands, and problems ranging from lack of insurance to overcharging to curbside fistfights among drivers competing for fares (Gilbert and Samuels 1982; Davis 1998). In response, cities placed moratoria on the issuance of additional licenses, seeking to let attrition bring supply back in line with demand for service. These codes often included provisions for issuance of additional licenses when they might be needed based on a regulatory finding of public convenience and necessity.

After W.W. II, entry controls remained in place and the first controversies broke out over whether cities should issue additional licenses. Taxi fleets and drivers in these large cities generally resisted, fearing a loss of income. New York, Boston, Chicago and some smaller cities

went decades without issuing additional taxi licenses. Licenses could be transferred between owners and grew in value, thus establishing "medallion" systems that enriched fleet owners and owner-drivers who held a vehicle license.

While big cities became renowned for medallion systems, the situation developed much differently in cities with predominantly dispatch trips. These cities tended to have strong fleets and few if any independent owner-drivers. Regulators built the regulatory structures that relied on fleets to provide training and oversight of drivers and respond to public complaints. Regulators sometimes focused simply on administering public safety requirements and little else.

Entry controls in fleet-oriented systems vary widely. Some cities let fleets adjust their fleet sizes either without government oversight or with relatively pro forma reviews, and let new companies can enter the industry provided they met minimum qualifications (e.g., background checks, licensing and vehicle standards). Other regulatory systems limit the number of taxicabs that each company can operate and control entry of new companies. Cities may allow fleets to adjust their fleet sizes through relatively simple and expeditious reviews. Las Vegas, for example, regularly reviews trip volumes and fleet sizes and adds medallions, spread across authorized companies. In other places the process may involve a company application, public hearings, petitions from user groups, and various calculations such as the ratio of cabs to population.

The most vexing regulatory issue in fleet-oriented systems concerns entry of new companies. Cities with franchise systems address entry of new companies through the competitive process to issue franchises, which is open to both incumbent fleets and newcomers. Where there is no franchise, regulatory systems that focus on fleet-level regulation take the form of certificate systems, in which the regulator issues a "certificate of public convenience and necessity" for the operation of the company and specifies the number of authorized vehicles.

In certificate systems, incumbent fleets may resist entry of new companies in order to protect their business interests. This can lead to shortfalls in service, in two ways. First, controversy over how much to enlarge the industry size and how to distribute additional operating authority can stalemate the process. Without sufficient cabs in service, dispatch response times can suffer. Second, fleets that are protected from competition sometimes lose the incentive to offer quality service. Both the regulatory system and industry can thus became calcified and reactive. This can occur whether the customer market was shrinking in the era of suburbanization and growing car ownership, or a growing market's needs were going unmet.

Regulating Service Quality

Regulators in cities with quite varied histories and regulatory systems were often drawn into the task of addressing problems with service quality as well as public safety. The result was a broad variety of regulatory initiatives. They included:

- Regulations to ensure service to all geographic areas of the city, in response to poor dispatch service as drivers congregated in high-demand areas and often sought to avoid crime-ridden neighborhoods.
- Regulations for disabled access, often by requirements for wheelchair-accessible vehicles and sometimes for service-focused requirements.
- Driver training programs focused on safe driving and customer courtesy.

- Lease fee caps designed to raise driver wages and thus attract and retain quality drivers as well as address equity concerns between owners and drivers.
- Requirements for partitions and cameras to protect driver safety.
- Requirements that independent drivers affiliate with a base (e.g., fleet or radio service) to relieve the regulatory burden of overseeing thousands of individual drivers.
- Street enforcement squads to enforce regulations, and specialized or streamlined procedures to adjudicate citations written by inspectors and based on citizen complaints, e.g., "taxi court."

By no means have all cities gone this route. Cities blessed with strong fleet operators who keep up service standards and resolve service complaints often have little active regulatory oversight other than licensing checks and vehicle inspections. But cities with chronic service quality problems tend to see a growth in the regulatory regime since market forces were unable to rectify the problems. Broadly speaking, these tend to be cities with substantial street hail and taxi stand trips, where market forces are inherently weaker.

