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Use of ride sharing and taxi services in New South Wales

A report for the Independent Pricing and Regulatory Tribunal

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Contents

Executive Summary	i
1. Introduction	1
2. Ride sharing has grown significantly in New South Wales since 2015	3
2.1 We estimate at least a quarter of all New South Wales residents paid for a taxi or ride sharing service with an electronic payment method in the year ending June 2017	3
2.2 The use of point to point transport paid via electronic payment methods has almost doubled, in both the number of transactions and the average amount spent per person	4
2.3 Ride sharing has grown the point to point transport service market paid via electronic payment methods, rather than substituted from taxis	5
2.4 Ride sharing has rapidly captured a substantial proportion of the point to point transport market	6
2.5 Ride sharing has the highest share of electronic transactions on weekends	8
2.6 Taxi-only customers who take up ride sharing are more likely to increase their overall spending on point to point transport	10
2.7 Ride sharing customers are more likely to repeatedly use the service	12
3. Ride sharing is mostly occurring in urban areas along the eastern coastline of New South Wales	15
3.1 Ride sharing is primarily used by residents of Sydney	15
3.2 In areas in Sydney where ride sharing is popular, more than one in every three people have used a ride sharing service	16
3.3 The proportion of residents using ride sharing in Sydney is more than double the neighbouring urban regions of Wollongong, the Central Coast and Newcastle	17
3.4 Ride sharing's share of the point to point transport market has increased across all regions from 2016 onwards	18
3.5 Ride sharing has grown the point to point transport service market in most regions across New South Wales where ridesharing operates	20
A1. Description of the data used	22
A1.1 Data overview	22
A1.2 The banking transactional data	22
A1.3 Key data limitations	22

Figure

Figure 1 Key metrics to analyse spending behaviour	ii
Figure 2 Indexed monthly electronic spend per person for taxis and ride sharing in NSW	iii
Figure 3 Proportion of NSW residents using point to point transport services in 2016/17 compared to 2015/16	4
Figure 4 Transactional behaviour for point to point transport in NSW, 2016/17 compared to (2015/16)	5
Figure 5 Amount spent per person for taxis and ride sharing using electronic payment methods by NSW residents	6
Figure 6 Share of electronic spend by category of point to point transport in NSW	7
Figure 7 Share of electronic transactions by category of point to point transport in NSW	7
Figure 8 Transactional behaviour for ride sharing in NSW, 2016/17 compared to (2015/16)	14
Figure 9 Transactional behaviour for taxis in NSW, 2016/17 compared to (2015/16)	14
Figure 10 Proportion of point to point transport users using ride sharing in Sydney, 2016/17	15
Figure 11 Proportion of point to point transport users using ride sharing in NSW, 2016/17	16
Figure 12 Share of total electronic transaction spending on point to point transport services by region, 2015/16 to 2016/17	19
Figure 13 Share of total number of electronic transactions on point to point transport services by region, 2015/16 to 2016/17	20
Figure 14 Average amount spent per person on point to point services across the nine regions for 2016/17 and 2015/16	21

Tables

Table 1 Share of electronic transactions on point to point transport services by day and time groupings	iv
Table 2 Data limitations	1
Table 3 Share of electronic spend by day and time groups	8
Table 4 Share of electronic transactions by day and time groups	9
Table 5 Average amount spent via electronic transactions per person by day and time groups	9
Table 6 Change in spending on point to point transport and use of ride sharing for a selected group of regular taxi users who used taxis exclusively in the 6 months prior to April 2016	10
Table 7 Decomposition of ride sharing spending for a selected group of regular taxi users who used taxis exclusively in the 6 months prior to April 2016	11
Table 8 Change in amount spent on point to point transport by use of taxi and ride sharing, and change in total use for a selected group of regular taxi users who used taxis exclusively in the 6 months prior to April 2016	12
Table 9 Key metrics for top ten most popular ride sharing areas in Sydney for 2016/17	17
Table 10 Key metrics for nine regions across NSW in 2016/17	18
Table 11 Average amount spent per person and share of electronic spend on point to point services across the nine regions	21

Executive Summary

Ride sharing services in New South Wales (NSW) are a growing part of the point to point transport market. Since its legalisation in December 2015, ride sharing services have expanded into different locations across NSW.

The Independent Pricing and Regulatory Tribunal (IPART) is currently reviewing taxi fares across NSW, and considering how many taxi licenses should be released outside of Sydney from July 2018. As part of this review IPART is examining competition in the point to point transport market.

It is within this context that HoustonKemp has been engaged to analyse recent trends in the use of taxi and ride sharing services, with a particular focus on how the introduction of ride sharing has affected the market for point to point transport services, and the use of taxi services in particular.

Bank transactional data has been used to provide insights on the point to point transport market

Our approach has involved the use of non-personally-identifiable, consumer banking transactional data, through Data Republic provided by Westpac Banking Corporation. The banking transactional data allows us to identify the amount spent on, and number of transactions involving, taxi and ride sharing services by those customers using electronic payment methods. This allows us to examine how both the number of transactions and the amount spent on these services has changed since 1 July 2015. In addition, we have also been able to examine trends based on the area where the account holder resides.

Westpac is one of Australia's big four banks with greater than 20 per cent share of card transactions. The sample size of the data includes over two million customers and represents over 25 per cent of New South Wales' population.¹ Based on the size of the sample, and the assumption that the big four banks in Australia are similarly competitive in their consumer product and service offering, we have assumed that Westpac Banking Corporation customers are 'typical' users of point to point transport services and so are representative of all customers making use of these services.

The use of taxi services will likely be underrepresented in this analysis as we do not have access to data on those services paid with cash. As at February 2017, cash was used as the payment method for approximately 51 per cent of all taxi trips.² Our analysis also does not capture changes in the use of cash as a mode of payment for taxi services. It follows that some of the observed growth in taxi use within our data might be because of a shifting trend towards using electronic payments as compared to cash to pay for these services. There has been an overall downward trend in the proportion of taxi trips paid by cash, decreasing from 55 per cent in February 2015 to 51 per cent in February 2017².

As the data is only for consumer banking transactions, we do not capture trends in corporate use of taxi or ride sharing services, including taxi trips paid via Cabcharge or business credit and debit cards. This means that the results only represent consumer electronic transactions, which is a subset of the entire market for point to point transport services. As at February 2017, the proportion of taxi and ride share trips that are for work purposes is estimated to be 19 per cent and 15 per cent respectively².

Finally, there are nuances in the data which causes the misallocation of transactions and spending behaviour. UberEats is such an example, where some UberEats transactions appear as a regular Uber ride

¹ ABS 2016 Census Quickstats for New South Wales

² Taverner Research, *Comparing Surveys of Point to Point Transport Use, November 2014 to February 2017, May 2017*

share transaction and is unable to be excluded from the analysis. The size of UberEats and the extent to which this inflates Uber ride share spending is unknown.

All of our results should therefore be interpreted taking into account these considerations, as the various limitations will impact the results in different ways.

Between 2015 and 2016 both the number and value of electronic point to point transport transactions almost doubled

The data shows that around 26 per cent of residents in NSW made use of at least one point to point transport service in 2016, and paid via electronic payment methods. This is an increase from 21 per cent in 2015. Of these users, 41 per cent used taxi services exclusively, 20 per cent used ride sharing exclusively, and the remainder made use of both (ie, 39 per cent).

