

CITY OF TORONTO  
MUNICIPAL LICENSING AND STANDARDS

# ECONOMIC IMPACT ANALYSIS OF TORONTO'S TAXICAB, LIMOUSINE, AND PRIVATE TRANSPORTATION COMPANIES

MAY 17, 2019



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# OVERALL FINDINGS

WSP Canada undertook a study for the city of Toronto's Municipal Licensing and Standards (MLS) Division, to explore the economic and social impacts of the Vehicle-for-Hire and Private Transportation Company (PTC) industries in the city since the introduction of Chapter 546, Licensing of Vehicles-for-Hire in 2016. The objective of this project was to understand the economic impacts of the Vehicle-for-Hire By-law on residents and the City, consumers, drivers, and the taxicab and limousine industry as a whole. With the arrival of PTCs in 2012, subsequent expansion of services to ridesharing in 2014 in the city of Toronto, and the introduction of Chapter 546, the vehicle-for-hire landscape has seen a shift. While the study aims to improve the quality and scope of information, the limitations encountered included the amount and accessibility of data in the taxicab, limousine, and PTC industries; the low response rate from the driver survey; and the relatively recent emergence of PTCs and few years under regulation. As part of the 2019 Review of Chapter 546, an Economic Impact Analysis has been developed to include the following sections:

- **Background Research and Methodology:** Focused on a review of the past and current vehicle-for-hire and PTC landscape in the city of Toronto and comparable jurisdictions in North America. Stakeholder interviews were conducted to gather industry perspectives on the entrance of PTCs and the Chapter 546 regulations in 2016 and their impact on taxicabs, limousines, and PTCs for both industry and drivers.
- **Economic and Social Changes Affecting Residents, Consumers and the City:** This section focuses on the evaluation of the quality of life, consumer choice, access, tourism, and environmental changes in the city of Toronto using a combination of qualitative and quantitative analyses.
- **Economic Impacts to Drivers and Industry:** Focused on the impacts related to the vehicle-for-hire and PTC industries as well as their drivers. A driver survey was administered to both vehicle-for-hire and PTC drivers in order to understand the opinion of the Chapter 546 regulations, ability to work in the industry, as well as ridership and revenue figures. The driver survey was used to develop supply and demand relationships, economic valuation, and impact to ancillary industries.

## INDUSTRY CONSULTATIONS

WSP conducted a total of 13 interviews with representatives from the vehicle-for-hire and PTC industries to gather information on the opinions of the emergence and regulation of PTCs and economic impacts of PTCs in the city of Toronto.

### Vehicle-for-Hire Interviews

Seven vehicle-for-hire interviews were conducted with various taxicab drivers and industry representatives. Most interviewees indicated that the entrance of PTCs and subsequent regulations has resulted in an oversupply of drivers in the city but that it has also required the vehicle-for-hire industry to embrace new technologies in order to compete going forward. Most drivers believed that the entrance of PTCs, and subsequent licensing, negatively impacted their quality of life as the demand for trips has decreased, resulting in longer shift durations to achieve their 2014 revenue levels, that drivers are leaving the industry, and the value of plates continues to decline. Many interviewees believe that the entrance of PTCs and subsequent regulation has decreased consumer safety (namely from the removal of mandatory training), increased congestion and Vehicle Kilometres Travelled (VKT), diminished the public image of taxicabs, and left a feeling of abandonment.

Interviewees self-reported a decrease in demand and revenues, primarily with streethailing as dispatching is still used by corporate accounts, contracts with institutions, and the older population segments. Most drivers saw a change in trip types with the majority occurring on evenings and weekends and has also shifted towards shorter trips within the central business district (CBD).

### **PTC Interviews**

Six PTC interviews were conducted with both drivers and industry representatives. When asked about the industry's initial perception of PTCs, all respondents agreed that the arrival of PTCs in Toronto provided positive benefits for consumers who saw increased choices, and potential drivers as they felt that existing barriers to entry into the market were removed. Most interviewees indicated that the vehicle-for-hire regulations made little visible impact on the operations of PTCs, but rather solidified their continued operations in the city of Toronto. It was noted that the increased use of PTCs is a result of the existing trajectory and adoption rather than the regulations, and therefore, interviewees were largely indifferent about the regulations. PTCs noted an overall positive impact to their quality of life due to the ability to flexibly earn revenue and the reduction in conflicts with the taxicab industry from being licensed.

In discussing revenue and demand implications, several interviewees indicated an increase in both demand and revenues which was a result of the existing trajectory of the industry as opposed to the regulations themselves. When asked about the type of consumers PTCs encounter, most interviewees indicated that their consumer base has seen an increase in tourists and a slight increase in vehicle occupancy from pooled services, though the economy service is still the most widely used.

## **ECONOMIC AND SOCIAL CHANGES AFFECTING RESIDENTS, CONSUMERS, AND THE CITY**

The economic and social changes affecting the city of Toronto, residents, and consumers were evaluated through the changes to quality of life of passengers, consumer choice, access, tourism, and environmental impacts. The assessment was done using a number of quantitative and qualitative approaches.

### **Quality of Life and Consumer Choice**

Consumer surplus is a measure of economic welfare (or utility) that is gained from the consumption of a good or service and is defined as the difference between the total amount a consumer is willing to pay for a service and the total amount they pay (ie. market price).

In quantifying the consumer surplus in the taxicab and PTC industries in the city of Toronto, WSP utilized data from the Transportation Tomorrow Survey (TTS), and information from the driver survey to understand consumers' behaviour when the market price changed over time. Data from census years 2011 and 2016 were used to represent the market prior to PTCs entering the city of Toronto (2011 census year) and a market consisting of PTCs in a regulated environment (2016 census year). In July 2016, the vehicle-for-hire regulation was implemented which reduced the base fare for taxicabs from \$4.25 to \$3.25, while introducing a minimum base fare and per trip fee for PTC rides of \$3.25 and \$0.30, which resulted in a base fare increase of \$1 as a response to the regulations.

Overall, the combined total consumer surplus (total for all users) for the taxicab and PTC industry as a whole increased from \$255.7 million in 2011 to \$368.6 million in 2016. This was mainly due to the entrance of PTCs in 2012, making the city of Toronto vehicle-for-hire market more competitive. On the one hand, the entrance of PTCs generated \$176.1 million in surplus for PTC consumers, because it allows them to experience a new service at lower generalized cost. On the other hand, it negatively impacted the taxicab industry by decreasing a total of \$63 million in surplus for taxicab consumers, mainly due to a decrease in demand for taxicab services. While the 2016 regulation generated \$12.2 million of benefits to the taxicab consumers, it reduced the benefits for PTC consumers by an estimated amount of \$11.5 million, which resulted in a marginal positive consumer surplus of \$0.7 million when isolating for the vehicle-for-hire regulations.

## Consumer Choice

The impact on consumer choice was assessed through the change in transportation modes. From the TTS, demand by transportation mode was captured, and it was seen that the overall number of trips between 2011 and 2016 has increased by 2.2%, however, when normalized for population growth, the overall number of trips per person has decreased by 4.5%, even with the introduction of a new transportation option (PTCs). This indicates that PTCs have likely captured the majority of their ridership from other modes. Overall, transit ridership and active transportation modes have seen an increase while ridership for private automobile, automobile passengers, and taxicab ridership has seen a decline.

In addition to the above quantitative measures, some qualitative impacts should be considered and have been outlined below.

Positive Considerations/Impacts	Negative Considerations/Impacts
<b>Considerations of PTC Entrance</b>	
Perceived increase in personal safety through the bi-directional rating system and transparency with trip information.	The rating system may be misrepresentative of a driver if the total number of ratings are low, with discrimination or bias, or due to a perceived inconvenience.
Secure, account-based payment method linked to credit card.	Cash-based users may be restricted from using this service.
Increased consumer choice for services offered and improvements in services offered or amenities.	
<b>Considerations of the Vehicle-for-Hire Regulatory Changes</b>	
Perceived personal safety.	The removal of the mandatory training and refresher courses, and CPR and first-aid training may decrease the overall safety of the industry.
Reduced out-of-pocket costs for customers.	
Background checks for drivers increase consumer safety.	
Increased competition of PTCs may lead to improved overall service of both vehicles-for-hire and other PTCs through additional amenity benefits or customer service improvements in order to stay competitive.	Increased competition may result in a loss of revenue in one market.
Increases the overall insurance coverage of the transportation network.	

Codification of PTC operations into a regulatory framework.	
Increased supply of vehicles-for-hire to meet current and future needs of the population.	There may be an over-supply of drivers at certain times of day and locations which would contribute to increased congestion, traffic issues, and environmental issues.

## Access

For this study, access looked at the connectivity of residents to services and activities. In order to measure the impact of PTCs in the city of Toronto, a correlation between the number of daily PTC trips made by residents of a given ward (based on the 44-ward system from the data received) and the population densities were assessed. A strong, positive relationship was found to exist between the number of origin trips by ward and ward density. It was also found that in wards with an average trip per capita above 5 are found in the higher density areas of the city. If these wards were excluded from the analysis, there would be lower correlation between PTC trips and population density.

A second regression was conducted between car ownership and number of origin trips per ward. The correlation coefficient was found to be -0.72, indicating that lower car ownership is associated with higher PTC trips. When controlling for car ownership in the regression between population density and number of trips, the relationship becomes weaker, and within lower density wards, no relationship between the two variables was observed. Further, the relationship between PTC trips and car ownership is stronger than the relationship between PTC trips and population density. Finally, it can be noted that the number of PTC trips has been increasing substantially between 2016 and 2018, particularly in lower-density wards that are situated outside of the CBD, indicating an increase in usage in these areas.

In addition to the quantitative assessment conducted, other qualitative considerations related to access include:

- Increased number of wheelchair-accessible service providers;
- Elderly and youth populations benefit from the increased transportation options and flexibility in travel;
- Benefits from reduced costs, travel, and wait times, route flexibility; and overall mobility for users with credit cards, bank accounts, and smart phones; and
- All users benefit from increased access to locations within the city, and beyond.

## Tourism

Toronto has seen an increase in tourism over the years and employs over 329,000 people in tourism-related businesses. With increasing expenditures from the increasing number of visitors, the economic impact of tourism related activities is expected to increase. While this is attributed to a number of events and trends, the entrance of PTCs in the vehicle-for-hire market has some influences on the sector. Qualitative considerations of PTC impacts on tourism include, but are not limit to:

- Familiarity with the platform: As PTCs operate in many international cities, the familiarity of the platform and service offering provide an easy, stress free, and safe transportation option for visitors as well as language options for tourists that may not speak conversational English;
- Flexibility: PTCs offer increased flexibility for consumers, particularly for tourists who may be unfamiliar with an area; and
- Tourists can benefit from time and cost savings from using PTCs over other modes of transportation.

## Environmental

In analyzing and understanding the environmental impacts of both the entrance of PTCs into the market as well as the implications of the 2016 vehicle-for-hire regulations, a “differences-in-differences” (diffs-in-diffs) method was used. The diffs-in-diffs method was used to evaluate changes in the vehicle kilometres travelled (VKT) per capita which was used as a proxy variable as external environmental impacts such as greenhouse gas emissions and local air quality (from criteria air contaminants) are linked to overall vehicle travel distances.

The result indicates that while the city of Toronto has seen an overall decrease in VKT from 2011 to 2016, the magnitude of the decrease was expected to be higher without the entrance of PTCs and the 2016 regulation, relative to the city of Vancouver. This is consistent with research in the U.S. that has shown quite substantial increases in VKT as a result of PTC entrance to the market.

In addition to the quantitative assessment, qualitative considerations related to the entry of PTCs and subsequent regulations include:

- Some PTCs include a driver destination feature that filters for trips that put them closer to their own destination at a particular time. This decreases the total deadhead time experienced by a driver;
- Some PTCs offer pooled or shared ride services to increase vehicle occupancy and potentially decrease VKT;
- PTC algorithms focus on time-efficiency and shortest distances, limiting total VKT;
- Vehicle age restrictions under the vehicle-for-hire regulations help ensure that older vehicles are not operating, which may result in more fuel-efficient vehicles used on PTC platforms;
- However, it is possible that total deadhead and idle time in the vehicle-for-hire industry increased as a result of the City permitting PTC operations.

## ECONOMIC IMPACTS AFFECTING DRIVERS AND INDUSTRY

The economic impacts affecting vehicle-for-hire and PTC drivers and their associated industries were quantitatively assessed through the changes in driver demographics and opinions, market supply and demand, economic valuation, and ancillary industries.

### Driver Survey

An online survey targeting drivers in the vehicle-for-hire and PTC industries was conducted for this study. Due to the low response rate from limousine drivers, the results are primarily focused on taxicab and PTC drivers.

- *Driver Profile:* The majority of taxicab drivers are familiar with Chapter 546. For PTC drivers, compliance with the regulations is automatically notified to them through their PTC application which reduces the need to consult Chapter 546. PTC drivers are in general younger than taxicab drivers, and have a higher household income. Finally, PTC and taxicab drivers were found to have similar education and racial backgrounds.
- *Driver Residence:* The majority of taxicab drivers reside within the city of Toronto with about 34% residing outside, predominantly in Mississauga and Brampton. Within the city itself, a large number of drivers reside in lower density neighbourhoods, away from the CBD. PTC drivers largely reside outside of the city of Toronto with only 47.5% residing within. A large concentration of PTC drivers can be seen in the municipalities surrounding the city such as Mississauga, Brampton, Vaughan, Richmond Hill, and Markham.



- *Agreement with Regulations:* While more taxicab driver respondents agree with the regulations imposed on their industry than those who disagree, the majority of all respondents are not satisfied with the changes adopted in July 2016. The reasons indicated include the licensing of PTCs with different regulations, and training requirement is now removed, though it should be noted that taxicab and PTC services differ and are therefore subject to different regulations. On the other hand, PTC drivers were largely indifferent about the introduction of the regulations into the industry, with the exception of the imposed increase in rates and fares.
- *Quality of Life:* Flexibility of work, job satisfaction, and job stability for taxicab drivers were found to have been negatively impacted since the entrance of PTCs and the vehicle-for-hire regulations have not altered this. PTC drivers reported an overall positive impact to their quality of life since the introduction of PTCs and ridesharing in the city of Toronto, and the 2016 regulation has had little impact.
- *Willingness to Drive:* 46% of taxicab drivers indicated that the vehicle-for-hire regulations “Strongly Decreased” their willingness to drive which corresponds to the findings from the stakeholder interviews that taxicab drivers do not agree that PTCs should be licensed in a different manner than taxicabs. However, it should be noted that PTCs offer different services than taxicabs and are therefore subject to different regulations.
- *Labour Market Outcome:* It is interesting to note, from the self-reported survey, that average taxicab driver earnings and number of trips per week decreased while their average hours of driving increased over the 2012-2018 period, as many drivers had previously indicated that they drive more for less since the arrival of PTCs. In contrast, PTC drivers found their earnings and number of trips per week grew proportionally with their hours of driving, consistent with the economic theory of labour supply.

## **Market Supply and Demand**

A mathematical model was developed to adapt the driver survey data and yield the supply and demand for both taxicab and ridesharing markets. Both industries were found to experience inelastic demand and supply curves where inelastic demand indicates a 1% increase in trip price will lead to a less than 1% decrease in the number of trips demanded. Quantities and prices for each industry were then identified from drawing the supply and demand curves. While the PTC market price-quantity pair is always in equilibrium (i.e., point where the demand curve cuts the supply curve), the taxicab market one is not, due to the regulation which limits quantity.

## **Economic Valuation**

The economic valuation of the vehicle-for-hire and PTC industries in Toronto were assessed using two methods; first, as the sum of the consumer surplus and producer surplus (equal to the total market surplus), and second through the use of Statistics Canada’s input-output multipliers. Both methods showed that the arrival of PTCs resulted in a significant economic loss to the taxicab industry: \$88.2 million if using the first method; and \$72 million if using the second. The impact of the 2016 regulation was however only able to be evaluated using the first method which showed an increase in total economic surplus by \$4.5 million for the taxicab industry, and an economic loss of \$8.8 million to the PTC industry. If the two industries are grouped together, with the arrival of PTCs, there has been an overall increase in economic valuation of \$140.7 million, while the 2016 regulation has caused a marginal economic loss of \$4.3 million.

## **Impact to Ancillary Industries**

Statistics Canada's Input-Output multipliers were used to assess the impact to ancillary industries through the sum of the indirect and induced effects (the resulting impacts of business-to-business transactions and the result of increased personal income, respectively). Overall, the taxicab industry continues to support ancillary industries, but their GDP and employment generated from the taxicab industry had significantly decreased from 2012 to 2018. However, the economic gain from the entrance of PTCs outweighed the economic loss by a large amount of GDP and employment, mainly due to the large number of PTC drivers available on the market.



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# 1 BACKGROUND AND METHODOLOGY

WSP Canada undertook a study for the City of Toronto's Municipal Licensing and Standards (MLS) division to explore the economic and social impacts of the Vehicle-for-Hire and Private Transportation Company (PTC) industries in the city of Toronto since the introduction of Chapter 546, Licensing of Vehicles-for-Hire in 2016. The overall goal of the project is to understand the economic impacts of the vehicle-for-hire bylaw on residents and the City, consumers, drivers, and the taxicab and limousine industry as a whole. With the arrival of PTCs in 2012, and subsequent expansion of services to ridesharing in 2014, the vehicle-for-hire landscape in Toronto experienced a significant disruption. This disruption has evoked mixed emotions from the vehicle-for-hire industry and residents, with some supporting the introduction of PTCs, while others were against their arrival and continued operations.

From 1998 to 2018, the City released a number of reports and industry reviews related to the taxicab and limousine industries, as well as a wider ground transportation review for vehicle-for-hire. The figure below presents a timeline of these reviews. This report seeks to inform the research and analysis being undertaken for the 2019 Review of Chapter 546, Licensing of Vehicles-for-Hire.



Figure 1-1: City of Toronto Taxicab/Limousine Industry Reviews

## 1.1 STUDY OBJECTIVES

On May 3, 2016, the Toronto City Council established a set of regulations for the vehicle-for-hire and PTC industry to satisfy the need to regulate the entrance of PTCs while continuing to ensure public safety, consumer protection, and equitable access to accessible vehicles. The vehicle-for-hire bylaw was created to:

- Create more opportunities for vehicle-for-hire drivers;
- Set rules for PTCs (especially for safety, insurance, and record keeping);
- Add flexibility for the taxicab and limousine industry by reducing regulatory burden; and
- Increase equitable access to accessible ground transportation.<sup>1</sup>

<sup>1</sup> City of Toronto. 2018. *Work Plan for Review of Chapter 546 Vehicles-for-Hire*. <https://www.toronto.ca/legdocs/mmis/2018/ls/bgnd/backgroundfile-115843.pdf>

While the study aims to improve the quality and scope of information, there are three main challenges in understanding the economic impact:

- 1 The amount and accessibility of data in the taxicab, limousine, and PTC industries. This was specific to the availability of data from the taxicab industry prior to and post 2016 and data availability from the PTC industry prior to 2016. This increased reliance on the driver survey and publicly available data sources for analysis purposes;
- 2 Low response rate for the driver survey from the vehicle-for-hire industry; and
- 3 The relatively recent emergence of PTC operation in the city of Toronto and few number of years under regulation.

The Economic Impact Analysis has been developed to include the following sections:

- **Background Research and Methodology:** This section includes a review of the past and current vehicle-for-hire and PTC landscape in the city of Toronto and in North America in order to understand the vehicle-for-hire regulations and practices used for licensing PTCs in other jurisdictions. A gap analysis was conducted to identify data needs for future studies. Additionally, an extensive stakeholder consultation was conducted to gather industry perspectives on the entrance of PTCs and the Chapter 546 regulations in 2016 and their impact on taxicabs, limousines, and PTCs for both industry and drivers.
- **Economic and Social Changes Affecting Residents, Consumers and the City:** This section evaluates the quality of life, consumer choice, access, tourism, and environmental changes in the city of Toronto using a combination of qualitative and quantitative techniques. Various economic measures were used to assess the quality of life, consumer choice, access, and environmental impacts of the entrance of PTCs and the Chapter 546 regulations in 2016 by assessing the before and after as well as comparative attributes associated with each socio-economic theme.
- **Economic and Labour Changes Affecting Drivers and Industry:** This section focuses on the impacts related to the vehicle-for-hire and PTC industries as well as their drivers. A driver survey was developed and administered to both vehicle-for-hire and PTC drivers in order to understand the opinions of the Chapter 546 regulations, ability to work in the industry, and ridership and revenue figures. The driver survey was used to further develop the industries' supply and demand relationships in 2011 and 2016, their economic valuation over time, and impacts to ancillary industries.

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## 1.2 TAXICABS AND LIMOUSINES

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### 1.2.1 TAXICAB AND LIMOUSINE INDUSTRY REVIEW<sup>2 3 4</sup>

Taxicabs and limousines are important forms of intracity transportation for the public which have existed in some form since the mid-1800s in Toronto. Taxicabs provide a means of transport for residents and visitors in the city who do not own a vehicle, who may want a private ride for a cost, or are not able to use a private car, public transit, or an active mode due to time, mobility, or other constraints. In contrast, limousines are luxury stretch or sedan vehicles accepting pre-booked rides only.

While taxicabs and limousines both pick-up and drop-off passengers, they differ in key respects. Taxicabs continue to be the only vehicle-for-hire that are allowed to pick-up passengers by street-hail or cabstand. As a result, taxicab vehicles must be equipped with a fare meter, security camera, an emergency light, driver identification information, Taxicab Bill of Rights, fare card,<sup>5</sup> and an exterior roof light. Taxicab vehicles may only be replaced by accessible vehicles or alternative fuel, hybrid, or low-emission vehicles that are on the City's approved vehicle list. The maximum age of a taxicab is 7 model years. Taxicab drivers can also pick up customers through dispatch services by phone or mobile application; although they cannot pick up customers at Toronto Pearson International Airport (Pearson) unless the fare is pre-arranged, as per federal airport regulations. Vehicles are often painted in the colours of the brokerage or fleet operator that own the car or provide dispatch services connecting drivers with passengers. Fares in taxicabs are distance- and time-based, with rates starting at \$3.25.

Licensing for taxicabs include:<sup>6</sup>

- **Taxicab Brokerage license** must be obtained for brokers who accept requests to connect individuals with taxicabs through a smartphone or similar dispatching technology;
- **Taxicab Owners:** A Toronto Taxicab Licenses (TTL) may be issued from a waiting list of drivers and are subject to additional fees and conditions. The waiting list of drivers consists of individuals who have been full-time taxicab drivers for the past 3 years and have not owned a taxicab in at least 5 years. Alternatively, a standard taxicab license may be issued with the purchase of an existing Standard taxi or TTL taxi.
- **Taxicab Operator license** must be obtained for those that manage one or more taxicabs.
- **Vehicle-for-Hire Driver license** must be obtained by a taxicab or limousine driver.

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<sup>2</sup> City of Toronto. 2014. *Toronto's Taxicab Industry Review Final Report*.

<sup>3</sup> City of Toronto. 2015. *Ground Transportation Review Findings Report*.

<sup>4</sup> Morley, K. 2009. "The Toronto Taxicab Industry: Past, Present and Future" Retrieved from: <https://web.archive.org/web/20110116060842/www.wheelchairtransit.com/spage-blog/detail-100.html>

<sup>5</sup> A fare card lists the initial, or drop, rate, how much the customer is charged by distance and time, and any other charges that may be applicable to a trip in the taxicab.

<sup>6</sup> City of Toronto, Permits and Licenses. <https://www.toronto.ca/services-payments/permits-licences-bylaws/>

Limousines, on the other hand, are luxury vehicles (e.g., have leather interior packages and carpeted floors) and can either be four-door sedans or stretch sedans. Limousines are pre-booked for a flat rate of a minimum of \$70 per hour for a minimum of two hours, must be registered with a Limousine Service Company, have a limousine license plate and front windshield decal, are typically painted solid black or white, and are able to pick-up and drop-off customers at Pearson. Specific vehicle and other regulatory requirements for both taxicabs and limousines are provided in Section 1.2.3.

For limousines, the licensing structure is simpler, with drivers, owners, and Limousine Service Companies requiring a single type of license each. Drivers are required to have the same vehicle-for-hire license as taxicab drivers, as listed above. Owners may or may not be drivers, and require licenses for their vehicles, in addition to their vehicle-for-hire license if the owner is also the operator. Finally, Limousine Service Companies also require licenses to receive calls for booking and arranging services for customers. All limousines must be affiliated with a Limousine Service Company.

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## 1.2.2 RECENT HISTORY OF TAXICAB AND LIMOUSINE REGULATION IN TORONTO<sup>7 8 9 10</sup>

In 1998, a comprehensive review of the taxicab industry was conducted by a Toronto Task Force in an effort to bring about structural and regulatory changes (outlined below) as a result of concerns from the public, industry, Toronto Licensing Commission, the Board of Trade, and the tourism industry. The Task Force was created by Toronto City Council, comprised of City Councillors, and was mandated to assess concerns stemming from perceived deterioration of the industry. The outputs of the Task Force resulted in the implementation of numerous regulations and structural changes outlined in Chapter 545 – Licensing of the Municipal Code. Some of the key changes included:

- |  |  |
|--|--|
| — Creation of the Passenger Bill of Rights                               | — Hiring additional enforcement officers   |
| — Placing age limits on vehicles   | — Setting the goal of 10% accessible cabs  |
| — Amending training courses and creating refresher courses every 4 years | — Creation of the Ambassador plate class, and associated training and vehicle requirements |

In 2000, the City developed a program to improve safety for drivers and customers. This program made the installation of emergency lights<sup>11</sup> mandatory, and gave drivers the option to install GPS or security cameras; by 2005 the installation of security cameras became mandatory. The cost of purchase and installation of this additional security equipment was borne by plate owners. Additionally, in 2005, a new licensing regime for limousines was established with the enactment of bylaw 706-2005 and was focused on distinguishing the limousine industry from the taxicab industry. The 375 cap on limousine licenses

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<sup>7</sup> Abraham, S., Sundar, A., and Whitmore, D. 2008. *Toronto Taxi Drivers: Ambassadors of the City. A Report on Working Conditions*. University of Toronto and Ryerson University.

<sup>8</sup> Sundar, A. 2012. “Making a ‘Global’ City: Racialization, Precariousness, and Regulation in the Toronto Taxicab Industry,” in *Immigration and Settlement: Challenges, Experiences, and Opportunities* ed. Harald Bauder. Toronto: Canadian Scholars’ Press Inc.

<sup>9</sup> City of Toronto. 2012. *Toronto’s Taxicab Industry – Taxicab Industry Review Preliminary Report*.

<sup>10</sup> City of Toronto. 2014. *Toronto’s Taxicab Industry Review Final Report*.

<sup>11</sup> Emergency lights are produced in a number of styles, with the most common being a system of two lights, one behind the front grill and another at the rear, which flash to indicate distress when activated. Retrieved from: <http://wx.toronto.ca/inter/it/newsrel.nsf/82f55f14f8d6b46285256ef500408475/EBB479D4BEDEA72D85256DF600463294?opendocument>

(“Livery Owner’s License”) was removed, however, a number of additional restrictions were placed; these included:

- Establishing the minimum rate of \$70 per hour for limousines;
- Requiring limousines to operate through limousine service companies;
- Regulating the ratio of stretch to sedan limousines;
- Requiring trips to be pre-arranged at a minimum of 20 minutes in advance; and
- Prohibiting limousines from “staging,” so limousines cannot park at curbside or loading areas within 200 metres of a hotel or entertainment venue without a pre-arranged passenger pick-up.

Following this, in 2006, bylaw 221-2006 required limousine service companies to be licensed and in 2007, there was a challenge to the bylaw which resulted in additional changes, most notably, the inclusion of training requirements for limousine drivers. Toronto City Council also introduced bylaw 435-2007 as a temporary measure where no limousine owner licenses would be issued by the City of Toronto to taxicab or limousine owners that held a license or permit issued by another jurisdiction and removed the airport exemption to prevent unlicensed vehicles and out-of-town vehicles from taking fares from the Toronto taxicab and limousine industry.

In 2012, with direction from the Licensing and Standards Committee, Municipal Licensing and Standards began a multi-year review of the taxicab industry, resulting in Toronto City Council's 2014 amendments to Municipal Code Chapter 545. The most significant change to Chapter 545 aimed to consolidate the requirements and operations of Accessible, Standard, and Ambassador Taxicab Licenses into a single form of license called the Toronto Taxicab License (TTL). The TTL is an owner-operated license cannot be leased but shift work under the license is permitted; is transferable; allows for vehicles to be operated 24 hours a day by drivers working a maximum of 12-hour shifts; must be affiliated with a brokerage; and must be wheelchair accessible. Ultimately, the TTL was a further attempt to transition the industry to an owner-operator accessible taxicab system to achieve 6% accessible vehicles in 2015.<sup>12</sup>

Around the same time as the 2014 review was submitted, ridesharing<sup>13</sup> began in Toronto’s transportation landscape. This arrival triggered a 2015 Ground Transportation Review by ML&S under the direction of City Council. The 2014 review provided an overview of the taxicab and limousine industries as well as the operations of technology-based companies that provide transportation services, including their impact on the public and ground transportation industry. At the time of the 2015 review, the taxicab and limousine industries were mostly opposed to the operation of PTCs, though many customers were supportive due to the greater affordability, control, and availability of service.<sup>14</sup> The result of the 2015 review included:

- Amendments to Chapter 545 Licensing of the Municipal Code, updating the definitions of Taxicab Broker and Limousine Service
- taxicab industry, and to develop future recommendations to modernize the limousine industry;
- Issuance of 100 new TTLs; and

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<sup>12</sup> Toronto City Clerk. <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2018.LS26.3>

<sup>13</sup> A PTC is a company that connects passengers with drivers of private vehicles through a mobile application. While PTCs originally entered the City of Toronto in 2012, “ridesharing” began operations in the City in 2014. Examples include Uber and Lyft. Retrieved from: <https://www.toronto.ca/services-payments/permits-licences-bylaws/private-transportation-companies-uberfacedrive-drivers/private-transportation-companies/>

<sup>14</sup> City of Toronto. Taxi and Uber Consultation Qualitative Research. <https://www.toronto.ca/legdocs/mmis/2015/ls/bgrd/backgroundfile-83494.pdf>

- Company and lowering "Tariff A" to reduce the "drop fee" from \$4.25 to \$3.25;
- Direction for ML&S to develop future recommendations that reduce the regulatory burden and enhance competitiveness in the
- Direction for ML&S to report on a framework to equitably regulate all ground transportation providers

City staff made a number of recommendations related to the licensing of limousines. These recommendations aimed to remove the restrictions placed on the industry, especially those introduced in 2005 such as minimum fares, booking, and fleet requirements. Most of the recommendations related to limousines were not adopted by City Council, and therefore, most provisions were transferred directly from Chapter 545 to Chapter 546. Changes to the taxicab and limousine industry are outlined in Section 1.2.3 below, and PTC regulations are discussed in Section 1.3.4.

### 1.2.3 2016 CHANGES TO VEHICLE-FOR-HIRE REGULATION STRUCTURE

As of July 14, 2016, Chapter 546 (entitled Licensing Vehicles-for-Hire), replaced the limousine, taxicab, limousine service company, and taxicab broker regulations from Chapter 545 of the Municipal Code. Chapter 546 included several changes to the taxicab and limousine industry, including the new categorization for Vehicles-for-Hire. PTCs are also included within this updated licensing regime, and the regulations governing their operations are described in Section 1.3.4.

Table 1-1 provides a brief overview of the key taxicab and limousine regulations prior to and after 2016.

