TE MANATŪ WAKA
MINISTRY OF TRANSPORT

Domestic Transport Costs and Charges Study

Working Paper C9
Taxi and Ride-hailing

Prepared for Te Manatū Waka Ministry of Transport (NZ)
Veitch Lister Consulting Pty Ltd, in association with Ian Wallis Associates Ltd
June 2023

Contents

Appendices

Disclaimer

This Working Paper is one of a series that has been prepared as part of the New Zealand Domestic Transport Costs and Charges (DTCC) Study. A consultant team led by Ian Wallis Associates Ltd was contracted by Te Manatū Waka Ministry of Transport to carry out this Study.

The views expressed in the Working Papers are the outcomes of the consultant's independent research and should not be regarded as being the opinion or responsibility of Te Manatū Waka. The material contained in the Working Papers should not be construed in any way as policy adopted by Te Manatū Waka or any other agency of the NZ Government. The Working Papers may, however, be used by NZ Government agencies as a reference in the subsequent development of policy.

While the Working Papers are believed to be correct at the time of their preparation, Te Manatū Waka and agents involved in their preparation and publication do not accept any liability for use of the material contained in the Working Papers. People using such material, whether directly or indirectly, should apply and rely on their own skill and judgment. They should not rely on the contents of the Working Papers in isolation from other sources of advice and information. If necessary, they should seek appropriate legal or other expert advice.

Copyright

Acknowledgements

The authors would like to thank the following parties for their contributions to this working paper:

- New Zealand Taxi Federation
- Taxis United
- Uber New Zealand
- Uber Australia/New Zealand.

Research, Economics and Evaluation

The Research, Economics and Evaluation team operates within the System Performance and Governance Group of Te Manatū Waka Ministry of Transport. The team supports the Ministry's policy teams by providing the evidence base at each stage of the policy development.

The team is responsible for:

- Providing sector direction on the establishment and use of the Transport Evidence Base (see below) – including the collection, use, and sharing of data, research and analytics across the transport sector and fostering the development of sector research capabilities and ideas.
- Leading and undertaking economic analyses, appraisals and assessment including providing economic input on business cases and funding requests.
- Performing the evaluation function for Te Manatū Waka, including designing monitoring and evaluation frameworks and approaches, developing performance metrics and indicators, and designing, conducting and procuring evaluations.

The Transport Evidence Base

The Transport Evidence Base Strategy creates an environment to ensure data, information, research and evaluation play a key role in shaping the policy landscape. Good, evidence-based decisions also enhance the delivery of services provided by both the public and private sectors to support the delivery of transport outcomes and improve wellbeing and liveability in New Zealand.

The Domestic Transport Costs and Charges study aims to fill some of the research gaps identified in the 2016 Transport Domain Plan (Recommendation R6.2), which forms part of the Transport Evidence Base.

Citation

Ministry of Transport (2023). Domestic Transport Costs and Charges (DTCC) Study – Taxi and Ride-hailing, Working Paper C9, Prepared by Veitch Lister Consulting Pty Ltd in association with Ian Wallis Associates Ltd, Wellington: Ministry of Transport, New Zealand.

Published in June 2023 by Te Manatū Waka Ministry of Transport, PO Box 3175, Wellington 6140, New Zealand.

For more information

For more information about this project and associated report, please contact: info@transport.govt.nz.

Glossary of terms and abbreviations

Term	Definition
CoF	Certificate of Fitness
DTCC	Domestic Transport Costs and Charges (study)
HTS	New Zealand Household Travel Survey
IWA	Ian Wallis Associates
MoT	New Zealand Ministry of Transport
PC-OC	Private car operating cost (model)
P-endorsement	Passenger endorsement
TR-OC	Taxi and ride-hailing cost (model)
TSL	Transport Services Licence
VLC	Veitch Lister Consulting Ltd

Executive summary

Overview

The Ministry of Transport Domestic Transport Costs and Charges (DTCC) study aims to identify all the costs imposed by the domestic transport system on the wider New Zealand economy including those costs (financial and non-financial) and charges borne by the transport user.

This working paper presents the analysis of the costs of taxi and ride-hailing services in New Zealand., **Taxi** refers to services operating under a taxi company that can be hailed off the street or dispatched by an operator; whereas **Ride-hailing** refers to a service that links a rider to a driver through a technology platform, predominantly operated via smartphone apps.

Like many parts of the transport system, the NZ taxi and ride-hailing sector has been undergoing rapid change in recent years. Uber's entry into the New Zealand ride-hailing market in 2014 led to rapid growth in the use of ride-hailing services and subsequent regulatory reforms. Several ride-hailing companies are now active in the New Zealand market, which we estimate to be—at the time of writing—split approximately 50:50 between taxis and ride-hailing services.