Types of Taxi Regulatory Systems

Permit/medallion system - Operating authority takes the form of taxicab vehicle permits. The number of permits, often called medallions after the metal ornament that is affixed to the exterior of the car, is set through law or regulation. Permits/medallion licenses are generally transferable and have value. Examples: New York City, Chicago, Boston, Miami-Dade, San Diego, Seattle and King County, Minneapolis, San Francisco (S.F. permits are non-transferable).

Certificate system - Authority to operate taxicabs is issued to companies, generally with a specified number of vehicles allowed to operate under the certificate. Companies can generally apply for a change in the number of authorized vehicles and a decision is made based on specified criteria. Certificates cannot be transferred between taxi companies. Examples: Fairfax and Arlington County, VA and Alexandria, VA, Kansas City, MO, Austin, TX, Denver, CO, Pittsburgh, PA

Franchise system - Franchise is issued in a competitive process. There is a set term of years (possibly with extensions/renewals) and then the franchise is re-bid. Franchise specifies the number of cabs that each company may operate. Examples: Los Angeles, Anaheim, CA, Dulles Airport.

Open entry - No limit on the number of cabs. New companies and possibly individual drivers can obtain authority based on showing qualifications. Examples: Phoenix, Orange County FL, Orange County, CA (outside Anaheim), Washington DC, livery sectors in New York City and Newark, NJ.

Source: Schaller 2007.

Geographic Requirements

One fairly common problem is particularly relevant to the discussion of TNCs, namely, the taxi industry's duty to provide responsive service to all geographic areas within the city. Operating authority virtually always carries with it the obligation to provide service to anyone requesting a cab ride. The economic rationale is to have “dense markets cross-subsidize low-density and impoverished areas; [and] peak traffic cross-subsidize off-peak service” (Dempsey 1996, p. 96). Without regulation, service to low-density areas and during off-peak hours may decline or not be available at all.

Failure to abide by this requirement can quite blatant, as when a driver refuses to take a prospective customer at a taxi stand for economic reasons (e.g., to avoid a short trip, or to avoid deadheading back from an outlying area), to avoid perceived high-crime areas, or out of outright racism. This issue is typically dealt with through enforcement and ultimately license revocation.

The problem can take another form in outlying or low-density parts of a city. Cabs may be clustered in downtown areas and in neighborhoods with a relatively high demand for service. When someone calls from another area of the city, the company may not be able to send a cab to pick them up at all (e.g., no driver accepts the call), or at least within a reasonable period of time.

Studies of taxi service utilizing computerized company dispatch data have shown that cab companies tend to have more service and faster response times in certain areas of the city and, conversely, pick up fewer passengers and have longer response times elsewhere. This has been documented in Boston Nelson\Nygaard Consulting Associates 2004), San Diego (Schaller Consulting 2000), Miami-Dade County (Tennessee Transportation and Logistics Foundation, 2006) and Fort Worth, Texas (Schaller Consulting 2006). To an extent, these variations reflect overall variations in demand, with higher demand in denser neighborhoods closer to downtown and lower demand in outlying areas of the city. It can also be the case that different fleets concentrate on different areas of town. The issue of geographic service becomes most acute when no company serves a particular part of the city.

Taxi regulators have developed a number of strategies aimed to ensure cab service throughout their jurisdictions. These include various geographically restricted licenses so that some portion of the fleet is dedicated to lower-demand areas (as in Las Vegas); geographic zones for different companies (as in Los Angeles), restrictions on airport pick-ups by time of day or day of the week or portion of the fleet, and outright service requirements. As examples of the latter, Chicago adopted regulations that require every cab to pick up a specified number of trips each day in certain zones. The Los Angeles taxi franchises set response time standards and reporting requirements for monitoring and compliance.

These requirements are not always necessary. In New York City, which has substantial demand for dispatch service throughout the outerboroughs, there are a multitude of car service companies (over 500 bases operating in an open-entry system), each specializing on geographic and customer markets. No company provides prompt service throughout the city, but it appears that all neighborhoods are served.