**Table 1-1: Key Taxicab and Limousine (now Vehicles-for-Hire) Regulations**

Topic	Key Regulations Prior to 2016	Key Regulations After 2016
<b>Training</b>	<ul style="list-style-type: none"> <li>— All drivers must complete ML&amp;S's driver training course and a refresher course every 4 years</li> <li>— Drivers who drive accessible vehicles must have completed the taxicab drivers' refresher training course and complete the accessibility refresher training course every 4 years</li> <li>— All drivers must complete a one-day first-aid and CPR training course provided by the City of Toronto's Emergency Medical Services every 4 years.</li> <li>— Limousine drivers must complete the 5-day Limousine Driver Training Course provided by ML&amp;S and a 1-day CPR and first-aid course provided by Toronto EMS or an ML&amp;S-approved agency prior to licensing</li> <li>— Limousine drivers must complete the driver/owner refresher training course provided by ML&amp;S and 1-day first-aid and CPR course provided by Toronto EMS or an ML&amp;S-approved agency</li> </ul>	<ul style="list-style-type: none"> <li>— Vehicle-for-hire drivers operating accessible vehicles must complete an accessible vehicle training program that meets the criteria established by ML&amp;S</li> <li>— Accessible vehicle drivers must complete a refresher course every four years meeting ML&amp;S criteria</li> <li>— Fees for accessible vehicle training and refresher courses offered by ML&amp;S are waived</li> </ul>



<b>Administrative</b>	<ul style="list-style-type: none"> <li>— Taxicab owners must have a minimum \$2-million insurance policy for loss or damage resulting from bodily injury to or death of one or more persons, including a passenger hazard provision</li> <li>— The minimum fleet requirement for a limousine service company is 1 stretch limousine and 2 sedan limousines, and up to 4 sedans for one stretch. Subsequent ratios must be 1 stretch per 6 sedan limousines</li> </ul>	<ul style="list-style-type: none"> <li>— Every taxicab and limousine owner must have \$2-million insurance policy for loss or damage resulting from bodily injury to or death of one or more persons, including a passenger hazard provision and third-party liability.</li> <li>— The minimum fleet requirement for a limousine service company is 1 stretch limousine and 2 sedan limousines, and up to 4 sedans for one stretch. Subsequent ratios must be 1 stretch per 6 sedan limousines</li> </ul>
<b>Licensing</b>	<ul style="list-style-type: none"> <li>— Existing Standard, Ambassador, and Accessible licenses to be transitioned to Toronto Taxicab Licenses by July 1, 2024</li> <li>— No new Standard, Ambassador, or Accessible licenses will be issued after July 1, 2014</li> <li>— Owners of standard, ambassador or Toronto Taxicabs can be sold to already licensed drivers, and driver's licenses cannot be transferred between individuals</li> <li>— Licensed drivers must be able to speak, read, and write the English language</li> </ul>	<ul style="list-style-type: none"> <li>— Elimination of all existing licensing classes for taxicab and limousine drivers, and replacing them with a standard Vehicle-for-Hire Driver license</li> <li>— Licensed drivers must be able to communicate in English</li> <li>— Established "screening criteria" for taxicab owner, limousine owner, and vehicle-for-hire driver licence class</li> <li>— Toronto Taxicab Licence shall not be issued upon the sale of a Standard or Ambassador taxicab</li> <li>— All Ambassador taxicabs to be deemed Standard Taxicabs</li> <li>— New licensing class for "Taxicab Operators" for any person, other than a vehicle-for-hire driver operating a taxicab, who manages, rents out, controls, or has custody of a taxicab licensed by the City on behalf of its owner</li> </ul>
<b>Vehicle Type</b>	<ul style="list-style-type: none"> <li>— Any vehicle used as an accessible or Toronto Taxicab must be an accessible vehicle.</li> <li>— Standard taxicabs must be: no more than 7 model years old if operated exclusively by the owner and purchased new when it was registered; no more than 6 model years if operated exclusively by the owner; or no more than 5 model years otherwise</li> <li>— Ambassador taxicabs must be no more than 6 model years old, unless it was purchased new and then may be up to 7 model years old</li> </ul>	<ul style="list-style-type: none"> <li>— All taxicabs must be no more than 7 model years old, and replacement vehicles must be accessible vehicles, alternative fuel or low emissions vehicles, or previously registered as a taxicab</li> <li>— Limousines must be no more than 7 years old by year date for sedans, and no more 8 model years old for stretch limousines</li> </ul>

	<ul style="list-style-type: none"> <li>— Accessible taxicabs must be no more than 2 model years old when beginning operations, and must not operate past 7 model years age</li> <li>— Alternative fuel, hybrid, or low emissions vehicles may be 2 model years older than maximum age, up to a maximum of 7 model years old</li> <li>— Sedan limousines cannot be more than 5 model years old</li> <li>— Stretch limousines cannot be more than 8 model years old</li> </ul>	
<b>Inspection Requirements</b>	<ul style="list-style-type: none"> <li>— Biannual inspections by a designated mechanic of vehicle and taximeter</li> </ul>	<ul style="list-style-type: none"> <li>— Vehicles must pass inspections conducted by an approved facility prior to providing transportation service; and once every six months if, on the annual licence renewal date, the vehicle has travelled 40,000 or more kilometres in the prior year; or once every 12 months if, on the annual licence renewal date, the vehicle has travelled less than 40,000 kilometres in the prior year.</li> </ul>
<b>Equipment Requirements</b>	<ul style="list-style-type: none"> <li>— All taxicabs must be equipped with a camera system, emergency lights, and global positioning system</li> <li>— Every vehicle used as a taxicab must be equipped with four snow tires every year from December 1 to March 15</li> </ul>	<ul style="list-style-type: none"> <li>— All taxicabs must be equipped with a camera system and emergency lights</li> <li>— All taxicabs and limousines must be equipped with four snow tires or all-weather tires, every year from December 1 to April 30</li> </ul>
<b>Rates and Fares</b>	<ul style="list-style-type: none"> <li>— Drop rate<sup>15</sup> of \$4.25, and fare calculated by time and distance</li> <li>— The minimum rate for a limousine is \$70 (+G.S.T.) per hour, for a minimum of 2 hours, and trips must be pre-arranged a minimum of 20 minutes prior to departure</li> </ul>	<ul style="list-style-type: none"> <li>— Taxicab drop rate of \$3.25, and fare calculated by time and distance</li> <li>— Taxicabs must charge the City-regulated taxicab rate when a customer street-hails or uses a cabstand</li> <li>— Taxicab Brokerages may offer rates discounted from the tariff or higher than the tariff</li> <li>— The minimum rate for a limousine is \$70 (+G.S.T.) per hour, for a minimum of 2 hours, and trips must be pre-arranged a minimum of 20 minutes prior to departure</li> <li>— Every limousine service company shall file a schedule of rates with ML&amp;S</li> </ul>

<sup>15</sup> The drop rate is the initial charge (or base fare) to the customer upon entering the cab and beginning a trip.

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## 1.3 PRIVATE TRANSPORTATION COMPANIES (PTC)

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### 1.3.1 HISTORY OF PRIVATE TRANSPORTATION COMPANIES

PTCs, as defined by the city of Toronto, are companies that connect passengers with drivers of private vehicles through mobile applications.<sup>16</sup> The goal of these services is to use mobile technology to connect riders with drivers on demand. Examples of these companies include Lyft and Uber – the two most prominent PTCs in Toronto and North America – as well as RideIn, and InstaRyde, which are local to Toronto. In most jurisdictions, PTCs are regulated at the municipal level, though in some cases they are regulated at a regional or state-level, and fewer still are regulated at a national level, primarily in Europe.

Some PTC services began operations as dispatch services (similar to brokerages) for licensed and/or unlicensed taxicabs and limousines, while others began as on-demand ride-hailing applications. Service offerings differ slightly between applications, with Lyft and Uber offering the most variety, outlined in Table 1-2. While most offer primarily economy and/or premium services, some PTCs specialize in a particular type of service or delivery method: for example, RideIn specializes in offering black car services with full-time licensed professional drivers.

Operations for PTCs are fairly standard across companies. Users and drivers sign up on a mobile application in order to use the service and are matched through algorithms when a trip is requested. The drivers are considered independent contractors on most services, and typically own or rent their vehicles. Flexibility for drivers is a major component of PTC operations. Drivers have the ability to control the duration and time of day they wish to drive with limitations placed on the maximum shift duration. Income is earned on each trip, with a portion of the earnings counted as driver revenue while a portion is paid to the PTC.

Users link a payment method and agree to the terms of service to create an account. Fares are calculated in advance of the trip, and shown through the application to the user, who is automatically charged upon completion of the trip. Average wait times for users are approximately 5 minutes for PTCs<sup>17</sup> and 8.5 to 9.5 minutes for taxicabs within the city of Toronto<sup>18</sup>.

Historically, PTCs have offered fares noticeably cheaper than traditional taxicabs and limousines, but increase their rates during peak periods (known as “surge pricing”) to reflect periods of high demand and low supply. PTCs offer promotions to drivers to drive more during peak demand periods, in particular areas, or during bad weather events. Promotions and discounts are also offered to users to encourage them to refer new users to sign up or to those who use the service a certain number of times within a given timeframe. Additionally, some PTC companies have partnered with rental car companies like Avis in order to provide rental cars with insurance and maintenance costs for individuals who wish to drive but do not own a vehicle or choose to rent one.

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<sup>16</sup> city of Toronto Private Transportation Companies. <https://www.toronto.ca/services-payments/permits-licences-bylaws/private-transportation-companies-uberfacedrive-drivers/private-transportation-companies/>

<sup>17</sup> Average wait time provided by Uber on March 1, 2019

<sup>18</sup> Taxi Research Partners. *Determining the Appropriate Number of Taxicabs and its Impacts for the City of Toronto*. <https://www.toronto.ca/legdocs/mmis/2013/ls/bgrd/backgroundfile-59690.pdf>

Many PTCs have expanded their operations in their national market and globally since launching, entering into markets with or without permissive regulation. In the United States for example, PTCs quickly became popular where they entered, and often circumvented existing vehicle-for-hire regulations as these companies claimed not to be vehicle-for-hire services but rather technology “platforms” that merely match customers with drivers. This created tension between the existing vehicle-for-hire industry, City licensing and regulation officials, and the public. After much controversy, cities and states moved to regulate PTCs, most often following the lead of California in creating a new regulatory category that left functions such as driver criminal record checks to be performed by the companies rather than government agencies.

### 1.3.2 PRIVATE TRANSPORTATION COMPANIES IN THE CITY OF TORONTO

The original service offering from PTCs in Toronto began in 2012 with dispatching licensed limousines (UberBlack) with a price point that was often greater than that of taxicabs. In 2013, dispatching was expanded to include licensed taxicabs (UberTaxi), and in 2014, the first economy class ridesharing service (UberX) was launched and provided a service with privately owned vehicles and unlicensed drivers. The economy class service (UberX) quickly became the preferred option for customers as it was the cheapest option. In 2015, Uber launched a two-week pilot for UberPool, a shared-ride economy class service, during the Pan/Parapan-Am Games. After the release of the 2016 vehicle-for-hire bylaw in July, subsequent service offerings were launched by Uber and other PTCs as they entered the market, primarily Lyft in 2017. PTCs currently offer services within four class categories – Economy, Premium, Extra Seats and Other, where:

- **Economy** offers economically priced individual or shared rides to and from a user’s origin and destination. The service offering includes individual door-to-door services; Pool or Shared which offers a shared car-pooling door-to-door service; and Express Pool which includes a short walk to a common pick-up location and a shared car-pooling service.
- **Premium** offers individual premium rides in high-end cars to and from a user’s origin and destination.
- **Extra Seats** offers affordable rides for larger groups (up to 6 people) to and from a user’s origin and destination.
- **Other** services that are offered in the city of Toronto include taxicab dispatching services and special assistance from certified drivers as well as wheelchair accessible rides.

**Table 1-2: PTC Services and Offerings in the city of Toronto**

	<b>Economy</b>	<b>Premium</b>	<b>Extra Seats</b>	<b>Other</b>
<b>Uber</b>	<ul style="list-style-type: none"> <li>— UberX</li> <li>— Uber Pool</li> <li>— Express Pool</li> </ul>	<ul style="list-style-type: none"> <li>— Select</li> <li>— Black</li> </ul>	<ul style="list-style-type: none"> <li>— UberXL</li> <li>— Black SUV</li> </ul>	<ul style="list-style-type: none"> <li>— Uber Taxi</li> <li>— Uber Assist</li> <li>— WAV</li> </ul>
<b>Lyft</b>	<ul style="list-style-type: none"> <li>— Lyft</li> <li>— Shared</li> </ul>	<ul style="list-style-type: none"> <li>— Lux</li> <li>— Lux Black</li> </ul>	<ul style="list-style-type: none"> <li>— LyftXL</li> <li>— Lyft Lux Black XL</li> </ul>	

There are currently around 80,000 PTC drivers licensed in the City, providing over 100,000 trips a day.<sup>19</sup> Note, drivers may work for one than one PTC, therefore requiring more than one licence. PTCs pay administrative fees to the City of \$20,000 for licensing, \$15 per registered driver, and \$0.30 per trip completed on the application.<sup>20</sup> Another important distinction, though beyond of the authority of the City of Toronto, is that PTCs are also able to pick-up and drop-off riders at Toronto Pearson International Airport as of 2018, providing them with more access to fares than traditional taxicabs, who are not permitted to pick-up fares at the airport without an additional license.

Opinions of the emergence of PTCs in Toronto, and the legality and public benefit of operations, prior to the introduction of Chapter 546 of the Municipal Code were varied, both between and within population groups. Overall, the majority of taxicab drivers were not supportive of PTCs due to the increased supply of vehicles-for-hire, as well as the devaluation of owner's plates. Further, there was a lack of agreement within the taxicab industry in 2015 on whether the City should decrease the "drop fee" to increase taxicab competitiveness on fares, as there was a belief this would likely further negatively impact their incomes.

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### 1.3.3 EMERGENCE OF PTCS AND THE VEHICLE-FOR-HIRE INDUSTRY<sup>21</sup>

Since the emergence of PTCs in Toronto in 2012, and subsequent ridesharing in 2014, the public was supportive of the additional transportation mode choice, and at a lower cost, with lesser wait times. This positive response was particularly high amongst those in the 18-34 age group, who believed that PTCs should be permitted to operate without the same regulations as taxicabs. The 35-and-over age group were opposed to this, expressing the opinion that all vehicles-for-hire should be subject to the same set of regulations.<sup>22</sup> PTC users expressed support for PTCs due to the flexibility to have the comfort of a private ride, or to take more environmentally friendly shared rides. Finally, PTC users also appreciated that they were less likely to have their ride refused by PTC drivers than traditional taxicab drivers, particularly for short-distance trips or trips outside of Toronto's jurisdictional boundaries.<sup>23</sup>

While the perceived effects of PTCs differ by individual and by relation to the vehicle-for-hire industry (e.g. taxicab/limousine driver, plate owner, brokerage, PTC driver, consumer, etc.), one of the most publicized effects has been the negative impact on the taxicab and limousine industry, particularly related to the ability to earn income, the loss of value of taxicab plates, increased working hours in order to earn the same income before the introduction of PTCs, and difficulties for plate owners to find shift drivers.<sup>24</sup>

Taxicab drivers urged that PTCs should be subject to the same regulations as taxicabs. Taxicab owners were concerned that the operations of PTCs outside of regulations devalued lease and sale prices for their cabs. Fleet operators expressed concern regarding market saturation, and significantly decreased demand for their services, as many became unable to rent their cabs to drivers for shift work. Taxicab brokerages were also against the emergence of PTCs, saying that their operations outside of a regulatory framework give them an unfair advantage in the vehicle-for-hire industry. Representatives from the limousine industry noted they were less affected than those in the taxicab industry as their services are different due

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<sup>19</sup> PTC driver and ridership information provided by the City of Toronto.

<sup>20</sup> Toronto Municipal Code. Chapter 546 Licensing of Vehicles-for-Hire.

<https://www.toronto.ca/legdocs/municode/toronto-code-546.pdf>

<sup>21</sup> Vehicle-for-hire industry and driver opinions were gathered through stakeholder consultations that were conducted as part of the study.

<sup>22</sup> City of Toronto. Taxi and Uber Consultation Qualitative Research.2015.

<https://www.toronto.ca/legdocs/mmis/2015/l/bgrd/backgroundfile-83494.pdf>

<sup>23</sup> City of Toronto. 2015.

<sup>24</sup> Perceived negative impacts from the entrance of PTCs were outlined through the stakeholder consultations conducted and summarized below in Section 1.6.

to the pre-booking requirement. Additionally, concerns have also been raised about the effect of PTCs on transit ridership and overall congestion; however, the effects of PTCs on congestion and transit in the city of Toronto have yet to be concluded.<sup>25</sup>

### 1.3.4 CURRENT PTC REGULATION STRUCTURE IN THE CITY OF TORONTO

This section provides a brief overview of the current regulatory structure of PTC operations, under Chapter 546 of the Toronto Municipal Code. Table 1-3 below provides a brief overview of the key requirements for private transportation companies and associated drivers and vehicles.

**Table 1-3: Overview of PTC Regulations in Toronto**

Topic	Description	Section
<b>General</b>	Any individual licensed, or required to be licensed, must not discriminate against any member of the public in the carrying on of the business.	12A
	Persons with service animals cannot be refused service. Drivers must permit the person and animal to enter or remain in the licensed vehicle.	12B
	Licensed drivers are not permitted to rent to, or otherwise employ an unlicensed driver to operate the vehicle on any public road.	12D
	No exclusive concession agreements can be entered into.	13A2
	Can only take fares requested through application - no street hails, pick-ups at cabstands, or any other form of solicitation.	110A B
<b>Fare Structure and Administrative Fees</b>	Annual licensing fee is \$15/driver, to be paid annually, as well as \$0.30/trip.	110
	Must charge a minimum of \$3.25 for every trip.	115A
	Prior to each trip, the passenger must have the following information disclosed: rate to be charged, vehicle make, model, and license plate number, first name of driver, and photo upon request.	115C
<b>Vehicle Requirements, including inspections</b>	Vehicles must pass a mechanical inspection required at time of licensing or renewal, facility approved by Executive Director (before operations and every 6 months if more than 40,000 km in prior year, otherwise 12 months).	14
	Unsafe vehicles shall not operate - operations to suspend until a certified mechanic approves inspection.	18

<sup>25</sup> Vehicle-for-hire industry opinions about the entrance of PTCs were outlined through the stakeholder consultations conducted and summarized below in Section 1.6.



	Vehicle requirements include: four doors, minimum seating capacity of 5, maximum seating capacity of 7, is no more than 7 years old, displays PTC identifier at all times when providing services, equipped with snow or all-weather tires from December 1 <sup>st</sup> to April 30 <sup>th</sup> , and has no roof light of markings to the effect of a traditional taxicab.	113
<b>Insurance Requirements</b>	Minimum \$2 million coverage, active from acceptance of trip to completion, driver named on policy or PTC has liability insurance that provides at least the equivalent of coverage.	114A-C
	PTCs must have general liability business insurance coverage of at least \$5 million.	114D
<b>Driver and Licensure Requirements/Training</b>	Unrestricted G-class or higher Ontario driver's license, 18+, communicates in English, and has minimum 1-year driving experience.	86
	Must fill out and submit standard form, unique for each PTC the individual drives for, and submit through their PTC.	111/112
	Criminal reference check and driving record abstract, certificate of insurance.	111E
<b>Record Keeping and Data Requirements</b>	Confirmation that passenger accepted fee prior to start of trip.	115D
	Must be electronically provided in a format prescribed/approved by Executive Director.	116
	Copy of criminal reference checks, driving record abstracts, issuance of PTC license.	
	Business records (for trips) including at a minimum: location and destination (intersections), date and time of start and end of trip, length of time, fare paid, number of trips involving multiple passengers paying separate fares, total number of passengers paying separate fares.	
	Business records (for cancelled/rejected trips) at a minimum: PTC driver name and license number, pick-up location and destination (by intersection), date and time of request.	
	Records related to drivers and vehicles: information provided to passengers on their receipt, driver name, vehicle license plate number, driver license identification number, type of service provided, total time driver was able to provide services through the platform, total time categorized in 3 periods (time logged into platform, time elapsing between request and arrival to pick-up location, trip time).	
	Report on accessible service delivery related to average wait times for accessible vehicles.	
	Maintain all records for minimum of 3 years.	

<b>Other</b>	Subject to 6-month probationary period during which ML&S can audit or investigate compliance at any time, and suspend the license for up to 14 days if considered danger to public health & safety.	111C
	Receipt upon conclusion of trip to include: all fees charged, total fare paid, date and time of trip, pick-up and drop-off locations, driver's first name and license plate number, PTC license number, total time and distance of trip.	115F
	Public disclosure: rates to be charged, criteria for vehicles and drivers, information on service delivery categories and distinctions between them, plain-language explanation of insurance coverage.	118
	Accessible vehicle service: PTCs with 500+ drivers must provide wheelchair accessible services, must be available within the average wait time for non-accessible services, fares to be the same or less than the lowest cost non-accessible service.	119

## 1.4 JURISDICTIONAL SCANS

The rapid expansion of PTCs across North America has obliged municipal governments to develop policies and regulations with respect to consumer safety, driver safety, congestion management, accessibility, data gathering, etc. This section and Appendix A outline the regulatory frameworks in several peer municipalities that were selected based on the variations in the frameworks, data availability, as well as relevance to the City of Toronto. The municipalities include San Francisco, New York City, Chicago, and Ottawa. The scans are high-level and provided to compare and understand the different regulations that have been developed and employed for PTCs and not as a recommendation for the City of Toronto.

### 1.4.1 SELECTED JURISDICTIONS AND OVERVIEW OF REGULATING STRUCTURES

#### SAN FRANCISCO

PTCs officially launched their services and mobile applications in San Francisco in 2011. Uber's original PTC service used California Public Utilities Commission (CPUC) licensed black luxury cars and cost the user approximately 50% more than a taxicab; other companies such as Sidecar and the predecessor to Lyft used unlicensed cars and drivers. After intensive controversy on the fledgling services, the CPUC asserted regulatory jurisdiction over PTCs and established a new regulatory category for them called "Transportation Network Companies" (TNCs). Companies approved under the TNC license may operate

ride-sharing<sup>26</sup> services, conduct their own criminal background check of drivers, conduct a driver training program, have a zero-tolerance policy on drugs and alcohol as well as have a \$1 million minimum insurance coverage per accident.<sup>27</sup> Additionally, PTCs in California are required to submit and annually update an accessibility plan that outlines a plan for PTCs to provide special assistance when requested and ensuring the drivers' review of customers does not result in discrimination. Since then, a number of decisions regarding the operation of TNCs have been made by the CPUC and are reflected in Appendix A.

## NEW YORK CITY

Prior to the entrance of PTCs in New York City, the vehicle-for-hire landscape was dominated by yellow cabs. In 2014, there were 13,437 medallions to run yellow cabs and over 50,000 drivers<sup>28</sup> in the city of 8.5 million people, as well as nearly 30,000 for-hire vehicles that served throughout the five boroughs and about 10,000 business-oriented black cars. Unlike the City of Toronto, the New York City Taxi and Limousine Commission (TLC) facilitates the sale of medallions through auctions. The number of taxicab medallions in New York had been capped by the government since 1937 which drove up the cost of a medallion, which, in January 2012 medallions were being sold for \$447,000 to \$710,000 and in January 2019, medallions were being sold for \$135,000 to \$425,000.<sup>29</sup> From 2017 to 2018, the number of for-hire drivers in New York City had increased by 59% with a total of 187,467 licensed drivers (up 82% since 2010).<sup>30</sup>

The New York City TNC regulations were developed by their taxicab authority, the TLC. As of 2017, PTCs were required to pay a fee of \$500 for a 3-year license and the regulations included transparent pricing and trip data reporting as well as background and drug tests on prospective drivers, similar to those for taxicab drivers. Due to the TLC reporting requirements, New York City is one of the few jurisdictions (including Toronto) where PTC trip data is available. Additionally, PTCs in New York must

**Figure 1-2: Number of Active Drivers in NYC (Source: TLC Trip Records)**

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<sup>26</sup> While the article cited uses the term “ride-sharing”, we believe that the services offered by PTCs are better described as ride-hailing, as passengers electronically hail rides through their app, and rides are only shared during pool services.

<sup>27</sup> Forbes. *California PUC Proposes Legalizing Ride-Sharing From Startups Lyft, Sidecar, Uber*. <https://www.forbes.com/sites/tomiogeron/2013/07/30/california-puc-proposes-legalizing-ride-sharing-companies-lyft-sidecar-uber/#68edcc3d186e>

<sup>28</sup> New York City Taxi and Limousine Commission. *2014 Taxicab Factbook*. [http://home2.nyc.gov/html/tlc/downloads/pdf/2014\\_tlc\\_factbook.pdf](http://home2.nyc.gov/html/tlc/downloads/pdf/2014_tlc_factbook.pdf)

<sup>29</sup> TLC Medallion Transfers. <https://www1.nyc.gov/site/tlc/businesses/medallion-transfers.page>

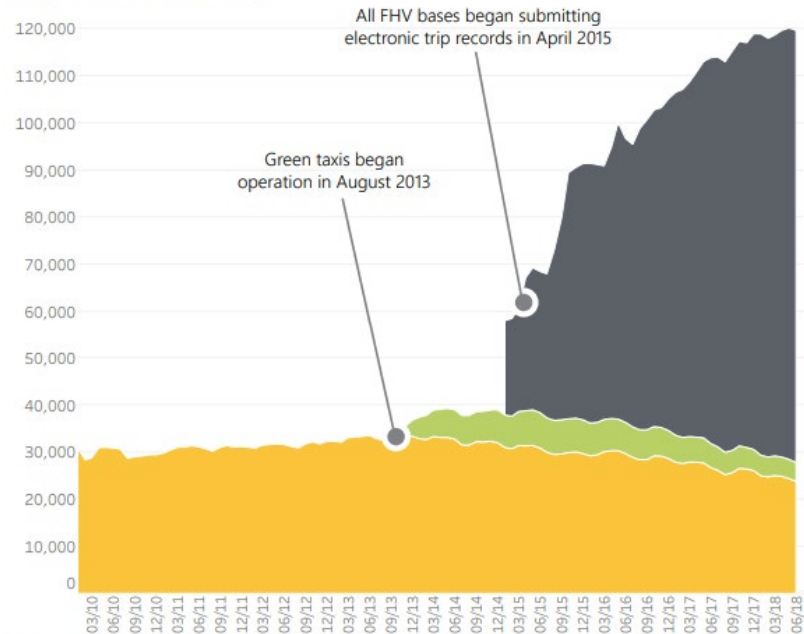
<sup>30</sup> TLC Administrative Records. [https://www1.nyc.gov/assets/tlc/downloads/pdf/2018\\_tlc\\_factbook.pdf](https://www1.nyc.gov/assets/tlc/downloads/pdf/2018_tlc_factbook.pdf)

ensure that equal service is provided to people with disabilities, this includes ensuring a similar wait time to conventional trips as well as ensuring that the services are available during the same days and hours as are made available to other passengers.

In August 2018, a separate licensing category for for-hire transportation services that dispatch more than 10,000 trips per day, or High-Volume For-Hire Services (HVFHS), was established which attempts to increase the data-sharing requirements. The HVFHS licensing class must be obtained in addition to the existing TLC license classes. Additionally, in August 2018, it was announced

that the New York City Council approved a one-year moratorium on issuance of new PTC driver licenses and established a minimum wage for drivers with the intention of reducing traffic, levelling the playing field between PTCs and taxicabs, and rectifying the low driver hourly earnings (it was found that 85% of for-hire vehicle drivers were earning less than \$17.22/hour).<sup>31</sup> The moratorium however does not affect permits for wheelchair accessible cars, and allows for exceptions in the event that data shows certain neighbourhoods continue to be underserved.

## ACTIVE DRIVERS



05. Active Drivers, January 2010 - June 2018  
Source: TLC Trip Records

<sup>31</sup> Bloomberg. *NYC is Set to Impose a Cap on Uber*. <https://www.bloomberg.com/news/articles/2018-08-06/nyc-set-to-impose-cap-on-uber-as-ride-hail-vehicles-clog-streets>

## CHICAGO

Prior to the launch of Uber in Chicago in September 2011, criticism existed regarding the lack of public transportation services to core neighbourhoods and the absence of a car service to bridge these gaps. Due to the government-created medallion system, taxicabs were often perceived to be overpriced and under-supplied as the growth did not match the demand from residents and visitors. The industry was also owned mainly by wealthy investors versus individual taxicab drivers due to the high cost associated with purchasing a medallion. In 2013 the average price of a Chicago taxicab medallion was \$320,000.<sup>32</sup> The high price of medallions resulted in high annual lease and brokerage fees; in August 2014, it was estimated that annual lease fees for full-time drivers were approximately \$21,300 and equated to a breakeven shift duration<sup>33</sup> of approximately 3.7 hours.<sup>34</sup> Since the emergence of Uber and other PTCs in Chicago, the average medallion price has dropped to between \$30,000 and \$100,000 in 2018, and has been mainly attributed to the effect of PTCs.<sup>35</sup>

In June 2016, the City of Chicago established a licensing and regulatory framework for the Transportation Network Providers (TNP) industry under Chapter 9-115 of the Municipal Code of Chicago. The TNP Ordinance focuses on:

- **Ride Safety** by requiring TNP companies to get licensed, conduct background checks, driver training, and vehicle inspections, as well as outlining insurance requirements; and
- **Protecting Consumers** by regulating surge pricing, requiring 311 information on ride-share applications, and requiring ride-shares to identify vehicles and drivers.<sup>36</sup>

The regulation requires licensing for both PTC drivers and vehicles as well as a per-trip fee. The City of Chicago requires an annual fee for PTCs as well as variable fees on a per trip basis for administrative costs and to support an accessibility fund. Additionally, PTCs are able to claim a 50% credit of the variable fee if the trip includes a pick-up or drop-off to an underserved area. The regulation also includes limitations on the number of hours per driver shift.

PTCs have captured part of their demand from the Chicago Transit Authority (CTA) resulting in a decrease in ridership, and according to an analysis conducted at DePaul University, CTA bus speeds in the city decreased by 2.4% from 2013 to 2017.<sup>37</sup> As in all major cities, PTCs are heavily concentrated in the downtown “Loop” and core city neighborhoods, where they are seen as having an adverse effect on congestion and transit ridership. But it has also been recognized that PTCs sometimes “fill the gaps” in the city’s public transportation network by servicing areas without train lines and limited bus service, as well as areas where taxicab drivers may not pick up return trips.

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<sup>32</sup> Business Affairs Consumer Protection, Office of the Mayor City of Chicago, Mayor’s Office for People with Disabilities. 2013. <https://chicago.gov/content/dam/city/depts/mayor/Press%20Room/Press%20Releases/2013/February/2.7.13TaxiIndustry.pdf>

<sup>33</sup> The breakeven shift duration refers to the average shift duration to cover all operating expenses for the driver.

<sup>34</sup> Uber. *Chicago – An Uber Case Study*. [https://uber-static.s3.amazonaws.com/web-fresh/legal/Uber\\_Chicago\\_CaseStudy.pdf](https://uber-static.s3.amazonaws.com/web-fresh/legal/Uber_Chicago_CaseStudy.pdf)

<sup>35</sup> City of Chicago Business Affairs and Consumer Protection. 2018 Medallion Transfer Prices. <https://www.chicago.gov/content/dam/city/depts/bacp/publicvehicleinfo/medallionowners/2017TaxicabTransferPrices030118.pdf>

<sup>36</sup> Business Affairs and Consumer Protection. [https://www.chicago.gov/city/en/depts/bacp/supp\\_info/transportation-network-providers.html](https://www.chicago.gov/city/en/depts/bacp/supp_info/transportation-network-providers.html)

<sup>37</sup> C. Scott Smith, PhD AICP, Chaddick Institute for Metropolitan Development. Analysis of Historical Traffic Speeds in Chicago. <http://dig.abclocal.go.com/wls/documents/2018/052318-wls-iteam-traffic-study-doc.pdf>

## OTTAWA

Uber officially began operations in Ottawa in October 2014 with fares reported to be lower than the average taxicab ride. Immediately following Uber's emergence in Ottawa, City regulators targeted Uber and its drivers with charges from various by-law infractions, including a maximum charge of \$20,000 for "offering transportation service without the appropriate license," as outlined in the Highway Traffic Act. Taxicabs in Ottawa are required to be licensed through the City of Ottawa, which includes being equipped with cameras and conducting regular inspections. Additionally, taxicab drivers partake in training through Algonquin College and are issued a taxicab license by the City; the City was determined to bridge the gap between the taxicab regulations and the lack of regulation for Uber and its drivers.

In 2015, a policy option paper was developed by KPMG<sup>38</sup> as part of the City of Ottawa's ongoing review of the taxicab and limousine industry and outlined three strategies for the future:

- 1 Implementing new concepts to the current strategy by using an application-based service model (such as Uber's service) within the existing taxicab industry;
- 2 Establishing a new licensing category and expanding the industry to allow competition, while seeking to "level the playing field;" and
- 3 Reducing costs by expanding the industry to allow more competition and removing limits on the number of plates.

Similar to the city of Toronto, the City of Ottawa began regulating Uber in 2016 (a review of the regulations can be found in Appendix A) and regulates drivers through an annual licensing fee of \$55, however, it does not include any variable (i.e., per-trip) fees. The regulation includes data and record-keeping requirements for up to a 3-year duration and subjects PTCs to reviews and audits by the Chief Licensing Inspector without notice. In 2017, Capital Taxi, an Ottawa taxicab brand, released an Android and iOS application that allows users to order a trip. "The initiative is focused on offering increased consumer choice, and to make the experience of booking a taxicab easier, faster and more reliable," according to Marc Andre Way, President of Capital Taxi.<sup>39</sup>

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<sup>38</sup> <https://obj.ca/index.php/article/kpmg-policy-paper-suggests-many-prefer-uber-taxi-industry>

<sup>39</sup> <https://obj.ca/article/battle-against-uber-ottawa-taxi-operators-push-mobile-ride-hailing-apps>



## 1.5 GAPS IN ACADEMIC LITERATURE

PTCs and ridesharing have been launched only relatively recently in the mobility space. Jurisdictions, both nationally and internationally, were quick to provide regulatory requirements for the operation of these services, while some, such as the city of Vancouver, chose to restrict the operations of PTCs. Given its recent emergence, few years under a regulatory structure, and lack of data availability, the number of studies conducted on the economic impacts of this service is limited and difficult to quantify with accuracy. While conducting the Economic Impact Analysis of Toronto's taxicab, limousine, and PTC industry, WSP drew upon studies to validate the analysis and results throughout the study. Many jurisdictions have begun to study the congestion and accessibility impacts of PTCs, however, few have studied the economic impacts of both the entry of PTCs and its associated regulation. While conducting the analysis for this study, the following comparisons were made between existing academic literature and the economic impact analysis:

Theme	Academic Literature	WSP Study
<b>Consumer Quality of Life</b>	Academic studies have been conducted based on user complaints, however, these have been focused on the entry of PTCs as opposed to solely regulatory implications.	WSP looked at consumer quality of life through consumer surplus and have isolated the incremental impact due to regulations.
<b>Access</b>	Access has been studied heavily in other jurisdictions, but specifically concentrated on accessibility, congestion, transit implications, etc.	WSP reviewed the relationship between the various wards after the vehicle-for-hire regulations. The City of Toronto is currently undertaking a detailed accessibility strategy and congestion management study.
<b>Tourism</b>	The impact of PTCs on tourism has not been seen through academic literature.	WSP qualitatively assessed the implications of the entry of PTCs on tourism.
<b>Environmental</b>	Academic studies related to environmental impacts have been conducted, however, have been focused on the entry of PTCs as opposed to solely regulatory implications.	WSP assessed the environmental implications using a diff-in-diff method to encompass the impact of the entry of PTCs and the regulations.
<b>Supply and Demand</b>	Few academic studies have been conducted on the short-run behaviour of consumers and producers since the entry of PTCs. Studies have not isolated the implications of regulations.	WSP assessed the impacts on long-run behaviour of consumers and producers
<b>Industry Economic Valuation</b>	None	WSP assessed the changes in economic valuation for both industries through the consumer and producer surplus.
<b>Ancillary Industries</b>	None	WSP assessed the impacts to ancillary industries using Statistics Canada's Input-Output multipliers.
<b>Jurisdiction</b>	— <b>US:</b> Studies have mainly been focused in New York, Boston, San Francisco,	— <b>Canada:</b> City of Toronto. First completed study on the impacts of PTCs in Canada.