Methodology

Our taxi and ride-hailing operating cost (TR-OC) model builds on the private car operating cost (PC-OC) model developed as part of the DTCC study. The TR-OC makes several changes to reflect unique cost structures associated with delivering taxi and ride-hailing services. These changes involve both adjustments to cost components as well as the addition of several new cost components, specifically:

- *Variable operating costs* – compared to the overall fleet makeup of private cars, we assume taxi and ride-hailing services make use of more modern vehicles that are more efficient with lower variable operating costs. This leads to different assumptions for petrol, oil, tyres, repairs, and maintenance.
- *Fixed operating costs* – we allow for additional costs associated with commercial use, such as fitout, insurance, driver licencing (Passenger Endorsements), logbooks, insurance, annual vehicle licensing/registration and warrant/certificate of fitness certifications.
- *Fixed ownership costs (capital charges)* – the use of modern vehicles compared to the average vehicle in the New Zealand light vehicle fleet, along with a higher depreciation rate to account for commercial use (which leads to increased mileage and wear and tear), resulting in higher capital charges on an annualised basis.
- *Labour / contracting costs* – we model the costs of payments to contractor-drivers, allowing for utilisation, ACC payments, dynamic (surge) pricing in situations of high demand (ride-hailing sector), and cleaning time. These components are assumed to yield an average per-hour rate around the level of the NZ minimum wage.
- *Platform and licensing charges* – representing the costs charged by ride-hailing and taxi companies to provide and/or license the platforms, including technology, marketing, and profit margins.

- *Passenger fares and additional consumer charges* – including the costs of airport charges (for both services) and electronic transactions (for taxi users).

Estimated costs per in-service kilometre are used to estimate the cost per trip, which is then divided by an occupancy rate to arrive at a passenger-km rate.

In terms of aggregate supply and demand, we estimate there are approximately 3,250 taxis and 8,375 rideshare drivers operating in New Zealand (as at 2020/21), with varying levels of exclusivity to platforms. Based on an assumed mileage of 60,000km/year for taxis and 30,000km/year for ride-hailing operations, the services are estimated to represent 0.39% and 0.56% of total national VKT for light vehicles, respectively, or around 0.95% of total VKT combined.

This working paper covers only total and financial costs to taxi and ride-hail service providers and users. It does not cover tangible and intangible costs incurred to other parties.

Results

Table ES. 1 presents costs per (in-service) kilometre for cars vis-à-vis ride-hailing and taxi services, as estimated using the PC-OC and TR-OC models. Ride-hailing and taxi total costs average $2.60 and $3.23 per in-service vehicle km, respectively, as compared to approximately $0.70 for private car operation (which excludes any driver wage costs). The results imply per kilometre operating costs of ride-hailing services are approximately 20% lower than taxis. Much of this cost difference stems from higher utilisation in the ride-hailing sector, which reduces the labour costs per in-service vehicle kilometre.

Table ES. 1 Costs per in-service vehicle-kilometre – Private car vis-à-vis Taxi and Ride-hailing Services (GST inclusive)

Cost components		Car	Ride Hail	Taxi
1) Variable operating costs	Resource	$0.26	$0.28	$0.28
	FED -- Other	$0.10	$0.08	$0.10
	FED -- ACC levy	$0.01	$0.01	$0.01
2) Fixed operating costs	Resource	$0.08	$0.08	$0.04
	Duty	$0.01	$0.01	$0.00
3) Fixed ownership charges		$0.24	$0.11	$0.10
4) Labour/contracting costs			$1.34	$2.19
5) Platform and licensing costs			$0.42	$0.30
6) Additional consumer charges			$0.28	$0.20
Total Costs	per in-service veh-km	$0.70	$2.60	$3.23
	per pass-km (inc GST)	$0.44	$1.92	$2.38
	per pass-trip (inc GST)	$2.86	$12.24	$15.20

Based on an average occupancy (excluding the driver) of 1.56 passengers per trip (consistent with estimated average occupancy for NZ cars/light vans) and an average trip length of 6.38km, then we find an average cost per passenger trip of $12.24 and $15.20 for ride-hailing and taxis, respectively (NB: For business related travel, the GST component should be deducted from these numbers).

Chapter 1 Introduction

1.1. Study Scope and Overview

The Domestic Transport Costs and Charges (DTCC) study aims to identify all the costs associated with the domestic transport system on the wider New Zealand economy including costs (financial and non-financial) and charges borne by the transport user.

The Study is an important input to achieving a quality transport system for New Zealand that improves wellbeing and liveability. Its outputs will improve our understanding of the economic, environmental and social costs imposed by different transport modes - including road, rail and coastal shipping - and the extent to which those costs are currently offset by charges paid by transport users.

The DTCC is intended to support the wider policy framework of Te Manatū Waka, especially the Transport Outcomes Framework (TOF). The TOF seeks to make clear what government wants to achieve through the transport system under five outcome areas:

- Inclusive access,
- Economic prosperity,
- Healthy and safe people,
- Environmental sustainability, and
- Resilience and security.