We found that in 2016, point to point transport customers on average spent a total of \$412 via electronic payment methods on these services, compared to \$263 in 2015. In addition, the average total number of transactions per customer doubled from eight in 2015 to 16 in 2016.

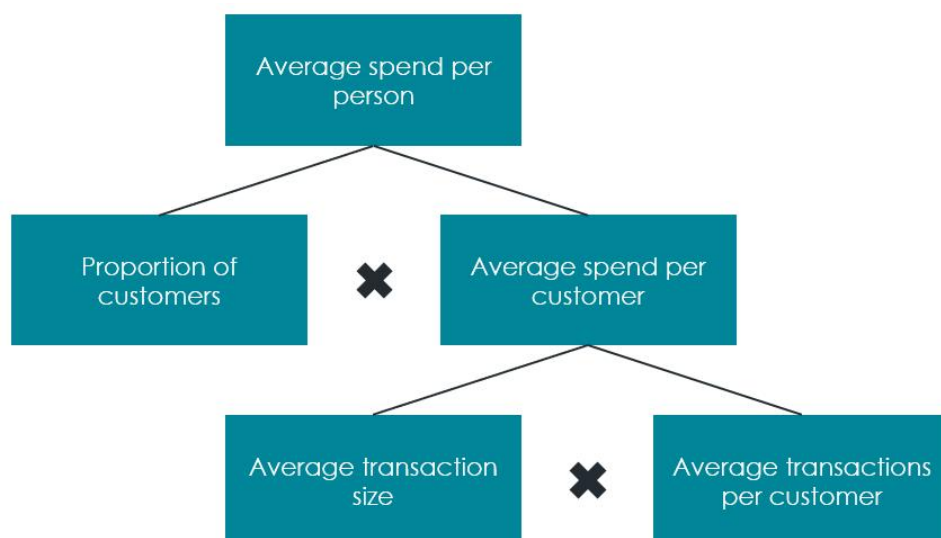
Ride sharing has grown the overall point to point transport service market, rather than substituting for taxi services

To better understand how ride sharing has affected the point to point transport market, we considered five key metrics to analyse how consumers spending behaviours have changed. These metrics are:

- transaction size – the amount spent per transaction;
- transactions per customer – the number of transactions by a customer within a time period;
- spend per customer – the total amount spent by a customer within a time period;
- proportion of customers – the proportion of the population which have used the service; and
- spend per person – the total amount spent on point to point transport services, multiplied by the proportion of the population that have used a point to point transport service.

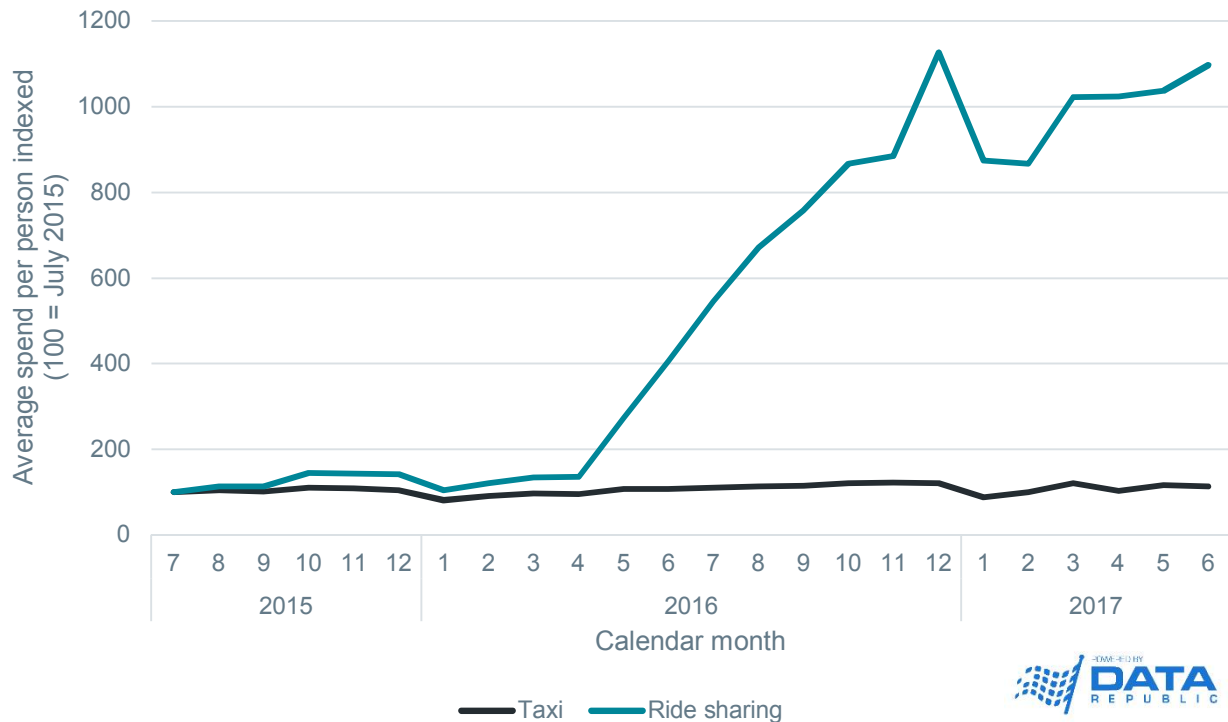
Figure 1 below illustrates the interactions between these five metrics.

Figure 1 Key metrics to analyse spending behaviour



Almost all of the growth in point to point transport services paid via electronic payment methods between 2015 and 2017 has been in ride sharing. From April 2016 to June 2017, spending on ride sharing services has increased by more than 750 per cent. In contrast, over the same period taxi service electronic spending increased by 19 per cent.

Figure 2 Indexed monthly electronic spend per person for taxis and ride sharing in NSW³



The growth of ride sharing year to year is demonstrated across all behavioural drivers, including:

- a higher number of transactions (four to 17);
- a higher spend per customer (\$116 to \$377);
- more people engaging with ride sharing (nine per cent to 15 per cent); and
- an overall increase in the spend per person (\$10 to \$58).

In contrast, for taxis, all behavioural drivers remained relatively constant through the period, including:

- the same number of transactions (seven);
- similar spend per customer (\$225 to \$231);
- a marginal increase in the number of people using taxis (19 per cent to 21 per cent); and
- a marginal increase in the spend per person (\$43 to \$48).

The absence of cash and other payment methods such as Cabcharge and business cards in the analysis means that these results only represent a subset of the entire point to point transport market. We would expect that relative to the entire market, our results likely understate the total number of trips, and the amount spent per customer, and per person. The proportion of customers using point to point transport services is likely to be understated to a lesser degree, as the only customers not captured are those who exclusively pay via cash, Cabcharge or business cards for the entire year. Ride sharing use is also likely to

³ Spend per person (monthly) is indexed as at July 2015 (\$0.68 per person for ride sharing, \$4.56 for taxi)

be marginally overstated due to the limitation where UberEats is unable to be distinguished from Uber ride share transactions.

Ride sharing has the greatest share of electronic transactions on weekends

In terms of market share, ride sharing in NSW has captured most weekend transactions growing to 75 per cent of all electronic transactions on point to point transport in 2016/17. This is in comparison to 58 per cent of all electronic transactions on point to point transport during weekdays.