	Los Angeles, Chicago, Washington, Miami, San Diego, and Seattle — <b>Australia:</b> Australian Capital Territory	
<b>Data</b>	— City recorded/Administrative data — Driver surveys	— A combination of City of Toronto, local surveys, and driver survey data
<b>Method</b>	— Econometrics (OLS, Instrumental Variables)	— Econometrics (OLS, differences-in-differences)

## 1.6 CONSULTATIONS

WSP conducted several stakeholder interviews to gather information on industry representative demographics, thoughts, opinions, and perceptions of the emergence and operations of PTCs in Toronto and the regulations subsequently introduced by the City of Toronto. The interviews also sought to gather information on the economic impacts of PTCs on industry participants, including impacts on the quality of life of drivers, demand for services, and driver revenues. A total of 13 interviews were conducted with representatives from the vehicle-for-hire and PTC industries; these included taxicab and PTC drivers, taxicab plate owners, and administrative and management representatives from taxicab brokerages, limousine service companies, and PTCs.<sup>40</sup>

### 1.6.1 VEHICLE-FOR-HIRE CONSULTATION SUMMARY

#### DEMOGRAPHIC PROFILE

Total Number of Interviews	Interviewees with Experience as a VFH Driver	Companies of Employment of Interviewees	Years of Driving Experience (Range)	Current Hours Driven per Week (Range)
7	5 (2 current)	<ul style="list-style-type: none"> <li>— Co-Op Cabs</li> <li>— Beck Taxi</li> <li>— Bloomingdale Limousine</li> <li>— Independent plate owners</li> </ul>	18 to 47 years	60 to 96 <sup>41</sup>

<sup>40</sup> The results presented in this section are not representative of the industries as a whole.

<sup>41</sup> Hours driven per week were self-reported results. Taxicab drivers are expected to adhere to “§ 546-103. Maximum shift hours and taxicab records. A. No vehicle-for-hire driver shall operate a taxicab for more than 12 hours during any 24-hour period.”

## THOUGHTS/OPINIONS/PERCEPTIONS

### Initial Perception of PTCs in 2012

Since the introduction of PTCs in the city of Toronto, followed by ridesharing in 2014, all taxicab and limousine interviewees identified that PTCs have made an impact in the city of Toronto and 5 interviewees reported a negative impact. Many respondents felt that the negative perception from the taxicab and limousine industry stemmed from the difference or “lack” of regulations required for PTCs and PTC drivers, however, it was also noted by one respondent that the limousine industry initially benefitted from the arrival of PTCs because they acted as a platform-based brokerage for licensed limousines.

### Opinions about the Vehicle-for-Hire Regulations

Most interviewees felt that there is a discrepancy between the regulations for vehicle-for-hire and PTC drivers and this has had a negative impact on the industry.<sup>42</sup> Many respondents noted that the biggest impact on the vehicle-for-hire industry was the codification of PTCs’ existing operations, and this would result in an oversupply of drivers and may impact consumer safety. Respondents noted that the biggest change related to their operations was the increase in hours worked, while most also indicated that their service delivery remained the same, though 2 interviewees believed that the regulations permitting PTCs forced the industry to embrace new technologies.

### Results of the Vehicle-for-Hire Regulations

*Quality of Life Impacts:* Most drivers believed that the regulations have negatively impacted their quality of life, as drivers are working more hours to achieve their 2014 revenue levels, some drivers are leaving the industry, and the value of plates continues to decline. Respondents cite missing family obligations, delaying retirement, not being able to afford holidays, and not being able to take personal time off.

*Unintended Results:* Of the interviewees, four main unintended results were cited:

- Many industry interviewees found that the major unintended result of the regulations was a perceived decline in consumer safety, due mainly to the perceived lack of formal training for PTC drivers and problems with PTC and driver insurance policies.
- Some respondents cited a negative impact to the environment due to increased Vehicle Kilometres Travelled (VKT) from more vehicles-for-hire and increased deadhead and idle time for taxicabs.
- Many interviewees also believe that the introduction of PTCs has diminished public perception of the taxicab industry due largely to lower prices for PTCs, increased consumer options, and a perceived increase in service quality.
- A final unintended result cited by interviewees was a growing sense of abandonment from stakeholders in the taxicab industry and the City – particularly the drivers, plate owners, and brokerages. Respondents noted that they felt the City’s regulations were ineffective and only impacted them negatively while providing benefits for consumers, PTCs, and PTC drivers.

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<sup>42</sup> Regulations for vehicle-for-hire drivers and PTC driver differ based on their service offering.

*Results from Increased Competition:* Some interviewees from the vehicle-for-hire industry believe that the increased competition has resulted in the modernization of the industry. The majority, however, believe that the competition has resulted in the loss of business and significant negative impacts on their lives, specifically regarding the increased working hours to earn the same revenue as prior to the arrival of PTCs in Toronto. The increase in competition has also led to many taxicab drivers leaving the industry or working part-time with PTCs, and has effectively stunted the registration of new taxicab drivers.

## DEMAND AND ECONOMIC IMPACTS

### Demand and Revenue Impacts from the Vehicle-for-Hire Regulations

The two radar charts below demonstrate the impacts of the introduction of PTCs on both taxicab streethailing and dispatching demand and revenues. Five out of seven respondents provided estimates on the percentage increase or decrease of streethail and dispatch demand and revenues. Each pentagonal layer represents the change in demand and revenue cited by the respondents, and the spokes represent the answers from each respondent. The layers begin in the middle at a 0% change, and increase outwards to a -80% change. Therefore, the closer a spoke point is to the outermost layer, the larger the impact.

All respondents experienced decreased demand and revenue for both services, between a reduction of 40% and 75%. The changes to the taxicab demand and revenues were recognized to be from the entrance of PTCs with the vehicle-for-hire regulation confirming that PTCs will continue to operate in the city of Toronto. Overall, the majority of respondents cited a shift towards dispatching and away from streethailing. Respondents all agreed that demand and revenues for both have decreased, though dispatching services are being bolstered by corporate accounts, contracts with institutions, and older population segments.

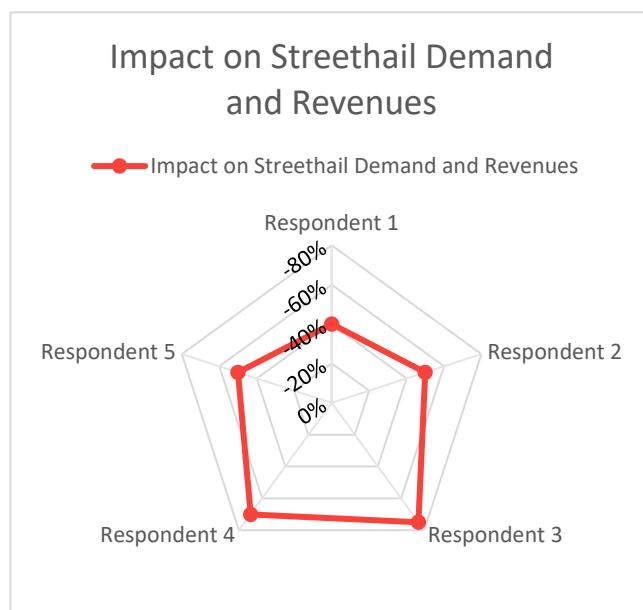


Figure 1-3: Impact on Street-hail Demand and Revenues

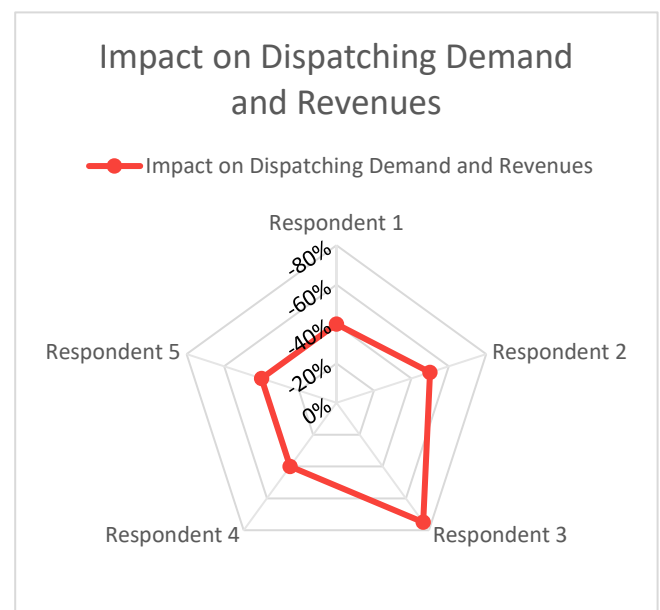


Figure 1-4: Impact on Dispatching Demand and Revenues

### Shift in Consumers, Trip Types, Trip Distances, and Occupancies

Industry stakeholders indicated that most drivers have seen a change in trip types with the majority of trips occurring in the evenings and weekends. Most drivers cited their average trip length has decreased, and are now providing primarily short distance trips to appointments or leisure activities, mainly in the

central business district (CBD). When asked whether there has been a shift in vehicle occupancy or consumer types, many noted that the occupancy has remained unchanged while there has been a decrease in tourists and younger consumers.

## 1.6.2 PRIVATE TRANSPORTATION COMPANY CONSULTATION SUMMARY

### DEMOGRAPHIC PROFILE

Total Number of Interviews	Interviewees with Experience as a PTC Driver	Companies of Employment of Interviewees	Years of Driving Experience (Range)	Current Hours Driven per Week (Range)
6	3	— Uber — Lyft — RideIn	3 years	40 to 63

### THOUGHTS/OPINIONS/PERCEPTIONS

#### Initial Perception of PTCs

When asked about the industry's initial perception of PTCs, all respondents agreed that the arrival of PTCs in Toronto provided positive benefits for consumers who saw increased choices, and potential drivers felt that existing barriers to entry into the market were removed. Some interviewees indicated that PTCs differ from other vehicle-for-hire services due to their use of technology to match riders with drivers.

All drivers interviewed also indicated that they have driven for more than one PTC, while 2 out of 3 drive regularly for more than one. Reasons for driving for multiple PTCs include supplementing income through increased commission or working hours, benefitting from different promotions, likelihood of demand, time of day, and trip locations.

#### Opinions About the Vehicle-for-Hire Regulations

Most interviewees indicated that the vehicle-for-hire regulations made little visible impact on the operations of PTCs but rather solidified an increase in consumer choice. It was often cited that the increased use of PTCs is a result of the existing trajectory and adoption rather than the regulations, and therefore, interviewees were largely indifferent about the vehicle-for-hire regulations. It was noted that the regulation of PTCs has allowed the formation of partnerships with other companies and organizations (for example, MADD Canada).

#### Results of the Vehicle-for-Hire Regulations

*Quality of Life Impacts:* Overall, interviewees noted mostly positive impacts on their quality of life and of drivers in the industry. Reasons included increased flexibility and peace of mind gained from operating within a regulatory framework with less conflict with taxicab drivers. One interviewee, however, indicated that some full-time drivers saw their working hours decline due to the vehicle-for-hire regulations, specifically limits on working hours.

*Unintended Results:* Less than half of the interviewees believed that there were any unintended consequences as a result of the regulations. It was noted that the regulations have caused slight confusion for PTC drivers relating mainly to unclear direction on driver responsibilities in tracking working hours, as well as enforcement of the regulations.

## DEMAND AND ECONOMIC IMPACTS

### **Demand and Revenue Impacts from the Vehicle-for-Hire Regulations**

Several interviewees indicated that both demand and revenues increased, however, this was largely due to the industry's existing trajectory as opposed to an impact of the vehicle-for-hire regulation. It was also noted that revenue is a function of how drivers choose to structure working hours and locations.

### **Shift in Consumers, Trip Types, Trip Distances, and Occupancies; Supply**

When asked about the type of consumers PTCs encounter, most interviewees noted that their consumer base has seen an increase in tourists, while the remainder did not notice a significant difference. In terms of changes in trip types, drivers indicated that the average vehicle occupancy remained at one, despite the introduction of pooled services. Industry representatives on the other hand cited incremental increases in average vehicle occupancy due to pooled services. Approximately half of the interviewees noted that they did not notice any significant difference in trip lengths, while the rest indicated a slight decrease and an increase in commuter trips. It was noted that trips to Pearson International Airport were common, though the operation of Union-Pearson Express has had an impact on the number of airport trips. Finally, it was noted that most morning commuter trips that begin outside of downtown end at TTC stops or stations, whereas commuter trips within downtown are typically directly to work or school. Overall, all interviewees have seen an increase in supply in the vehicle-for-hire industry, though it was consistently highlighted that this was not attributed to the regulations, but rather that the vehicle-for-hire regulation solidified PTC's operation in the city.

## 2 ECONOMIC AND SOCIAL CHANGES AFFECTING RESIDENTS, CONSUMERS, AND THE CITY

This section looks at the economic and social changes affecting city of Toronto residents, consumers, and the City through the assessment of changes to quality of life of consumers, consumer choice, access, tourism, and environmental impacts using a number of quantitative and qualitative approaches.

### 2.1 QUALITY OF LIFE AND CONSUMER CHOICE

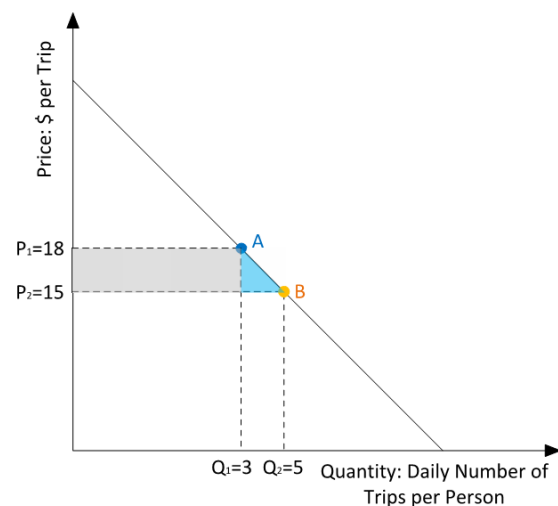
Consumer surplus is a measure of economic welfare (or utility) that is gained from the consumption of a good or service and is defined as the difference between the total amount a consumer is willing to pay for a service and the total amount they pay (ie. market price). If consumers are willing to pay more for a vehicle-for-hire or PTC service, they are getting more benefit from the service. In understanding the changes to the quality of life and consumer choice of city of Toronto residents, consumer surplus may be quantified for the vehicle-for-hire and PTC markets.

#### 2.1.1 CONSUMER SURPLUS

When a consumer participates in a market by purchasing a good at a particular price based on their demand, the consumer realizes a benefit if the price paid (market price) is lower than the price they were willing to pay (ie. if they were willing to pay more than the current market price). This is known as “Consumer Surplus” and is measured by the area under the downward-slope demand curve and above the market price line. Figure 2-1 displays a sample vehicle-for-hire market (for simplicity, the demand curve has been drawn linearly) where:

- The original market price is \$18 per trip for a given Origin-Destination (O-D) pair trip, and at that price, consumers make 3 trips daily.
- With a change in price per trip to \$15, a reduction of \$3, for the same O-D pair trip, a total of 5 trips are made.

The price a consumer is willing to pay for a good varies by person, so the current price a consumer pays for that identical trip generates a benefit (or surplus) and is representative of the choice they consider as a consumer. With the same level of services, the reduction in price creates a consumer surplus for existing users (represented by the grey area) and for induced users (represented by the blue area). In this case, the existing users were those that would have taken the trip if it costed \$18 and would therefore see a surplus of  $(\$18 - \$15) \times 3 = \$9$ . The new or induced users are those that take the trip because of the decrease in price and would realize a surplus of  $(\$18 - \$15) \times 0.5 \times 2 = \$3$ .



**Figure 2-1: Sample Consumer Surplus Calculations**



## QUANTIFYING CONSUMER SURPLUS IN THE CITY OF TORONTO

The city of Toronto vehicle-for-hire market consists of 3 sectors – taxicabs, limousines, and PTCs where the main competition lies between the taxicab and PTC industries as the limousine industry targets a different consumer type; as such, this section will focus on the taxicab and PTC industries only. When the demand curve is known, then consumer surplus can be calculated at any given price.

In order to quantify the consumer surplus associated with the vehicle-for-hire market in the city of Toronto, data from census years 2011 and 2016 were used to represent the market prior to PTCs entering the city of Toronto (2011 census year) and a market consisting of PTCs in a regulated environment (2016 census year). The following table outlines the data used to determine the consumer surplus. Daily trips, trip length, and mode share declined between 2011 and 2016 for the taxicab industry, and the base fare for vehicles-for-hire decreased (due to the 2016 Vehicle-for-Hire regulation). The demand for taxicab trips decreased by approximately 7% from 2011 to 2016, while population had increased by more than 5%.

**Table 2-1: city of Toronto Vehicle-for-Hire Market Data. Sources, and Assumptions, 2011-2016**

Variable	Unit	Value			Source
		Taxicab - 2011	Taxicab - 2016	PTC - 2016	
Number of trips per day	trips/day	36,545	34,012	31,089	Transportation Tomorrow Survey (TTS)
Mode share - Toronto residents	%	0.71%	0.66%	0.60%	TTS
Median trip length	km	4.61	4.16	4.43	TTS
Base fare - before regulation	\$/trip	4.25	4.25	4.25	City of Toronto Regulation and Uber
Base fare - after regulation	\$/trip	NA	3.25	5.25	City of Toronto Regulation and Uber <sup>43</sup>
Distance Based Fare	\$/km	1.75	1.75	0.81	City of Toronto Regulation and Uber
Population (15+)	persons	2,214,200	2,333,440	2,333,440	Statistics Canada

The generalized cost (or price users pay) was calculated as follows for taxicab and PTC trips:

*Generalized Cost*

$$= \text{Base Fare (\$)} + \text{Median Travel Distance (km)} \times \text{Distance Based Fare (\$/km)} \\ + (\text{Wait Time} + \text{In Car Travel Time})(\text{hours}) \times \text{Value of Time (\$/hour)}$$

The quantity of trips conducted was determined as follows:

$$\text{Quantity} = \frac{\text{Number of Trips by Mode}}{(\text{Population in Toronto above 15 years} \times \text{Mode Share})}$$

Table 2-2 below outlines the assumptions used to develop the demand curve for the taxicab and PTC industries. The Price Elasticity of Demand (PED) is a major input in determining the consumer surplus of an industry as it defines the slope of the demand curve. As described further in Appendix C, the results of the vehicle-for-hire and PTC driver survey were used to determine the PED and how it has changed from before the vehicle-for-hire regulation in 2016. By developing a relationship between the number of trips

<sup>43</sup> The fare structure used for analysis purposes does not consider surge pricing. The fare structures were provided through Toronto Uber Prices (<http://uberestimate.com/prices/Toronto/>). The differential before and after the vehicle-for-hire regulations were provided by Uber.

conducted per week and the revenues earned, the PED for the vehicle-for-hire and PTC industries were determined.

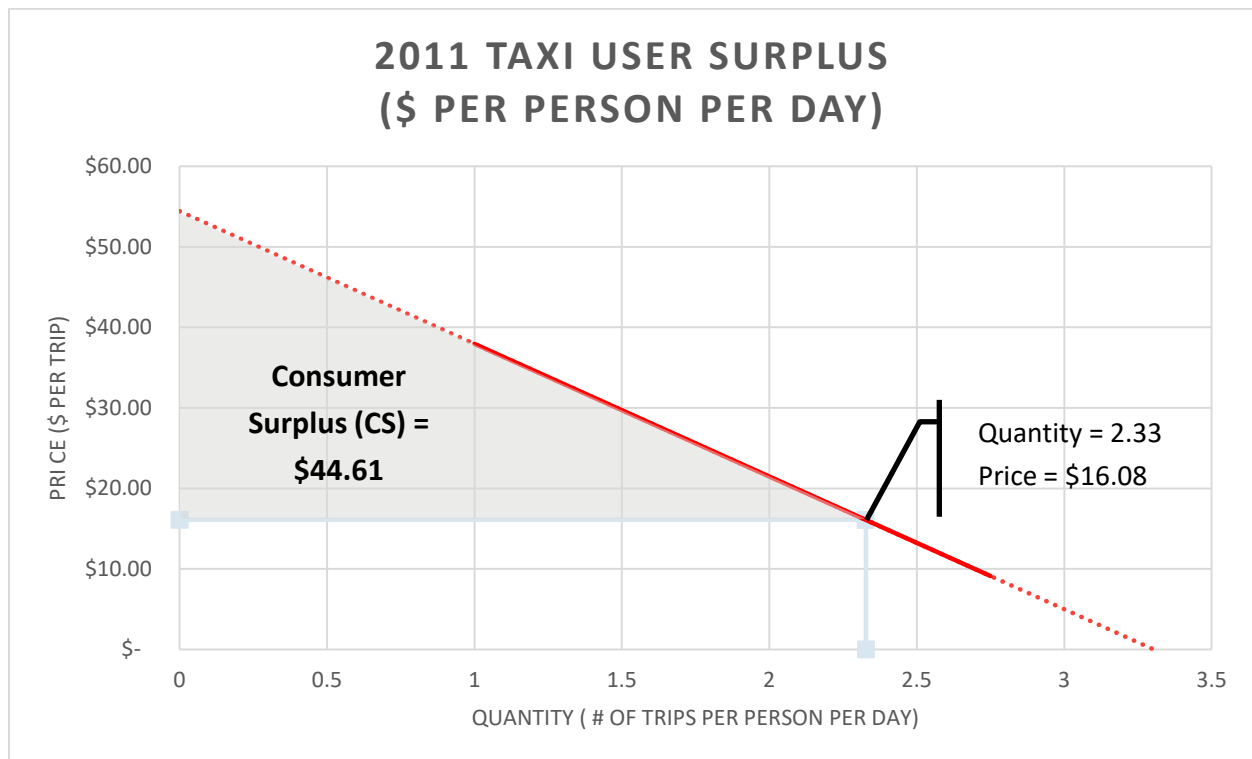
**Table 2-2: Assumptions for the Quantification of Consumer Surplus**

Variable	Unit	Value			Source
		Taxicab - 2011	Taxicab - 2016	PTC - 2016	
Price elasticity of demand	unitless	-0.42	-0.45	-0.39	VFH and PTC Driver Survey
Median Travel Distance	Km	4.61	4.16	4.43	TTS
Average speed	km/h	40	40	40	Assumption
Travel time	minutes	6.9	6.2	6.6	Calculation
Wait time	minutes	6.1	6.1 <sup>44</sup>	5.0	City of Toronto and Taxi Research Partners <sup>45</sup> & Uber
Value of time	\$/h	17.36	17.36	17.36	Metrolinx Business Case Guidance
Generalized cost per trip - before regulation	\$/trip	16.08	15.09	11.21	Calculation
Generalized cost per trip - after regulation	\$/trip	NA	14.09	12.21	Calculation
Daily quantity - before regulation	trips/person/day by mode	2.33	2.03	2.62	Calculation
Daily quantity - after regulation	trips/person/day by mode	2.33	2.20	2.20	Calculation

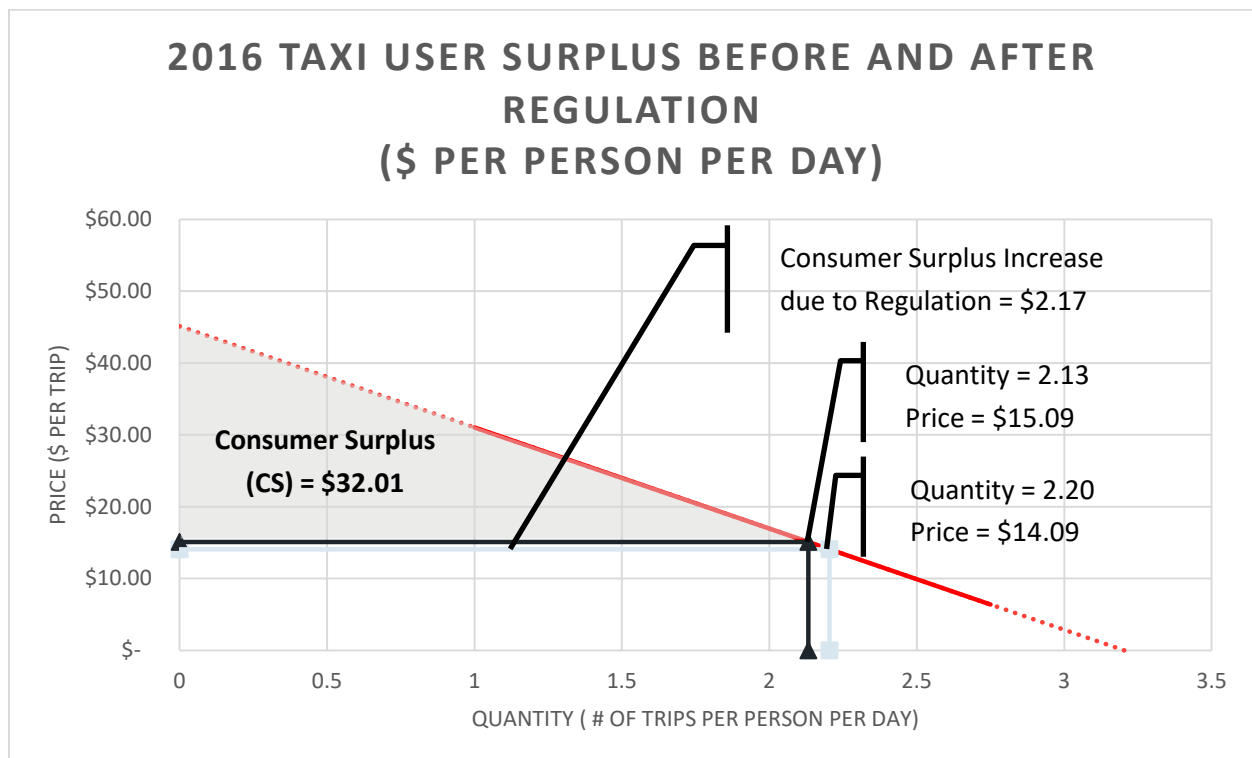
Figure 2-2 and Figure 2-3 graphically show the consumer surplus for the taxicab industry in both 2011 and 2016. For the purposes of this study, the demand curve is taken as linear. As seen below, the taxicab consumer surplus before the regulation, measured by the grey area, has decreased from 2011 to 2016 due to the inward shift and steeper slope of the demand curve. Without the vehicle-for-hire regulation, the taxicab user surplus decreased from \$44.61 to \$32.01 per day as indicated by the grey triangles. In 2016, the vehicle-for-hire bylaw lowered the base fare, which in turn lowered the per taxicab trip price. As a result, the total taxicab user surplus in 2016, post-regulation, was \$34.18 per day. The additional surplus attributed to the regulation estimated at \$2.17 per day is indicated by the blue area in Figure 2-3.

<sup>44</sup> Taxicab wait times have been assumed to remain the same between 2011 and 2016 due to lack of data availability. This is a relatively conservative assumption.

<sup>45</sup> Taxi Research Partners. Determining the Appropriate Number of Taxicabs and Its Impacts for the City of Toronto. <https://www.toronto.ca/legdocs/mmis/2013/ls/bgrd/backgroundfile-59690.pdf>

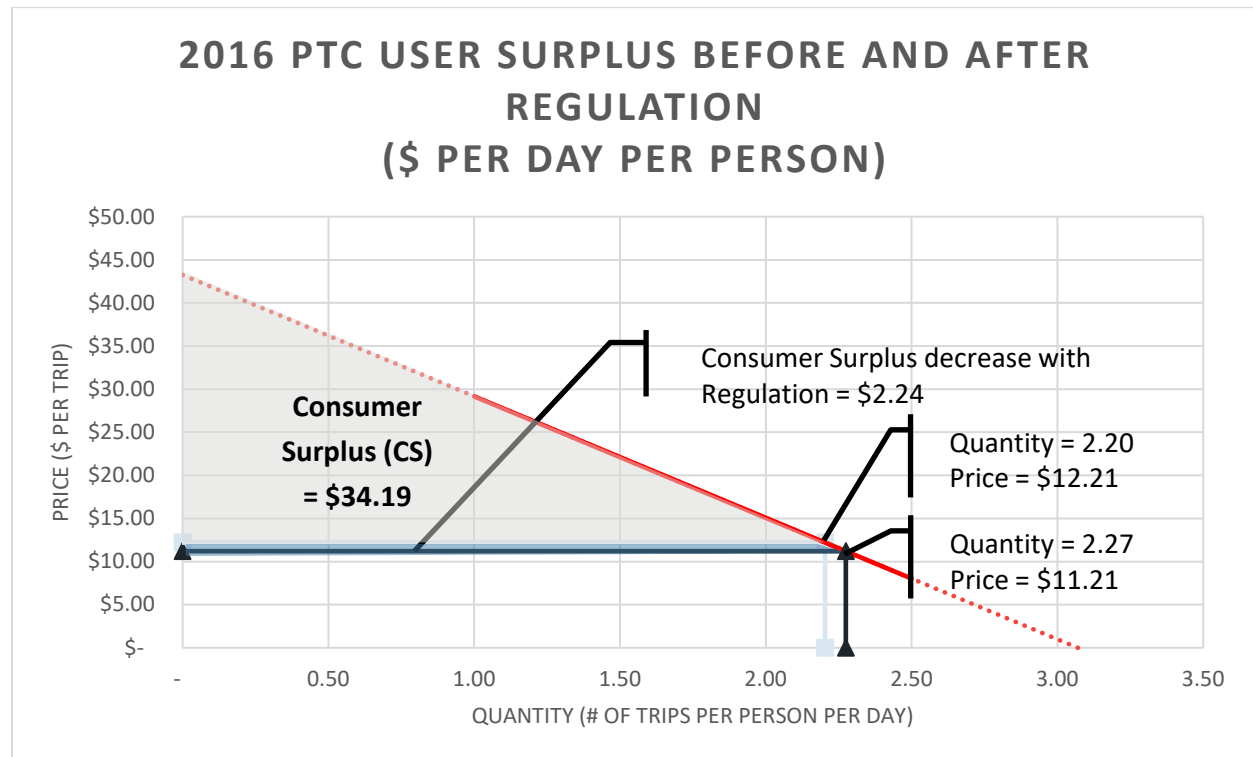


**Figure 2-2: 2011 Taxicab Consumer Surplus**



**Figure 2-3: 2016 Taxicab Consumer Surplus**

As PTCs began operation in the city of Toronto in 2012 (ridesharing services began in 2014) and the vehicle-for-hire regulation was introduced in 2016, consumer surplus was quantified in 2016 using TTS data (which was collected after the introduction of the regulation). Without the vehicle-for-hire regulation, PTC user surplus was estimated to be \$36.43 per day. With the regulation, PTC user surplus decreased by \$2.24 per day as indicated by the blue area in Figure 2-4, meaning the final consumer surplus for PTC users was \$34.19.



**Figure 2-4: 2016 PTC Consumer Surplus**

Assuming that only the proportion of Toronto residents aged 15 and over use vehicle-for-hire services, and they travel 365 days per year (which realizes 100% of the VKT on weekdays and weekends), the economic impact to quality of life and consumer choice to those riders is reported in Table 2-3.

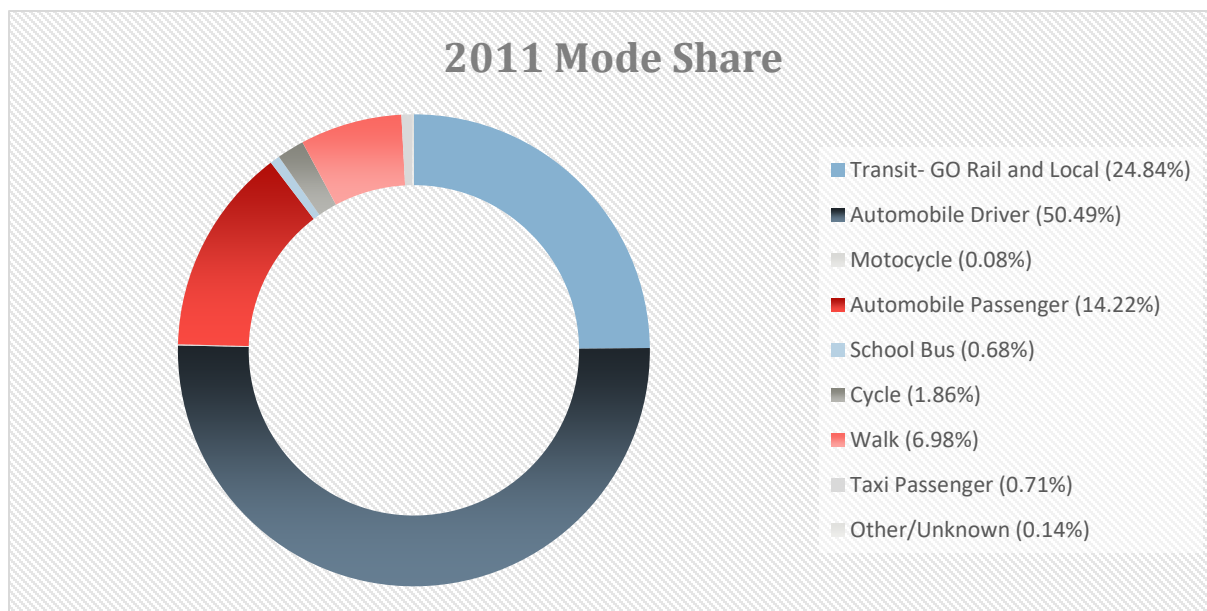
Overall, the combined total consumer surplus for all taxicab and PTC users increased from \$255.7 million in 2011 to \$368.6 million in 2016. This was mainly due to the entrance of PTCs in 2012, making the city of Toronto vehicle-for-hire market more competitive. The competition generated \$176.1 million in consumer surplus for PTC users and decreased the user surplus for taxicab users by approximately \$63 million. Although the vehicle-for-hire regulation generated \$12.2 million of benefits to taxicab users through the reduction in base fares, it also reduced the benefits for PTC users by an estimated \$11.5 million (through the introduction of a minimum fare and per trip fee). In total, when isolating for the vehicle-for-hire regulations, the consumer surplus in the city of Toronto vehicle-for-hire and PTC market increased by \$0.7 million. This indicates that the entrance of PTCs negatively impacted taxicab users, but positively impacted both vehicle-for-hire and PTC users, combined. Subsequently, the regulations made a positive contribution to taxicab users and negative contribution to the PTC industry by lowering the gap between fare prices to allow the two markets to compete further. Overall, the regulations provided a positive surplus for both vehicle-for-hire and PTC users, combined.