Handicapped Accessibility

Accessibility of taxi service for persons with disabilities has been a growing issue in recent years. Despite strong support from advocacy groups and elected officials, it has proven difficult to expand the ranks of accessible taxicabs. The primary obstacles involve the cost of acquiring

and operating accessible vehicles, including fuel and maintenance expenses, higher insurance premiums, and lower productivity from the time it may take to serve a customer using a wheelchair.

Cities have taken a variety of steps to require, encourage, subsidize and mandate that accessible taxicabs be available to the public. These include requirements that a certain percentage of fleet cabs be accessible, grants and tax incentives for vehicle purchase; relaxed vehicle age limits; reduced licensing fees; passes to jump to the front of the queue at airport taxi stands; and sales of medallion licenses that may be used only for accessible vehicles.

Despite these efforts, the number of accessible cabs has remained low, nearly always less than 10% of the entire fleet (DC Taxi Commission 2014; survey conducted for this paper). Trip volumes also remain modest, reflecting in some combination of limited supply and limited demand:

- In the District of Columbia, accessible cabs undertook about 4 accessible trips per month per cab, representing 8% of all trips provided by the 20 accessible cabs in 2012, up from 3% in 2010 (DC Taxi Commission 2014).
- In San Francisco, there are 13 accessible trips per cab per month, about 2-3% of total trips provided by the 100 accessible vehicles (DC Taxi Commission 2014).
- In New York City, accessible medallion cabs are dispatched to pick up wheelchair users through a central dispatch operation created for that purpose. There were about 12 accessible trips per cab per month, or 1% of trips made by accessible cabs, from September 2012 to March 2013 (NYC Taxi and Limousine Commission 2014).

Cities continue to examine how to increase the supply of accessible vehicles and make them available to disabled persons. There seems to be growing recognition that in addition to having vehicles available, it is important to provide a central dispatching mechanism for accessible cabs to speed response times, and to have drivers properly trained and motivated to serve the unique needs of these customers. Several cities including Washington DC and New York have set up dispatch services for these vehicles. Several cities have also established funds paid through industry or passenger fees to subsidize out-of-pocket capital and operating costs, and also provide financial incentives to drivers. The fees include a 30-cent per trip fee to be added to the fare in New York and $100 annual fee on Chicago medallion owners who do not operate an accessible vehicle. The funds will be used to help off-set the added expenses incurred by owners and drivers of accessible vehicles.

Other financial incentives are also used. For example, the dispatch system in New York City provides additional payments to drivers for time spent deadheading to pick up wheelchair passengers and payment if the driver waits more than 10 minutes for the passenger.
Recently, cities have also moved toward outright mandates that vehicles newly put in service be accessible:

- Chicago and Washington DC have adopted requirements that fleets of a certain size have a minimum percentage of accessible vehicles (5% in Chicago and 6% by December 2014 in DC).
- New York City auctioned new medallion licenses that can only be used on accessible taxicabs, and now has over 600 accessible yellow cabs in service (out of over 13,000 total) as well as 1,200 accessible "green cabs" (out of 6,000 total). In 2014, New York City mandated that

one-half of new vehicles being put into service as medallion cabs be accessible, starting no later than January 2016. Through that measure and issuance of additional accessible medallions in both the yellow and green industries, New York aims to have 50% or more of the fleet accessible by 2020.

Fees and Taxes

Three types of fees and taxes are levied on the taxi industry above and beyond business and personal taxes that apply broadly. The first are licensing fees for driver, vehicle and fleet or base licenses. These range widely from less than $100 to several times that amount. By law, they are set to (at most) cover the administrative costs of issuing the license and regulating licensees. Similarly, vehicle inspection fees are charged for each inspection to cover the costs thereof. License and inspection fees may not be used for general revenue purposes. That distinguishes fees from taxes, which are designed to raise revenue for any number of uses.

While license fees are universal, taxes that apply specifically to taxi drivers and owners are not common. There are examples, however. Chicago charges medallion owners a Ground Transportation Tax of $78 per month. New York has a 50 cent tax on each taxi ride and a $1,000 annual Commercial Motor Vehicle Tax. In addition, New York and Philadelphia apply a sales tax on medallion transfers that is levied only when the medallion license is sold.