Underpinning outcomes in these areas is the guiding principle of mode neutrality. In general, outputs of the DTCC study will contribute to the TOF by providing consistent methods for (1) estimating and reporting economic costs and financial charges and (2) understanding how these costs and charges vary across dimensions that are relevant to policy, such as location, mode and trip type.

Robust information on transport costs and charges is critical to establishing a sound transport policy framework. The Study itself does not address future transport policy options; but the study outputs will help inform important policy development including areas such as charging and revenue management, internalising externalities, and travel demand management.

The Study has been undertaken for Te Manatū Waka by a consultant consortium headed by Ian Wallis Associates. The Study has been divided into a number of topic areas, some of which relate to different transport modes (including road, rail, urban public transport and coastal shipping), and others to impacts or externalities (including accidents, congestion, public health, emissions, noise, biodiversity and biosecurity).

Working papers are being prepared for each of the topic areas. The topic areas and specialist authors are listed in Appendix 2.

1.2. Costing Practices

The focus of DTCC is on NZ transport operations, economic costs, financial costs and charges for the year ending 30 June 2019 (FY 2018/19). Unless otherwise noted, the analyses in this paper are based on the following key assumptions:

- ***Base price period.*** All prices are expressed in NZ$2018/19 (i.e. prices typical of or averaged over the 12 months ending 30 June 2019).
- ***Pricing in real terms.*** All prices are expressed in constant real $ terms, i.e. excluding any inflationary components.
- ***GST.*** The financial costs given in this paper include a GST component (except where noted). All economic costs given exclude any GST component.
- ***Other taxes and duties.*** Economic analyses are concerned with resource costs rather than financial costs, so taxes or duties are excluded from the prices of goods and services. That said, we retain GST in our analysis of (financial) charges to the traveller. Note that transport fees and charges are included in specific working papers to understand the cost burden to users.

Where appropriate, we adopt the same structure and assumptions as used in other parts of the DTCC study.

One notable departure is the cost of capital, where our conversations with industry participants led us to adopt a rate of 5% p.a.(in real terms), which is slightly higher than the 4% p.a. that has been used in other parts of the DTCC (for which capital costs are financed principally through the public sector). We suggest the slightly higher cost of capital is appropriate here given the structure of the ride-hailing and taxi industries, which are both privately-owned and currently face somewhat elevated risk profiles compared to other parts of the transport sector. These risks arise in response to factors affecting both the ride-hailing and taxi industries directly, such as competition from new entrants, as well as indirectly, such as competition from shared e-scooters and e-bikes.

1.3. Paper Overview

This working paper estimates financial and economic costs for ‘average’ taxi and ride-hailing service in New Zealand. (These costs may not reflect the costs of more specialised services, such as wheelchair taxis, van-style taxis, and for airport travel.)

This working paper contributes to the TOF by shedding light on the economic costs and financial charges associated with a rapidly-growing part of New Zealand’s passenger transport system. The outputs of this working paper are intended to support economic prosperity, public health and environmental sustainability objectives.

Like many parts of the transport system, taxis and ride-hailing have been undergoing rapid change in recent years. Uber’s entry into the New Zealand market in 2014 has led to rapid growth in the use of ride-hailing services and subsequent regulatory reforms. Several ride-hailing companies are now active in the New Zealand market, which we estimate to be—at the time of writing (2021/22)—split approximately 50:50 between taxis and ride-hailing services. We encourage readers to keep these dynamics in mind when considering our findings, which are by necessity “backwards looking”.

The paper is structured into the following main Chapters:

- Chapter 2 outlines the key features of our methodology
- Chapter 3 presents our main results
- Chapter 0 summarises some limitations of our analysis.

This working paper should be read in conjunction with the **TR**-OC model (developed as part of the DTCC study and documented in WP C5).

1.4. Specific Terms

The following paragraphs define specific terms that are used in subsequent Chapters of this report.

Small Passenger Service: In 2017, NZ adopted reforms to the regulatory framework governing the provision of taxi and ride-hailing services, with the aim of creating a more level playing field. The main changes included[1]:

- Streamlining the processes for a driver to obtain a Passenger (P) Endorsement by removing course requirements, area knowledge certification, and the English Language Requirement.
- Providing greater flexibility for pricing, where fares are not set via a fixed price schedule, provided the cost of the ride is agreed by the customer in advance.
- Clarifying the requirements for in-car cameras, removing the requirement for ride-hailing (as long as the passenger is registered on the system).
- Removing requirements to operate a service 24/7.
- Removing the requirement for a Passenger Service Licence.
- Removing the need for an 'approved taxi organisation' to operate.
- Extending the maximum work-time without a break to 7 hours for all small passenger services.

The effects of these regulatory reforms are still working through the industry, with many taxi companies going through restructures in response to the changes in requirements.