**Table 2-3: Total Consumer Surplus (Millions \$)**

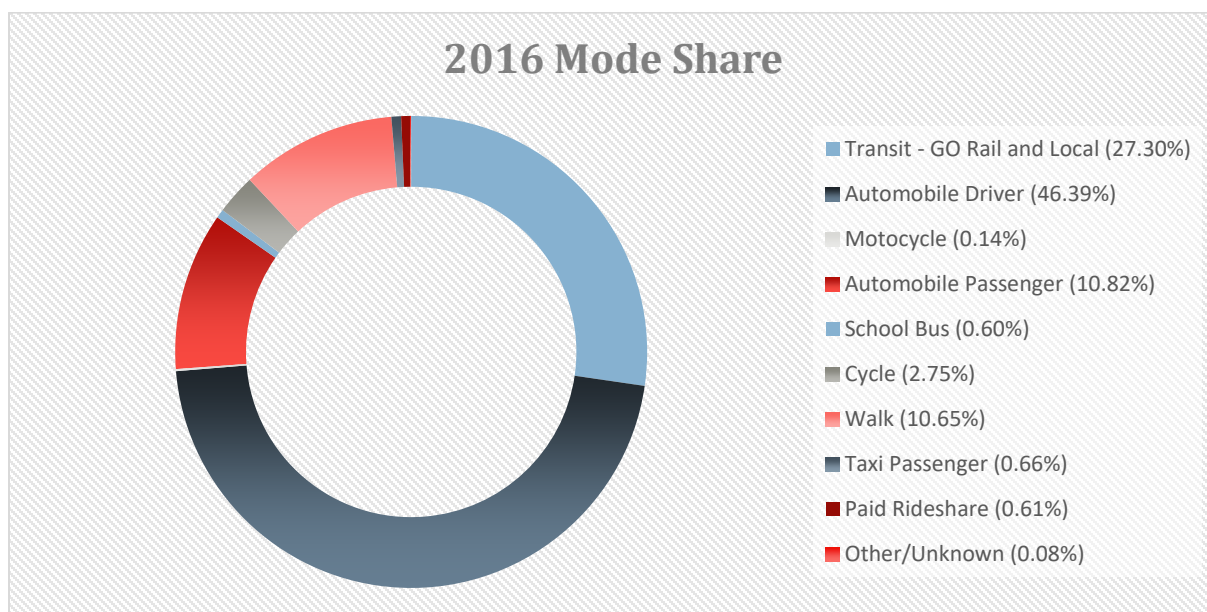
	<b>2011</b>	<b>2016</b>	<b>2011-2016 Difference</b>
<b>Taxicab Industry</b>	<b>255.7</b>	<b>192.5</b>	<b>-63.1</b>
<i>Without 2016 VFH Regulations</i>	<i>255.7</i>	<i>180.3</i>	<i>-75.3</i>
<i>Due to 2016 VFH Regulations</i>	<i>0.0</i>	<i>12.2</i>	<i>12.2</i>
<b>PTC Industry</b>	<b>0.0</b>	<b>176.1</b>	<b>176.1</b>
<i>Without 2016 VFH Regulations</i>	<i>0.0</i>	<i>187.6</i>	<i>187.6</i>
<i>Due to 2016 VFH Regulations</i>	<i>0.0</i>	<i>-11.5</i>	<i>-11.5</i>
<b>Taxicab &amp; PTC Combined</b>	<b>255.7</b>	<b>368.6</b>	<b>112.9</b>
<i>Without 2016 VFH Regulations</i>	<i>255.7</i>	<i>367.9</i>	<i>112.2</i>
<i>Due to 2016 VFH Regulations</i>	<i>0.0</i>	<i>0.7</i>	<i>0.7</i>

### 2.1.2 TRANSPORTATION MODE SHIFT

In addition to the consumer surplus, consumer choice may be understood through the change in transportation modes. The census years of 2011 and 2016 captures the effect of both the entrance of PTCs in the city of Toronto and the vehicle-for-hire regulations. The daily trips by transportation mode data for the city of Toronto was collected through the Transportation Tomorrow Survey (TTS) during these years. Figure 2-5 and Figure 2-6 below outline the mode share splits in both 2011 and 2016.



**Figure 2-5: 2011 Transportation Mode Share (Source: Transportation Tomorrow Survey)**



**Figure 2-6: 2016 Transportation Mode Share (Source: Transportation Tomorrow Survey)**

The overall number of trips between 2011 and 2016 has increased by 2.2%, however, when normalized for population growth, the overall number of trips per person has decreased by 4.5%, even with the introduction of a new transportation mode (PTCs). This indicates that PTCs have likely captured the majority of their ridership from other modes. Of the various transportation modes, overall transit ridership and active transportation modes have seen an increase while ridership for private automobile, automobile passengers, and taxicab ridership has seen a decline.

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### 2.1.3 QUALITATIVE CONSIDERATIONS

When observing the quality of life and consumer choice impacts of PTCs and the vehicle-for-hire regulations in the city of Toronto, a number of qualitative considerations have been developed through primary research, feedback from stakeholder interviews, and understanding of the vehicle-for-hire regulations and their associated implications. These have been categorized as both individual and societal impacts where italicized considerations represent negative impacts.

#### QUALITATIVE CONSIDERATIONS OF PTC ENTRANCE

- 1 Perceived increase in personal safety through the bi-directional rating system and transparency with trip information.<sup>46</sup>
  - The bi-directional rating system present within PTC platforms allows users and drivers to rate each other, incentivizing both to be respectful. In the case of drivers, if their rating drops below a certain threshold, they are barred from the platform, creating a system where riders feel safe and secure knowing that their driver provides a quality service.
  - *There are however possible negative considerations with the bi-directional rating system. Drivers may begin with many highly rated trips early, though this rating may be deceiving as it is representative of their past performance, and does not reflect any form of standardized knowledge or training. Therefore, there is a risk of having an undertrained driver, or a driver who is unfamiliar in the area, providing trips.*
  - *Passengers or drivers may give each other poor ratings based on race, gender, ability, or other factors due to implicit or explicit bias, negatively affecting the other's ability to use/benefit from the service. Further, some drivers may receive a negative rating for a consumer perceived inconvenience such as providing a drop-off further from the destination, but in a safe stopping zone or when there is a malfunction with the application and the trip is cancelled.*
  - There is a high level of transparency in regard to driver and trip information. Driver names; vehicle make, model, and license plate; and trip cost are all presented to the customer prior to beginning a ride, which can create a sense of comfort and security. Some PTC applications allow users to send ride details including driver name, vehicle information, and real-time ride tracking in case anything was to go wrong.<sup>47</sup>
  - Similar to the requirements for taxicab and limousine drivers, PTC drivers must also have criminal record and driver abstract checks conducted prior to providing services. This helps to ensure rider safety, and can foster a level of comfort and trust.

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<sup>46</sup> Uber. How the Uber Rating System Works. <https://www.uber.com/en-EG/blog/how-the-uber-rating-system-works/>

<sup>47</sup> Uber Newsroom. Peace of Mind When Your Family is On the Go. <https://www.uber.com/newsroom/trip-tracker-4/>



- 2 Secure, account-based payment method linked to credit card.
  - Payments for trips are charged directly to the rider's account, where they can link various payment forms (depending on the particular PTC) including credit or debit cards, PayPal accounts, Google or Apple Pay accounts, and gift cards. This allows individuals to pay for rides in a convenient manner. Further, it reduces the risks of theft or fraud in exchanging cash or using faulty or tampered point of sale machines (i.e. wireless credit and debit card terminals).<sup>48</sup>
  - *Cash-based users, however, may be restricted from using this service.*
- 3 Increased consumer choice for services offered and improvements in services and amenities.
  - PTCs provide a variety of different services, through a single platform. Riders are able to browse through services including economy, pooled, premium, wheelchair-accessible, and extra seat type rides with price information provided prior to selection. Riders can also compare prices between different PTCs easily if the applications are downloaded on their phone, looking for discounts and promotions for example.
  - PTC drivers may sometimes have improved amenities within their vehicles, including water, gum, and snacks for riders. Some even install games and allow the passenger to control in-vehicle entertainment. This helps to improve the overall customer experience during the ride.
  - Additional transportation option for city of Toronto residents.

## QUALITATIVE CONSIDERATIONS OF THE VEHICLE-FOR-HIRE REGULATORY CHANGES

- 1 Perceived increase in personal safety.
  - The City's regulations create service consistency between PTCs and their offerings by standardizing base fares, driver and company requirements, and trip information provided to riders through the platform. Regulations that increase perceived customer safety include driver background and driving history checks, vehicle age and inspection requirements, and trip and driver information transparency. The regulation also includes a specific requirement that the driver's vehicle license plate number and PTC license number are both included on the customer's copy of the receipt. It also allows people to send detailed information to friends and family before rides in the case of an emergency.
  - *There is, however, a potential safety disbenefit as a result of the regulations. The mandatory training, refresher courses, as well as CPR and first-aid training were removed for taxicab drivers and are not included in the new regulations. This may potentially decrease the overall safety of the industry as not all drivers are consistently trained in customer service and safety. Some taxicab brokerages have introduced training courses or have training requirements for taxicab drivers in lieu of the city of Toronto issued training.*<sup>49</sup>

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<sup>48</sup> Ridesharing Driver. Uber payment options. <https://www.ridesharingdriver.com/uber-payment-options-select-different-credit-card/>

<sup>49</sup> Beck. <https://www.becktaxi.com/drivers/>

- 2 Reduced out-of-pocket costs for customers.
  - The 2016 regulations require PTCs to clearly communicate the rate to customers prior to their acceptance of the ride, and sets a minimum fare to be paid which is equal to that of the taxicab industry. Further, the regulations resulted in a decrease in the base rate for taxicabs, providing cheaper starting rates for customers taking non-luxury and standard size (i.e. four seats) taxicabs.
- 3 Background checks for drivers increase consumer safety.
  - The introduction of PTC regulations included criminal record and driving abstract checks for PTC drivers. While this was already mandated by the PTCs themselves, there was no requirement for this information to be maintained or submitted to the City. The regulation has changed that, requiring the information be maintained and available to ML&S or Toronto Police Services upon request.
  - *Contrasted against the requirements for taxicab and limousine drivers, there is a discrepancy between the two industries. Taxicab and limousine drivers are required to submit to Judicial Matters Checks conducted by a Canadian Police Service, whereas PTC drivers only require Criminal Record Checks from a third-party provider selected by the PTC.*
- 4 Increased competition of PTCs may improve overall service of both vehicles-for-hire and other PTCs.<sup>50</sup>
  - PTCs are challenging the vehicle-for-hire industry with low rates, increased service offerings, larger fleets, and mobile applications. In some cases, this has led to the taxicab industry increasing their offerings by introducing their own mobile applications that allow customers to book and pay for rides through the platform. In other cases, taxicab brokerages have maintained driver training requirements, partnering with a local college to deliver the course, to ensure their drivers have adequate customer service and city knowledge.
  - *Increased competition may result in a loss of revenue from another market or transportation mode.*
- 5 Increases the overall insurance coverage of the transportation network.
  - Mandatory insurance for PTC drivers ensures that drivers, their passengers, and other road users they interact with are adequately covered financially should they get into a collision or hit a cyclist or pedestrian. However, the current insurance package for PTCs with \$2 million coverage is only active from the point when the driver turns the application ‘on’ to when the passenger drop-off is confirmed in application.
- 6 Codification of the existing market structure of PTCs.
  - Official regulations of PTC operations and providing companies and drivers municipal licenses helps make people feel more secure with the service they are using. It also helps increase the demand for service but otherwise would not because the City did not previously allow or regulate the service.

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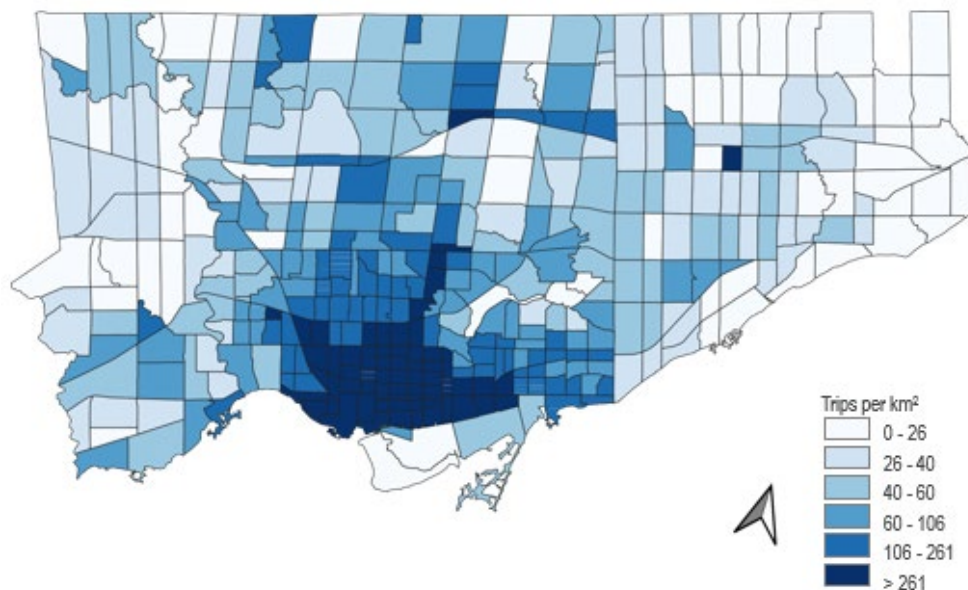
<sup>50</sup> Observed through the stakeholder consultations conducted and summarized in the previous section. It was noted that a number of companies are creating applications to compete against PTCs.

- 7 Increased supply of vehicles-for-hire to meet current and future needs of the population.
- The absence of a limit on PTC driver licenses allows as many individuals to sign up to drive as are interested. This provides a means of part-time, temporary, or full-time work, with or without their own vehicle (in the case where the PTC has an arrangement with a car rental company). Providing driver incentives also increases the supply of vehicle available during peak hours.
  - *This however, may also be a disbenefit as there may be too many drivers working at the same time, thus creating an oversupply on the roads and increasing local congestion and environmental impacts.*
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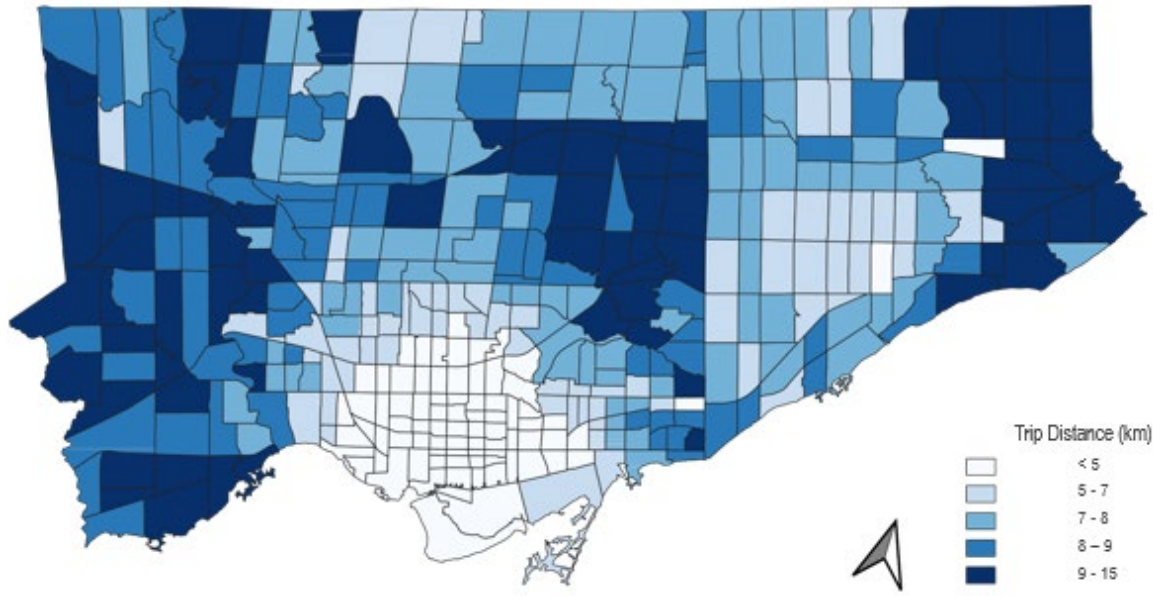
## 2.2 ACCESS

Access in regards to this report looks at the connectivity of residents to services and activities. As seen in Section 2.1, the introduction of PTCs into the Toronto vehicle-for-hire market has impacted transportation user mode shares. This section assesses the impact of the entrance of PTCs and the impact of the vehicle-for-hire regulation on access in the city. Specifically, the impact to access has been identified through how well the lower density wards in the city of Toronto have been served. The expected outcome is that without geographic restrictions, PTCs allow for a better access and service to those areas.

Based on PTC Origin-Destination information, PTC trips are heavily concentrated in the Central Business District (CBD) of Toronto, as seen in Figure 2-7. However, as see in Figure 2-8, PTC trip lengths are usually longer in suburban, lower density areas.



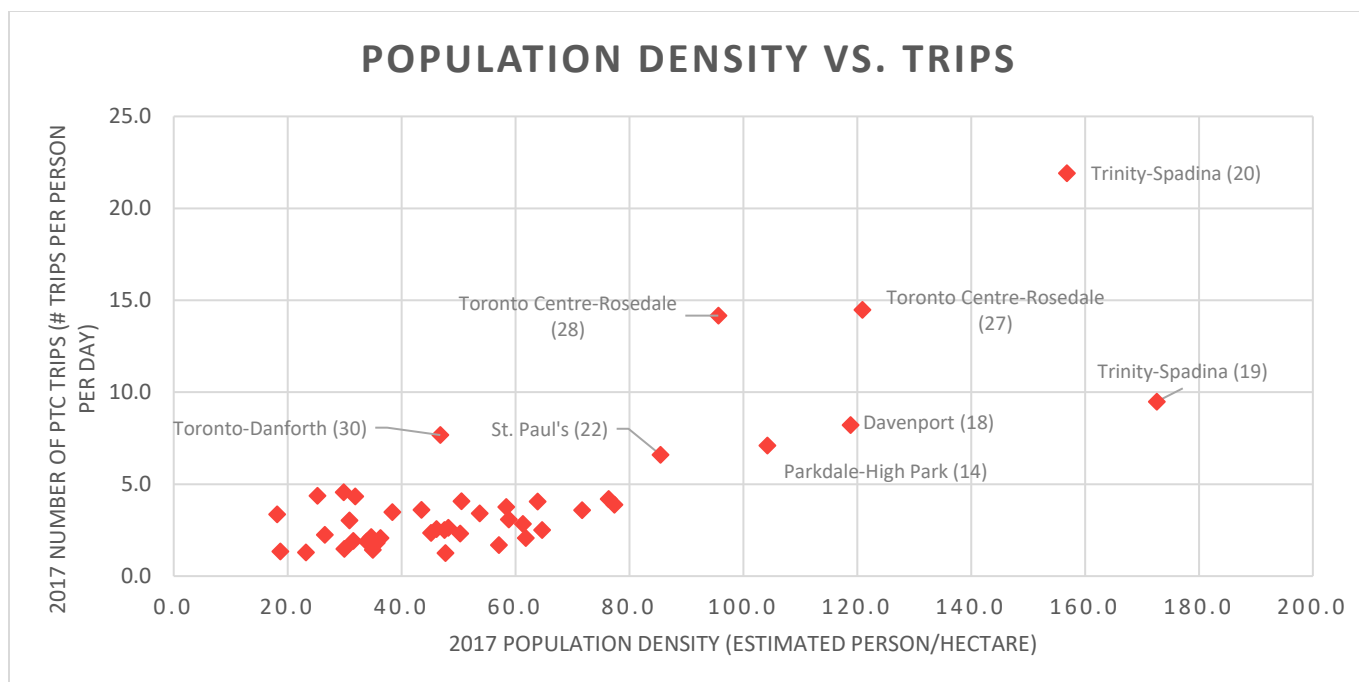
**Figure 2-7: PTC Pick-up Density, Source: City of Toronto, Transportation Services Big Data Innovation Team**



**Figure 2-8: Median PTC Trip Length, Source: City of Toronto, Transportation Services Big Data Innovation Team**

In order to measure the impact of PTCs in the city of Toronto on access, a correlation between the number of daily PTC trips made by residents of a given ward (provided by the City of Toronto) and the population density at the 44-ward level<sup>51</sup> was assessed. Figure 2-9 below presents a scatter plot of the 44-ward data points and results in a correlation of 0.78, indicating a strong, positive relationship between the two variables. It can also be seen that in wards with an average trip per capita above 5 are found in the higher density areas of the City such as Parkdale-High Park (Ward 14), Davenport (Ward 18), Trinity-Spadina (Ward 19), St. Paul's (Ward 22), Toronto Centre-Rosedale (Wards 27 and 28), and Toronto-Danforth (Ward 30). If these wards were excluded from the analysis, there would be lower correlation between PTC trips and population density. Some less populated wards (density/hectare < 50) even realized a higher number of PTC trips made than a few more populated wards (density/hectare > 50).

<sup>51</sup> City of Toronto. 44-Ward Model. <https://www.toronto.ca/city-government/data-research-maps/neighbourhoods-communities/ward-profiles/44-ward-model/>



**Figure 2-9: Relationship between PTC Trips and Population Density**

Equation (1) establishes the slope of a regression line relating PTC trips and population density:

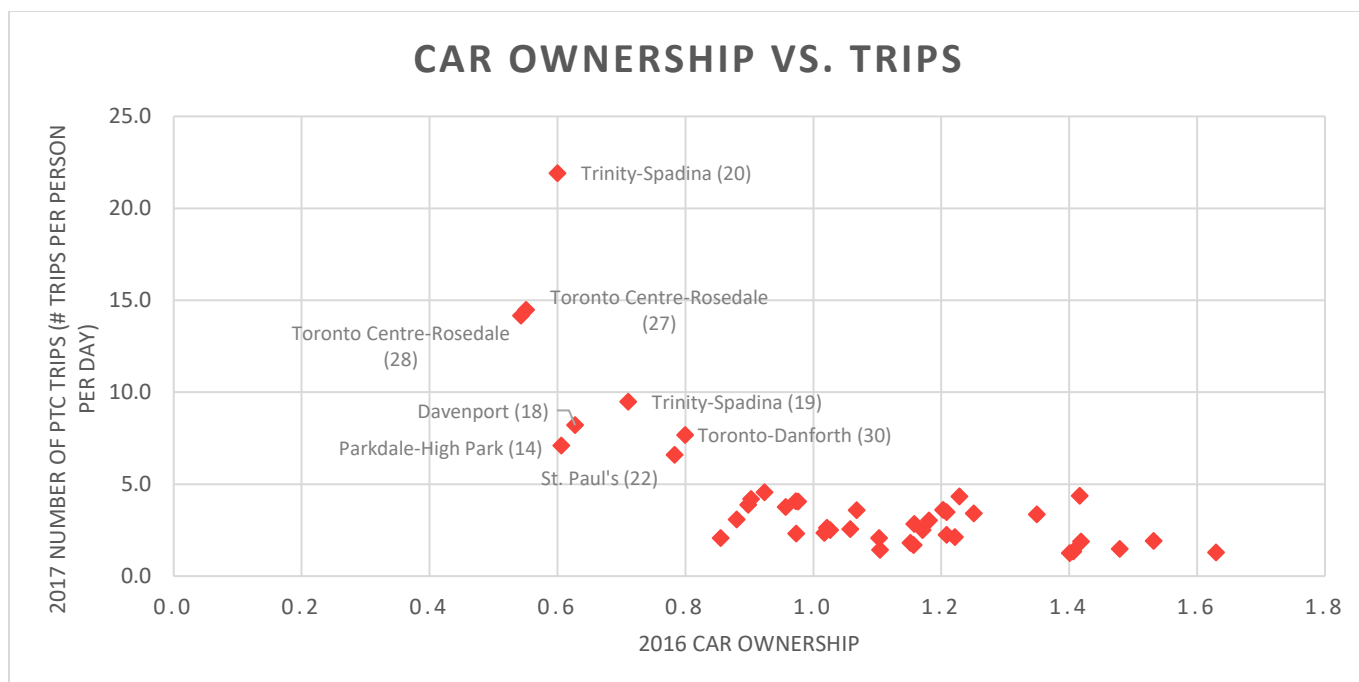
$$(Eq. 1) \quad PTC\ Trip = \alpha + \beta \times Pop\ Density,$$

where  $\alpha$  is the intercept of the regression line, and  $\beta$  is the line's slope which determines the change in PTC trips at a ward associated with a change in population density. The Regression 1 column in Table 2-4 reports the estimated slope of 0.09 when using all 44 observations in Figure 2-9 and is statistically significant. If the 8 wards labelled in Figure 2-9 were removed, then the slope decreases to 0.02 and the R-squared decreases by more than six times, indicating that the relationship between PTC trips and population is much weaker, though the estimated slope is still statistically significant (Regression 2).

**Table 2-4: Regression Analysis of PTC Trips and Population Density**

Parameter	Regression 1	Regression 2
$\alpha$ (t-student)	-0.95 (-1.25)	0.91 (3.89)
$\beta$ (t-student)	0.09 (8.09)	0.02 (1.88)
R-squared	0.62	0.09
Number of observations	All 44 Wards	35 Wards with Pop. Density < 100 residents/hectare & PTCs trips < 5

Although higher populated wards in this sample tend to have higher number of PTC trips, there are other factors that affect PTC trips such as car ownership (per household) obtained from the TTS. Figure 2-10 draws a scatterplot of 2017 PTC trips and 2016 car ownership. The correlation coefficient of the sample is -0.72, indicating that lower car ownership is associated with higher PTC trips. Combining Figure 2-9 and Figure 2-10, it is clear that car ownership is lower in higher density wards, which is likely due to the availability of public transit as well as the availability and cost of parking.



**Figure 2-10: Relationship between PTC trips and Car Ownership**

Equation 2 adds the car ownership variable to Equation 1 and the new estimated slope is summarized in Table 2.

$$(Eq. 2) \quad PTC\ Trip = \alpha + \beta \times PopDensity + \gamma \times CarOwnership,$$

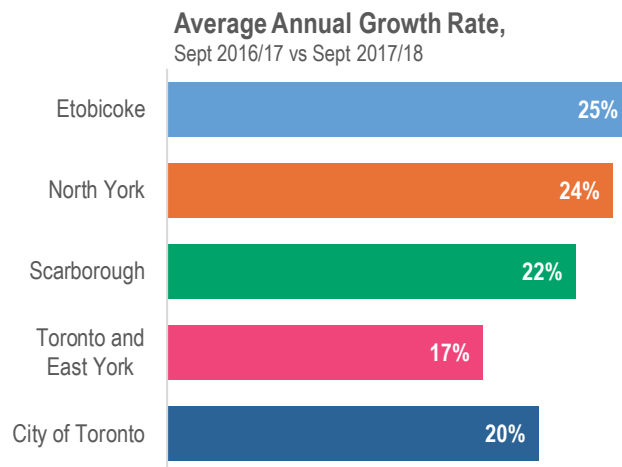
where  $\gamma$  determines the slope of the regression straight line in Figure 2-10. When comparing Regression 3 to Regression 1, the result shows that when controlling for car ownership, the relationship between PTC trips and population density becomes weaker, with the estimated  $\beta$  decreased from 0.09 to 0.07. But within the lower density wards, no relationship between the two variables was observed. Further, the relationship between PTC trips and car ownership is stronger than the relationship between PTC trips and population density. Additionally, as seen in Figure 2-11, it can be noted that the number of PTC trips has been increasing substantially between 2016 and 2018, particularly in lower-density wards that are situated outside of the CBD, indicating an increase in usage in these areas.

Considerations have been made regarding the relationship between household income and the number of PTC origin trips, however, a correlation was not found.

**Table 2-5: Regression Analysis of 2017 PTC trips on Population Density and Car Ownership**

Parameter	Regression 3	Regression 4
$\alpha$	5.21	5.58
(t-student)	(1.56)	(3.28)
$\beta$	0.0658	0.0007
(t-student)	(3.68)	(0.05)
$\gamma$	-4.35	-2.43
(t-student)	(-1.89)	(-2.24)
R-squared	0.65	0.22
Number of observations	All 44 Wards	35 Wards with Pop. Density < 100 residents/hectare & PTCs trips < 5





**Figure 2-11: Annual Average PTC Trip Growth Rate, Source: City of Toronto, Transportation Services Big Data Innovation Team**

### 2.2.1 QUALITATIVE CONSIDERATIONS

In addition to the quantitative assessment above, the following qualitative considerations have been listed (where the italicized considerations are disbenefits). It should also be noted that benefits related to access in this report are high-level and overall network impacts are being further developed in the Congestion Management Study and Accessibility Strategy.

#### QUALITATIVE CONSIDERATIONS OF PTC ENTRANCE

- 1** Increased numbers of wheelchair-accessible service options.
  - The introduction of PTCs to the transportation market increases the number of vehicles-for-hire service providers within Toronto that provide wheelchair-accessible vehicles.
  - *While there are an increased number of wheelchair-accessible service providers, this doesn't necessarily translate to an increased number of wheelchair-accessible vehicles and drivers. Additionally, these drivers may not receive accessibility training.*
- 2** Elderly and youth populations may benefit from the increased transportation options and flexibility in travel.
  - Elderly and youth populations are the two demographics that are least likely to have a valid driver's license or use a private auto as their primary mode of transport. While seniors are also least likely to have cell phones, PTCs provide the option of taking a car without needing a license and providing curb-to-curb access at a cost that is generally cheaper than a traditional taxicab.
- 3** Everyone has the opportunity to benefit from reduced costs, travel, and wait times; route flexibility; and overall mobility.
  - All population segments that have access to a smart phone and banking relationship can take advantage of PTC benefits from the lower costs and reduced wait times associated with this mode compared to other vehicles-for-hire. Riders also benefit from an easy-to-use platform that enables them to request and pay for a ride simply by touching a few buttons on a mobile application.
  - The flexibility of individuals who use public transit can also increase, as PTCs are able to fill the gaps of underserved or unserved pockets of the city, when TTC trips do not reach a



particular area or the schedules do not provide adequate service. This also benefits those commuting from outside of the city as they can make easy connections to and from subway stations.

## QUALITATIVE CONSIDERATIONS OF THE VEHICLE-FOR-HIRE REGULATORY CHANGES

- 1 Persons with disabilities see increased options/service providers for wheelchair-accessible travel.<sup>52</sup>
  - The City's regulations mandate that large PTCs (500+ vehicles) provide wheelchair-accessible service, within the average wait time and for an equal or smaller fare than traditional services offered. While it is also outlined under various provincial and federal regulations, the vehicle-for-hire regulations also prohibit drivers from refusing rides to persons with service animals. This helps to ensure that persons requiring accessible services can take equal advantage of vehicle-for-hire services.
- 2 Increased mobility for a low cost.
  - The introduction of PTCs to Toronto's transportation network have resulted in more and cheaper options for travel. While the regulations increased the minimum fare for PTCs, it also reduced the initial fare for taxicabs to increase affordability of the services for groups who generally do not drive. This is particularly helpful for lower-income demographics.
- 3 All users benefit from increased access to locations within the city, and beyond.
  - As PTCs do not have the same jurisdictional constraints as taxicabs by having the ability to pick-up trips outside of the city of Toronto, they are more likely to complete drop-off trips outside of the city.

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## 2.3 TOURISM

Through the attraction of domestic and international visitors, Toronto was the leading tourist destination in Canada in 2015. A total of over 40 million<sup>53</sup> visitors in 2015 and over 43 million<sup>54</sup> in 2017 indicates an increase in tourism for the city. It is estimated that Toronto employs over 329,000 people in tourism-related businesses and with increasing expenditures by an increasing number of visitors, the direct, indirect, and induced impacts of tourism related activities are expected to increase. While this is attributed to a number of events and trends, the entrance of PTCs in the vehicle-for-hire market has some influences on the sector. This section looks at what qualitative benefits and disbenefits (*italicized*) are derived from the introduction of PTCs and were developed through consultation with the City of Toronto.

### QUALITATIVE CONSIDERATIONS OF PTCs

- 1 Familiarity with the platform: As PTCs operate in many international cities, the familiarity of the platform and service offering provide an easy, stress free, and safe transportation option for visitors.
  - Large PTCs, like Uber and Lyft, operate internationally with easy to use platforms. This increases ease of travel for many individuals, who do not need to figure out the local transit options or the local taxicab companies. With an internet connection or cellular service, visitors can use a familiar and trusted service on their visit.

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<sup>52</sup> It should be noted that the City of Toronto is currently undertaking an Accessibility Strategy.

<sup>53</sup> City of Toronto. Tourism. <https://www.toronto.ca/business-economy/industry-sector-support/tourism/>

<sup>54</sup> CBC News. Toronto Welcome a Record of 43 Million Visitors in 2017.

<https://www.cbc.ca/news/canada/toronto/toronto-welcomed-a-record-43-million-visitors-in-2017-1.4501626>

- The familiarity with rating systems on any PTC provides a perceived safety benefit for domestic and international visitors knowing that there are equivalent consumer protection mechanisms and drivers are rated based on performance and service quality. Additionally, there is a single customer service channel for PTCs that users are familiar with, whereas customer service complaints for taxicabs are typically more difficult to file for tourists.
  - PTC applications may be accessed in multiple languages which can assist tourists or users who do not speak conversational English.
- 2 Flexibility:** PTCs offer increased flexibility for consumers, particularly tourists unfamiliar with an area.
- PTCs offer an additional transportation mode choice for tourists who may be unfamiliar with the local transit options.
  - There is also increased flexibility for users based on the service offering choices provided by PTCs. Riders can choose between economy, pooled, premium, extra seats, accessible, or licensed taxicab in Toronto, allowing them to select whichever service suits them for each trip.
- 3 Tourists can benefit from time and cost savings using PTCs over other modes.**
- With base fares often lower than taxicabs, lower travel times than taxicabs and public transit, tourists may save both time and money using PTCs to travel. This allows them to spend more time exploring the city.
- 4 Tourists may also feel safe and comfortable with the price certainty prior to requesting a ride.**

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## 2.4 ENVIRONMENTAL

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### 2.4.1 DIFFERENCES-IN-DIFFERENCES METHOD

In analyzing and understanding the environmental impacts of both the entrance of PTCs into the market as well as the implications of the 2016 vehicle-for-hire regulations, a “differences-in-differences” (diffs-in-diffs) method was used. The diffs-in-diffs method is an econometric method that can be employed to evaluate the impact of a program, policy, or some other intervention or treatment. The central idea of this method is that the causal effect of a policy can be measured by variations in individual circumstances that arise because of changes in legal institutions, location, program implementation, or other factors that are not intended.