In its own category, New York has periodically auctioned new taxi medallion licenses as a way to both raise revenue and provide additional taxicab service. Medallion auctions have provided major infusions of cash. New York is in the midst of issuing 2,000 new medallions that are expected to generate over $1 billion for the city's General Fund. Chicago has auctioned smaller numbers of medallions that had been returned to the city due to foreclosure, revocation or failure to renew a license.

Service to Airports

Airports are a major trip generator and destination in nearly all cities. They often comprise the largest single market segment within a metropolitan area and are thus a prized piece of the taxi business. Airports have several unique characteristics that affect both how airport service operates and how it is regulated.

Perhaps most importantly for regulation, access to airport property is controlled by the airport operating authority. Airport officials directly control who can pick up passengers, the system for doing so, and fees that must be paid. Because taxi and limousine pick-ups occur in a concentrated area, they present a more focused target for enforcement efforts.

Operationally, airports provide a flow of business to cab drivers which is relatively easy to service, providing a steady flow of customers who are for the most part are going to downtown hotels or office areas, or going to residential destinations that the passenger knows how to get to. Airports are thus magnets for taxi and sedan/limousine drivers, including those attracted to the simplicity and ease of serving these trips. Without access controls, they are often vastly oversupplied, creating long waits in taxi holds. Waits can extend to three of four hours, with hundreds of drivers congregating in taxi holding lots. Airports also attract all manner of drivers who are unlicensed, possibly uninsured, and may be intending to overcharge and abuse passengers.

To address these issues, airport authorities tend to strictly regulate taxi and limousine service to their facilities. Various approaches are used. For taxi service, competitively bid concession systems are commonly used at mid-size airports such Orange County (John Wayne), Tampa, Raleigh-Durham and Sacramento and at a few large airports such as Dulles. In some cases, there is one concessionaire and in other cases two or three cab companies are involved. Seattle's Sea-Tac airport has an agreement with a driver association to provide cab service. Drivers from outside the association are allowed to pick up when there is a shortage of cabs from the association. Franchise and concession systems often include service mandates to ensure that cabs are available for passengers who arrive late at night or in adverse weather. The concessionaire generally has the responsibility to provide dispatchers at the curb and manage activity in the taxi holding lot. (Cooper, Mundy and Nelson 2010)

Airports in larger cities that have strong regulatory systems are often open to any driver licensed for service in the city. The airport may require drivers obtain a permit, and may take steps to prevent oversupply, long driver waiting times, and attendant ills. LAX and Portland have alternate day systems that allow cabs to serve every fifth day and every other day, respectively (although LAX's system is currently being revised to prevent drivers from working more than 12 hours a day). San Jose limits how many cabs from each fleet can be at the airport.

Either through concession agreements or permit systems, airports often mandate background checks, vehicle age and inspection requirements and auto liability insurance with limits in excess of that required by taxi regulators. These mandates are motivated by a combination of customer service and security considerations. They also implicitly acknowledge that airports possess considerable leverage when they control access to their lucrative ground transportation market.

Airports may charge fees for each passenger pick-up, and also an annual per-vehicle fee. Fee revenues are used to pay for dispatch operations and maintenance and upkeep of taxi holding lots and in some cases for general revenue. An Airport Ground Transportation Survey of 77 North American airport operators found that 60% charge a fee on taxi pick-ups. Fees range from $1 to $5 and average $2.67 per pick-up. About one-half of the airports surveyed charge taxis an annual fee, which average $626 (AGTA 2014).

The situation with sedans and limousines is quite different. Although there are examples of concession systems for sedans and limousines, particularly in Canada, more often, any licensed operator can pick up passengers at the airport. However, the driver must park in a garage, meet the customer in the baggage area, and then retrieve the car. This procedure, though less efficient than taxi stands, is meant to ensure that drivers only serve pre-arranged trips, although in practice drivers soliciting passengers inside the terminal is quite common and a significant problem. While once common, security considerations now dictate against allowing drivers to park at the curb and enter the terminal.