Ride-hailing refers to a service that links a rider to a driver through a technology platform, predominantly operated via smartphone apps. Riders first register their phone number and a credit card, after which they can order rides. Ride-hailing drivers are typically contractors with Passenger (P) Endorsements that operate vehicles with a Certificate of Fitness (CoF). The technology platforms are required to have a Transport Service Licence (TSL), which specifies requirements for quality aspects, such as driver vetting, customer service, and local representation. All rides are dispatched via the platform and riders accept pricing and payment terms at the time of booking. Once a rider has been paired with a driver then the ride can commence and, when complete, all payments are facilitated through the platform itself. Cash payments are not accepted. We define ride-hailing services to exclude dial-a-driver or scheduled shuttle services, such as airport transport vans.

Taxi refers to services operating under a taxi company that holds a Transport Service Licence (TSL). Vehicles must be decalled (or have signs). Prices are set using a fixed schedule, although prices for pre-arranged trips can be negotiated. As for ride-hailing, drivers must have P-Endorsements and the vehicles must have a CoF. In addition, taxis must be fitted with a camera system with local storage to record interactions between passengers/drivers. Taxis obtain rides in two ways – via dispatch or rank. With dispatch, the driver is given the dispatch address through a technology platform (traditionally custom hardware, but increasingly app-based) and then travels to the location. For rank, or 'street hail' work, the vehicle is positioned in a specific location, such as an airport, downtown location, or hotel, where riders can enter the taxi and direct the driver to their destination, where payment is processed.

[1] "Small Passenger Services Review | Ministry Of Transport." *Transport.govt.nz*. N.p., 2020. Web. 28 July 2020.

Chapter 2 Methodology

2.1 Overview

Our analysis of the costs of taxi and ride-hailing services builds on the PC-OC model developed for light vehicles/cars by Richard Paling Consulting as part of the DTCC study (as documented in working paper C5). The following three components of the PC-OC model carry over into our TR-OC model with only minor modifications, specifically:

- *Variable operating costs* – compared to the overall fleet makeup of private cars, we assume taxi and ride-hailing services use more modern and more efficient vehicles that lead to lower variable operating costs.
- *Fixed operating costs* –we make allowance for additional costs associated with, for example, fitout and insurance, to reflect commercial use.
- *Fixed ownership costs (capital charges)* –we assume the use of more modern vehicles compared to the average vehicle in the New Zealand fleet.

Compared to the PC-OC model, our TR-OC model also includes the following additional cost components:

- *Labour/contracting costs* –representing the costs of payments to drivers, allowing for utilisation and availability due to cleaning.
- *Platform and licensing charges* –representing the costs charged by companies to provide and/or license the platform, including technology, marketing, and profit margins.
- *Additional consumer and related charges* – including airport charges, electronic transactions (for taxi users), and surge pricing (for ride-hailing users).

Estimated costs per in-service vehicle kilometre are used to estimate the cost per trip, which is divided by the passenger occupancy rate to arrive at the user charge per passenger-km.

2.2 Variable Operating Costs

As per the PC-OC model, variable operating costs cover the following items:

- Petrol
- Oil
- Tyres
- Repairs and Maintenance.

The TR-OC model focusses on petrol vehicles (including hybrids), which represent >95 per cent of the vehicle fleet[2] used to deliver taxi and ride-hailing services in New Zealand. Whereas the PC-OC model considers fuel consumption ranges between 6.25L and 11.56L/100kms, most taxi and ride-hailing fleets have fuel consumption between 5.5 and 10L/100kms due to more than 80% of the fleet being hybrid vehicles.[3] We calculate an average fuel consumption for taxis and ride-hailing services according to their respective fleet compositions. Petrol prices are split between taxes/charges and resource costs, which are based on prices at the end of 2018 of $2.21 a litre ($1.32 resource costs and $0.89 duty costs). This represents a 10-cent discount on

[2] Source: private conversations with industry participants.

[3] Conversation with John Hart, Executive Director of the New Zealand Taxi Federation.

consumer average prices for 2018, which reflects bulk purchase agreements with fuel companies.

2.3 Fixed Operating Costs

As per the PC-OC model, fixed costs represent operating costs that are incurred on an elapsed time basis, rather than varying with vehicle use. They comprise the following:

- Insurance
- Annual Vehicle Licensing/Registration
- Warrant/Certificate of Fitness Certification.

The cost of insurance is assumed to be a fixed annual cost but the figures have been adjusted to take account of differences in the vehicle fleet and the commercial nature of the services. Vehicle licensing costs have been split between taxes/charges (the major portion) and resource costs (for administration). The average annual vehicle licensing charge reflects the relatively high initial costs and the lower annual relicensing charges. Vehicles being operated commercially under small passenger service (either taxi or ride-hail) licences are required to obtain a Certificate of Fitness (CoF) every 6 months at a cost of $153.00.