The diffs-in-diffs method was used to evaluate the vehicle kilometres travelled (VKT) per capita from the entrance of PTCs in the city of Toronto and the vehicle-for-hire regulation updates in 2016 by drawing a comparison between two regions, one which considers PTCs and one that does not:

- 1** The city of Toronto, where PTCs entered the market in 2012 and the vehicle-for-hire by-law was implemented in 2016.
- 2** The city of Vancouver, where PTCs are not permitted or regulated. Although no comparison is perfect, the city of Vancouver was selected as it consists of similar attributes to Toronto in terms of population characteristics, density, policies, etc.

VKT per capita (based on the portion of the population greater than 15 years of age) was used as a proxy variable as external environmental impacts such as greenhouse gas emissions and local air quality (from criteria air contaminants) are linked to overall vehicle travel distances.

With this data, the causal effect of PTCs entering the city of Toronto combined with the 2016 regulation can be estimated using the diffs-in-diffs estimator, where:

- $\bar{Y}_{2011}^{Toronto}$  is the quantitative value of the VKT per capita in Toronto **before the city of Toronto 2016 regulation;**
- $\bar{Y}_{2016}^{Toronto}$  is the quantitative value of the VKT per capita in Toronto **after the city of Toronto 2016 regulation;**
- $\bar{Y}_{2011}^{Vancouver}$  is the quantitative value of the VKT per capita in Vancouver **before the city of Toronto 2016 regulation;**
- $\bar{Y}_{2016}^{Vancouver}$  is the quantitative value of the VKT per capita in Vancouver **after the city of Toronto 2016 regulation.**

The differences-in-differences estimator, denoted by  $\hat{\beta}^{diffs-in-diffs}$ , is the average change in the VKT per capita in the city of Toronto, minus the average change in the VKT per capita in the city of Vancouver:

$$\hat{\beta}^{diffs-in-diffs} = \frac{(\bar{Y}_{2016}^{Toronto} - \bar{Y}_{2011}^{Toronto})}{\bar{Y}_{2011}^{Toronto}} - \frac{(\bar{Y}_{2016}^{Vancouver} - \bar{Y}_{2011}^{Vancouver})}{\bar{Y}_{2011}^{Vancouver}}$$

The diffs-in-diffs method was developed using the census years of 2011 and 2016 which captures the effect of both the entrance of PTCs in the city of Toronto and the vehicle-for-hire regulations in 2016. The annual VKT for the city of Toronto was collected through the TTS in 2011 and 2016. The total VKT includes the daily VKT for private automobile drivers, motorcycle, automobile passenger, taxicab passenger, and paid rideshare, and was annualized. Similarly, the annual VKT in the city of Vancouver was collected through the Transportation Panel Survey (TPS) which used a combination of vehicle registrations with the Insurance Corporation of British Columbia (ICBC) and odometer reads. The annual VKT was divided by the total population over the age of 15 years from Statistics Canada to develop the VKT per capita in 2011 and 2016.

$$\hat{\beta}^{diffs-in-diffs} = \frac{(4,852.16 - 5,283.47)}{5,283.47} - \frac{(4,866.66 - 6,238.78)}{6,238.78} = (-8.16\%) - (-21.99\%) = 13.83\%$$

While the city of Toronto has seen a decrease in VKT from 2011 to 2016, the diffs-in-diffs estimates an increase in VKT due to the entrance of PTCs and the 2016 vehicle-for-hire regulation, relative to the city of Vancouver. This figure is likely representative of the entrance of PTCs with the effect of the 2016 regulation being the confirmation that PTCs will continue to operate in the city of Toronto as opposed to being removed from the market, like in the city of Vancouver. In this calculation, the VKT in Toronto has decreased between 2011 and 2016, however, the VKT in Vancouver decreased further, resulting in a relative increase. The diffs-in-diffs figure is also likely overestimated as it does not estimate external events that influence the use of automobiles and taxicabs/PTCs such as transit network improvements and the creation of active transportation infrastructure. An increase in VKT, however, is consistent with research in the U.S. that has shown quite substantial increases in VKT as a result of the entrance of PTCs to the market.

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## 2.4.2 QUALITATIVE BENEFITS AND DISBENEFITS

Environmental impacts, in the form of greenhouse gas emissions and air quality are generally tied to the total VKT, fuel efficiencies, travel speeds, and vehicle type. This section outlines qualitative considerations of the entrance of PTCs and the vehicle-for-hire regulations in relation to environmental changes in the city of Toronto. It should be noted that negative considerations have been italicized.

## QUALITATIVE CONSIDERATIONS OF PTCs

- 1 Some PTCs include a driver destination feature that filters for trips that put them closer to their own destination when they are at the end of their shift.<sup>55</sup>
  - Destination features result in shared trips, where the driver and passenger are both travelling along a route that will bring them both to their desired destinations. Drivers can input their desired destination and time of arrival and will be matched with rides that will enable them to complete their own trip on time. This reduces the amount of VKT as the last leg of a driver's shift will be utilized.
- 2 Some PTCs offer pooled or shared rides, helping to reduce the total number of single-occupancy trips taken by PTCs, however, this may not offset the total VKT increase from the entrance of PTCs.
  - Pooled and shared rides help to reduce single-occupancy PTC trips, which theoretically reduces the total trips taken in PTCs, and thus VKT. As a result of decreased VKT, there is an associated environmental benefit from reduced emissions.
  - *However, U.S. research has shown that the introduction and growth of PTCs leads to increased VKT as PTC patrons switch to PTCs from public transit, walking and biking more often than from personal automobiles. Someone using a PTC instead of transit, for example, adds VKT for the entire trip. In addition, PTC drivers "deadhead" between trips, which is not the case for personal autos, further adding to VKT compared with personal auto trips. It was found that pooling is not able to offset these increases, as pooled trips are a fraction of overall PTC trips, and pooled trips are even more likely to draw from transit, walking and biking than solo PTC trips.*<sup>56</sup>
- 3 PTC algorithms focus on time-efficiency and shortest distances, limiting total VKT.<sup>57</sup>
  - Routing algorithms for PTCs are varied, though they require much of the same information and produce similar results. These algorithms are built to deliver the most time-efficient and shortest distance routes based on a number of considerations, including real-time traffic, driver and passenger ratings, pick-up and drop-off locations, and demand for example. Efficient trip routing can help to avoid congestion and idle time, and reduce VKT, therefore reducing pollution from vehicle emissions. This, however, can only be perceived as a benefit when considering the entrance of PTCs without this technology.

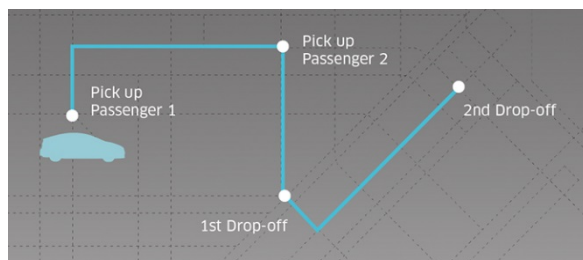


Figure 2-12: Sample PTC Route

<sup>55</sup> Setting my Driver Destination. Uber. <https://help.uber.com/partners/article/setting-my-driver-destination?nodeId=f3df375b-5bd4-4460-a5e9-afd84ba439b9>

<sup>56</sup> B. Schaller. Unsustainable? The Growth of App-Based Ride Services and Traffic, Travel and the Future of New York City. February 2017. <http://www.schallerconsult.com/rideservices/unsustainable.pdf>

<sup>57</sup> Uber Engineering. ETA Phone Home. <https://eng.uber.com/engineering-an-efficient-route/>

## QUALITATIVE CONSIDERATIONS OF THE VEHICLE-FOR-HIRE REGULATION

- 1 Vehicle age and fuel type requirements help ensure that older and higher polluting vehicles are not operating commercially.
  - The vehicle-for-hire regulations require PTC and taxicab vehicles to be no more than seven model years old, and new (or replacement) taxicabs must also be either wheelchair-accessible, alternative fuel, hybrid, or low emissions. This helps to reduce overall emissions from vehicles-for-hire as older cars are considered to be less fuel efficient than vehicles that integrate newer technologies.
- 2 *It is possible that deadhead and idle time in the vehicle-for-hire industry increase as a result of the City permitting PTC operations.*
  - *As there is a decrease in demand for taxicab services, taxicabs drivers may experience increased deadhead and idle time from a reduction in overall demand.*<sup>58</sup>

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<sup>58</sup> The increased idle and deadhead time was outlined by a number of stakeholders during the stakeholder interview process.

## 3 ECONOMIC IMPACTS AFFECTING DRIVERS AND INDUSTRY

This section focuses on the economic impacts affecting vehicle-for-hire and PTC drivers as well as their associated industries. In understanding these impacts since the entrance of PTCs and the subsequent vehicle-for-hire regulations, a driver survey was administered and utilized to understand driver demographics, opinions about the regulations, impacts to quality of life, supply and demand, economic valuation of the taxicab and PTC industries, and impacts to ancillary industries.

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### 3.1 DRIVER SURVEY

An online survey targeting drivers in the vehicle-for-hire and PTC industries was conducted for this study. The survey was released to drivers for a period of two weeks (closing March 23, 2019) through the City of Toronto Vehicle-for-Hire Bylaw Review website<sup>59</sup>, brokerages, PTCs, and through direct e-mails to drivers. Of the 12,781 and 73,239 (as of 2018) vehicle-for-hire and PTC drivers in the City of Toronto, respectively, the survey collected 79 responses from taxicab drivers, 29 from limousine drivers, and 1,561 from PTC drivers.<sup>60</sup> In understanding and analyzing the survey responses, there are three main limitations with the driver survey:

- 1 The low response rates from the vehicle-for-hire industry;
  - 2 The survey was entirely voluntary with self-reported results; and
  - 3 The inconsistency in quantitative responses.
- 

#### 3.1.1 DRIVER PROFILE

The driver survey included a series of questions (which can be found in Appendix B) to understand the demographics of both the taxicab and PTC industries. While both industries provide similar transportation services, it is interesting to note the differences between the driver demographics in the PTC industry as it operates with a different set of regulations than the taxicab industry regulations and provides the additional flexibility in work schedule (which can allow for full-time and part-time drivers). The table below summarizes the backgrounds of taxicab and PTC drivers. It should be noted that the results presented below represent those who currently drive in each of the industries.

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<sup>59</sup> City of Toronto. Vehicle-for-Hire Bylaw Review. <https://www.toronto.ca/community-people/get-involved/public-consultations/vehicle-for-hire-bylaw-review/>

<sup>60</sup> Due to the low response rate from limousine drivers, the results have not been reported. However, it was found that of the 1,561 PTC driver responses, 134 had previously driven a taxicab, either independently or through a brokerage service. By differentiating the results of these respondents for the years in which they were part of the taxicab industry, this increased the overall sample size for the taxicab industry.

As seen below, more taxicab drivers are familiar with Chapter 546 than PTC drivers. This is consistent with the findings from the stakeholder interviews where it was identified that PTC applications provide notifications to drivers regarding compliance with the regulations (some notifications include: license renewal, inspection requirements, and other pertinent information), which reduces the need for PTC drivers to be familiar or regularly consult with the regulations. The most frequently cited age range in the PTC industry is lower than that of the taxicab industry while the household income levels are higher which can be a result of drivers operating part-time, in addition to another occupation. Finally, between the two industries, the education and racial background are largely similar.

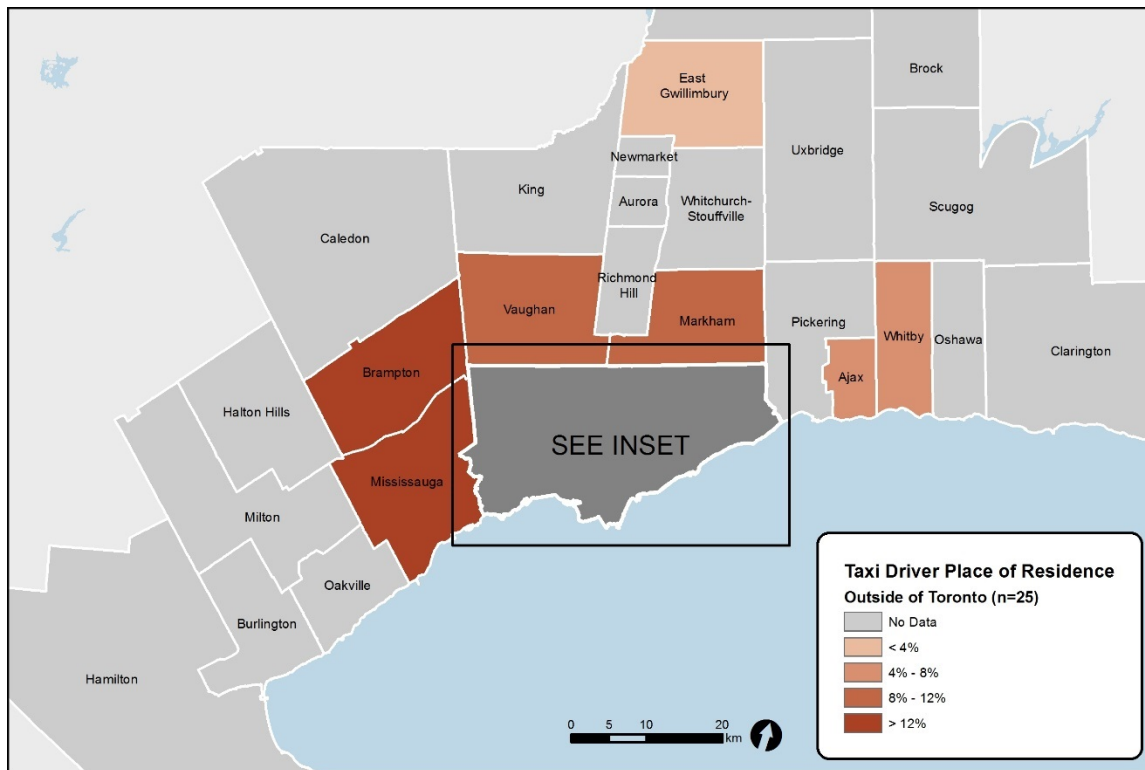
**Table 3-1: Driver Demographics**

	<b>Taxicab</b>	<b>PTC</b>
<b>Familiar with Chapter 546</b>	78%	54%
<b>Gender (% Males)</b>	99%	94%
<b>Age</b>		
<i>Most Frequently Cited Age Range</i>	45-54 (35% of Responses)	35-44 (29% of Responses)
<i>Second Most Frequently Cited Age Range</i>	35-44 and 55-64 (23% of Responses)	45-54 (25% of Responses)
<b>Education</b>		
<i>Most Frequently Cited Level of Education</i>	University (34% of Responses)	University (33% of Responses)
<i>Second Most Frequently Cited Level of Education</i>	College (26% of Responses)	College (26% of Responses)
<i>Third Most Frequently Cited Level of Education</i>	High School (22% of Responses)	Graduate Degree (20% of Responses)
<b>Racial Background</b>		
<i>Most Frequently Cited Racial Background</i>	South Asian (62% of Responses)	South Asian (35% of Responses)
<i>Second Most Frequently Cited Racial Background</i>	Black (15% of Responses)	White (18% of Responses)
<i>Third Most Frequently Cited Racial Background</i>	Middle Eastern (9% of Responses)	Middle Eastern (14% of Responses)
<b>Household Income and Supporting Members</b>		
<i>Most Frequently Cited Income Level</i>	\$20,000-\$39,999 Supporting 4 or 6 People	\$40,000-\$59,999 Supporting 4 People
<i>Second Most Frequently Cited Income Level</i>	\$5,000-\$19,999 Supporting 3 People	\$20,000-\$39,999 Supporting 2 People
<b>Origin of Trips</b>		
<i>Most Frequently Cited Trip Origin</i>	Toronto & East York (42% of Responses)	The Greater Toronto Area (53% of Responses)
<i>Second Most Frequently Cited Trip Origin</i>	The Greater Toronto Area (26% of Responses)	Toronto & East York (23% of Responses)
<i>Third Most Frequently Cited Trip Origin</i>	North York (15% of Responses)	North York (9% of Responses)

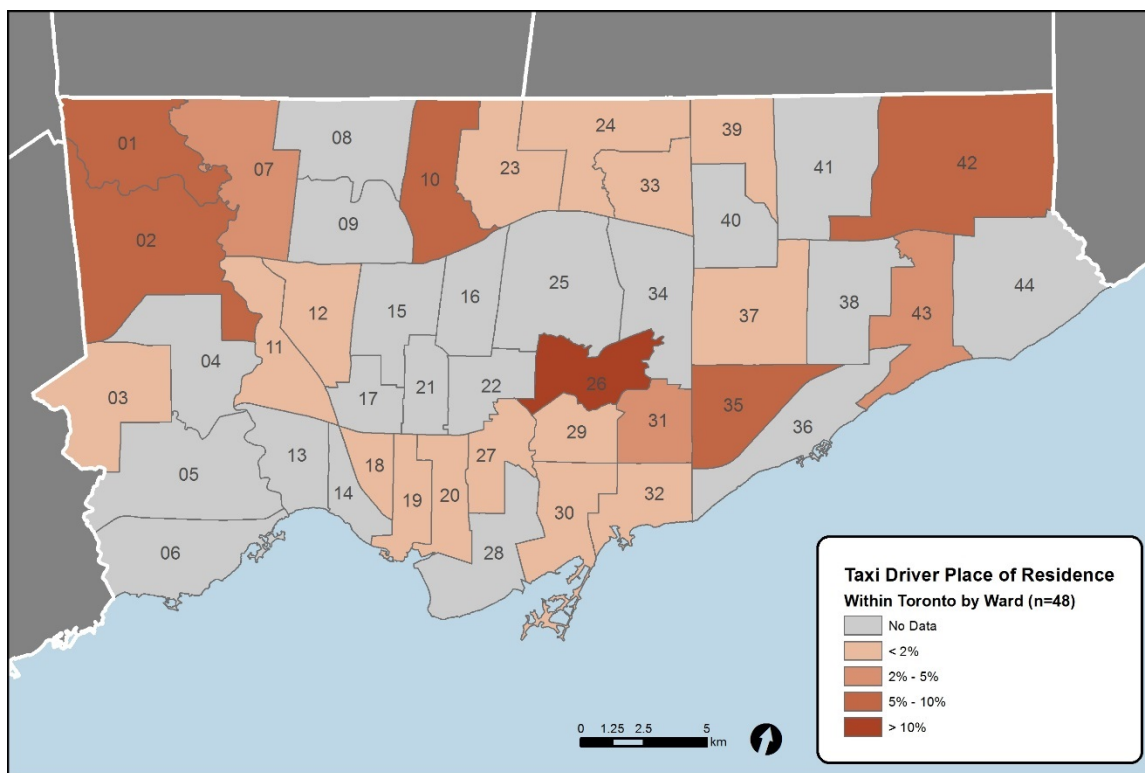


## DRIVER RESIDENCE

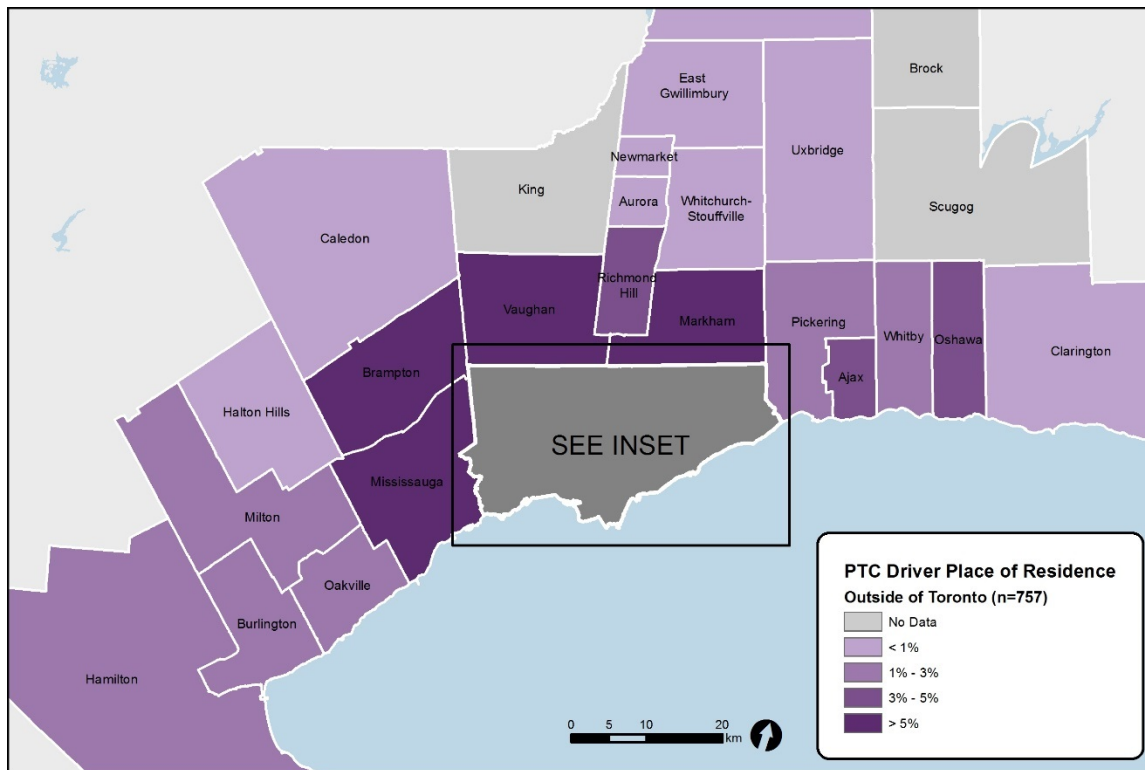
Through the driver survey, home postal codes were collected from vehicle-for-hire and PTC drivers which were mapped by centroid in the figures below. The majority of taxicab drivers reside within the city of Toronto with about 34% residing outside, predominantly in Mississauga and Brampton. Within the city itself, a large number of drivers reside in lower density neighbourhoods, away from the CBD. PTC drivers largely reside outside of the city of Toronto with only 47.5% residing within. A large concentration of PTC drivers can be seen in the municipalities surrounding Toronto such as Mississauga, Brampton, Vaughan, Richmond Hill, and Markham. As the majority of PTC drivers reside outside of the city of Toronto, these areas would benefit from driver expenditures and indirect and induced benefits as a result. While this provides an understanding of the place of residents of drivers, it should be noted that taxicab drivers are only permitted to pick-up passengers in the city of Toronto while PTCs are permitted to pick-up trips outside of the city boundaries. This discrepancy has an influence on the driver residence and therefore, the two markets should not be compared.



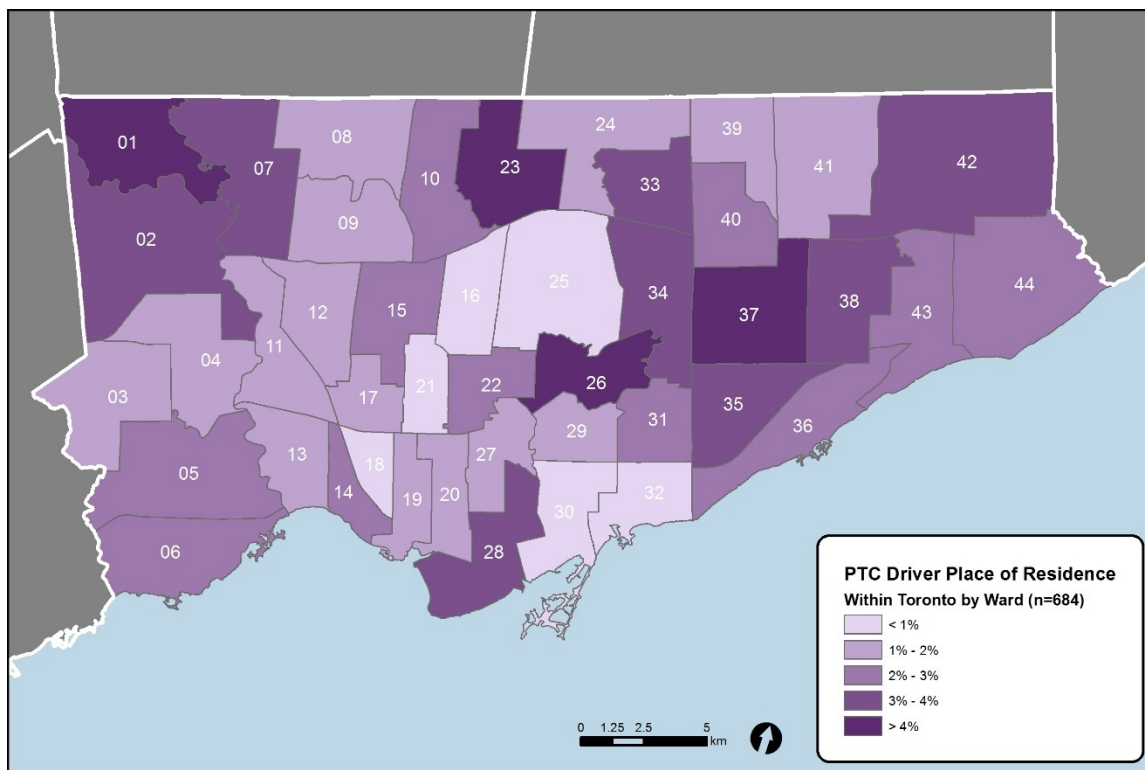
**Figure 3-1: Taxicab Driver Place of Residence**



**Figure 3-2: Taxicab Driver Place of Residence - Within the city of Toronto**



**Figure 3-3: PTC Driver Place of Residence**



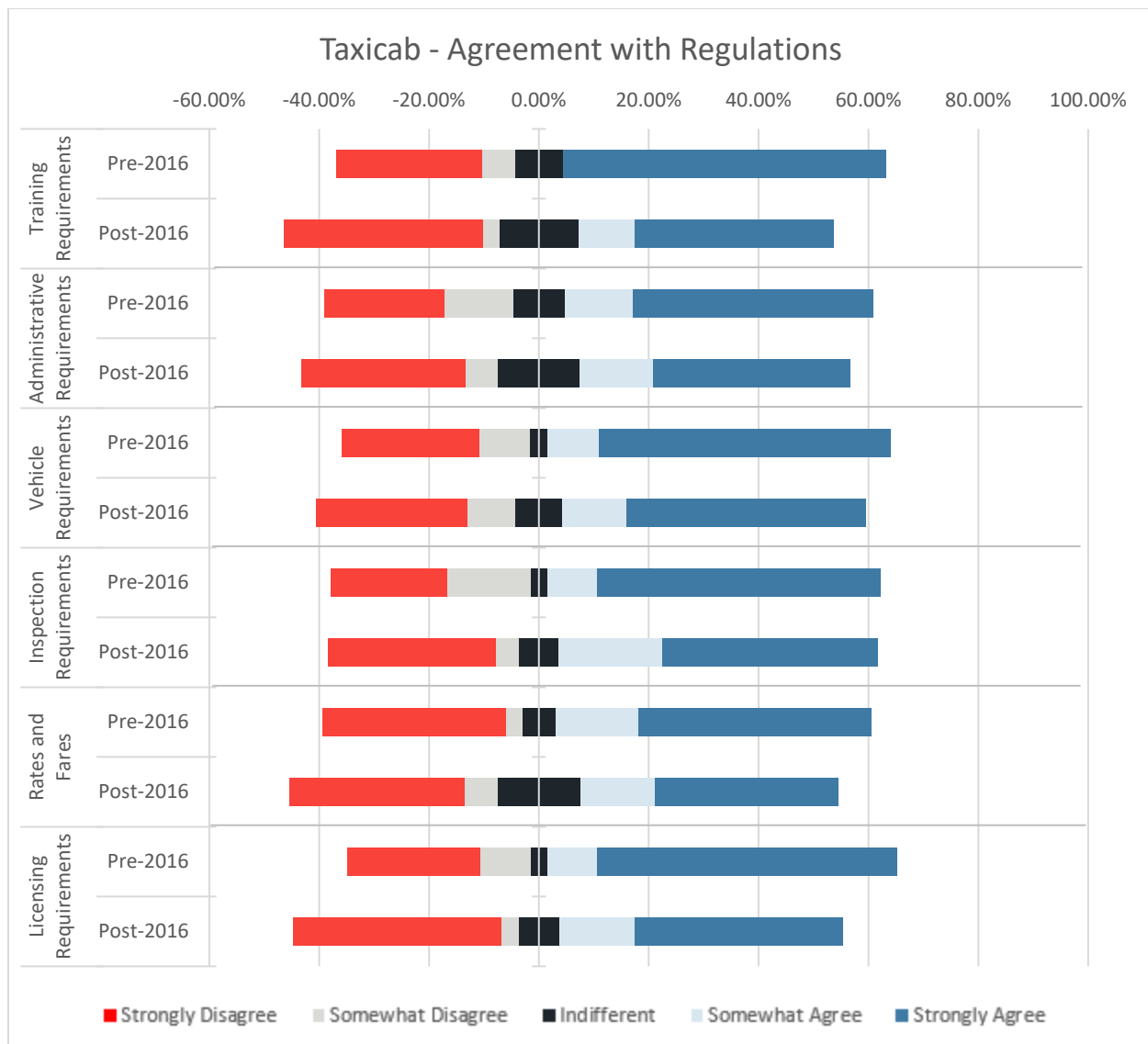
**Figure 3-4: PTC Driver Place of Residence - Within the city of Toronto**

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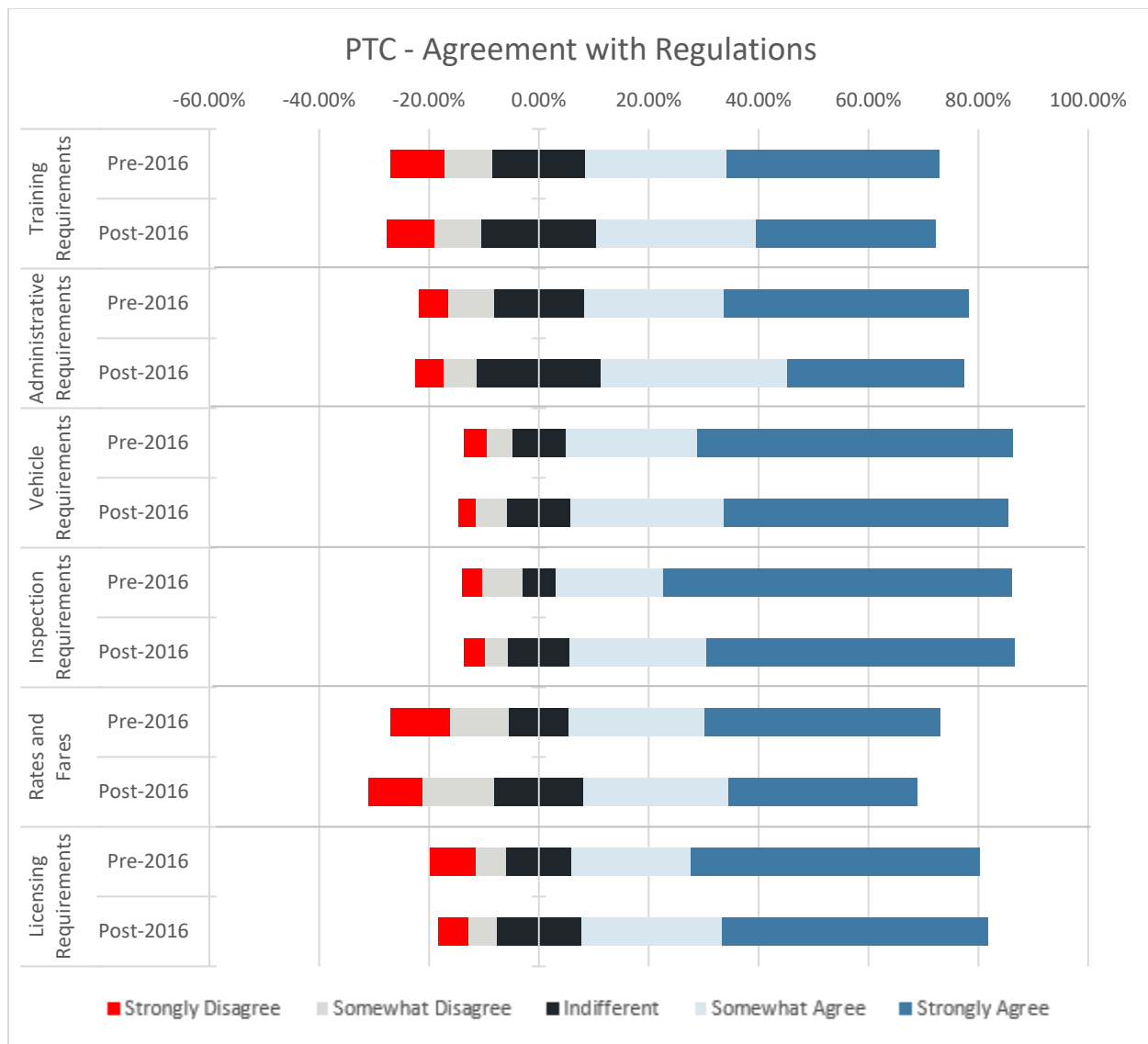
### 3.1.2 AGREEMENT WITH REGULATIONS

The driver survey also aimed at understanding taxicab and PTC drivers' level of agreement with their associated regulations pre-2016 and post-2016, specifically in regards to training requirements, administrative requirements, vehicle requirements, inspection requirements, rates and fares, and licensing requirements. While the majority of taxicab driver respondents agree with the vehicle-for-hire regulations across all categories, the change in overall agreement with the regulations has decreased from pre-2016 to post-2016. This can be seen in Figure 3-5 where the number of "Somewhat Agree" and "Strongly Agree" responses have decreased and the number of "Somewhat Disagree" and "Strongly Disagree" responses have increased from Pre-2016 to Post 2016.

On the other hand, prior to 2016, the PTC industry was operating unregulated and unlicensed (both PTCs and PTC drivers). In this case, the reported agreement with the regulations pre-2016 can be used as a benchmark to understand the agreement with the regulations post-2016. As seen in Figure 3-6 below, the agreement with regulations has stayed relatively the same from pre-2016 and post-2016 across the various categories, with the exception of rates and fares. These results appear consistent with the findings from the stakeholder interviews where it was identified that the vehicle-for-hire regulations had little impact to PTC drivers as it had simply codified the requirements from PTCs, however, it was identified that the base fare increase for Uber rides after the regulation may impact ridership.