AGTA reports that 86% of airports responding to its survey of airport operators charge a fee on sedan/limousine pick-ups. Fees range from $1 to $40 and average $5.68 per pick-up. About one-half of the airports surveyed charge taxis an annual fee, which average $1,060 (AGTA 2014).

Deregulation, Re-Regulation and the Differences Between Dispatch and Walk-Up Markets

During the 1970s, as trucking, airline and telecommunications industries were being deregulated, the notion caught hold that taxi deregulation would deliver similar benefits. Economists at the

time predicted that unfettered entry and fares for taxi providers would produce lower fares, a higher level of service to customers and service innovations such as shared ride service as new firms enter the market (Frankena and Pautler 1984). A leading academic predicted that open entry would allow smaller taxi companies the "entrepreneurial freedom" to service "marginal markets abandoned by large fleets" and would "open the way for a rich mix of new services to penetrate urban transportation markets" (Cervero 1985).

The goals of encouraging competition and service innovation were primary motivations for changes to entry restrictions that were adopted in 19 cities from 1965 to 1983 (Shaw et. al. 1983). The largest of these included San Diego, Seattle, Atlanta, Phoenix, Cincinnati, Indianapolis, Kansas City, Mo., and Sacramento, Calif.,

The experience of these cities did not realize the expected benefits of deregulation. Instead, deregulated cities experienced a sharp influx of individual owner-operators who primarily if not exclusively worked taxi stands at airports and large hotels (Teal and Berglund 1987, Frankena and Pautler 1984, ITRE 1998 and La Croix et. al. 1992). The arrival of additional drivers did not improve taxi availability since prior to deregulation there was no shortage of taxi service at these stands. Proliferation of cabs did result in drivers waiting a longer time for their next trip. This led to "a reduction in drivers' productivity and real earnings" (Teal and Berglund 1987). The financial pressures in turn resulted in upward pressure on fares and "aggressive solicitation of passengers and confrontations among drivers" as drivers sought to obtain the most lucrative trips and avoid unprofitable short trips (PriceWaterhouse 1993, p. 15). Open airport systems were found to be "unworkable," with "price gouging, dirty drivers, unsafe cabs, and unfair competition" (La Croix et. al. 1992).

The dispatch market was affected as well as hotel and airport stands. In Atlanta, service to minority neighborhoods decreased despite a doubling in the number of cabs. The reason was that most new entrants focused on the airport (Frankena and Pautler 1984). Prior to the city's closing entry in 2003, the main dispatch company in Sacramento reported an average response time of 30 minutes (Nelson\Nygaard Consulting Associates 2004).

Contrary to expectations, deregulation weakened fleets that focused on serving dispatch trips. Drivers working for the larger fleets in San Diego avoided the long lines at cab stands and focused more exclusively on dispatch trips, losing 10 to 25 percent of their customer base in the process. These drivers had difficulty making up for the loss of cab stand trips with additional dispatch trips and as a result "the real earnings of drivers in the largest company in the city have fallen 30 percent since deregulation" (Teal and Berglund 1987).

In addition, there were few new entrants to the dispatch business. There were several reasons for this. Entry for dispatch companies requires accumulation of considerable capital that may be difficult to attract to an industry with "marginal financial status" (Teal and Berglund 1987). New dispatch companies must advertise heavily to attract customers. They must quickly build the size of their fleets in order to achieve the economies of scope necessary to provide competitive response times for telephone requests for service. Another factor was that demand in the telephone dispatch market was either stable or declining in the cities that deregulated (Teal and Berglund 1987), so new entrants would have had to dethrone existing companies with large fleets and well-established name recognition. This proved difficult if not impossible.

These results led most of the cities that deregulated entry in the 1970s and early 1980s to re-regulate entry within a few years. PriceWaterhouse (1993) found that 14 of 18 cities that removed entry limits from the mid-1960s to the mid-1980s later restricted entry at airports or throughout the jurisdiction. Other cities such as Dallas and Sacramento have also closed entry in

recent years. Notably, the PriceWaterhouse study also found that four smaller cities (Spokane, Wash.; Tacoma, Wash., Berkeley, Calif. and Springfield, Ill.) retained “fully-deregulated system[s]” which apparently operated satisfactorily.