The delivery of commercial small passenger services incurs the following additional costs:

- Driver Licencing (P-Endorsements)
- Logbooks (Electronic or Paper-based)

To reflect typical commercial service operations, the TR-OC model assumes an average annual distance travelled per vehicle of 30,000km[4] and 60,000km[5] for ride-hailing and taxis, respectively. This compares to the 14,000km p.a. assumed by the AA for private vehicles and the 11,000km pa average for the NZ car/light van fleet. The effect of these assumptions are to spread the higher fixed operating costs incurred by taxis and ride share over more kilometres, so reducing average costs per kilometre. Vehicles used for ride-hailing and taxis services may also be used for some personal travel, although this is not factored in the TR-OC calculations.

2.4 Fixed Ownership (Capital) Charges

Capital charges associated with the purchase (and depreciation) of cars are calculated on an annualised (mortgage) basis. Based on information supplied by industry participants, we assume a commercial cost of capital at 5% with an average vehicle life of 5 years in commercial operations6. The higher cost of capital and shorter economic life reflects the commercial nature of activities and subsequent wear and tear on vehicles. We assume depreciation at 20% p.a. (diminishing value), which is higher than the rate for private vehicles used in the PC-OC model7. Costs have been developed for three types of vehicles used in the taxi and ride-hailing sectors, from which we calculate a weighted averaged, as per Table 2.1

[4] Source: Conversation with Richard Menzies, former GM of Uber New Zealand.

[5] Conversation with John Hart, Executive Director of the New Zealand Taxi Federation.

[6] WACC average.

[7] Based on conversations with industry participants.

Table 2.1 Composition of the vehicle fleet – Taxi and ride-hailing services

Vehicle fleet market share	Engine Size Capacity		
	SMALL (0-1500cc)	COMPACT (1501-2000cc)	MEDIUM (2001-3500cc)
Taxi	10%	20%	70%
Ride-hailing	25%	55%	10%
Average upfront purchase costs (incl fitout)	$15,500	$21,500	$49,500
Expected residual value after 5 years	$6,229	$8,640	$19,893

2.5 Labour/Contracting Costs

Taxi and ride-hail drivers are assumed to be engaged as contractors rather than being directly employed by taxi or ride-hailing companies. Drivers are not paid a salary but rather earn the difference between revenue collected and expenses incurred in providing the service. While earnings are variable, full-time drivers typically earn close to the NZ minimum wage ($18.90/hour in 2018/19).

We assume a 20-45 minute vehicle cleaning/upkeep period is required per 10 hour shift, costed at an hourly rate. In addition to cleaning to meet minimum service standards, the TR-OC model includes a buffer for lost wages resulting from soiling, which must be carried out by drivers before carrying further passengers. In the case of ride-hailing, this cost is often recovered through a charge to the customer's credit card (which is kept on file at the time of ride booking) via the platform. In the case of taxis, the costs are higher due to the reduced likelihood of being able to successfully recover costs.

ACC work, earner and Working Safer levy costs are estimated at $1,400 per year based on a full-time schedule for both taxi and ride-hailing drivers earning around $55,000 per year (pre-tax). These have been included in the overall labour costs.

In terms of utilisation (or "dead heading"), feedback from industry suggests taxis are on paid trips for approximately 30-40% of the time they are in operation (depending on location and company). For ride-hailing vehicles the proportion is closer to 50% on trip (not including going to/from 'jobs') due to better matching technology between the rider and driver. For ride-hailing, all calls are dispatched whereas taxis also have a street/rank hail component. These differing levels of utilisation flows through to distance calculations based on average speeds (i.e. both the time and the distance component from this activity are captured in the overall passenger-km costs).

2.6 Platform and Licensing Charges

We assume profit margins for taxi and ride-hailing companies are incorporated into platform and licensing charges. For a taxi or ride-hailing driver to accept rides, their vehicle must be registered with a TSL holder, such as a ride-hailing platform (e.g. Uber, Zoomy, Ola) or a taxi company (e.g. Combined, Auckland Coop, Alert, Corporate Cabs). These transport services involve differing levels of service and responsibility, which are reflected in the costs they charge to drivers.