**Figure 3-5: Taxicab Industry Agreement with Regulations**

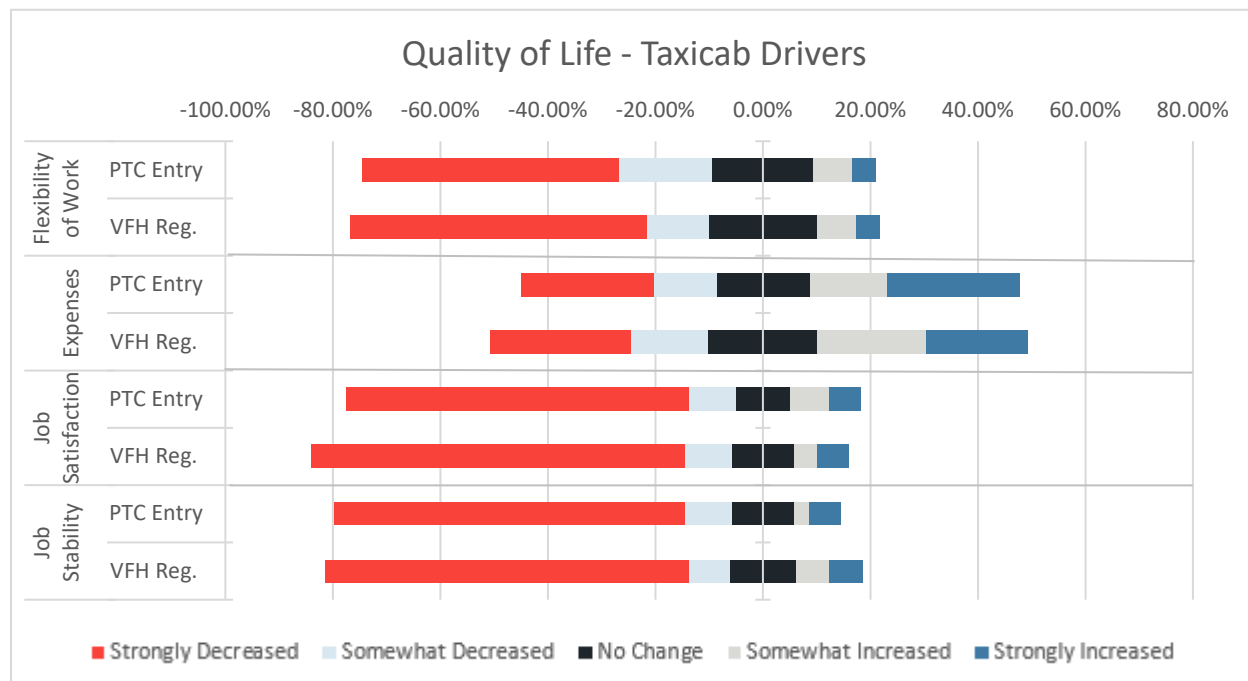


**Figure 3-6: PTC Industry Agreement with Regulations**

### 3.1.3 QUALITY OF LIFE AND WILLINGNESS TO DRIVE

As seen in the stakeholder interviews, the quality of life for taxicab drivers was reported to have decreased since the entrance of PTCs and was not impacted by the vehicle-for-hire regulations. The driver survey responses, as seen in Figure 3-7 below, validates this response as flexibility of work, expenses, job satisfaction, and job stability have all reportedly “Strongly Decreased” since the entrance of PTCs and the introduction of the vehicle-for-hire regulations which licensed PTCs and allows them to remain operational in the city of Toronto. Furthermore, the survey sought qualitative feedback from drivers regarding the reasons for changes in their quality of life. Among the reported reasons for the decrease in quality of life, taxicab drivers reported:

- A decrease in earnings;
- Longer working hours to compensate for the lack of earnings which reduces recreational and social time;
- Inability to cover expenses; and
- Increased stress.

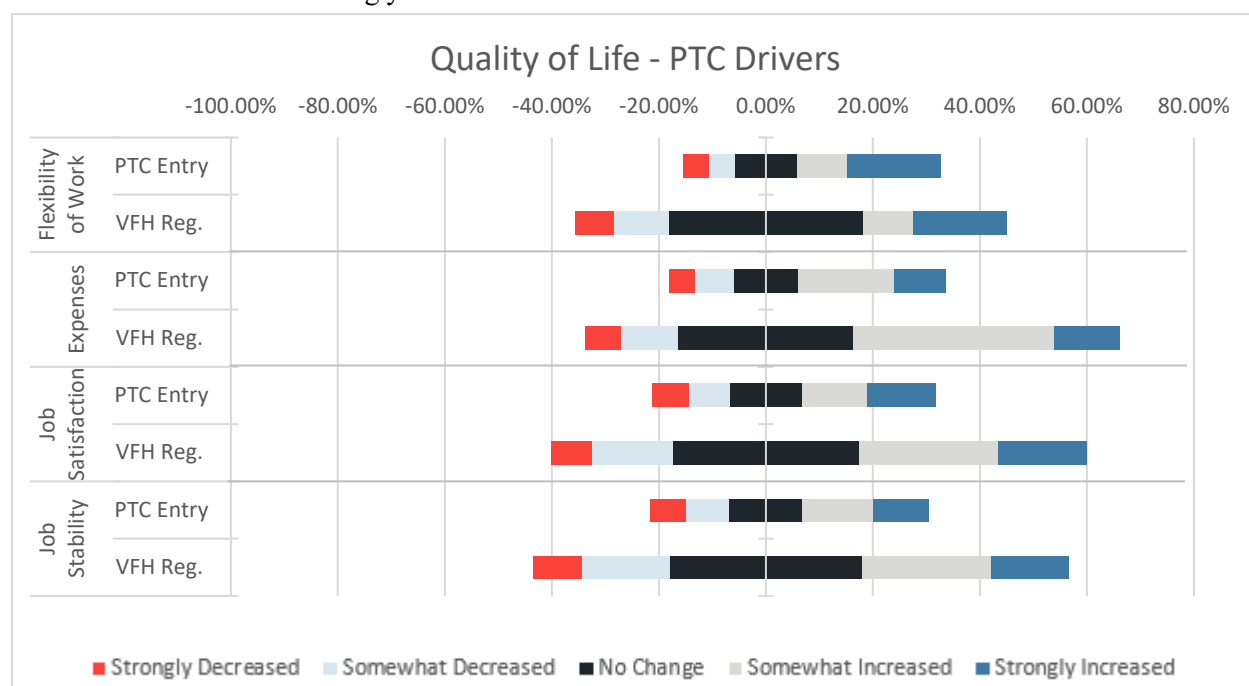


**Figure 3-7: Quality of Life Impacts - Taxicab Drivers** (Note: “Not Applicable” responses have not been included)



PTC drivers reported an overall positive impact to their quality of life across each category since the introduction of PTCs and ridesharing in the city of Toronto. As seen in Figure 3-8 below, the vehicle-for-hire regulations had little impact to the quality of life of PTC drivers as over 32% of drivers reported no change to their quality of life since 2016. Among of the descriptive/qualitative responses for the perceived quality of life impacts, the following were most commonly cited:

- Flexibility with driving schedule;
- Increased confidence with legitimization post-regulation;
- Ability to earn income in a flexible manner;
- Overall job security; and
- The vehicle requirements, specifically related to the vehicle age, may be a constraining factor for some drivers in the coming years.



**Figure 3-8: Quality of Life Impacts - PTC Drivers** (Note: “Not Applicable” responses have not been included)

While there were 79 taxicab drivers who reported a decreased in quality of life, 134 PTC drivers (also included in Figure 3-8) previously drove for the taxicab industry and reported an increase in quality of life since the vehicle-for-hire regulations of approximately 13% to 21%. Looking further at the qualitative feedback on the change in quality of life, it was frequently cited that switching from the taxicab to PTC industry has benefited drivers by providing increased flexibility in drivers’ work schedule to allow for more family time and increased income with the ability to pay expenses, though some drivers have cited lower income levels if they are operating during off-peak hours.

## WILLINGNESS TO DRIVE

The impact of the vehicle-for-hire regulations on drivers' willingness to drive has been summarized in Figure 3-9 and Figure 3-10 below. 46% of taxicab drivers indicated that the vehicle-for-hire regulations "Strongly Decreased" their willingness to drive which corresponds to the findings from the stakeholder interviews that taxicab drivers do not agree that PTCs should be licensed and operating in the city. It was found that approximately 42% of PTC drivers indicated that the question did not apply as they were not driving prior to 2016 and around 20% of drivers indicated that the regulations did not affect their willingness to drive.

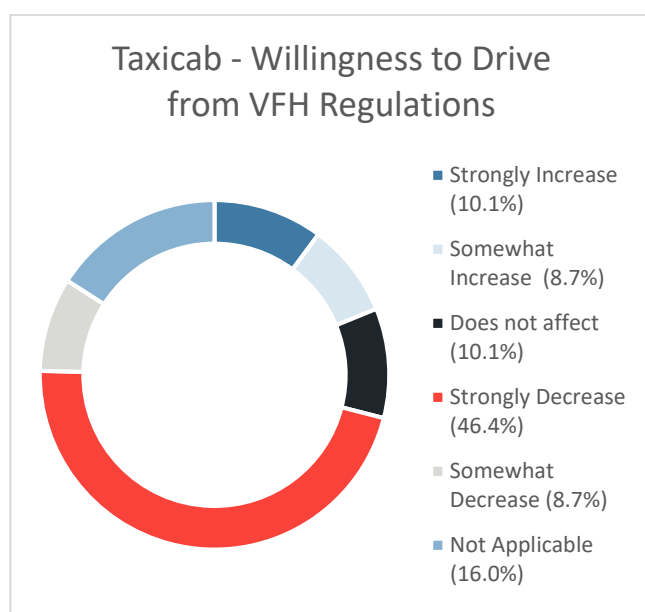


Figure 3-9: Willingness to Drive - Taxicab Drivers

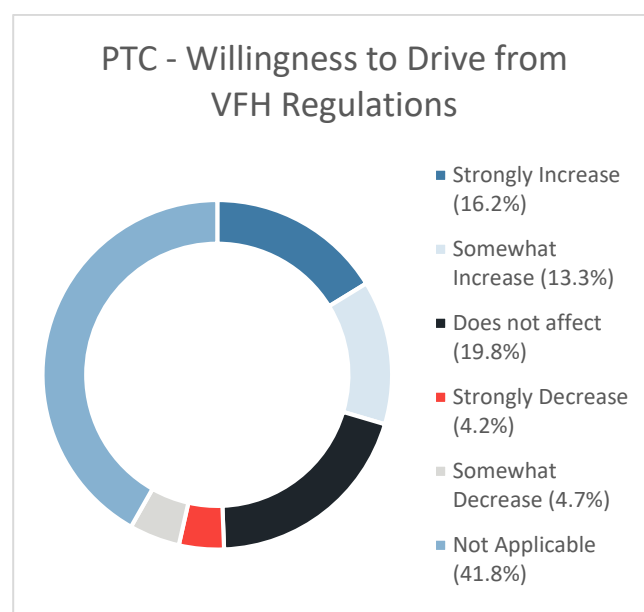
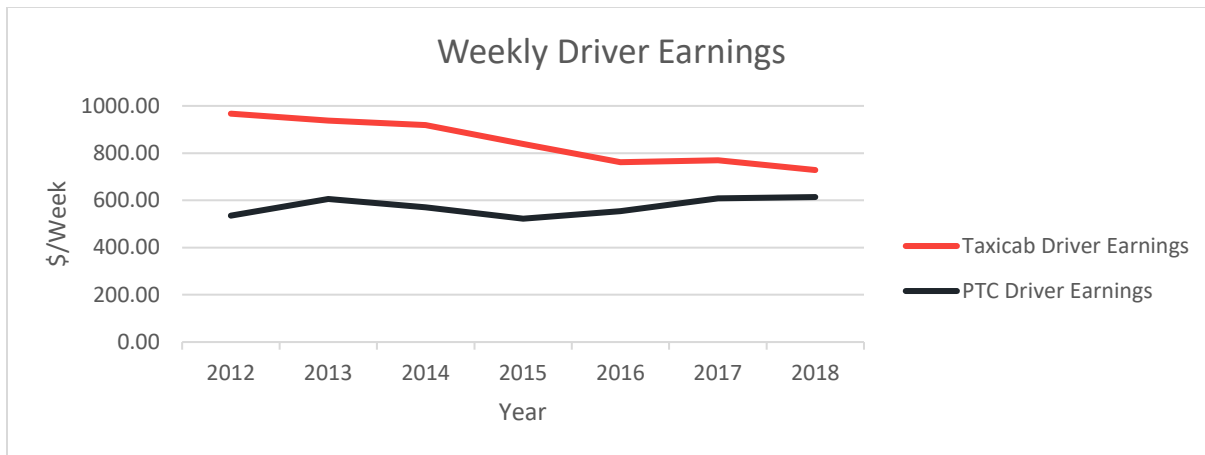


Figure 3-10: Willingness to Drive - PTC Drivers

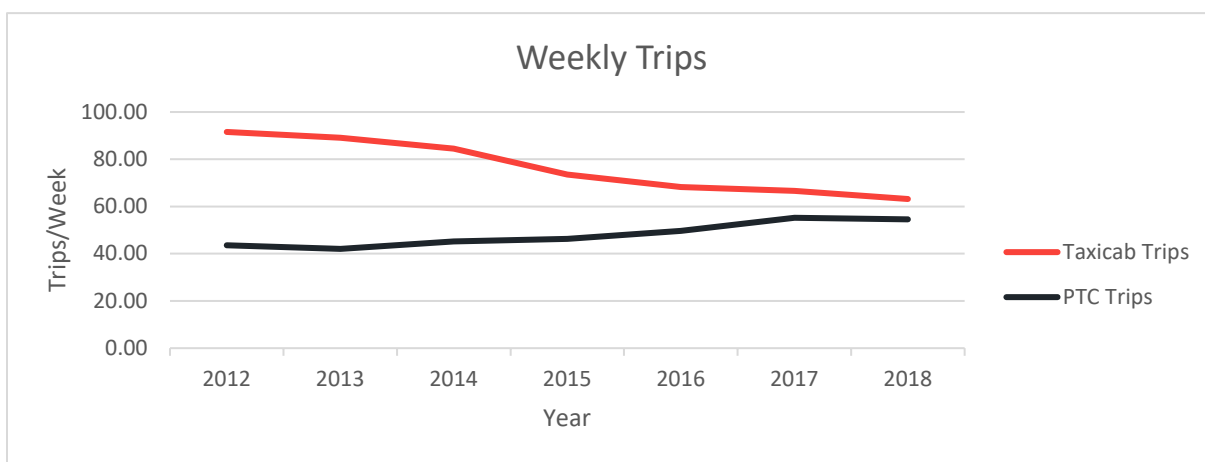
### 3.1.4 QUANTITATIVE SURVEY RESULTS

Figure 3-11 through Figure 3-13 below graphically show the average driver earnings per week, average number of trips per week, and the average hours of driving per week for vehicle-for-hire and PTC drivers. The results reported by taxicab drivers between 2012 and 2015 (since the entrance of PTCs) indicated that the average driver earnings have decreased by 13.3% and the average number of trips per week has decreased by 19.7%. From 2016 to 2018 (since the vehicle-for-hire regulation), the average driver earnings stabilized slightly with a decrease of 4.3% and the average number of trips per week decreased by 7.5%. Contrary to what was reported during the stakeholder interviews and quality of life related questions in the driver survey, the average hours spent driving has remained relatively stable between 2012 and 2018.

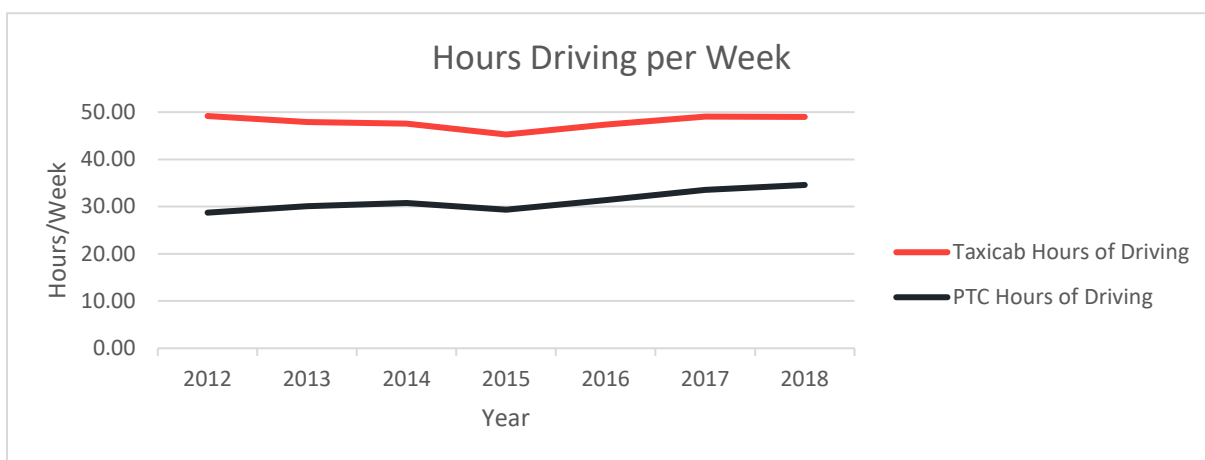
For PTC drivers between 2012 and 2015 (initial entrance of PTCs), the average weekly earnings has decreased slightly by 2.5%, the average number of trips per week has increased by 6.0%, and the average hours driving per week has increased by 2.0%. Since the introduction of the vehicle-for-hire regulations (between 2016 and 2018), the average weekly earnings increased by 10.8%, the average number of trips per week increased by 9.7%, and the average hours driving per week increased by 10.3%. As PTC driver earnings are a function of the number of hours spent driving (as well as location and time-of-day), the similar increases in earnings and hours driving are expected.



**Figure 3-11: Average Weekly Driver Earnings**



**Figure 3-12: Average Weekly Trips**



**Figure 3-13: Average Hours Driving per Week**

## 3.2 SUPPLY AND DEMAND

Consumer behaviour has been understood through the demand curve in Section 2.1.1. This section further develops the demand curve and develops the supply curve to study the behaviour of taxicab and ridesharing service providers. The supply curve, calculated below, represents drivers' behaviour in response to price changes. The method used to describe these relationships is based on information obtained from the driver survey. For this study, long-run demand and supply curves are of primary interest as they represent the long-run industry changes which are of interest for this scope of work. The long-run demand and supply relationships were also researched for comparable jurisdictions, however, only information regarding short-run demand and supply curves was available.

The driver survey was primarily used for this analysis as many key variables such as the weekly earnings or revenue (R), the hours of driving per week (denoted by  $L^S$  – labour supply), and the number of trips made per week (denoted by  $Q^D$  – quantity demanded) were collected. Other variables that are likely to affect demand and supply include origin of trips, driver age, experience, household income, and total expenditures.

Table 3-2 presents the estimated coefficient  $\beta_1$  for each industry separately by using the Ordinary Least Squares (OLS) regression method outlined in Appendix C. The price elasticities of demand for taxicab and PTC services falls within the range estimated by various studies and literature from other jurisdictions. While these studies focus primarily on the short-run elasticities, the long-run elasticities are of interest for this study. Both industries experience an inelastic demand curve which means a 1% increase in trip price will lead to a smaller percentage decrease in the number of trips demanded. The response of the demand following an increase in trip price is higher for taxicab users than for PTC users. Perhaps this reflects the general consumer preference towards PTCs' lower price and greater customer satisfaction as taxicab services can be substituted easily by its competitor. The regulation has somewhat changed the consumer behaviour as the regulation reduced the taxicab base fare while increasing the PTC base fare. The regulation has narrowed the price differential between the two industries and as a result, the customer preference towards PTCs is reduced.

**Table 3-2: Comparison of Price Elasticities of Demand (PED) from Other Jurisdictions**

Study	Jurisdiction	Taxicab PED	PTC PED
<b>WSP Study – Long-Run PED Before 2016</b>	Toronto	-0.42	-0.27
<b>WSP Study – Long-Run PED From 2016</b>	Toronto	-0.45	-0.39
<b>Buchholz (2017)<sup>61</sup> – Short-Run</b>	New York	(-3.61; -0.64)	
<b>Cohen et al. (2016)<sup>62</sup> – Short-Run</b>	San Francisco, Los Angeles, Chicago, New-York		(-0.60; -0.40)
<b>Centre for International Economics (2015)<sup>63</sup></b>	Australian Capital Territory	Long-Run: -1.20 Short-Run: -0.80	-2.00

<sup>61</sup> Spatial Equilibrium, Search Frictions and Efficient Regulation in the Taxi Industry. Nicholas Buchholz, December 2017. [https://scholar.princeton.edu/sites/default/files/nbuchholz/files/taxi\\_draft.pdf](https://scholar.princeton.edu/sites/default/files/nbuchholz/files/taxi_draft.pdf)

<sup>62</sup> Peter Cohen, Robert Hahn, Jonathan Hall, Steven Levitt, Robert Metcalfe. Using Big Data to Estimate Consumer Surplus: The Case of Uber. <https://www.nber.org/papers/w22627>

<sup>63</sup> The Centre for International Economics. Modelling of Policy Scenarios for the ACT On-Demand Transport Sector. August 2015. [https://www.cmtedd.act.gov.au/\\_data/assets/pdf\\_file/0004/779179/CIE-Final-Report\\_ACT-Gov\\_ACT-Taxis-2015-04092015.pdf](https://www.cmtedd.act.gov.au/_data/assets/pdf_file/0004/779179/CIE-Final-Report_ACT-Gov_ACT-Taxis-2015-04092015.pdf)

<b>Schaller (1999)<sup>64</sup> – Short-Run</b>	New York	-0.22	
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Note: In order to test the methodology and results relative to the literature, short-run elasticities of demand were developed and compared to the above studies. It was found that the short-run elasticities were within the range found in other jurisdictions.

The estimated coefficient  $\gamma_1$  represents the slope of Equation 10 found in Appendix C, and is presented in Table 3-3. The result indicates that the long-run supply is quite inelastic in the taxicab and PTC markets, which is consistent with findings from other studies, though their elasticities were mostly short-run. This indicates that drivers are not sensitive or impacted heavily by changes in trip prices (which corresponds to increase revenues). Although the number of drivers in the taxicab industry is capped, it shows a positive PES, in contrast to previous studies of capped taxicab industries. Some studies found a negative labour supply elasticity in the taxicab industry, meaning that taxicab drivers will drive less when expected income increase. While the price elasticity of supply for both industries is inelastic, and in contrast to the price elasticity of demand between industries, the results indicate that the PTC supply curves are flatter than the taxicab ones, meaning PTC drivers are likely to respond more than taxicab drivers to higher earnings opportunity. This could indicate that drivers are incentivized to drive due to additional promotions from PTCs or drive during surge periods which generates more revenue per trip. Additionally, as seen below, the price elasticity of supply for both the taxicab and PTC industries increased slightly, indicating that drivers are responding more to changes in price since the introduction of the vehicle-for-hire regulations.

**Table 3-3: Comparison of Price Elasticities of Supply (PES) from Other Jurisdictions**

Study	Jurisdiction	Taxicab PES	PTC PES
<b>WSP Study - Long-Run PES Before 2016</b>	Toronto	0.14	0.19
<b>Our Study – Long-Run PES From 2016</b>	Toronto	0.17	0.24
<b>Jackson (2019)<sup>65</sup> – Short-Run</b>	Boston	(-0.28; 0.48)	
<b>Chen and Sheldon (2015)<sup>66</sup> – Short-Run</b>	Chicago, Washington DC, Miami, San Diego, and Seattle		(0.17; 0.50)
<b>Farber (2015)<sup>67</sup> – Short-Run</b>	New York	(-0.10; 0.59)	
<b>Ashenfelter, Doran, Schaller (2010)<sup>68</sup> – Long-Run</b>	New York	-0.20	

<sup>64</sup> Bruce Schaller. Elasticities for Taxicab Fares and Service Availability. November 1998.

<http://www.schallerconsult.com/rideservices/elastic.pdf>

<sup>65</sup> Osborne Jackson. The Supply Side of Discrimination: Evidence from the Labor Supply of Boston Taxi Drivers.

[https://adcb115e-a-62cb3a1a-sites.googlegroups.com/site/osbornejackson/taxi\\_oaj.pdf?attachauth=ANoY7crj610VjNgmJv54kOCeFlPXyWy4ixPHet3tpBSKEcPFTDMyOuFY2VgRwh5WKATpd4xcilfa8KR9wWFF4pxfxMI64QNMk8Bvj3GPd5sAmIn-cYKwmGDH7Ha7fbDlrXfWioUBXiWTKa0qzhED2AgSnhP0FXIyFoJZFw8Q33Daza8qQ0wZw6eba78D1huDjqR5zcC3goLfrjQpNy0j-5abuSHX0py7Q%3D%3D&attredirects=0](https://adcb115e-a-62cb3a1a-sites.googlegroups.com/site/osbornejackson/taxi_oaj.pdf?attachauth=ANoY7crj610VjNgmJv54kOCeFlPXyWy4ixPHet3tpBSKEcPFTDMyOuFY2VgRwh5WKATpd4xcilfa8KR9wWFF4pxfxMI64QNMk8Bvj3GPd5sAmIn-cYKwmGDH7Ha7fbDlrXfWioUBXiWTKa0qzhED2AgSnhP0FXIyFoJZFw8Q33Daza8qQ0wZw6eba78D1huDjqR5zcC3goLfrjQpNy0j-5abuSHX0py7Q%3D%3D&attredirects=0)

<sup>66</sup> M. Keith Chen, Michael Sheldon. Dynamic Pricing in a Labor Market: Surge Pricing and Flexible Work on the Uber Platform. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.704.3600&rep=rep1&type=pdf>

<sup>67</sup> Henry Farber. Why You Can't Find a Taxi in the Rain and Other Labor Supply Lessons from Cab Drivers. <https://www.nber.org/papers/w20604>

<sup>68</sup> Orley Ashenfelter, Kirk Doran, Bruce Schaller. A Shred of Credible Evidence on the Long Run Elasticity of Labour Supply. <https://www.nber.org/papers/w15746>

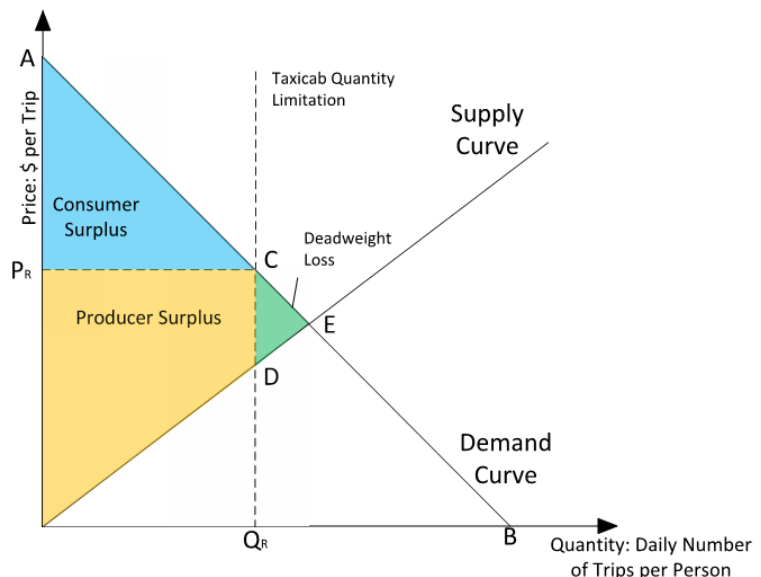
Note: In order to test the methodology and results relative to the literature, short-run elasticities were developed and compared to the above studies. It was found that the short-run elasticities were within the range found in other jurisdictions.

### 3.3 ECONOMIC VALUATION

This section describes the method used to assess the economic valuation of vehicle-for-hire and ridesharing services. First, the industry economic valuation was assessed as the sum of consumer surplus and producer surplus to produce the total market surplus. Second, the driver survey information, pertaining the earnings before expenses, was used with an input-output model and is described further in Section 3.4.

The market total surplus represents the overall value of economic transaction between consumers and producers. As seen in Section 2.1.1, the consumer surplus is defined by the area under the demand curve and above the market price or the generalized cost of travel. The producer surplus can be understood as the area above the supply curve and under the market price. To draw the supply curve, two main inputs are needed: the price elasticity of supply (calculated in the previous section) and a price and quantity along the supply curve. While the market price and demand are both known, the quantity of supply producers are willing to provide at the market price is not known. In a free-market system without any regulations, the intersection between the demand curve and the supply determines the market equilibrium price and quantity. Therefore, the quantity of supply that producers are willing to provide at the market price is equal to the quantity of demand that is observed in the TTS data (outlined in Section 2.1.1).

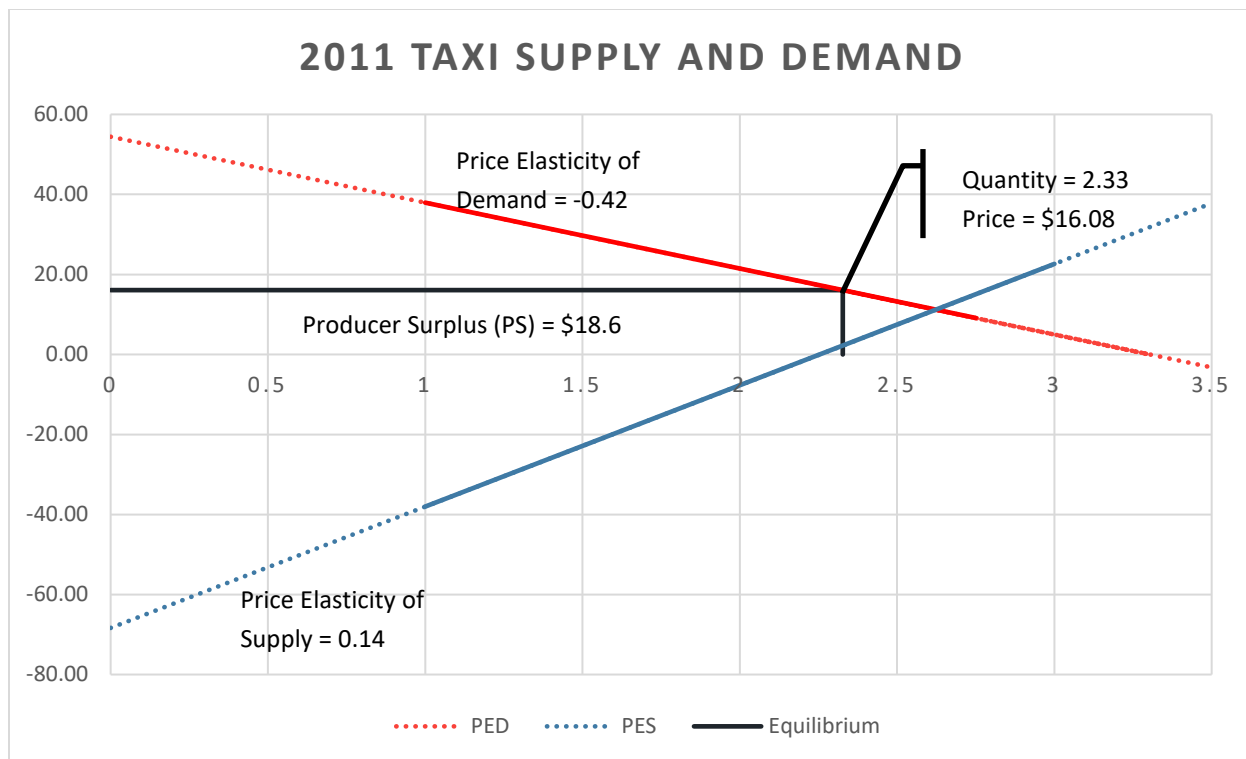
In practice however, the taxicab industry in the city of Toronto operates in a regulated market where the number of taxicab licenses is limited. In pure economic terms, the restriction on the supply side makes the market price higher than the free-market price equilibrium (Figure 3-14). For this reason, the taxicab price and quantity are not equal to the equilibrium level in the presence of regulations limiting supply quantity, while the PTC price and quantity will always be in equilibrium. If the taxicab industry was not regulated, the price and quantity are determined by point E where supply is equal to demand. Due to the supply restriction that fixes quantity at  $Q_R$ , taxicab users pay the market price  $P_R$  which is higher than the equilibrium price in the absence of regulations. At the market price,  $P_R$ , the quantity taxicab service providers are willing to provide is higher than the quantity demanded. Therefore, the market for taxicab services is oversupplied. While the consumer surplus is equal to the blue triangle in the above figure, the producer surplus is equal to the orange area because the sold price is higher than the marginal cost at point D. The green triangle area represents the economic loss (or deadweight loss) or the cost to the society made by the taxicab industry regulation.