The few larger cities that kept or have long had open entry systems show less encouraging results. Arizona officials report the presence of many unlicensed and uninsured cabs in the Phoenix and Tucson areas. In Orange County, Fla., cabs frequently fail to meet acceptable service and vehicle standards. In Washington DC, cabs are plentiful downtown, but there are chronic complaints about service quality and response times in outlying areas (Schaller 2007).

The experience with deregulation thirty-plus years ago is informative for current consideration of the role and possible effects of rapidly expanding TNCs. Problems from deregulation were focused on taxi stand and street hail markets which became oversupplied by newly licensed independent drivers. TNCs by contrast serve the dispatch segment of the market, where they have the same incentive as traditional taxi dispatch operations to balance supply and demand of trips. Predictions that de facto deregulation of entry for TNCs would have the same effect as the earlier move to open entry for taxis need to address this difference.

At the same time, the experience with deregulation points out the important interdependence of market segments. Taxi drivers tend to serve multiple markets: taxi stands downtown and at the airport, dispatch trips throughout the city. In doing so, they gain efficiencies from being able to pick up a dispatch call in an outlying residential neighborhood after dropping off a trip that started at an airport taxi stand, as an example. Without this mix of trips, drivers would spend precious time and fuel deadheading back to more lucrative areas.

IMPLICATIONS FOR GOVERNMENTAL RESPONSE TO TNCS

The committee is charged with providing information on issues surrounding app-enabled transportation services "to inform decisions about the possibility and implications of future regulations and surrounding issues." Several observations about experience with taxi and limousine industry and regulatory structures are relevant to this task.

Reducing Costs of Entry and Operating in the Dispatch Market

Public discussions about TNCs have tended to focus on technology as the disruptive and most significant aspect of these new companies. Smartphone apps are at the cutting edge of today's mobile technologies and understandably become the shorthand description for app-enabled ride services. If simply offering smartphone apps were transformative, however, established taxi fleets that already provide them would be realizing the same benefits as TNCs.

What is disruptive is TNCs' use of their apps to bring far greater levels of transparency and reliability to the arena of ride services. Up until TNC smartphone apps arrived, when customers called a cab to pick them up at their home, workplace, grocery store, hotel, etc., they often had no idea how long it would take for the cab to actually arrive (Schaller 2015). In addition, large swaths of cities had long and unreliable wait times. The lack of transparency and unreliability of service discouraged potential customers from placing telephone orders in the first place.

The maps featured prominently on TNC smartphone apps show clearly where available vehicles are and an estimated time for the pick-up. When customers request a trip, they know

with reasonable precision how long they will have to wait (Schaller 2015). Once a ride is arranged, customers can see the driver getting closer and the estimated waiting time. The apps thus address long-standing issues with customers' not being sure when, if ever, the cab will arrive.

In addition to addressing transparency and reliability for customers, the apps have enabled TNCs to dramatically lower the costs of entering the market and the day-to-day costs of operating a ride service. Apps do away with the cost of dispatchers and enable TNCs to attract drivers who use their personal vehicles or were already working as taxi or sedan/livery drivers. TNCs thus eliminate the need for a large capital investment in vehicles and vastly reduce their operating costs as compared with traditional taxi fleet operators. Drivers form a part-time labor pool that can adjust their working routines according to call volumes. This business model has enabled TNCs to attract new capital and rapidly enter numerous and diverse cities.

Prior to the advent of TNCs, locales as diverse as San Francisco, Boston and Montgomery County, Md., that had demonstrably poor dispatch response times saw little if any competition from sedan or livery companies. Anyone could set up such a company, including taxi operators in neighboring jurisdictions, and likely attract an enthusiastic clientele had they been able to become known and offer quick pick-up times. Yet none did, presumably because of the barriers to entry: branding, buying vehicles, obtaining radio bandwidth, hiring dispatchers, and attracting drivers before there was a good flow of business.

TNCs introduced for the first time a nationally branded service that provides rides through a single app. Downloading the app once provides potential customers with service in numerous cities nationally and even internationally. The apps include driver ratings systems that give customers a feeling of choice and confidence about the drivers and quality of service as they make trip requests.