Table 1 Share of electronic transactions on point to point transport services by day and time groupings

Share of electronic transactions Day and time grouping	Ride share			Taxi		
	2015/16	2016/17	Change	2015/16	2016/17	Change
Fri & Sat nights (7pm – 7am)	25%	69%	45%	75%	31%	-44%
Weekdays (7am – 7pm)	19%	58%	39%	80%	42%	-38%
Weekends (7am – 7pm)	24%	75%	51%	76%	25%	-50%
Weekdays incl Sun (7pm – 7am)	22%	64%	42%	77%	36%	-41%



It is likely that growth in ride sharing is centred on Sydney and the east coast of NSW

We also investigated how ride sharing is being used in regional areas throughout NSW, noting that the data only identifies the location of the customer's residence, not the location of the transaction. We found that:

- ride sharing is being mostly used by Sydney residents, with the most popular areas within Sydney having more than one in every three people having used ride sharing in 2017;
- 20 per cent of Sydney residents used ride sharing, compared to 11 per cent of residents in Byron Bay, and nine per cent of residents in Wollongong, Newcastle and the Central Coast; and
- in most regions, the use of ride sharing has grown without affecting the use of taxi services in those regions. However, it is unknown whether the ride sharing service was used in their home region, or in Sydney (or any other location in Australia) when they travel domestically.

1. Introduction

The NSW Government has asked the Independent Pricing and Regulatory Tribunal (IPART) to review and recommend taxi fares across NSW, and the number of new taxi licences to be released outside Sydney from July 2018. This will be the first time that fares and licences are reviewed since the legalisation of ride sharing services in NSW, and the reduction in restrictions on hire cars and limousines. These reforms to the point to point transport sector, in combination with how the sharing economy has changed mobility consumption, means that ride sharing and hire car services are closer substitutes for taxi services than they may have been in the past.

HoustonKemp has been engaged by IPART to investigate how reforms to ride sharing and hire car services have affected the taxi industry. Specifically, we have been asked to analyse:

- the extent to which point to point transport service demand has grown;
- the extent to which ride sharing services are substitutes for taxi services; and
- the share of the point to point transport market that is provided by taxis, ride sharing and hire cars

To provide these insights, we have analysed non-personally-identifiable, banking transactional data through Data Republic provided by Westpac Banking Corporation. The data cover the period from July 2015 to June 2017, and are provided to us in a deidentified form so that transactional records for any individual cannot be identified.

The data allow us to identify the number and value of electronic transaction records of point to point transport services, linked to the geographic location of the card holder's dwelling. Whilst the data coverage may be larger than traditional survey studies, it is still important to understand what the data comprises of, and its limitations. The key limitations to this analysis and their likely impacts are listed below in Table 2.

Table 2 Data limitations

Limitations	Impact on results
Cash is not included in the analysis	Underrepresentation of the usage of taxi services. Proportion of cash for taxi fares is estimated to be 51 per cent ⁴
Only includes retail consumer credit and debit cards (does not include Cabcharge or business cards)	Underrepresentation of the usage of taxi services. Proportion of taxi and ride share trips for work is 19 per cent and 15 per cent respectively ⁴
The use of electronic payments for taxi services has grown as a proportion of taxi transactions	Growth for taxis may be as a consequence of shifts in payment methods from cash to card. Downwards trend in the proportion of taxi trips paid by cash, decreasing from 55 percent in Feb 2015 to 51 percent in Feb 2017 ⁴
Analysis by geographic regions is based on where the consumer lives rather than where the service is used	Overstates the use by residents (ie, if they use ride sharing when travelling domestically) and understates the use by customers who visit the region.
Misallocation of transactions	Some UberEats transactions cannot be separated from Uber ride sharing transactions. The size of UberEats and the extent to which this is occurring is unknown and will overstate rideshare.
Only the payer of the service is considered to have used the service	Passengers who did not pay for the service are not considered to have used it, will understate the overall number of 'users'.

While this does not perfectly capture the point to point transport market over the period, it does allow us to analyse trends over time, which provide insights on likely trends across the entire point to point transport market.

We explain our data source in greater detail in Appendix A.1.

This report sets out the results of our analysis and describes the data in detail. The remainder of this report is structured as follows:

- section 2 examines the use of ride sharing and taxi services across NSW; and
- section 3 examines the use of ride sharing and taxi services within key regions in NSW.

2. Ride sharing has grown significantly in New South Wales since 2015

In this section, we examine how the point to point transport market in NSW has changed since 2015. Our focus is on how ride sharing has impacted on the overall use of point to point transport services, and whether it has led to a change in the use of taxi services.

2.1 We estimate at least a quarter of all New South Wales residents paid for a taxi or ride sharing service with an electronic payment method in the year ending June 2017

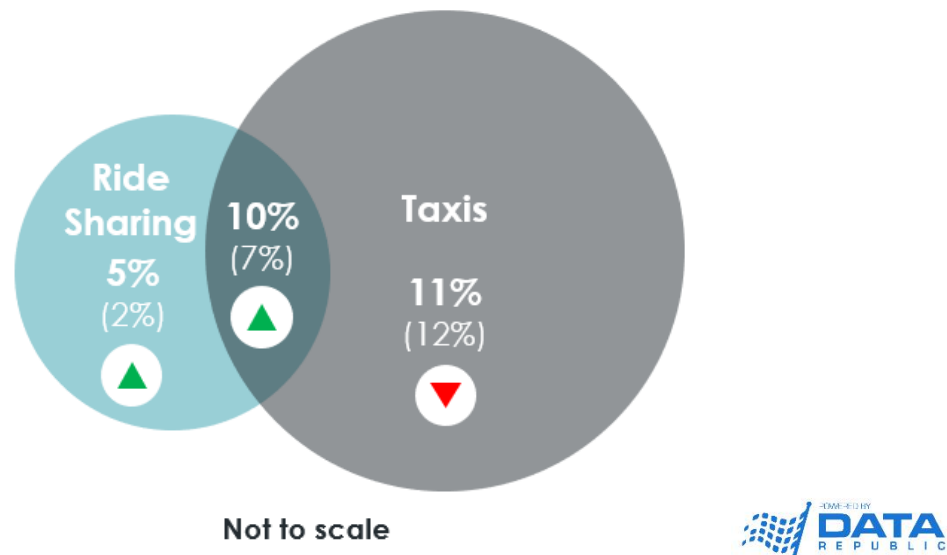
The starting point for our analysis was to consider the extent to which residents in NSW made use of ride sharing services, which were paid via electronic payment methods. Our analysis of the electronic transaction data showed that around a quarter of NSW residents (26 per cent) had used an electronic payment method to pay for a taxi or ride sharing service in the year ending June 2017 (ie, 2016/17). This likely significantly understates the number of residents that made use of taxi or ride sharing services, because it does not include those users who exclusively paid for these services via cash, Cabcharge or business cards, or those people who exclusively did not pay for taxi or ride sharing services themselves, because they travelled with someone else who did.

The 26 per cent was made up of five per cent of residents who had electronic transactions only for ride sharing, 11 per cent who had transactions only for taxis, and 10 per cent who had transactions for both ride sharing and taxis over the 12-month period.