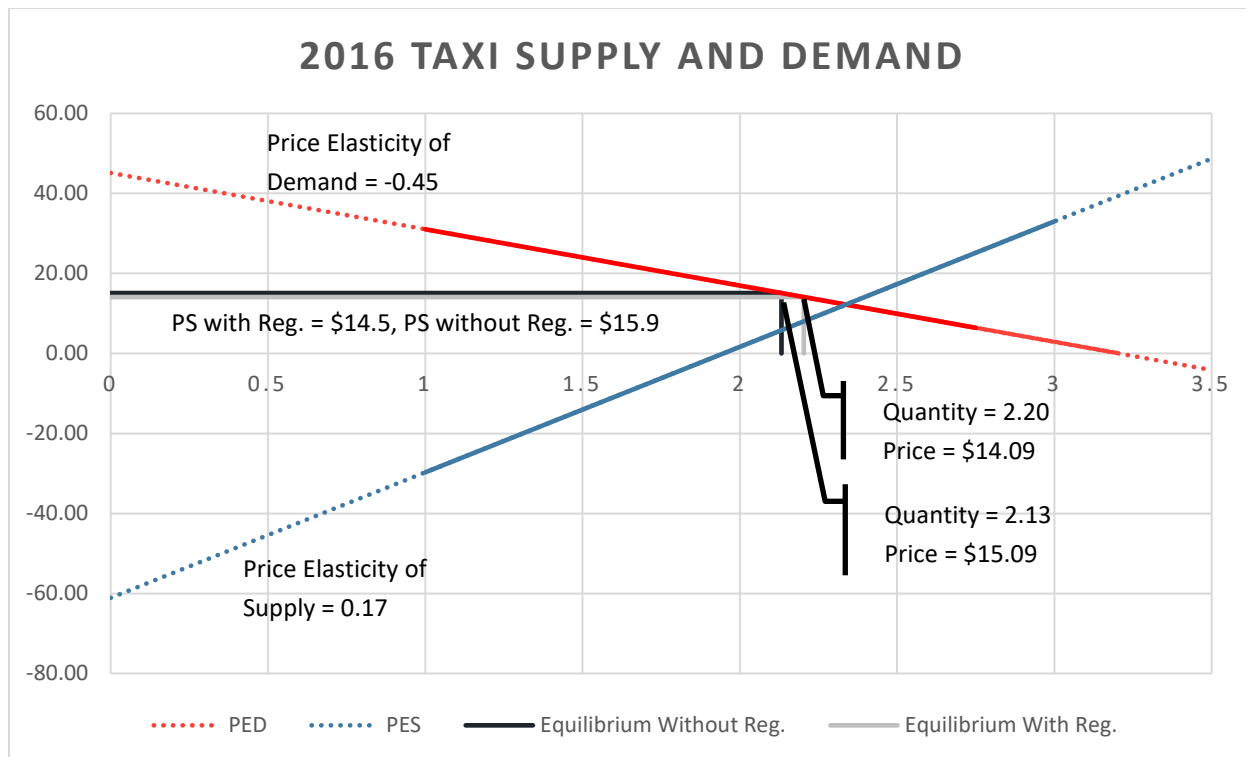
**Figure 3-14: Economic Valuation Measure of Taxicab Industry in the Presence of Regulations**



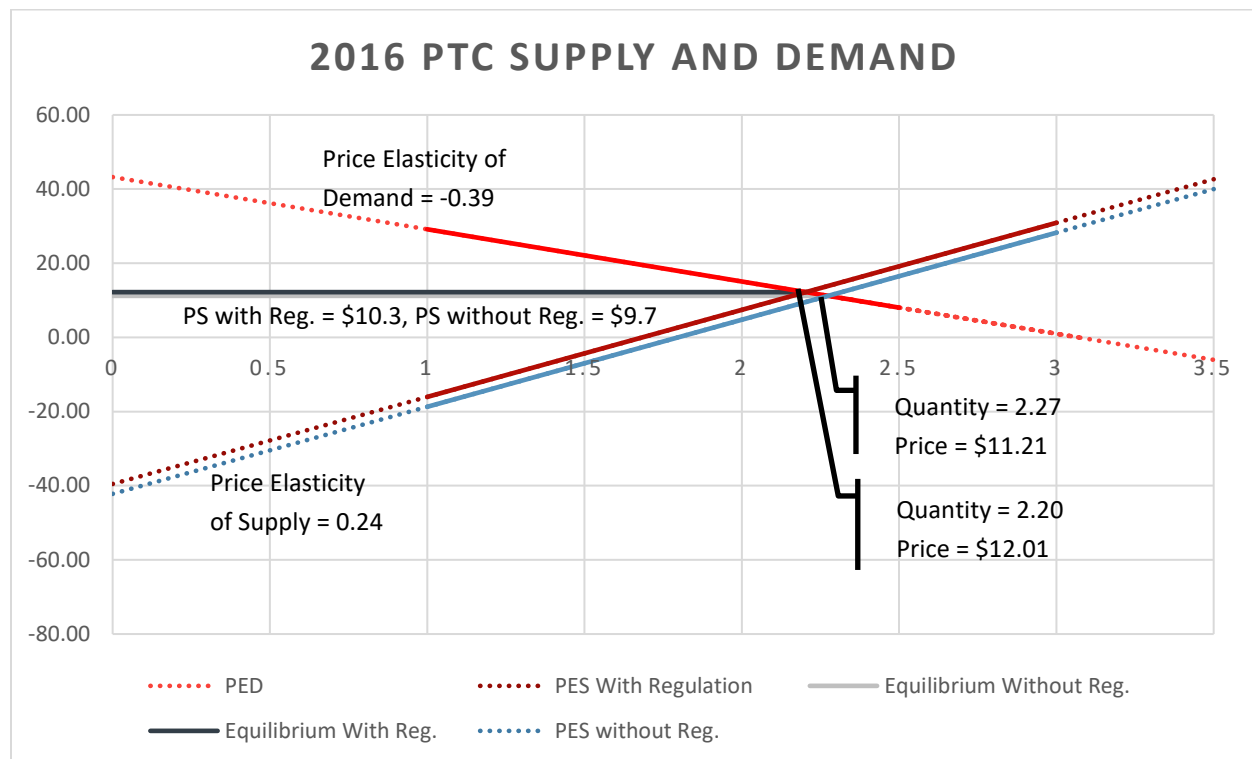
In order to find a pair of price and quantity along the supply curve, we assume that the taxicab market price, in the absence of regulation, is equal to the PTC equilibrium market price of \$11.21 per trip. This combined with the taxicab demand curve yields a quantity of demand which is equal to the quantity of supply due to the absence of regulation. Given the calculated pair of market price and quantity and the price elasticity of supply, the supply curve and the demand curve for the taxicab industry in 2011 and 2016 are presented in Figure 3-15 and Figure 3-16, respectively. Unlike taxicab drivers, PTC drivers can enter the market with unlimited supply. Therefore, the market price and quantity are expected to always be in equilibrium as shown in Figure 3-17.



**Figure 3-15: 2011 Taxicab Supply, Demand, and Producer Surplus**



**Figure 3-16: 2016 Taxicab Supply, Demand, and Producer Surplus Difference**



**Figure 3-17: 2016 PTC Supply, Demand, and Producer Surplus Difference**

When PTCs arrived in 2012, the taxicab industry experienced a decrease in both price (due to the average trip length) and quantity from \$16.08/trip and 2.33 trips/person in 2011 to \$15.09/trip and 2.14 trips/person in 2016 (this is also seen in Section 2.1.1). The 2016 regulatory changes decreased the price further from \$15.09/trip to \$14.09/trip, but the quantity with the 2016 regulatory changes (2.20 trips/person) was higher than without the 2016 regulatory changes (2.13 trips/person).

Regarding the PTC industry, the market operated at an equilibrium price of \$11.21/trip with a quantity of 2.27 trips/person before the vehicle-for-hire regulation. Since 2016, the price has gone up to \$12.21/trip and quantity has decreased slightly to 2.20 trips per person. As long as the PTC price is still below the taxicab price, more PTC drivers are able to enter the PTC industry to compete with taxicab drivers.

Table 3-4, Table 3-5, and Table 3-6 presents the resulting consumer surplus, producer surplus, and combined surplus for both the taxicab and PTC industries. Overall, the arrival of PTCs resulted in an economic loss of \$88.2 million in the taxicab industry. The vehicle-for-hire regulation increased the economic surplus by \$4.5 million as the increase in consumer surplus (\$12.2 million) exceeds the loss in producer surplus (\$7.7 million). The PTC industry experienced an economic loss of \$8.8 million due to the vehicle-for-hire regulations. If the two industries are grouped together, the arrival of PTCs has increased the overall economic value by an amount of \$140.7 million, while the vehicle-for-hire regulations has caused a marginal economic loss of \$4.3 million.

**Table 3-4: Total Consumer Surplus (millions)**

	<b>2011</b>	<b>2016</b>	<b>2011-2016 Difference</b>
<b>Taxicab Industry</b>	<b>255.7</b>	<b>192.5</b>	<b>-63.1</b>
<i>Without 2016 VFH Regulations</i>	<i>255.7</i>	<i>180.3</i>	<i>-75.3</i>
<i>Due to 2016 VFH Regulations</i>	<i>0.0</i>	<i>12.2</i>	<i>12.2</i>
<b>PTC Industry</b>	<b>0.0</b>	<b>176.1</b>	<b>176.1</b>
<i>Without 2016 VFH Regulations</i>	<i>0.0</i>	<i>187.6</i>	<i>187.6</i>
<i>Due to 2016 VFH Regulations</i>	<i>0.0</i>	<i>-11.5</i>	<i>-11.5</i>
<b>Taxicab &amp; PTC Combined</b>	<b>255.7</b>	<b>368.6</b>	<b>112.9</b>
<i>Without 2016 VFH Regulations</i>	<i>255.7</i>	<i>367.9</i>	<i>112.2</i>
<i>Due to 2016 VFH Regulations</i>	<i>0.0</i>	<i>0.7</i>	<i>0.7</i>

**Table 3-5: Total Producer Surplus (millions)**

	<b>2011</b>	<b>2016</b>	<b>2011-2016 Difference</b>
<b>Taxicab Industry</b>	<b>106.8</b>	<b>81.7</b>	<b>-25.1</b>
<i>Without 2016 VFH Regulations</i>	<i>106.8</i>	<i>89.4</i>	<i>-17.4</i>
<i>Due to 2016 VFH Regulations</i>	<i>0.0</i>	<i>-7.7</i>	<i>-7.7</i>
<b>PTC Industry</b>	<b>0.0</b>	<b>52.9</b>	<b>52.9</b>
<i>Without 2016 VFH Regulations</i>	<i>0.0</i>	<i>50.2</i>	<i>50.2</i>
<i>Due to 2016 VFH Regulations</i>	<i>0.0</i>	<i>2.8</i>	<i>2.8</i>
<b>Taxicab &amp; PTC Combined</b>	<b>106.8</b>	<b>134.6</b>	<b>27.8</b>
<i>Without 2016 VFH Regulations</i>	<i>106.8</i>	<i>139.6</i>	<i>32.8</i>
<i>Due to 2016 VFH Regulations</i>	<i>0.0</i>	<i>-5.0</i>	<i>-5.0</i>

**Table 3-6: Industry Economic Valuation (millions)**

	<b>2011</b>	<b>2016</b>	<b>2011-2016 Difference</b>
<b>Taxicab Industry</b>	<b>362.5</b>	<b>274.2</b>	<b>-88.2</b>
<i>Without 2016 VFH Regulations</i>	<i>362.5</i>	<i>269.7</i>	<i>-92.7</i>
<i>Due to 2016 VFH Regulations</i>	<i>0.0</i>	<i>4.5</i>	<i>4.5</i>
<b>PTC Industry</b>	<b>0.0</b>	<b>229.0</b>	<b>229.0</b>
<i>Without 2016 VFH Regulations</i>	<i>0.0</i>	<i>237.7</i>	<i>237.7</i>
<i>Due to 2016 VFH Regulations</i>	<i>0.0</i>	<i>-8.8</i>	<i>-8.8</i>
<b>Taxicab &amp; PTC Combined</b>	<b>362.5</b>	<b>503.2</b>	<b>140.7</b>
<i>Without 2016 VFH Regulations</i>	<i>362.5</i>	<i>507.5</i>	<i>145.0</i>
<i>Due to 2016 VFH Regulations</i>	<i>0.0</i>	<i>-4.3</i>	<i>-4.3</i>

### 3.4 IMPACT TO ANCILLARY INDUSTRIES

The production of the final goods or service is a process that involves a number of industries (such as the taxicab plate market, automobile concessionaire, insurance, fuel, etc.). Each stage of the production process creates a value added to the economy as the difference between the cost of inputs to production and the price of output at any particular stage in the overall production process. The gross domestic product (GDP) is defined as the sum of all value added at all stages of production. If each stage of production represents an individual industry, then the industry's value added represents the economic value of that industry. It should be noted that the economic value of the industries is not an incremental value added. This may be representative of a transfer from another industry and/or a value add.

To illustrate the taxicab industry economic valuation in the case of a plate owner, the final ride service is delivered to the consumer via 3 main players: the purchase of a plate by an owner, the broker who rents the plate to licensed drivers, and the driver who delivers the service to the customer. At each stage, there is a positive value added, since each player in the supply chain is able to create output that has a higher market value than its inputs. As demonstrated in Table 3-7, the economic value of the brokerage taxicab industry is finally the amount  $E - (B + D)$ , while the economic value of ancillary industries is captured by the amount  $C - A - B$  for the brokerage industry.

**Table 3-7: Sample Calculations of Value Added from Ride Services**

Production Stage	Costs of Inputs	Price of Output	Value Added
1. Purchase of Plate	0	A	A
2. Renting plate and cars to licensed drivers	A + B (purchase cars + insurance + administration fees)	C	C - A - B
3. Selling ride services	C + D (fuel + booking + license + etc.)	E	E - C - D
<b>TOTAL</b>	<b>A + B + C + D</b>	<b>A + C + E</b>	<b>E - B - D</b>

Statistics Canada's Input-Output multipliers<sup>69</sup> were used to conduct an economic impact analysis to understand the indirect and induced impacts (or impacts on ancillary industries). The input-output multipliers were developed based on the relationship between industries to determine how the effects in one industry will impact other sectors. Provincial multipliers were used for this study as city of Toronto multipliers are not available. This relies on the assumption that the same provincial industry composition (in terms of production and consumption) can be applied at the city level.

The direct impacts refer to the results of the money initially spent in the industry, indirect impacts are the results of business-to-business transactions as a result of the direct effects, and the induced impacts are the result of increased personal income as a result of the direct and indirect effects. The input-output multipliers not only provide GDP multipliers, but also labour income and full-time job multipliers for various industries in Ontario. Table 3-8 reports the latest values derived from the 2015 industry provincial account data. The multipliers for Ontario's "Other transit and ground passenger transportation and scenic and sightseeing transportation industry" which is the most relevant, amongst others, to the taxicab and PTC industries in the city of Toronto. While the direct multiplier represents the economic impact on

<sup>69</sup> Source: Statistics Canada. Table 36-10-0595-01 Input-output multipliers, provincial and territorial, detail level  
<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610059501>

taxicab and PTC industries, the indirect multiplier plus the induced multiplier represent the economic impact on ancillary industries.

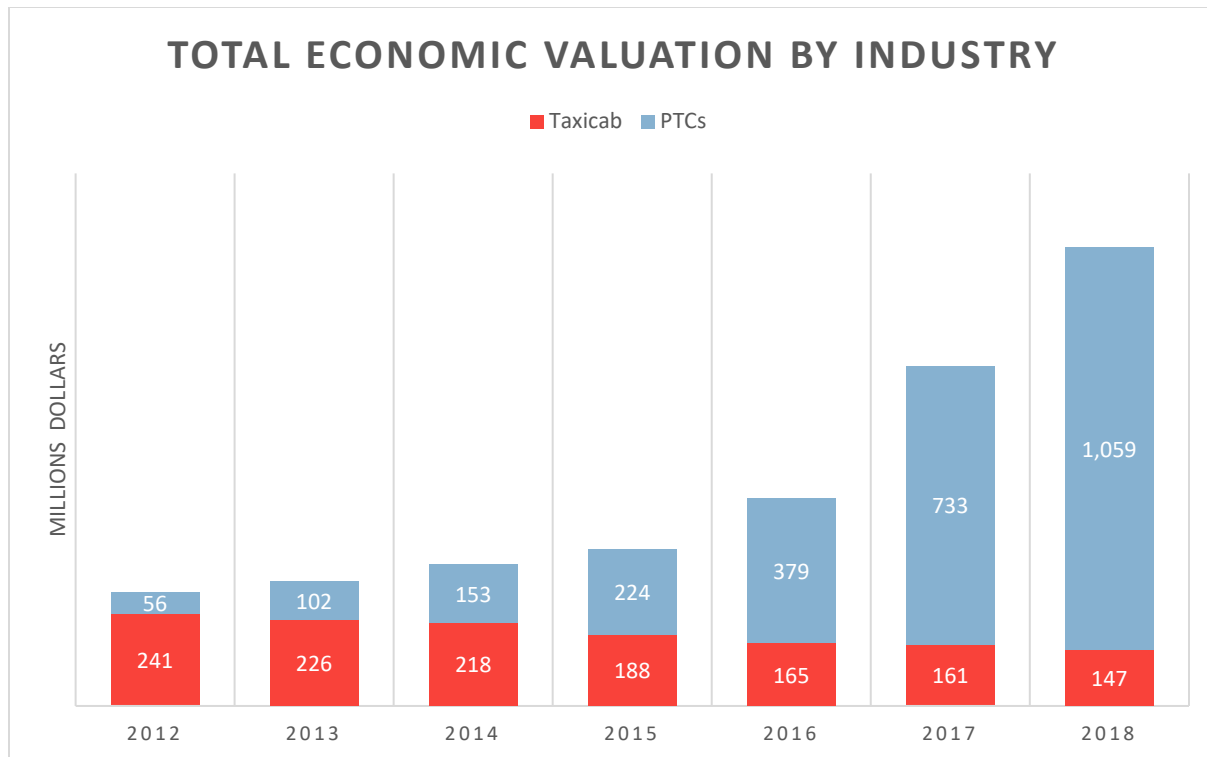
**Table 3-8: Statistics Canada Input-Output Multipliers, 2015**

Variable	Unit	Multipliers			
		Direct	Indirect	Induced	Total
<b>Output (per \$1 of output)</b>	\$	1	0.427	0.394	1.821
<b>GDP/Value added (per \$1 of output)</b>	\$	0.471	0.213	0.232	0.916
<b>Labour income (per \$1 of output)</b>	\$	0.445	0.127	0.110	0.682
<b>Fulltime jobs (per million \$ of output)</b>	persons-years	14.06	2.174	2.276	18.51

Based on the number of taxicab and PTC drivers in 2018 and the median weekly earnings before expenses obtained from the driver survey (reported in Section 3.1.4), the total output by industry from 2012 to 2018 was determined. The decrease in the taxicab industry output is the combined reduction in both number of drivers and earnings, while the substantial increase in the PTC industry output from 2012 to 2018 is mainly due to the increase in the number of drivers.

As a result, the annual economic value of taxicab industry decreases, while that of PTCs increases from 2012 to 2018. It should be noted, however, that this is a discrepancy between the economic value calculated by the input-output multiplier approach and the total surplus approach as:

- 1 The total surplus approach considered only marginal costs and excluded fixed costs when calculating producer surplus, while the input-output took both marginal and fixed costs into account; and
- 2 The total surplus approach used TTS data which underreported the number of trips, while the input-output multiplier approach used the driver survey data which reported the weekly average number of trips and the associated earnings.



**Figure 3-18: Total Economic Valuation by Industry Using Input-Output, 2012-2018**

Using the indirect and induced multipliers, and the output value by industry, the economic impact on the ancillary industries are presented below. Three main variables were quantified: GDP, labour income, and fulltime jobs. While the taxicab industry continues to support ancillary industries, the GDP, the number of fulltime jobs, and therefore the labour income has decreased in those industries. The arrival of PTCs has substantially increased the economic value of ancillary industries and created significant number of fulltime equivalent jobs by 2018.



**Table 3-9: Economic Impacts on Ancillary Industries (Indirect + Induced Impacts)**

Variable	Unit	2012	2013	2014	2015	2016	2017	2018
<b>Taxicab</b>								
<b>GDP</b>	M\$	228	214	206	178	156	152	139
<b>Labour Income</b>	M\$	121	114	110	95	83	81	74
<b>Fulltime jobs</b>	person-years	2,281	2,138	2,063	1,778	1,557	1,520	1,388
<b>PTCs</b>								
<b>GDP</b>	M\$	53	96	145	212	358	692	1,001
<b>Labour Income</b>	M\$	28	51	77	113	191	369	533
<b>Fulltime jobs</b>	person-years	534	963	1,448	2,115	3,583	6,922	10,006
<b>Taxicab &amp; PTCs Combined</b>								
<b>GDP</b>	M\$	281	310	351	389	514	844	1,139
<b>Labour Income</b>	M\$	150	165	187	207	274	450	607
<b>Fulltime jobs</b>	person-years	2,815	3,101	3,511	3,893	5,140	8,442	11,393

# APPENDIX

**A**

## JURISDICTIONAL REGULATION SCAN



	San Francisco	New York City	Chicago	Ottawa
Regulation Body	California Public Utilities Commission (CPUC)	New York City Taxi and Limousine Commission (TLC)	TNP City Ordinance	City of Ottawa
Operation	<ul style="list-style-type: none"><li>As dictated by the CPUC, PTCs may provide pre-arranged trips through the application and are not permitted to accept street hails.</li><li>PTCs are not limited by geography in California, except when operating to and from the airport. PTCs must operate under the authorization of the airport.</li><li>PTCs are not permitted to own or manage a fleet of vehicles.</li></ul>	<ul style="list-style-type: none"><li>PTCs may provide pre-arranged trips through the application and are not permitted to solicit passengers, respond to street hails or pick up passengers at taxicab stands.</li><li>PTC drivers must own or lease their cars independently.</li><li>PTCs must be licensed as an E-Hail provider by the TLC.</li><li>Must submit a rate schedule (annually and whenever rates change) which includes any price multipliers or variable pricing policies, fees for e-dispatching vehicles, and rates for rides dispatched.</li><li><i>A high-volume for-hire service (HVFHS) Owner must maintain a principal place of business.</i></li><li><i>A HVFHS must be responsible for handling customer complaints.</i></li><li><i>A HVFHS must file all contact information made available to or offered to the public for pre-arranging trips along with a working customer service telephone number and/or email address.</i></li></ul>	<ul style="list-style-type: none"><li>PTCs may provide pre-arranged trips through the application and are not permitted to solicit passengers, respond to street hails, or pick up passengers at taxicab stands.</li></ul>	<ul style="list-style-type: none"><li>At the time of arranging the trip, any software, application, platform, or network used to connect passengers to PTC drivers must disclose the first name and photograph of the PTC driver; the make, model, colour, and license plate of the vehicle; the charge rate and/or surcharge for the trip; a total cost estimate; allow the passenger to track the location and route of the vehicle; and provide a rating for the driver and vehicle. Additionally, PTCs must allow passengers to accept or reject the trip and keep the associated record, provide a secure payment mechanism, and provide an electronic receipt at the end of the trip.</li></ul>
Administrative Fees	<ul style="list-style-type: none"><li>PTCs are required pay a \$1,000 initial application fee followed by an annual fee of \$100.</li><li>\$3.80 per trip airport charge.</li><li>0.33% of gross revenues are paid to the CPUC Transportation Reimbursement Account.</li></ul>	<ul style="list-style-type: none"><li>PTCs are subjected to a \$500 application fee for the E-Hail provider license. Renewal of this license occurs every three years.</li><li>PTC drivers are subject to a \$252 application and renewal fee every three years for licensure.</li><li>PTCs collect a 2.5% surcharge from each ride to contribute to the Black Car Fund for workers’ compensation.</li><li><i>Annual fee of \$190,000 for high-volume for-hire services</i></li></ul>	<ul style="list-style-type: none"><li>PTCs are required to pay a \$10,000 annual fee in addition to license fees.</li><li>The City of Chicago has a Ground Transportation Tax of \$0.40 per trip and PTCs pay an additional \$0.02 per trip for administrative purposes.</li><li>The Ground Transportation Tax Rate for O’Hare and Midway Airports, McCormick Place, and Navy Pier is \$5.40 per trip.</li><li>An additional fee of \$0.10 must be paid by PTCs for every trip in a non-accessible vehicle.</li></ul>	<ul style="list-style-type: none"><li>PTC drivers must pay an application and annual renewal fee of \$55.</li></ul>
Vehicle Requirements	<p>The minimum vehicle requirements to drive with a PTC in California include:<sup>70</sup></p> <ul style="list-style-type: none"><li>15-year-old vehicle or newer</li><li>4-door vehicle</li><li>Good condition with no cosmetic damage</li><li>No branding</li></ul> <p>Additionally, every year or every 50,000 miles (whichever comes first), the CPUC requires PTC drivers</p>	<ul style="list-style-type: none"><li>PTC vehicles must be inspected every four months.</li><li>Vehicles are not permitted to be apple green or taxicab yellow.</li><li>PTC vehicles must be differentiated with TLC signage and internal safety stickers for pedestrian/cyclist safety.</li><li>Vehicles must be equipped with a Hearing Induction Loop with the appropriate decal.</li></ul>	<p>The minimum vehicle requirements to drive with a PTC in Chicago include:<sup>71</sup></p> <ul style="list-style-type: none"><li>15-year-old vehicle or newer</li><li>4-door vehicle</li><li>Good condition with no cosmetic damage</li><li>No branding</li><li>Display PTC and/or airport decal while online</li></ul>	<ul style="list-style-type: none"><li>PTCs must ensure that a PTC vehicle has a valid and current Ontario Ministry of Transportation Safety Standards Certificate, a valid motor vehicle permit, and the vehicle is less than 10 model years old. Additionally, PTCs shall obtain and maintain the above records for 3 years following the termination of services.</li><li>PTCs shall provide the Chief License Inspector the above records upon request.</li></ul>

<sup>70</sup> <https://www.uber.com/drive/san-francisco/vehicle-requirements/>

<sup>71</sup> <https://www.uber.com/drive/chicago/vehicle-requirements/>

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	San Francisco	New York City	Chicago	Ottawa
	to conduct a 19-pont inspection at a California Bureau of Automotive Repair licensed facility.			
Insurance Requirements	<ul style="list-style-type: none"><li>PTC drivers must maintain their own insurance policy in compliance with state and local laws.</li><li>In the event of a collision in the state of California, PTC drivers are required to provide proof of the PTC’s commercial insurance.</li><li>Additionally, the CPUC also has a zero-tolerance drug and alcohol policy for PTC drivers.</li></ul>	<ul style="list-style-type: none"><li>PTCs and drivers are required to maintain their own insurance policy.</li><li>PTCs must carry commercial general liability coverage, professional liability coverage, crime insurance, and business automobile liability insurance.</li><li>PTCs must be members of the Black Car Fund through the New York State Department.</li></ul>	<ul style="list-style-type: none"><li>PTC companies must maintain commercial general liability insurance for up to a \$1,000,000 coverage per occurrence.</li><li>PTC drivers must also carry the PTC’s commercial liability insurance.</li><li>PTCs must issue all drivers an identification card indicating the driver’s affiliation with the company. The card must include vehicle and licensure information as well as the driver’s name and photo identification.</li></ul>	<ul style="list-style-type: none"><li>PTCs must ensure drivers maintain an Automobile Liability Insurance for a minimum of \$2,000,000.</li><li>PTCs must maintain commercial general liability insurance for up to \$5,000,000 with the City of Ottawa. Additionally, PTCs must obtain non-owned automobile insurance.</li></ul>
Driver and Licensure Requirements/ Training	<ul style="list-style-type: none"><li>PTCs may apply for a permit from the CPUC every three years and are required to apply for a San Francisco International Airport permit if operating to and from airports.</li><li>PTC drivers must be at least 21 years of age and clear of offenses.</li><li>The California Department of Motor Vehicles (DMV) regulates licenses for all individual vehicle drivers, which includes PTC drivers.</li><li>In California, PTCs are required to provide driver training programs and provide reporting on the number of drivers that have completed the course.</li><li>Additional safety training videos to reduce conflicts with cyclists are also provided by the San Francisco Bicycle Coalition.</li><li>The California DMV limits the maximum drive time to 10 hours and resets after an 8-hour period.</li><li>Background checks are conducted with a social security number and driver history from the DMV.</li></ul>	<ul style="list-style-type: none"><li>PTC driver applicants are fingerprinted to crosscheck criminal history records.</li><li>PTC drivers are subjected to a driver history background check and annual drug testing.</li><li>PTC drivers must be at least 19 years old and undergo a medical exam.</li><li>PTC drivers are limited to driving for a maximum of 10 hours in a 24-hour period with at least an 8-hour period of no trips. Additionally, drivers are not permitted to transport passengers for more than 60 hours a week.</li><li>PTC drivers are required to pass a Defensive Driving Course every three years, a 24-hour driver education course, and video training in sex trafficking awareness and wheelchair accessible vehicles. Additionally, all PTC drivers must complete a wheelchair passenger assistance training as part of the licensure process.</li><li><i>An applicant for a HVFHS license must submit a business plan for approval with each application for a new or renewal license or for a change of ownership of the base station license. The business plan must include trip volumes, vehicle counts, service area, compliance with TLC accessibility requirements, impact analysis, driver payments and earnings, and the bases for which the applicant is dispatching trips.</i></li><li><i>PTC drivers must pay a biennial licensing fee</i></li></ul>	<ul style="list-style-type: none"><li>PTCs are required to obtain a permit from the City of Chicago.</li><li>PTC drivers must be licensed as a City of Chicago chauffeur and PTCs must ensure compliance by all drivers.</li><li>PTC drivers must be at least 21 years of age and clear of offenses.</li><li>PTCs are required to conduct criminal background checks on drivers, including fingerprinting and photographs.</li><li>PTCs must also obtain the driving record prior to acceptance of a driver application.</li><li>PTC drivers are not permitted to drive more than 10 hours in one 24-hour period and compliance must be monitored by the PTC.</li><li>PTC drivers are required to complete an in-person or online training program approved by the Commissioner.</li><li>PTCs must enforce a zero-tolerance policy regarding alcohol and other intoxicating substances.</li></ul>	<ul style="list-style-type: none"><li>All PTC drivers must obtain a PTC license under By-Law 2016-272. A PTC license is not transferable.</li><li>All PTC drivers must be at least 18 years of age, provide proof that the corporation is legally entitled to conduct business in Ontario, and provide proof of insurance.</li><li>PTC drivers must carry an identification card issued by the PTC.</li><li>PTC drivers must hold a valid and unrestricted G Class license, provide the PTC a police record check and statement of driving record at commencement and annually, and an annual statement declaring no outstanding criminal charges or warrants.</li><li>PTCs must provide the Chief License Inspector with an up-to-date list of PTC drivers and PTC vehicles.</li></ul>
Record Keeping and Data Requirements	<ul style="list-style-type: none"><li>CPUC requires PTCs to provide the following information on a quarterly basis: provision of accessible vehicles; service provided by zip code; reporting on driver related problems, driver hours,</li></ul>	<ul style="list-style-type: none"><li>PTC companies must be able to automatically collect and transmit all data on E-Hail requests as well as the request outcomes to the TLC. Specifically: latitude</li></ul>	<ul style="list-style-type: none"><li>PTCs are required to report on the following information: the number and percentage of customers within the city who required wheelchair accessible vehicles and the fulfillment rate; number and percentage of rides requested and accepted or not</li></ul>	<ul style="list-style-type: none"><li>PTCs must maintain (and keep accessible) the following information for a minimum of 3 years: the total number of trips requested and fulfilled, requested and not fulfilled, annually; the date and time a trip was requested and fulfilled as well as</li></ul>

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	San Francisco	New York City	Chicago	Ottawa
	<p>and driver mileage; and the number of drivers completing the training course.</p> <ul style="list-style-type: none"><li>— PTC drivers are also required to participate in the California DMV Employer Pull Notice (EPN) Program which also allows PTCs to check the driving records of their drivers.</li><li>— The airport requires PTCs to submit trip activity records on a monthly basis.</li><li>— PTCs must provide real-time PTC vehicle activity for the airport tracking system.</li></ul>	<p>and longitude of pick-up and drop-off locations, drivers, itemized fares, fees, and payments.</p> <ul style="list-style-type: none"><li>— A trip record must be kept in the vehicle during any trip and presented upon request by a police officer or a TLC authorized individual.</li><li>— <i>Trip records to be kept include date, time, and location of trip request, pick-up, and drop-off; driver and vehicle license information; for-hire dispatch base information; number of passengers; trip distance; itemized trip fare; driver’s payment received; Congestion Zone entry point information; and MTA Access-A-Ride program information.</i></li><li>— <i>The total amount of time a vehicle makes itself available to be dispatched by the HVFHS must be submitted.</i></li><li>— <i>The amount of time spent transporting passengers each day by each vehicle and the time spent by each vehicle between trips but not on the way to the passenger.</i></li><li>— <i>An applicant for HVFHS must submit a description of all deductions proposes to charge either the vehicle owner or driver as well as an estimate of the average gross hourly earning of a driver based on the actual or anticipated trips and fares.</i></li><li>— <i>Trip records to be maintained for 18 months and made available for inspection during regular business hours.</i></li><li>— <i>Other records to be kept include rate schedule, hours of operation, total time a vehicle is made available to be dispatched, total time a vehicle spends daily transporting passengers, and online deadhead time.</i></li></ul>	<p>accepted based on geographic region and time; violations and suspensions of its drivers; and information on any accidents or incidents involving a PTC driver.</p>	<p>geographic start and endpoint; reason for trip cancellations; and PTC vehicle and driver information for each requested trip.</p> <ul style="list-style-type: none"><li>— Additionally, PTCs are required to provide the Chief License Inspector the records or information required within 48 hours following a request.</li><li>— PTCs are required to provide the Chief License Inspector direct access to its platform to inspect by-law compliance in real time.</li></ul>
Other	<ul style="list-style-type: none"><li>— PTCs are required to submit an accessibility plan with annual updates, a plan to bridge the gaps between able and disabled communities, as well as a report on their driver training program.</li><li>— PTCs must allow passengers to specify the need for a wheelchair accessible vehicle or a special assistance vehicle. PTCs must also report annually the number and percentage of customers who requested accessible vehicles and how often the PTC was able to comply.</li><li>— PTCs have partnered with automakers and rental car companies for drivers whose vehicles do not meet vehicle standards. PTC drivers are provided lower rental rates and unlimited mileage; however, this has become an issue when PTCs lower their fares to</li></ul>	<ul style="list-style-type: none"><li>— PTCs are subjected to New York TLC’s accessibility rules by providing accessible vehicles to passengers with disabilities with similar response times to regular operations.</li><li>— All for-hire services must not discriminate unlawfully against people with disabilities, including refusal to serve, load or unload mobility devices, or charge rates other than those set.</li><li>— <i>All vehicles must be participants of the E-Z Pass program.</i></li><li>— <i>Services must not identify themselves as providing ‘taxicabs’ or any variation of the word, nor can drivers refer to themselves as taxicab drivers.</i></li></ul>	<ul style="list-style-type: none"><li>— PTCs are required to submit a plan to the commissioner to enhance service to customers with disabilities. Once approved, the PTC must implement the plan within 6 months or are subjected to a fine of \$10,000 per day.</li><li>— PTCs must be accessible to customers who are blind, visually impaired, and deaf, as well as the option to select a wheelchair accessible vehicle.</li><li>— Wheelchair accessible vehicles must be inspected by the city for compliance before being put into use and are required to have signage indicating they are wheelchair accessible.</li></ul>	

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	San Francisco	New York City	Chicago	Ottawa
	compete and drivers must drive more miles to compensate for the income loss.	— <i>Must provide the option of request a wheelchair accessible vehicle from the same bases through which it dispatches trips.</i>		

\*Italicized items in the New York jurisdictional scan refer to the High-Volume For-Hire Services, targeting For-Hire Services that dispatch more than 10,000 trips per day.<sup>72</sup>

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<sup>72</sup> [https://www1.nyc.gov/assets/tlc/downloads/pdf/rule\\_book\\_current\\_chapter\\_59.pdf](https://www1.nyc.gov/assets/tlc/downloads/pdf/rule_book_current_chapter_59.pdf)

# APPENDIX

## B DRIVER SURVEY QUESTIONS



## Introduction

WSP Canada is undertaking a study for the City of Toronto to explore the economic and social impact of the vehicle-for-hire and private transportation company (PTC) industry in the City of Toronto, since the introduction of private transportation companies in 2016. We are looking to understand the changes affecting residents, businesses, and visitors to the city as well as the City of Toronto itself, and the impact on existing and new drivers as well as other industry stakeholders.