Taxis companies operate on a periodic fee structure that pays for marketing, a dispatch centre, business development and management (in the case of larger companies), ACC and DHB transport contracts, as well as liability insurance. According to industry players, costs of this vary substantially from $100-350 per week: we assume an average of $280/week. Several of the largest taxi operators (for example, Blue Bubble, Alert, Corporate Cabs) have a cooperative structure into which drivers must first buy in. The cost of shares declined following the 2017 Small Passenger Service reforms with average fees for buying-in estimated at around $10,000-25,000. For the purposes of this model, we assume a buy-in of $20,000 with financing costs of 12% over 10 years. Higher financing costs for buying-in (12% p.a.) vis-à-vis vehicle purchase (9%) reflects that vehicles are able to be collateralised.[8]

Ride-hailing companies charge fees as a percentage of gross bookings for rides facilitated through the platform. The fees cover marketing for the platform, technology development (the customer and driver apps), passenger screening, customer service, third party liability insurance and payment processing. In New Zealand, the fees are typically between 15-28% of gross takings, with multi-nationals Uber and Ola charging 28% and 18%, respectively, whereas the predominant local player Zoomy charges 15%. Industry participants indicate Uber currently holds around 80% share of the NZ ride-hail market, implying weighted average platform and licensing charges of approximately 24% for the sector.

Many ride-hailing platforms use dynamic pricing to clear the market during peak periods (events, weather etc.). Dynamic pricing works by both suppressing demand and increasing supply: higher prices encourage ride-hailing drivers onto the road. Surge prices are presented to customers as an upfront fare accepted by the rider in advance of a trip. According to industry experts, about 10% of all trips are subject to surge pricing, for which the average multiplier is around 1.3 times the standard pricing. On this basis, we estimate surge pricing adds about 3% to the overall costs of ride-hailing trips, and this is factored into the labour costs.[9]

2.7 Additional Consumer Charges

Between 15-30% of taxi and ride-hailing trips involve travelling to/from an airport. Airport fees vary: they are set at $3 in Wellington for pick-up and drop-off; $3-5 at Auckland depending on pick-up/drop-off and terminal; and $5.50 in Christchurch. In the TR-OC model, we assume an average of $4.20 applies per airport trip. Additional road tolls are not included in the model.

For taxis, additional fees of $2.30 per ride are incurred for customers using electronic payment (Eftpos/debit card). This covers around 75% of transactions. For ride-hailing services, these costs are incorporated into the platform and licensing charges.[10]

2.8 Occupancy Rates to Determine Per-km Costs

There is no definitive data on the average occupancy rates of taxi or ride-hailing vehicles in New Zealand. The mean occupancy for light 4-wheeled vehicles in New Zealand is estimated at 1.56 (based on HTS information). In the absence of information specific to the taxi/ride-hail sector, this figure has been taken as the average number of passengers per vehicle (when it is on

[8] Conversations with John Hart and Jim McWilliams of the New Zealand Taxi Federation.

[9] Source: private conversations with industry participants.

[10] Conversation with John Hart, Executive Director of the New Zealand Taxi Federation.

paying trips) additional to the driver: it is used to factor the per vehicle km cost model estimates to derive per passenger km average costs.

2.9 Aggregate Demand and Supply Data

To estimate total demand and supply, we rely on two distinct sources of information, one focussed on passenger demand statistics (passenger trips and passenger kilometres) drawing on the MoT Household Travel Survey (HTS); and one focussed on supply statistics (vehicle kilometres travelled), drawing on various industry sources.

2.9.1 Passenger Trips and Passenger Kilometres Travelled

To estimate the total passenger trips made and the average distance travelled per trip, we draw on the 2015-18 HTS survey data, specifically the fields for *trmode,* which records taxi passenger (code 8), and *truber,* which records the use of mobile app services. This data is summarised in Table 2.2, noting that all these statistics relate to the passengers carried (not the vehicle). For each trip recorded in the HTS, the MoT estimates multipliers, or expansion factors, which are used to estimate total annual trips and total kilometres travelled. Using the HTS data, we estimate the average trip distance for travel by taxi and ride-hailing services is 6.38 km (as in Table 2.2).

Appendix C provides further commentary on and interpretation of the HTS data as a measure of taxi/ride hail demand.

Table 2.2 Aggregate person travel demand for taxi and ride-hailing services – Estimated from HTS data for 2015-18

Truber	HTS sample (trips)	Annualised trips [millions]	Annualised kms [millions]	Average distance [km / trip]
0 (no)	405	11.19	80.18	7.21
1 (yes)	81	3.95	16.44	4.13
Total	486	15.14	96.62	6.38

2.9.2 Total Vehicle Kilometres Supplied

To estimate total vehicle kilometres travelled, we draw on aspects of our analyses and conversations with industry. For taxis, this suggests there are approximately 3,250 taxis operating in New Zealand, of which we assume 90% are exclusive (some also register to drive on a ride-hailing platform). Based on an assumed mileage of 60,000 km/year, taxis are estimated to operate 175.5 million km/year, or around 0.39% of total VKT (for all types of motor vehicles). For ride-hailing, we estimate based on industry data that there were approximately 8,375 drivers in New Zealand in 2020/21, travelling on average 30,000km p.a. on ride-hail services or 251.25 million km/year, which is around 0.56% of total VKT.. The taxi and ride-hailing sector thus appears to account for around 0.95% of the 44.90 billion VKT travelled by light vehicles in New Zealand in 2018 (based on Waka Kotahi statistics).