The proportion of residents that used a ride sharing service has increased significantly when compared to the previous year, with the proportion who exclusively used ride sharing more than doubling (from 2 per cent to 5 per cent), and a significant increase in the proportion of residents using both ride sharing and taxis (7 per cent to 10 per cent) and paying using electronic payment methods.

In 2016/17, approximately five in every ten taxi customers who paid using electronic payment methods also used ride sharing (ten per cent of 21 per cent), compared to four in every ten customers last year (seven per cent of 19 per cent).

Figure 3 Proportion of NSW residents using point to point transport services in 2016/17 compared to 2015/16



2.2 The use of point to point transport paid via electronic payment methods has almost doubled, in both the number of transactions and the average amount spent per person

We next considered the number of, and changes in, ride sharing electronic transactions recorded for each customer, and changes in the amount spent per transaction.

In 2016/17, the average number of electronic transactions for those residents that made use of point to point transport services increased to 16 from eight in 2015/16. However, the average transaction size was slightly lower at \$26⁴ compared to \$33 the previous year.

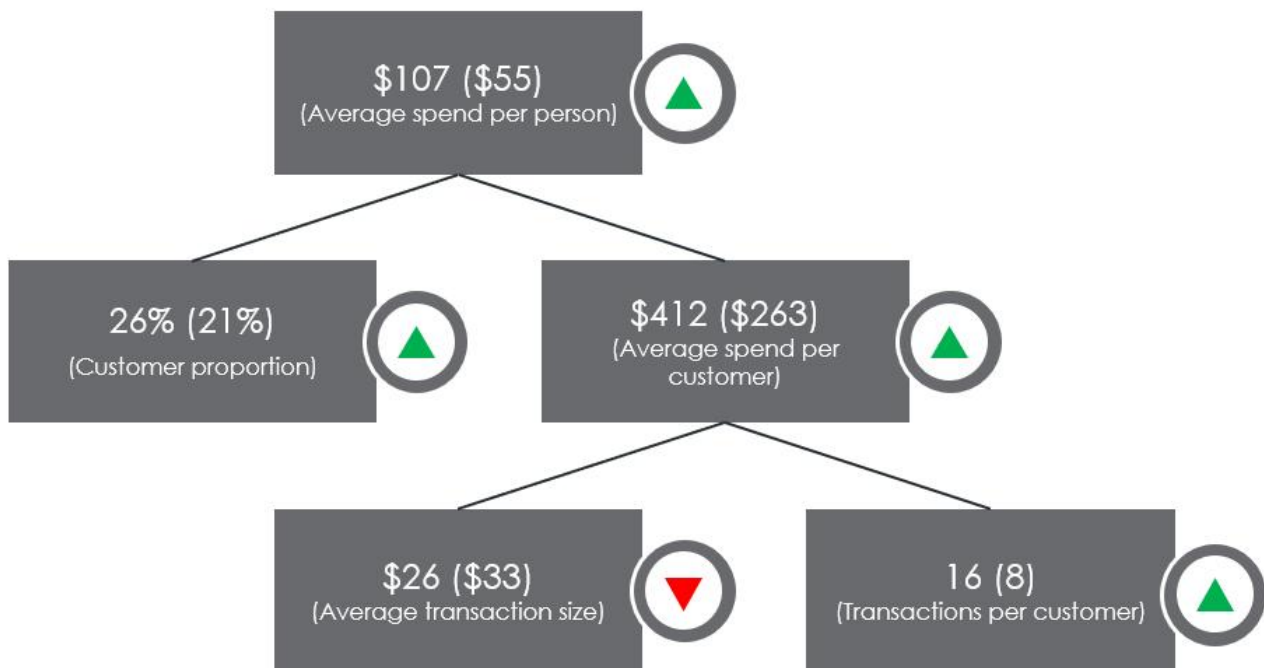
This suggests that in addition to more residents now making use of ride sharing services, they are also using ride sharing services more frequently. The lower average transaction size likely reflects both lower costs of ride sharing services, or that the length of these journeys are slightly shorter than the previous year as ride sharing has a higher share of transactions than their share of spending (see Figure 6 and Figure 7).

We find that customers of point to point transport services spend on average \$412 per year, averaging a little over one transaction each month and spend on average \$34 each month.

Figure 4 below summarises how residents in NSW are using the point to point transport market in 2016/17 compared to 2015/16.

⁴ The average transaction size for ride sharing may be skewed by promotional activities including discounts such as \$20 off your first ride coupons, bonus credit for referring friends etc.

Figure 4 Transactional behaviour for point to point transport in NSW, 2016/17 compared to (2015/16)



2.3 Ride sharing has grown the point to point transport service via electronic payment methods, rather than substituted f

Figure 5 compares the average amount spent per person via electronic payment methods on ride sharing services and taxi services since July 2015.

Prior to April 2016, the average amount spent per person in NSW on ride sharing services was \$1 per month. Since then, the amount spent has grown significantly to roughly \$7 per month.

The average amount spent per person on taxi services has also increased over the 24-month period, albeit at a much slower rate (one per cent per month) compared to ride sharing (13 per cent per month). As the analysis does not include cash or other payment methods such as Cabcharge and business cards, the actual amount spent per person on taxi services is likely to be higher than indicated in Figure 5.

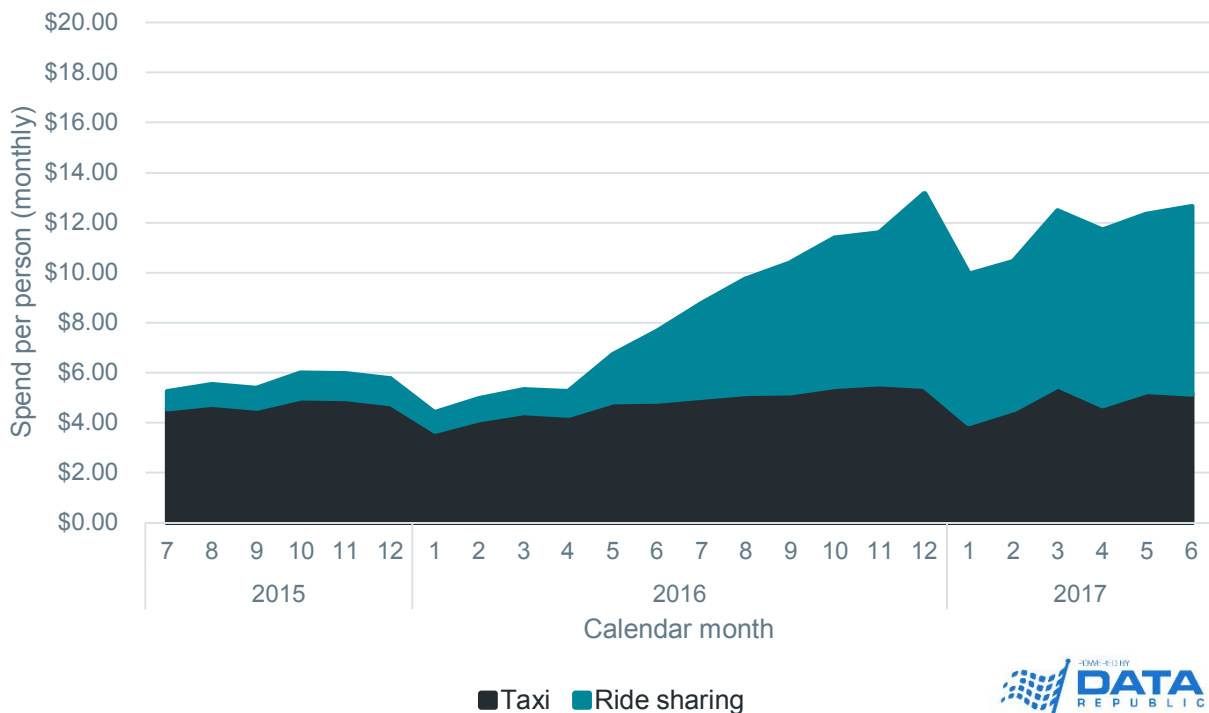
This suggests that customers have continued to make use of taxi services despite the legalisation of ride sharing services.⁵ However, much of the observed growth in the use of point to point transport services has been captured by ride sharing providers.⁶

This evidence supports a conclusion that the introduction of ride sharing services has grown the overall point to point transport market, rather than acted as a substitute for the traditional market for taxi services. Whilst the amount spent on taxi services via electronic payment methods has also grown over the same period, this may be due to consumers changing their payment methods from cash to electronic.