This 20-minute survey has been developed and administered to taxicab, limousine, and PTC drivers to assess the impacts of the regulations in 2016. The survey will include questions to develop a demographic profile of drivers, opinions about the vehicle-for-hire regulations, and the economic impact of the regulations. We thank you for taking the time to participate in the survey!

### Chapter 546, Licensing Vehicles-for-Hire

***\*Please note that we require all responses to be submitted by 23 March 2019 at 11:59pm ET, after which time the survey will be closed.***

\* 1. Are you familiar with the Chapter 546 Vehicle-for-Hire Regulations?

☐ Yes

☐ No

## Demographic Profile

\* 2. Please indicate your gender:

- ☐ Man ☐ Non-binary
- ☐ Woman ☐ Two-spirit (this option is only applicable to those who identify as "Indigenous")
- ☐ Transgender ☐ Prefer not to answer
- ☐ Not listed, please specify:

\* 3. What is your age?

- ☐ 18 - 24 ☐ 55 - 64
- ☐ 25 - 34 ☐ 65 - 74
- ☐ 35 - 44 ☐ 75 - 84
- ☐ 45 - 54 ☐ 85 years or older

\* 4. What is your level of education?

- ☐ No degree/diploma ☐ College
- ☐ High school ☐ University
- ☐ Trade/Certificate ☐ Graduate degree

\* 5. *In our society, people are often described by their race or racial background. For example, some people are considered "White" or "Black" or "East/Southeast Asian," etc.*

Which race category best describes you? Select all that apply.

- ☐ Black (African, Afro-Caribbean, African-Canadian descent) ☐ South Asian (South Asian descent, e.g. Indian, Pakistani, Bangladeshi, Sri Lankan, Indo-Caribbean, etc.)
- ☐ East Asian (Chinese, Korean, Japanese) ☐ Southeast Asian (Taiwanese descent; Filipino, Vietnamese, Cambodian, Thai, Indonesian)
- ☐ Indigenous (First Nations, Métis, Inuk/Inuit) ☐ White (European descent)
- ☐ Latino (Latin American, Hispanic descent) ☐ Prefer not to answer
- ☐ Middle Eastern (Arab, Persian, West Asian descent, e.g. Afghan, Egyptian, Iranian, Lebanese, Turkish, Kurdish, etc.)
- ☐ Another race category, please specify:

\* 6. What is your annual household income before taxes?

- |   |  |
|---|--|
| <input type="radio"/> Under \$5,000     | <input type="radio"/> \$100,000-\$119,999  |
| <input type="radio"/> \$5,000-\$19,999  | <input type="radio"/> \$120,000-\$139,999  |
| <input type="radio"/> \$20,000-\$39,999 | <input type="radio"/> \$140,000 and over   |
| <input type="radio"/> \$40,000-\$59,999 | <input type="radio"/> Do not know          |
| <input type="radio"/> \$60,000-\$79,999 | <input type="radio"/> Prefer Not to Answer |
| <input type="radio"/> \$80,000-\$99,999 |  |

\* 7. How many people does this income support?

- ☐ Prefer not to answer
- ☐ Household income supports \_\_\_ people:

8. What is your postal code?

\* 9. What area do the majority of your trips originate from?

- |   |   |
|---|---|
| <input type="radio"/> Toronto & East York | <input type="radio"/> Scarborough                   |
| <input type="radio"/> Etobicoke & York    | <input type="radio"/> The Greater Toronto Area      |
| <input type="radio"/> North York          | <input type="radio"/> Pearson International Airport |

\* 10. Which industry do you currently drive for?

- ☐ Taxicab - independent
- ☐ Taxicab - brokerage affiliated
- ☐ Limousine
- ☐ Private Transportation Company (Uber, Lyft, etc.)

\* 11. Have you driven for another industry before? If so, please select one or more from the following options:

- |   |  |
|---|--|
| <input type="checkbox"/> Taxicab – independent          | <input type="checkbox"/> Private Transportation Company (Uber, Lyft, etc.) |
| <input type="checkbox"/> Taxicab – brokerage affiliated | <input type="checkbox"/> Not Applicable                                    |
| <input type="checkbox"/> Limousine                      |  |

\* 12. How long have you been a driver in the City of Toronto? Please choose your answer in the table below. Please note that you might have more than one answer if you drive for more than one industry.

	Less than 3 months	4 to 12 months	13 to 36 months	3 to 6 years	More than 6 years
Taxicab	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Limousine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Private Transportation Company (e.g. Uber, Lyft, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Opinion About the Vehicle-for-Hire Regulation

\* 13. When did you begin driving a vehicle-for-hire or for a PTC?

☐ Prior to 2012

☐ 2015

☐ 2013

☐ 2016 or later

☐ 2014

## Opinion About the Vehicle-for-Hire Regulation

\* 14. Please indicate the extent to which you agree or disagree with the licensing by-laws when PTCs first began operations in the City of Toronto (specifically from 2012 to 2015).

	Strongly Agree	Somewhat Agree	Indifferent	Somewhat Disagree	Strongly Disagree
Training Requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Administrative Requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vehicle Requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspection Requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rates and Fares	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Licensing Requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Opinion About the Vehicle-for-Hire Regulation

\* 15. Please indicate the extent to which you agree or disagree with the 2016 Vehicle-for-Hire (Chapter 546) by-law overall:

	Strongly Agree	Somewhat Agree	Indifferent	Somewhat Disagree	Strongly Disagree
Training Requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Administrative Requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vehicle Requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspection Requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rates and Fares	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Licensing Requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\* 16. Please indicate the extent to which the 2016 by-law has increased or decreased your willingness to drive in the vehicle-for-hire industry. If you were not a vehicle-for-hire or PTC driver during that year, please indicate "Not Applicable" and proceed to the next question.

- |   |   |
|---|---|
| <input type="radio"/> Strongly increase | <input type="radio"/> Strongly decrease |
| <input type="radio"/> Somewhat increase | <input type="radio"/> Somewhat decrease |
| <input type="radio"/> Does not affect   | <input type="radio"/> Not applicable    |

## Impact of the Vehicle-for-Hire Regulation

\* 17. Please indicate the extent to which your quality of life has been impacted by the entry of PTCs in the City of Toronto (2012 to 2015). If you were not a vehicle-for-hire or PTC driver during this time period, please indicate "Not Applicable" and proceed to the next question.

	Strongly Decreased	Somewhat Decreased	No Change	Somewhat Increased	Strongly Increased	Not Applicable
Flexibility of Work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Expenses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Job Satisfaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Job Stability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Please include a brief description of the impacts to your quality of life as a result of the entrance of PTCs in the City of Toronto (2012 to 2015). If you indicated "Not Applicable" to the previous question, please skip this question and proceed to the next one:

\* 19. Please indicate the extent to which the new by-law has impacted the quality of your job as a driver for vehicle-for-hire services (2016 onward):

	Strongly Decreased	Somewhat Decreased	No Change	Somewhat Increased	Strongly Increased
Flexibility of Work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Expenses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Job Satisfaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Job Stability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. Please include a brief description of the impacts to your job quality as a result of the 2016 by-law:



\* 21. How many **trips per week** did you make on average, between 2012 and 2018? Please type in a number if you were actively driving during that year. If you were not a vehicle-for-hire or PTC driver during that year, please indicate "0" (zero) in the response.

Average trips per week in  
2012

Average trips per week in  
2013

Average trips per week in  
2014

Average trips per week in  
2015

Average trips per week in  
2016

Average trips per week in  
2017

Average trips per week in  
2018

\* 22. How many **hours per week**, on average did you drive for vehicle-for-hire services between 2012 and 2018? Please type in a number if you were actively driving during that year. If you were not a vehicle-for-hire or PTC driver during that year, please indicate "0" (zero) in the response.

Average hours per week in  
2012

Average hours per week in  
2013

Average hours per week in  
2014

Average hours per week in  
2015

Average hours per week in  
2016

Average hours per week in  
2017

Average hours per week in  
2018

\* 23. On average, what were your **earnings before expenses per week** from driving for vehicle-for-hire services between 2012 and 2018? Please type in a dollar amount if you were actively driving during that year. If you were not a vehicle-for-hire or PTC driver during that year, please indicate "0" (zero) in the response.

Average earnings per week in 2012

Average earnings per week in 2013

Average earnings per week in 2014

Average earnings per week in 2015

Average earnings per week in 2016

Average earnings per week in 2017

Average earnings per week in 2018

\* 24. Please indicate your **average weekly vehicle rental or lease fees** for each of the identified years. If your vehicle is owned, please indicate "0" (zero) in the response. If you rent on a per-shift basis, please estimate the cost over an average week or indicate "0" (zero) in the response. If you were not a vehicle-for-hire or PTC driver during that year, please indicate "0" (zero) in the response.

Average weekly fees in 2012

Average weekly fees in 2013

Average weekly fees in 2014

Average weekly fees in 2015

Average weekly fees in 2016

Average weekly fees in 2017

Average weekly fees in 2018

\* 25. Please indicate your **average weekly: fuel costs, insurance costs, vehicle maintenance costs, and any other additional costs**. If you were not a vehicle-for-hire or PTC driver during that year, please indicate "0" (zero) in the response.

Average additional costs  
per week in 2012

Average additional costs  
per week in 2013

Average additional costs  
per week in 2014

Average additional costs  
per week in 2015

Average additional costs  
per week in 2016

Average additional costs  
per week in 2017

Average additional costs  
per week in 2018

\* 26. Please indicate your **annual licensing fee paid to the City**. If you were not a vehicle-for-hire or PTC driver during that year, please indicate "0" (zero) in the response.

Annual licensing fee in  
2012

Annual licensing fee in  
2013

Annual licensing fee in  
2014

Annual licensing fee in  
2015

Annual licensing fee in  
2016

Annual licensing fee in  
2017

Annual licensing fee in  
2018

\* 27. If you are a vehicle-for-hire driver (e.g. taxi or limo driver), please indicate your **average weekly booking fees paid to the taxi/limousine plate owner or brokerage**. If you were not a vehicle-for-hire driver during that year, please indicate "0" (zero) in the response.

Average booking fees per week in 2012

Average booking fees per week in 2013

Average booking fees per week in 2014

Average booking fees per week in 2015

Average booking fees per week in 2016

Average booking fees per week in 2017

Average booking fees per week in 2018

\* 28. If you are a PTC driver, please indicate your **average weekly commission paid to a Private Transportation Company**. If you were not a PTC driver during that year, please indicate "0" (zero) in the response.

Average commission paid per week in 2012

Average commission paid per week in 2013

Average commission paid per week in 2014

Average commission paid per week in 2015

Average commission paid per week in 2016

Average commission paid per week in 2017

Average commission paid per week in 2018

# APPENDIX

## C ELASTICITY METHODOLOGY

# APPENDIX

## DRAWING THE DEMAND CURVE

If the cost per trip, “P,” determines the price a consumer is willing to pay for a ride, then the link between revenue, “R,” and quantity demanded, “Q<sup>D</sup>,” can be established by Equation (1).

Eq. (1): 
$$R = P \times Q^D.$$

Given R and Q<sup>D</sup> are both known from the driver survey, the cost per trip is calculated as:

Eq. (2): 
$$P = \frac{R}{Q^D}.$$

Figures 1 and 2 show two scatterplots of the price per trip versus the average number of trips per week for 212 taxi drivers and 1,384 PTC drivers from 2012 to 2018. Both industries demonstrate a negative relationship between demand, “D,” and price. With the assumption that the demand curve is linear, it can be drawn by estimating the price elasticity of demand (denoted by PED). The PED is defined as the percentage change in quantity following a 1% change in price. It can be computed by the following equation:

Eq. (3): 
$$PED = \frac{\partial Q^D}{\partial P} \times \frac{P}{Q^D},$$

where  $\frac{\partial Q^D}{\partial P}$  is the derivative of Q<sup>D</sup> with respect to P. The sign of PED is expected to be negative as an increase in price will lead to a decrease in quantity demanded. With the data observed for Q<sup>D</sup> and the calculation of P in Eq. (2), the PED can be estimated through the following linear regression model:

Eq. (4): 
$$\ln(Q_i^D) = \beta_0 + \beta_1 \ln(P_i) + \text{Other Factors Affecting Demand}_i.$$

where  $Q_i^D$  is the number of trips made by the  $i^{\text{th}}$  driver,  $P_i$  is the average revenue per trip, and other factors affecting demand<sub>i</sub> includes, but is not limited to, the areas the driver serves and his hours of driving and waiting with and without customers. While the coefficient  $\beta_0$  represents the intercept of the regression line, the coefficients  $\beta_1$  represents the slope. The reason why both quantity demanded and price are put on the natural logarithm (ln) is because  $\beta_1$  is mathematically the price elasticity of demand (PED), as shown by the development of Equation (5).

Eq. (5): 
$$\beta_1 = \frac{\partial \ln(Q^D)}{\partial \ln(P)} = \frac{\partial Q^D}{\partial P} \times \frac{P}{Q^D} = PED.$$

# APPENDIX

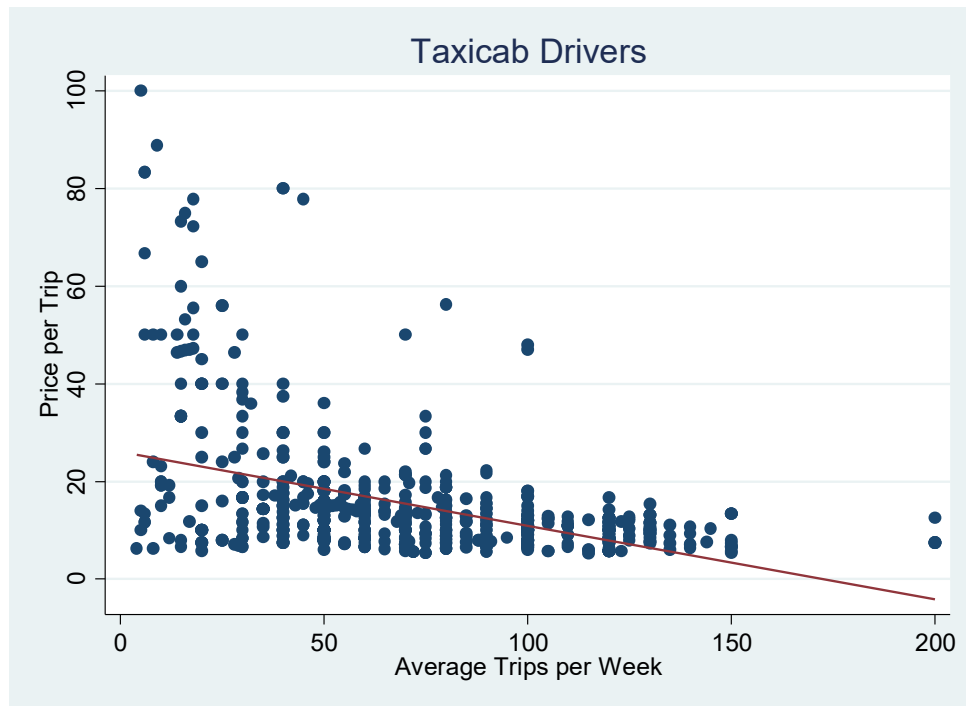


Figure 1: Average Trips per Week versus Price per Trip (Taxicab)

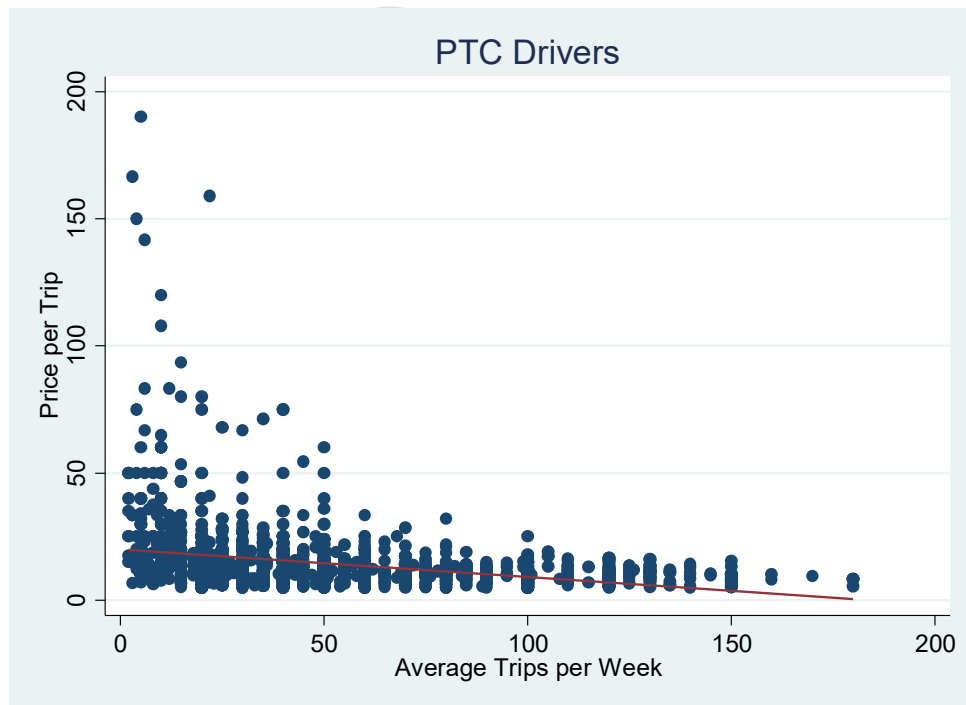


Figure 2: Average Trips per Week versus Price per Trip (PTC)

# APPENDIX

## DRAWING THE SUPPLY CURVE

The price elasticity of supply, denoted by PES, can be calculated using the following formula:

Eq. (6): 
$$PES = \frac{\partial Q^S}{\partial P} \times \frac{P}{Q^S}.$$

where “ $Q^S$ ” is the supply quantity. In practice, collecting data on the supply quantity is challenging as it requires drivers to report not only the number of trips with customers, but also the number of trips without customers. A solution to overcome this challenge is to transform the quantity supplied into the number of hours of driving - the labour supply variable, “ $L^S$ ” - which includes the deadhead time. The first term of Eq. (6) can then be decomposed and the price elasticity of supply can be understood as:

Eq. (7): 
$$PES = \frac{\partial Q^S}{\partial P} \times \frac{P}{Q^S} = \left( \frac{\partial Q^S}{\partial R} \times \frac{\partial R}{\partial P} \right) \times \frac{P}{Q^S}$$

Since revenue is a function of price and quantity of demand, and if the quantity of demand is assumed to be unchanged in the long-run,  $Q^D = \bar{Q}^D$ , then,

Eq. (8): 
$$PES = \left( \frac{\partial Q^S}{\partial R} \times \bar{Q}^D \right) \times \frac{R/\bar{Q}^D}{Q^S} = \frac{\partial Q^S}{\partial R} \times \frac{R}{Q^S}.$$

Since a driver needs only a car and fixed fees to provide ride services, the quantity of supply can be assumed to be a linear function of labour supply, “ $L^S$ ”:

Eq. (9): 
$$Q^S = \bar{K} \times L^S.$$

where  $\bar{K}$  represents the fixed amount of capital required to produce the final output. As a result, Eq. (8) can be understood as:

Eq. (10): 
$$PES = \frac{\partial \bar{K} \times L^S}{\partial R} \times \frac{R}{\bar{K} \times L^S} = \frac{\partial L^S}{\partial R} \times \frac{R}{L^S}.$$

Eq. (10) indicates that the supply curve of taxicab and PTC drivers can be drawn through the drivers’ labour supply in response to expected earnings. Since both labour supply and earnings are observed from the driver survey, the positive relationship between labour supply and earnings is depicted in Figures 3 and 4. However, several other factors affecting drivers’ labour supply were considered, including drivers’ age, experience, education, total expenditures, and demand for ride services. To estimate the magnitude of the price elasticity of supply, the following regression was used:

Eq. (11) 
$$\ln(L_i^S) = \gamma_0 + \gamma_1 \ln(R_i) + \text{Other Factors Affecting Supply}_i.$$

The estimated coefficient  $\gamma_1$  determines the slope of above equation and represents the long-run supply and is presented in the above report.



# APPENDIX

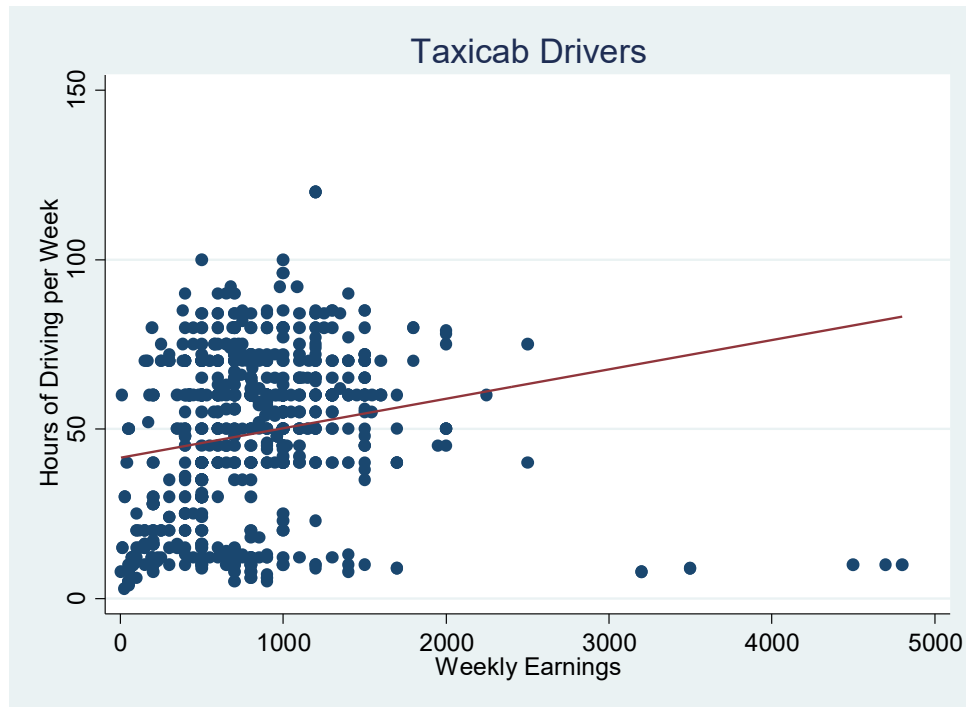


Figure 3: Labour Supply versus Earnings (Taxicab)

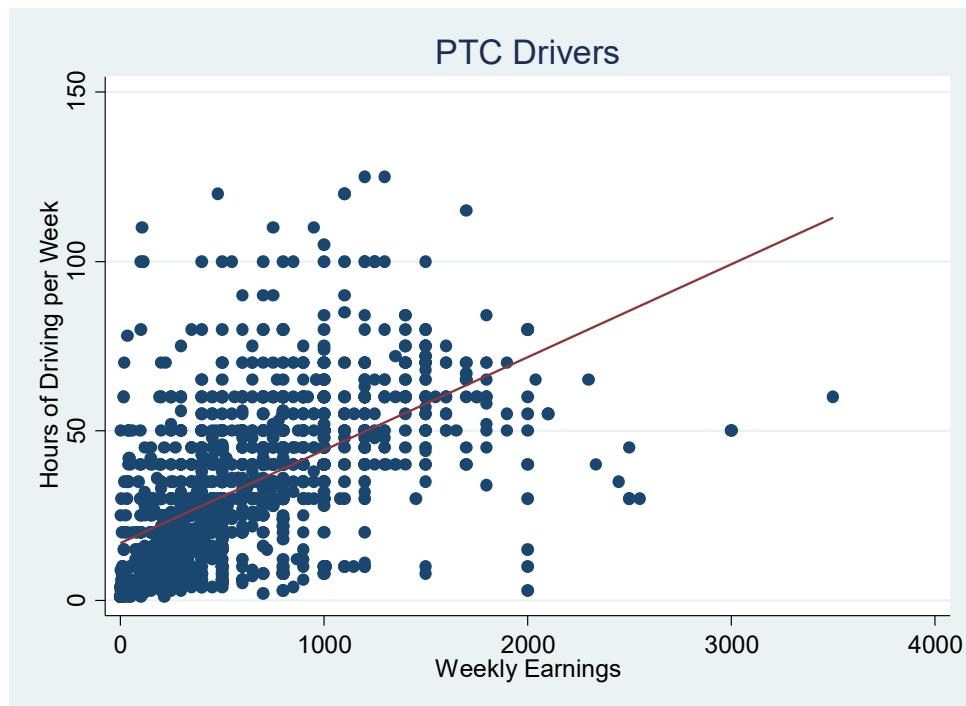


Figure 4: Labour Supply versus Earnings (PTC)

# APPENDIX

## D RIDERSHIP

# APPENDIX

For the purposes of this study, three main sources were used for ridership and demand information for the vehicle-for-hire and PTC industries. The first source is the Transportation Tomorrow Survey (TTS) which is a travel survey conducted in the Greater Golden Horseshoe Area and is conducted every 5 years (most recently in 2011 and 2016). The 2011 TTS was conducted online while the 2016 TTS used a mixed sampling approach, however, both years were found to have undercounted discretionary trips which likely represents a portion of both taxicab and PTC demand. TTS discretionary trips are likely undercounted as one household member conducts the survey on the behalf of others and mid-trip stops are generally underreported.

The following table provides the ridership figures per day by mode. The TTS trip counts to determine the taxicab and paid ridership consumer surplus and for the understanding of supply and demand, consumer surplus, and producer surplus in the above sections as it was the only data source for taxicab trips. As shown below, the taxicab ridership has decreased at a compound annual growth rate (CAGR) of 1.43% from before the entrance of PTCs and after the vehicle-for-hire regulations.

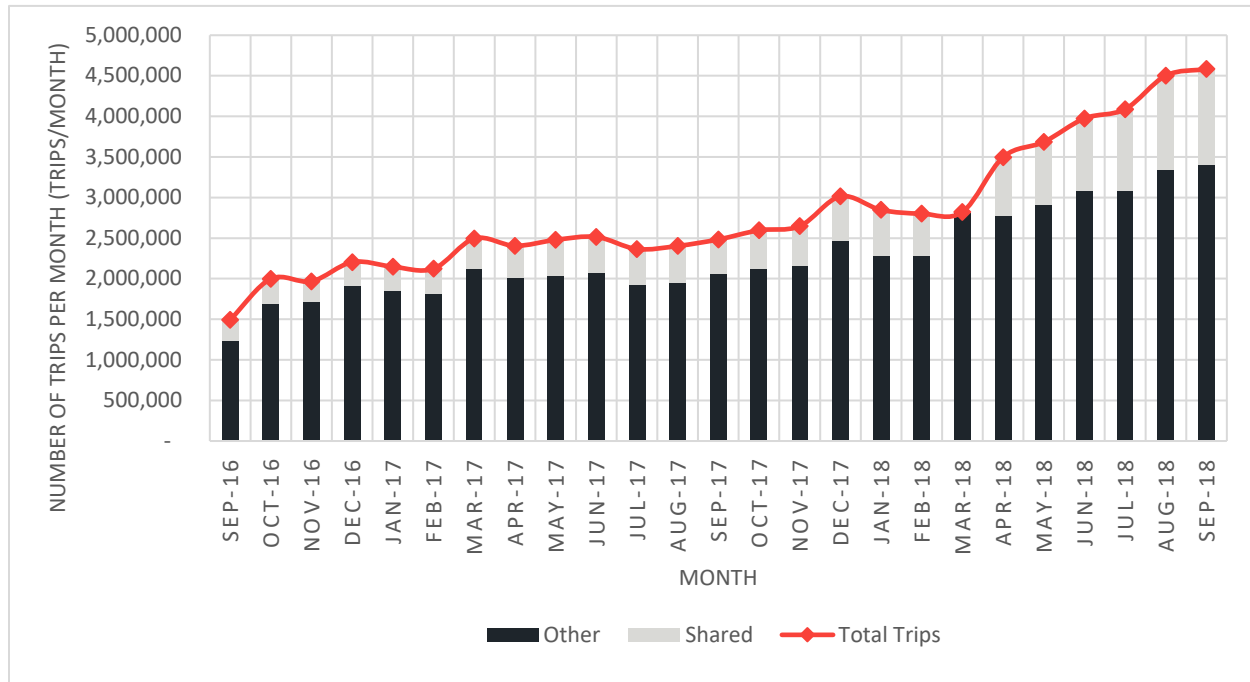
**Figure 5: TTS Ridership per Day by Transportation Mode**

	2011 TTS	2016 TTS	CAGR
<b>Transit (Excluding GO Rail)</b>	1,255,467	1,374,779	1.83%
<b>Cycle</b>	96,084	141,120	7.99%
<b>Private Automobile Driver</b>	2,601,765	2,385,664	-1.72%
<b>GO Rail (Only)</b>	20,194	22,127	1.85%
<b>GO Rail + Local Transit</b>	4,551	6,884	8.63%
<b>Motorcycle</b>	4,114	7,258	12.02%
<b>Automobile Passenger</b>	733,026	556,241	-5.37%
<b>School Bus</b>	34,883	30,972	-2.35%
<b>Taxicab Passenger</b>	36,545	34,012	-1.43%
<b>Paid Rideshare</b>	-	31,089	N/A
<b>Walk</b>	359,525	547,721	8.78%
<b>Other</b>	7,035	3,907	-11.10%
<b>Total:</b>	5,146,154	5,137,867	-0.03%

The second data source was specific to PTC ridership and was provided by the City of Toronto for September 2016 onwards. The number of PTC trips by month and by service was provided between September 2016 and September 2018 and shows an average growth rate of 5.4% every month. The number of shared PTC trips per month have increased from approximately 260,000 (in September 2016) to 1.2 million (in September 2018), a 359% increase, while other PTC services have increased from approximately 1.2 million (in September 2016) to 3.4 million (in September 2018), a 175% increase.

# APPENDIX

**Table 1: PTC Ridership by Service (trips/month)**



Ridership was also provided by origin and destination between the 44 wards in the city of Toronto which was mainly used in understanding the relationship between population density, car ownership, and number of origin trips by ward in Section 2.2 above. As seen in the table below, the average number of origin trips per month from 2017 to 2018 consistently increased across all wards in the city of Toronto, but increased more in lower-density wards outside the Central Business District.

# APPENDIX

**Table 2: Difference Between 2017 and 2018 Average Monthly Origin Trips by Ward**

Ward Name		Ward Name	
<b>Etobicoke North (1)</b>	83%	<b>Willowdale (23)</b>	47%
<b>Etobicoke North (2)</b>	60%	<b>Willowdale (24)</b>	48%
<b>Etobicoke Centre (3)</b>	43%	<b>Don Valley West (25)</b>	39%
<b>Etobicoke Centre (4)</b>	45%	<b>Don Valley West (26)</b>	48%
<b>Etobicoke-Lakeshore (5)</b>	44%	<b>Toronto Centre-Rosedale (27)</b>	49%
<b>Etobicoke-Lakeshore (6)</b>	40%	<b>Toronto Centre-Rosedale (28)</b>	48%
<b>York West (7)</b>	76%	<b>Toronto-Danforth (29)</b>	45%
<b>York West (8)</b>	67%	<b>Toronto-Danforth (30)</b>	39%
<b>York Centre (9)</b>	74%	<b>Beaches-East York (31)</b>	56%
<b>York Centre (10)</b>	52%	<b>Beaches-East York (32)</b>	41%
<b>York South-Weston (11)</b>	64%	<b>Don Valley East (33)</b>	60%
<b>York South-Weston (12)</b>	69%	<b>Don Valley East (34)</b>	52%
<b>Parkdale-High Park (13)</b>	37%	<b>Scarborough Southwest (35)</b>	71%
<b>Parkdale-High Park (14)</b>	41%	<b>Scarborough Southwest (36)</b>	51%
<b>Eglinton-Lawrence (15)</b>	56%	<b>Scarborough Centre (37)</b>	74%
<b>Eglinton-Lawrence (16)</b>	41%	<b>Scarborough Centre (38)</b>	71%
<b>Davenport (17)</b>	50%	<b>Scarborough Agincourt (39)</b>	60%
<b>Davenport (18)</b>	44%	<b>Scarborough Agincourt (40)</b>	64%
<b>Trinity-Spadina (19)</b>	41%	<b>Scarborough-Rouge River (41)</b>	67%
<b>Trinity-Spadina (20)</b>	41%	<b>Scarborough-Rouge River (42)</b>	66%
<b>St. Paul's (21)</b>	45%	<b>Scarborough East (43)</b>	67%
<b>St. Paul's (22)</b>	40%	<b>Scarborough East (44)</b>	55%

Finally, ridership trends were also interpreted from the results of the driver survey conducted in March 2019. While the results from the driver survey are self-reported the results correspond to the feedback received through the stakeholder interviews. From 2012 to 2015 (since the entrance of PTCs), the average number of trips per week decreased by 19.7% and increased by 6.0% for taxicab and PTC drivers, respectively. From 2016 to 2018 (since the vehicle-for-hire regulations), the average number of trips per week has decreased by 7.5% and increased by 9.7% for taxicab and PTC drivers.