We note that these estimates for service supply include all travel by taxis and ride-hailing vehicles, including out-of-service running. We also note that the industry estimates for taxi and ride-hail vehicle kms travelled may well be over-stated: for example they are likely to include

vehicle travel undertaken for personal, rather than commercial, purposes; and they may well make insufficient (if any) allowances for driver holidays/sickness and for vehicles being under repair.

2.9.3 Reconciliation of Supply and Demand Estimates

Appendix C provides our reconciliation of the passenger demand estimates and the service supply estimates summarised above. By including our best professional judgements of several supply and demand factors for which reliable information is not readily available, we find that the demand and supply estimates outlined above are broadly consistent.

Chapter 3 Results and limitations

3.1 Summary of results

Our main results are summarised in the following tables. First, in Table 3.1 we present the costs per kilometre for cars vis-à-vis ride-hailing and taxi services, as estimated using the PC-OC and TR-OC models. Ride-hailing and taxis cost $2.60 and $3.23 per in-service km, respectively, compared to approximately $0.70 for cars: the main factor accounting for the much higher costs for ride-hailing and taxi transport is, of course, the inclusion of the costs of labour.

Table 3.1 Costs per in-service vehicle-kilometre – Car vis-à-vis Taxi and Ride-hailing Services (GST inclusive)

Cost components		Car	Ride Hail	Taxi
1) Variable operating costs	Resource	$0.26	$0.28	$0.28
	FED -- Other	$0.10	$0.08	$0.10
	FED -- ACC levy	$0.01	$0.01	$0.01
2) Fixed operating costs	Resource	$0.08	$0.08	$0.04
	Duty	$0.01	$0.01	$0.00
3) Fixed Ownership Charges		$0.24	$0.11	$0.10
4) Labour/Contracting Costs			$1.34	$2.19
5) Platform and Licensing Costs			$0.42	$0.30
6) Additional Consumer Charges			$0.28	$0.20
Cost	per in-service veh-km	$0.70	$2.60	$3.23
	per pass-km (inc GST)	$0.44	$1.92	$2.38
	per pass-trip (inc GST)	$2.86	$12.24	$15.20

The results imply per kilometre operating costs for ride-hailing services are some 19.5% lower than for taxis. Most of this difference stems from higher utilisation, which reduces labour costs for ride-hailing services vis-à-vis taxis. Based on an average of 1.56 passengers per trip and an average trip length of 6.38km, we find a total per passenger trip cost (on a financial basis) of $12.24 and $15.20 for ride-hailing and taxis, respectively[11] (NB: For business-related travel, the GST component would need to be removed from these numbers).

Table 3.1 presents long-run average costs per passenger-km of $1.92 and $2.38 for ride-hail and taxi, respectively. To arrive at estimates for marginal costs, we suggest removing the contribution from items 2) fixed operating costs, 3) fixed ownership charges, and a proportion, say 50% of 5) platform and licensing costs. This yields estimated marginal costs of $1.51 and $2.09 per passenger-km for ride-hailing and taxis, respectively (i.e. around 80% - 85% of the average cost rates in the two cases).

[11] Note that these average trip costs are based on the overall average trip length of 6.38km for both sectors; in practice, average taxi trip lengths are significantly longer than this average and ride-hail trip lengths significantly shorter (refer Table 3).

3.2 Limitations

Our analysis is backwards-looking, based on the situation in 2018/19: it does not account for more recent changes in demand and technology. Given the rate and direction of changes in the industry, our analyses may under-estimate current total demand, especially for ride-hailing services.

We may also miss the effects of technological innovations, such as electric vehicles, which may reduce costs compared to what we have assumed. And further into the future, it is possible that connected, autonomous vehicles (AV) may be deployed—removing the need for a driver. If it becomes available, then AV technology can be expected to substantially reduce the costs of ride-hailing and taxi services compared to the figures we estimate in this working paper. That said, most aspects of our TR-OC could be adapted and used to analyse AVs.

We estimate costs per in-service vehicle km, which are then on-charged to passengers proportionally. In the absence of better data, our passenger occupancy estimates, however, are derived from data on NZ car travel generally. Further research could usefully seek to plug this knowledge gap.

Appendix 1 : Bibliography

Ministry of Transport (2020) RD029 Mean Occupancy of Light 4-Wheeled Vehicles by Region (People/Vehicle). *Transport.govt.nz*. (Accessed online 28 Sept. 2020).

Appendix 2 : Listing of DTCC Working Papers

The table below lists the Working Papers prepared as part of the DTCC Study, together with the consultants responsible for their preparation.