⁵ This statement presumes that there has been no reduction in the number of taxis services paid via cash over the time period analysed. We believe this is a reasonable assumption absent evidence to the contrary, given there has been no decrease in the number and value of electronic transactions on taxis following the growth in ride sharing from April 2016 onwards.

⁶ Some of the observed growth may be because of growth in UberEats, which cannot be separately identified within our data.

Figure 5 Amount spent per person for taxis and ride sharing using electronic payment methods by NSW residents



2.4 Ride sharing has rapidly captured a substantial proportion of the point to point transport market

Ride sharing's share of the NSW point to point transport market paid via electronic payment methods sharply increased over the course of 2016 and appears to have stabilised at just under 60 per cent of the total amount spent on point to point transport services and 70 per cent of the number of transactions in the first half of 2017. The sharp increase follows the legalisation of Uber in NSW in December 2015, and the allowance for Uber to pick up passengers at domestic and international terminals at Sydney Airport in May 2016.

Ride sharing has a lower share of electronic spending (60 per cent in 2017) compared to its share of electronic transactions (70 percent), which likely reflects either that ride sharing services are generally cheaper than taxi services, or that ride sharing trips paid via electronic payment methods are shorter than taxi trips.

As the analysis does not include cash, or other payment methods such as Cabcharge and business credit and debit cards, the share of electronic spending may not precisely reflect the market share for ride share services across the entire point to point transport market.

Figure 6 Share of electronic spend by category of point to point transport in NSW

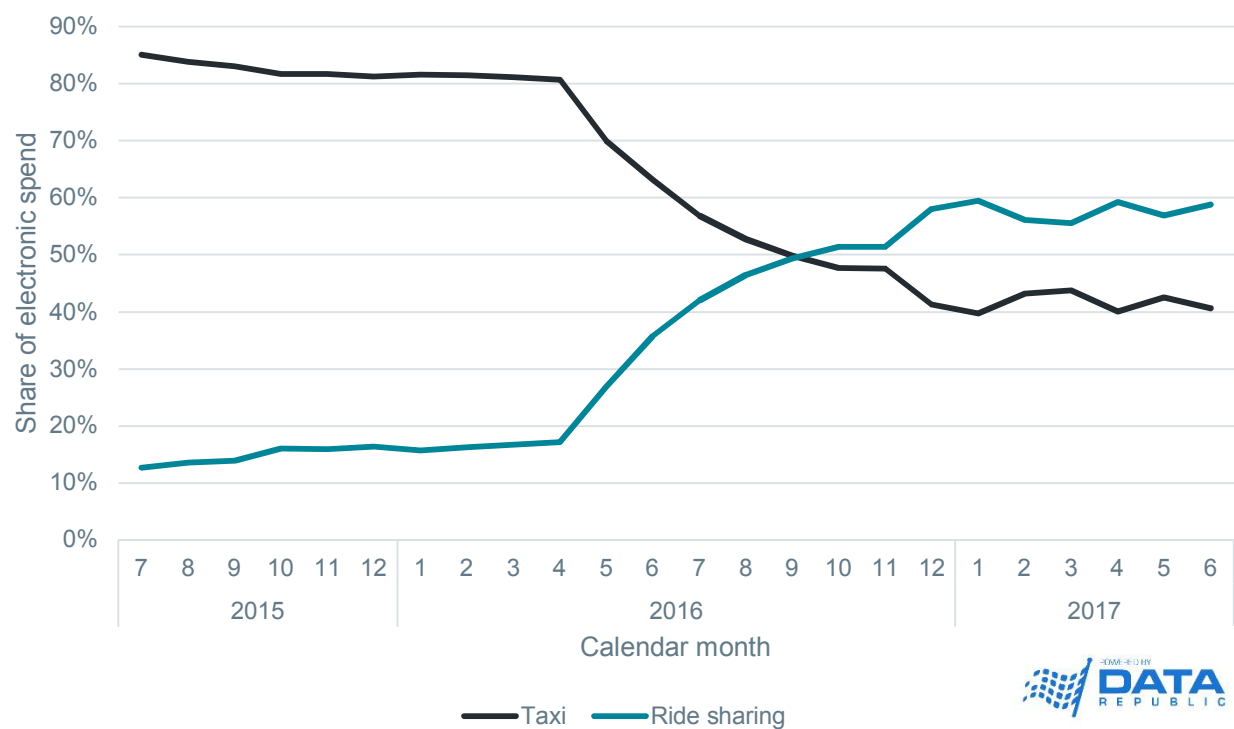
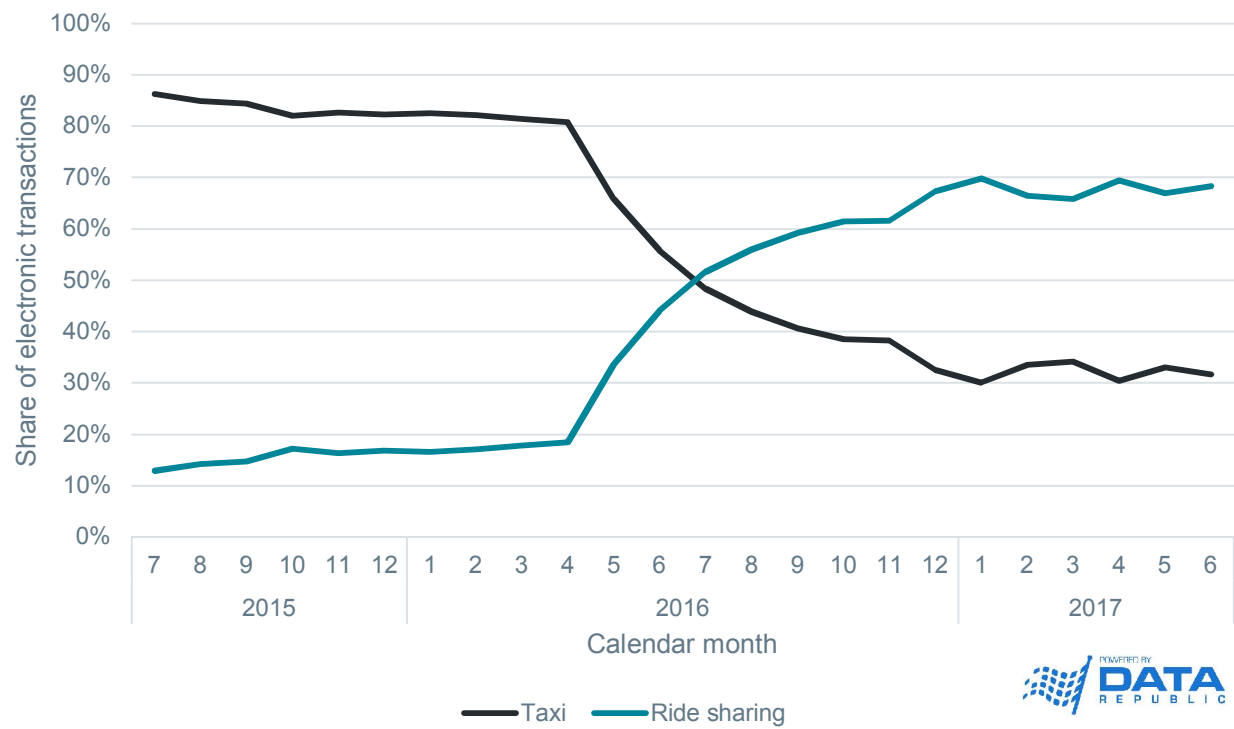