Taxi and sedan companies are working individually and with app providers such as Curb, which aggregate service offerings across transportation providers, to compete with TNCs. In this way, TNCs have challenged the incumbent ride providers to upgrade their offerings.

Critical to the ability of existing providers' ability to compete with TNCs concerns costs. Regulatory requirements for auto insurance, driver background checks, vehicle replacement and the like have direct implications for the cost of providing taxi and sedan services. The task for government regulators is to set requirements that apply equitably to traditional taxi and sedan/limo companies and TNCs. Regulators need to resolve the conflicts between public desire to accommodate these popular new services and calls to apply what have been broadly accepted public safety regulations for for-hire liability insurance, driver background checks and other requirements onto TNCs.

How regulations are set affects the profitability of the companies that must meet them, and will affect the quality and safety of the services provided. Allowing TNCs to circumvent these costs is likely to affect service across the board by leading existing taxi and sedan/livery operators to take steps to reduce their costs. There could be a race to the bottom, at least among some owners and drivers, with unfortunate consequences for public safety, quality of service and driver income.

Challenge of Serving All Customers

For decades, a core aspect of taxi regulation has been the requirement that the industry serve all customers. Various customer groups have, however, complained of substandard service based on

factors such as geography, disability, trip length, carrying of groceries and race and ethnic discrimination. Except where motivated by fear of crime or discrimination, these issues are economic in nature, with the trips going unserved being more costly and less remunerative to serve.

Government has been called on to rectify these problems. This has been the case even in open-entry systems that focus on public safety regulations, not to mention in medallion systems with a heavy dose of entry and economic regulation. The same set of expectations is now raised with TNCs.

The implication of experience with taxi and limousine regulation is that these issues are unlikely to be solved simply, easily or cheaply. To take the case of wheelchair accessibility, experience has made apparent that simple (if costly) requirements for accessible vehicles do not ensure satisfactory service. Companies need to have systems in place that include the vehicle, driver training and ability and willingness to serve customers with specialized needs. Financial arrangements to make the service economically viable can be needed. Recently adopted regulations to create industry funds through permit fees or fare surcharges are notable recognition of this.

In a similar vein, requirements that all companies have 24/7 dispatch service does not guarantee that a worker going home late at night will be able to get a cab in a timely fashion, or shoppers going home from a grocery store will get a driver willing to take them.

An additional implication from experience is that these issues may be better tackled through competition and open markets, probably combined with regulation or financial measures, rather than through regulation alone. Cab companies may specialize in different markets and drivers themselves will have preferences for different types of customers. It can be more effective to build an industry with multiple providers having different focuses than mandate that all companies and drivers serve a large city, or provide service to specialized customer groups.

Importance of the Airport Market

It is already evident that decisions of airport operators will shape the regulatory response in important ways. Airports are a lucrative market and relatively easy to serve, but at the same time, airport authorities are among the strictest regulators that oversee these industries, particularly in smaller metropolitan areas that have minimal municipal regulation of the industry.

The implication for government officials is that there may be strong benefits for airport and non-airport regulators to work coordinate their responses toward common goals.

Outcomes Will Depend on Local Circumstances

One of the biggest contrasts between taxi and limousine operators and TNCs is that the former are intensely local while the latter are national in scope. One note in the public discussion of TNCs has been a sense of relief to have well-known national or international brands available and move past the need to know which company to call in each city.

But the fact that the service seems essentially identical no matter where one is should not be taken to mean that the same regulatory response will produce the same result city to city. The effects of TNCs are likely to be quite different in different cities, depending on the size of the

market, quality of taxi dispatch service, customer characteristics and needs, geography, and current industry and regulatory structure.

It is not surprising that TNC trip volumes would be very strong in San Francisco, a city with abysmal taxi dispatch response times. One might expect the same in a city such as Boston, but not necessarily in places like Los Angeles which have focused far more effort on ensuring adequate response times for dispatch service.