Ref	Topic/Working Paper title	Principal Consultants	Affiliation
MODAL TOPICS			
C1.1	Road Infrastructure – Marginal Costs	David Lupton	David Lupton & Associates
C1.2	Road Infrastructure – Total & Average Costs		
C2	Valuation of the Road Network	Richard Paling	Richard Paling Consulting
C3	Road Expenditure & Funding Overview		
C4	Road Vehicle Ownership & Use Charges		
C5	Motor Vehicle Operating Costs		
C6	Long-distance Coaches	David Lupton	David Lupton & Associates
C7	Car Parking	Stuart Donovan	Veitch Lister Consulting
C8	Walking & Cycling		
C9	Taxis & Ride-hailing		
C10	Micro-mobility		
C11.2	Rail Regulation	Murray King	Murray King & Francis Small Consultancy
C11.3	Rail Investment		
C11.4	Rail Funding		
C11.5	Rail Operating Costs		
C11.6	Rail Safety		
C12	Urban Public Transport	Ian Wallis & Adam Lawrence	Ian Wallis Associates
C14	Coastal Shipping	Chris Stone	Rockpoint Corporate Finance
C15	Cook Strait Ferries		
SOCIAL AND ENVIRONMENTAL IMPACT TOPICS			
D1	Costs of Road Transport Accidents	Glen Koorey	ViaStrada
D2	Road Congestion Costs	David Lupton	David Lupton & Associates
D3	Health Impacts of Active Transport	Anja Misdrak & Ed Randal	University of Otago (Wellington)
D4	Air Quality & Greenhouse Gas Emissions	Gerda Kuschel	Emission Impossible
D5	Noise	Michael Smith	Altissimo Consulting
D6	Biodiversity & Biosecurity	Stephen Fuller	Boffa Miskell

Note:

The above listing incorporates a number of variations from the initial listing and scope of the DTCC Working Papers as set out in the DTCC Scoping Report (May 2020).

Appendix 3 : Reconciliation of demand and supply estimates

A3.1 Demand estimates – passenger km

1. The HTS (2015-18) figures (Table 2.2) are for 15.14 mill passenger trips pa and 96.62m. pass-km, with an average trip distance of 6.38 km. Taxis and ride-hailing services accounted for 80.18 m. and 16.44 m. pass-km, respectively.
2. To estimate the equivalent figure for 2018/19, we apply 2% p.a. and 100% p.a. compound growth rates for taxis and rideshare respectively, over two-year period[12] (i.e. from average 2015-2018 to average 2018/19). On this basis, the HTS passenger trips figure should be increased by c54%, giving 149.18 m. pass-km in 2018/19.
3. These estimates do not include travel by non-residents, especially short-term visitors, who would not be covered by HTS. Non-residents are likely to have disproportionately high use of taxis etc, with average trip distances that are on average longer than those covered by HTS (e.g. their trips would comprise a substantial proportion of airport- related trips). Our judgement is that these trips would account for 40%-50% of total demand: on this basis the total passenger demand would be **in the range 249-298 mill passenger kms in 2018/19** with a midpoint of 271 mill passenger kms

A3.2 Supply estimates – service km

1. The Chapter 2.9 estimates are for an annual total of 427 mill vehicle kms run by taxis plus R-H services at 2021/22.
2. It seems highly likely to us that these figures will be on high side, as:
    - They most likely include a component of private use of the taxi vehicles etc by the operators: we guestimate this is 15% of the total distance operated.
    - The sector estimates of annual kms per vehicle are highly likely to be based on an assumed 52 week full-time basis; whereas in practice most taxi/R-H vehicles spend some time out of service for repairs/maintenance, driver holidays etc. We estimate a reduction in the annual distance operated per vehicle of 15% for this reason.
    - As a result of the above, the nominal 427 mill vehicle kms would reduce to 427 * 0.85 * 0.85 = 310 mill veh kms per year.
3. Allowance also needs to be made for out-of-service running. Our broad assessment is that this would be in the range 40% - 80% of the in-service running. On this basis, the in-service running estimate becomes **180 – 230 mill veh kms** for 2018/19.

A3.3 Demand and supply reconciliation

1. The ratio passenger km: in-service km represents the average occupancy of taxis etc while carrying passengers.
2. Based on the above figures, these ratios are:
    - 1.32, based on the averages for the two range estimates given above;
    - 1.08, taking the lower figure for passenger km and the higher figure for veh km;
    - 1.66, taking the higher figure for passenger km and the lower figure for veh km.

12

3. In the absence of other data, we previously assumed the same average occupancy as the light vehicle fleet (when carrying passengers) of 1.5. The latter lies within the range estimated above from supply and demand statistics, although somewhat towards the top end of this range.
4. This is an aspect on which further (and updated) work could well be warranted (but depending on the importance placed on the taxi/ride hail sector in the overall DTCC context).

Domestic Transport Costs and Charges Study

Working paper C9
Taxi and Ride-hailing

transport.govt.nz

ISBN 978-1-99-117849-7

Te Kāwanatanga o Aotearoa
New Zealand Government