Figure 7 Share of electronic transactions by category of point to point transport in NSW



2.5 Ride sharing has the highest share of electronic transactions on weekends

In 2016/17, ride sharing had the highest share of electronic transactions within the point to point transport market during weekends⁷ at 75 per cent, followed by Friday and Saturday nights⁸ at 69 per cent. In contrast to 2015/16 when taxis had a higher share across all day and time groupings, in 2016/17, ride sharing had a higher share of electronic transactions across all time groups.

The amount spent per person for ride sharing has grown considerably for all day and time groups, with the largest increase being for weekdays at \$15, and the largest proportional increase of seven times for weekends (\$8.84 compared to \$1.07).

Whilst the share of electronic transactions of taxi services within the point to point transport market has dropped considerably across all day and time groupings, the amount spent per person on taxis has marginally increased. This further supports a conclusion that the use of taxis has not dramatically changed within any day and time group. Rather ride sharing has grown the overall market rather than substituting for taxis across all date and time groups.

The share of electronic transactions and amount spent per person on point to point transport services as set out in Table 3, Table 4 and Table 5 below are likely to be understating total market share of taxi services, and the amount spent, due to the lack of cash and other forms of payments, including Cabcharge and business spending. Ride sharing's share is likely to be overstated due to some UberEats transactions contributing to the share and spend increases, that were unable to be excluded from the analysis.

Table 3 Share of electronic spend by day and time groups

Share of electronic spend Day and time groups	Ride share			Taxi		
	2015/16	2016/17	Change	2015/16	2016/17	Change
Fri & Sat nights (7pm – 7am)	22%	61%	38%	76%	39%	-37%
Weekdays (7am – 7pm)	16%	47%	30%	80%	52%	-28%
Weekends (7am – 7pm)	20%	65%	46%	79%	34%	-44%
Weekdays incl Sun (7pm – 7am)	20%	55%	34%	78%	45%	-33%

⁷ Defined as Saturday and Sunday, 7am to 7 pm.

⁸ Defined as Friday and Saturday, 7pm to 7am.

Table 4 Share of electronic transactions by day and time groups

Share of electronic transactions	Ride share			Taxi		
Day and time groups	2015/16	2016/17	Change	2015/16	2016/17	Change
Fri & Sat nights (7pm – 7am)	25%	69%	45%	75%	31%	-44%
Weekdays (7am – 7pm)	19%	58%	39%	80%	42%	-38%
Weekends (7am – 7pm)	24%	75%	51%	76%	25%	-50%
Weekdays incl Sun (7pm – 7am)	22%	64%	42%	77%	36%	-41%



Table 5 Average amount spent via electronic transactions per person by day and time groups

Average spend per person	Ride share			Taxi		
Day and time groups	2015/16	2016/17	Change	2015/16	2016/17	Change
Fri & Sat nights (7pm – 7am)	\$2.16	\$12.89	\$10.73	\$7.39	\$8.26	\$0.87
Weekdays (7am – 7pm)	\$3.89	\$19.25	\$15.36	\$18.96	\$21.29	\$2.33
Weekends (7am – 7pm)	\$1.07	\$8.84	\$7.77	\$4.27	\$4.62	\$0.35
Weekdays incl Sun (7pm – 7am)	\$3.23	\$17.13	\$13.90	\$12.52	\$14.12	\$1.60



2.6 Taxi-only customers who take up ride sharing are more likely to increase their overall spending on point to point transport

To further explore how ride sharing has affected the spending behaviours of customers who typically use taxis, we analysed a group of customers who:

- only used taxis (no ride sharing) in the 6-month period ending April 2016; and
- had six or more electronic transactions for taxis services in that period.

The 6-month period was selected because it reflected the period after April 2016 when the use of ride sharing grew rapidly. The number of transaction segmentation was used so as to focus on a group of more regular taxi users.

We examined the behaviours of this group of customers a year later, over the 6-month period ending April 2017. This comparison period was selected to remove any seasonality throughout the course of the year.

To analyse how these customers' behaviours changed, we considered two dimensions:

- whether their total use of point to point transport increased; and
- the share of point to point transport transactions on ride sharing.

The results on how the selected group of customers' spending behaviours changed are presented in Table 6 and Table 7 below.

Table 6 Change in spending on point to point transport and use of ride sharing for a selected group of regular taxi users who used taxis exclusively in the 6 months prior to April 2016

Use of point to point transport	Exclusively used taxis	Used ride share	Total
Decreased use of for point to point transport (Spend decreased by 25% or more)	27%	13%	40%
No change in use of point to point transport	7%	10%	17%
Increased use of point to point transport (Spend increased by 25% or more)	8%	34%	43%
Total	43%	57%	100%

Table 7 Decomposition of ride sharing spending for a selected group of regular taxi users who used taxis exclusively in the 6 months prior to April 2016

Use of point to point transport	Exclusively used taxis	Mostly used taxis (> 67% with taxis)	Split between modes (33 - 67% with taxis)	Mostly used ride share (< 33% with taxis)	Exclusively used ride share	Total
Decreased use of for point to point transport (Spend decreased by 25% or more)	27%	3%	5%	2%	3%	40%
No change in use of point to point transport	7%	4%	2%	3%	1%	17%
Increased use of point to point transport (Spend increased by 25% or more)	8%	9%	7%	15%	2%	43%
Total	43%	16%	15%	20%	6%	100%



Overall, within the selected group there were more customers who used ride sharing (57 per cent) compared to those who continued to use taxis exclusively (43 per cent). The most common behaviour of this group of customers was an increase in their use of point to point transport services, and having started using ride sharing to some extent, with just over a third of customers (34 per cent) exhibiting this behaviour.

Of the customers who continued to exclusively use taxis, approximately two-thirds of these customers decreased their use of point to point transport (27 per cent of 43 per cent). Of the customers who used ride sharing, 60 per cent (34 per cent of 57 per cent) increased their use of point to point transport. Therefore, it was more likely for a customer who used ride sharing to increase their overall use of point to point transport, compared to a customer who exclusively used taxis.