Thus, TNCs may quickly become a major ride provider in some cities, exploiting the presence of gaps in existing service, but slower to expand in markets with good dispatch service. Their arrival may incentivize existing taxi and sedan/livery providers to better their offerings in order to compete, provided that the incumbents have the financial resources, management and marketing savvy and cooperation across their own industries to do so. Or the contested territory may move to City Hall or the courthouse, fought out over legislation and lawsuit rather than by telephone or app.

Another potential outcome is that the lines between old and new begin to blur. This has already happened in particular circumstances, as when Uber and Lyft opened or bought black car or car service bases in New York City and fully complied with existing regulations. Another example is where taxi and sedan/livery drivers have continued working as usual while also joining TNCs, thus serving customers through both old and new communication channels.

The lines could also blur if cab companies establish look-alike services separate from their existing fleets, utilizing the same business model as TNCs, much as some cab companies established sedan services, and as legacy airlines and one automaker established separate companies to compete with newcomers to their businesses.

Outcomes will be shaped not just by what regulations may be adopted, but the level of enforcement. Taxi regulatory experience is filled with examples of rules being adopted but never enforced and thus of little effect. One can find essentially the same regulation repeated in municipal codes, adopted at different times, indicating that initial legislative action failed to make the issue go away. Enforcement through licensing procedures and field enforcement of regulations has often been essential to ensuring compliance with the law.

This has been particularly true when market conditions change. When the economy is robust, the sedan/livery industry may grow to meet expanding demand for premium pre-arranged service. When fortunes reverse and demand drops, drivers face difficulty maintaining their former incomes. With few other job prospects they may solicit for rides at hotels, office and entertainment centers and airports, illegally competing with cab drivers. This activity can mushroom in the absence of vigorous street enforcement.

Finally, outcomes will be shaped by the fluidity of the competitive landscape. Drivers and customers can readily choose to switch between taxi and sedan/livery companies and TNCs, and potentially to switch back again. If the promises of faster response times, friendly drivers and higher pay are not met, the sheen of the new may wear thin.

Taxi Deregulation Is an Imperfect Guide for Current Issues

The results of deregulation in the 1970s and 1980s demonstrate that regulatory decisions matter greatly to the availability and quality of taxi service and economic health of the industries, and in sometimes unpredictable ways. Entry of new companies and in particular legions of independent drivers may not benefit customers and in fact may undercut incumbents who were serving hard-

to-serve trips. On the other hand, regulatory protection of existing providers can induce calcification and deterioration in service.

These are important lessons from the era of deregulation. But differences between deregulation in 1970s and 1980s and today's situation are important to highlight. Deregulation as carried out in most of the cities that took that course of action allowed independent cab drivers to enter the taxi stand and street hail markets. The resulting oversupply was concentrated in those markets. The TNCs, at least initially, have sought to serve pre-arranged trips rather than taxi stand and street hail trips. Historically, there have been far fewer imbalances of supply and demand in the dispatch market. Incentives against oversupply are strong since cab companies need to both keep drivers busy with trips and keep customers happy with prompt response times.

How this plays out with TNCs remains to be seen. TNCs may attempt to balance supply and demand through information (letting drivers know when the peak times are) and through pricing (e.g., surge pricing). But one could also imagine drivers with time on their hands beginning to solicit outside major trip generators such as hotels, entertainment and office complexes and airports. In that case, the history of deregulation would be directly relevant.

Need for Regulatory Adaptability as Conditions Evolve

The history of regulation of these markets and service providers is filled with unintended consequences. Medallion systems developed out of moratoria on license issuance at a time of acute oversupply of drivers and vehicles. No one intended to create a property right with values exceeding hundreds of thousands of dollars. The proponents of deregulation in the 1970s and 1980s expected service innovations and a more competitive marketplace that never came to pass. Reregulation of cities that had opened entry during deregulation found their industries taking a different form, as fleets were replaced with radio groups and independent owner-operators. Regulations for accessible vehicles that addressed only vehicle purchases did little to improve accessibility until operational issues were addressed.

The lesson from this history is that regulatory responses to TNCs need to be carefully thought through, be sensitive to local circumstances, and will likely need ongoing revision in light of evolving experience.

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