Given that a customer who used ride sharing is more likely to increase their overall point to point transport spending, we further explored whether the total amount they spent on point to point transport services rose as their use of ride sharing increased. Table 8 below presents the results on how customers' total spending has changed.

Table 8 Change in amount spent on point to point transport by use of taxi and ride sharing, and change in total use for a selected group of regular taxi users who used taxis exclusively in the 6 months prior to April 2016

Use of point to point	Taxi and ride share usage	Proportion of customers	Average total spend 6m to April 2016	Average total spend 6m to April 2017	Average increase in total spend	Average ride share spend share
Decreased use	Exclusively used taxis	27%	\$328	\$99	(\$229)	0%
	Mostly used taxis	3%	\$571	\$286	(\$285)	13%
	Split between modes	5%	\$426	\$166	(\$260)	40%
	Mostly used ride share	2%	\$490	\$218	(\$272)	75%
	Exclusively used ride share	3%	\$323	\$76	(\$248)	100%
No change in use	Exclusively used taxis	7%	\$323	\$316	(\$6)	0%
	Mostly used taxis	4%	\$408	\$403	(\$4)	14%
	Split between modes	2%	\$344	\$338	(\$6)	40%
	Mostly used ride share	3%	\$360	\$356	(\$4)	75%
	Exclusively used ride share	1%	\$239	\$232	(\$7)	100%
Increased use	Exclusively used taxis	8%	\$270	\$588	\$318	0%
	Mostly used taxis	9%	\$320	\$814	\$494	14%
	Split between modes	7%	\$292	\$828	\$536	46%
	Mostly used ride share	15%	\$261	\$1,011	\$750	82%
	Exclusively used ride share	2%	\$193	\$685	\$492	100%



For customers who's use of point to point transport services increased, those who used ride sharing proportionally more, tend to have higher total spend. 15 per cent of customers who previously only spent on average \$261 with taxis in a 6-month period now spend over \$1,000 with 82 per cent going towards ride sharing.

This evidence further supports a conclusion that customers who adopt ride sharing are more likely to increase the amount they spend on point to point transport services, with customers who make more use of ride sharing further increasing their total spend.

2.7 Ride sharing customers are more likely to repeatedly use the service

Despite the substantial growth in ride sharing, there are still more people in NSW who have used a taxi than a ride sharing service (21 per cent compared to 15 per cent) in 2016/17. This is likely due to the lack of availability of ride sharing services in regional areas of NSW with most areas outside of Sydney having less than ten per cent of residents having used ride sharing in 2016/17 (see Figure 10 and Figure 11).

Customers who use ride sharing tend to have a larger number of transactions, and spend almost 1.6 times more compared to customers that only use taxis (\$377 compared to \$231). This shows that the average ride

sharing customer spends more with ride sharing through repeated use of the service, compared to taxi customers, who transact less frequently and so spend less in total on taxis services.

A closer look at the behavioural breakdown of customers that have been using ride sharing services shows that the average number of (annual) transactions has more than quadrupled (from four to 17) when we compare the 2015/16 to 2016/7. In contrast, the average number of transactions with taxis has remained flat at seven transactions per year.

The growth of ride sharing from 2015/16 to 2016/17 is demonstrated across all behavioural drivers, including:

- a higher number of transactions (four to 17);
- a higher amount of spending per customer who transacts with ride sharing (\$116 to \$377);
- more people using ride sharing services (nine per cent to 15 per cent); and
- an overall increase in the amount spent per person (\$10 to \$58).

In contrast, for taxis, all behavioural drivers remain rather constant through the period, including:

- the same number of transactions (seven);
- a similar spend per customer who transacts with taxis (\$225 to \$231);
- a marginal increase in the number of people using taxis (19 per cent to 21 per cent); and
- a marginal increase in the amount spent per person (\$43 to \$48).

The absence of cash and other payment methods such as Cabcharge and business cards in the analysis means that these results only represent a subset of the entire point to point transport market. We would expect that relative to the entire market, our results likely understate the total number of trips, and the amount spent per customer, and per person. The proportion of customers is likely to be a lower bound due to the absence of information on those customers who exclusively pay via cash, Cabcharge or business cards for the entire year. Ride sharing use is also likely to be partially overstated due to the inability to disaggregate and exclude UberEats spending within the data.

Figure 8 Transactional behaviour for ride sharing in NSW, 2016/17 compared to (2015/16)

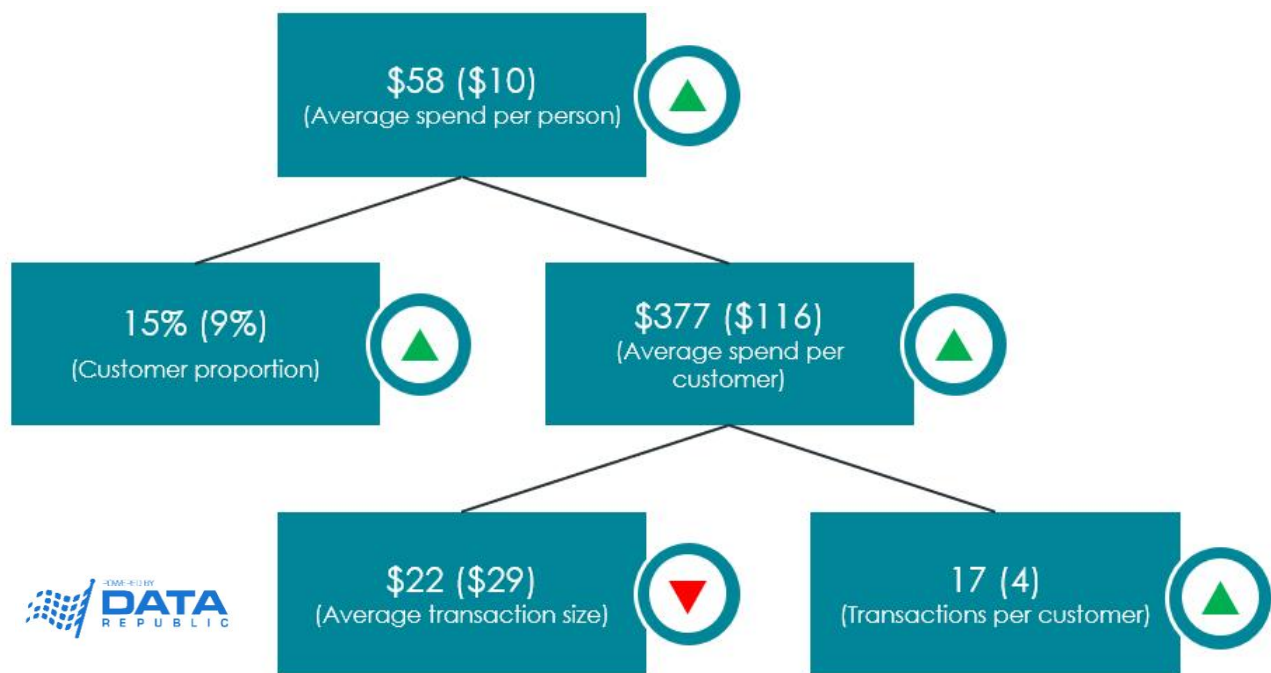
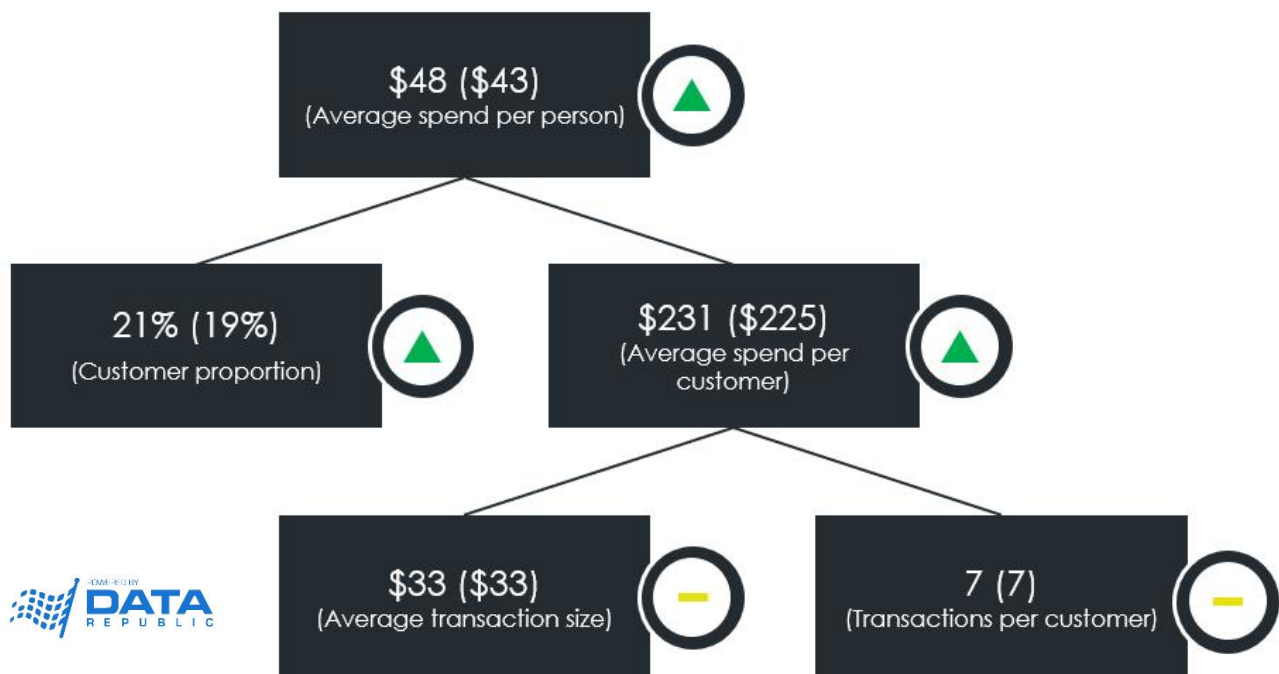


Figure 9 Transactional behaviour for taxis in NSW, 2016/17 compared to (2015/16)



3. Ride sharing is mostly occurring in urban areas along the eastern coastline of New South Wales

In this section, we examine how the point to point transport market across a number of regions in NSW has changed since 2015. Our focus is on how ride sharing in these regions has affected the overall use of point to point transport services over time, and the use of taxi services in particular.

3.1 Ride sharing is primarily used by residents of Sydney

The proportion of customers using ride sharing is closely tied with the distance from the Sydney CBD and is likely driven by the locations where ride sharing providers have chosen to launch and expand their service offering, as shown in Figure 10 and Figure 11 below.

Figure 10 Proportion of point to point transport users using ride sharing in Sydney, 2016/17

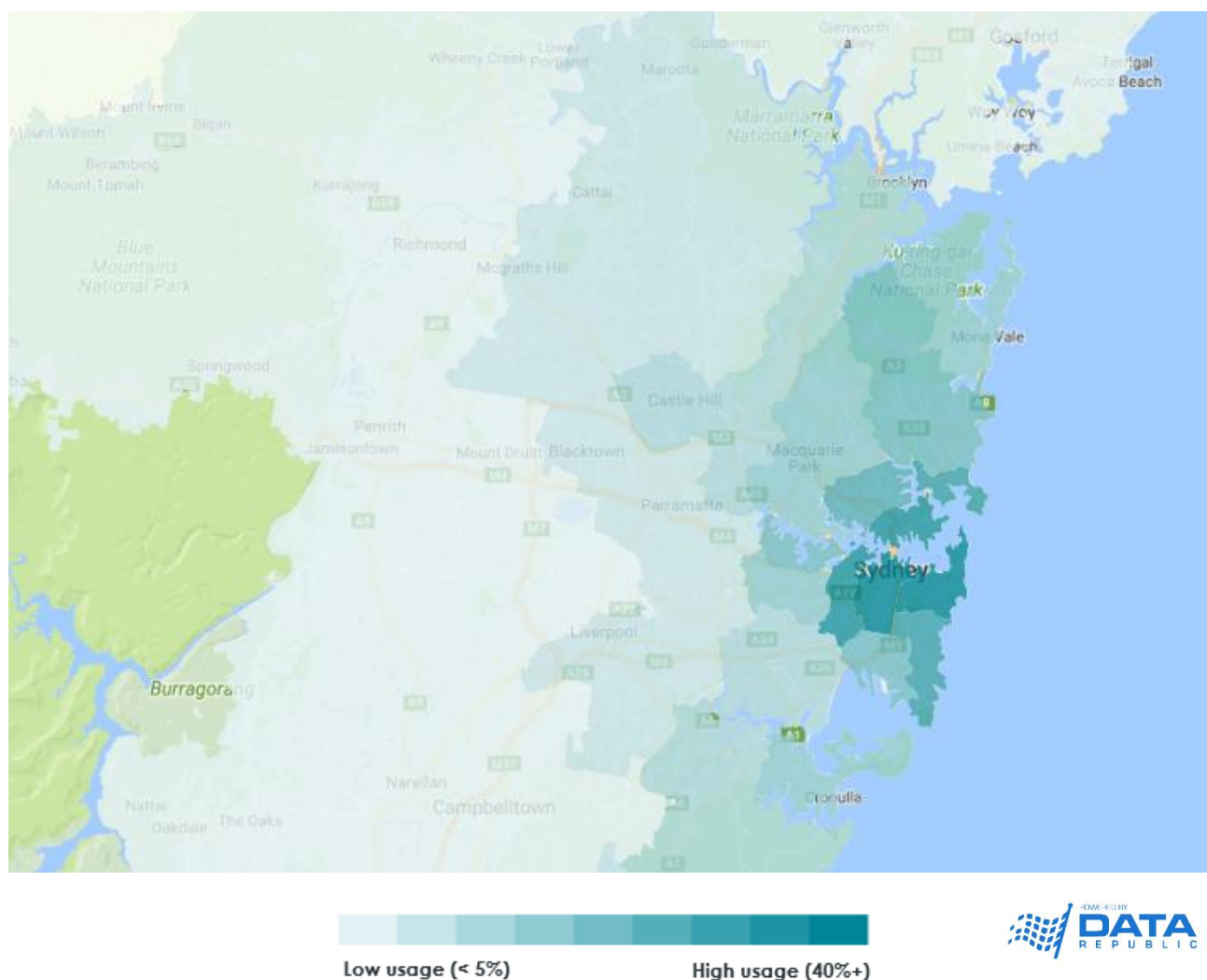
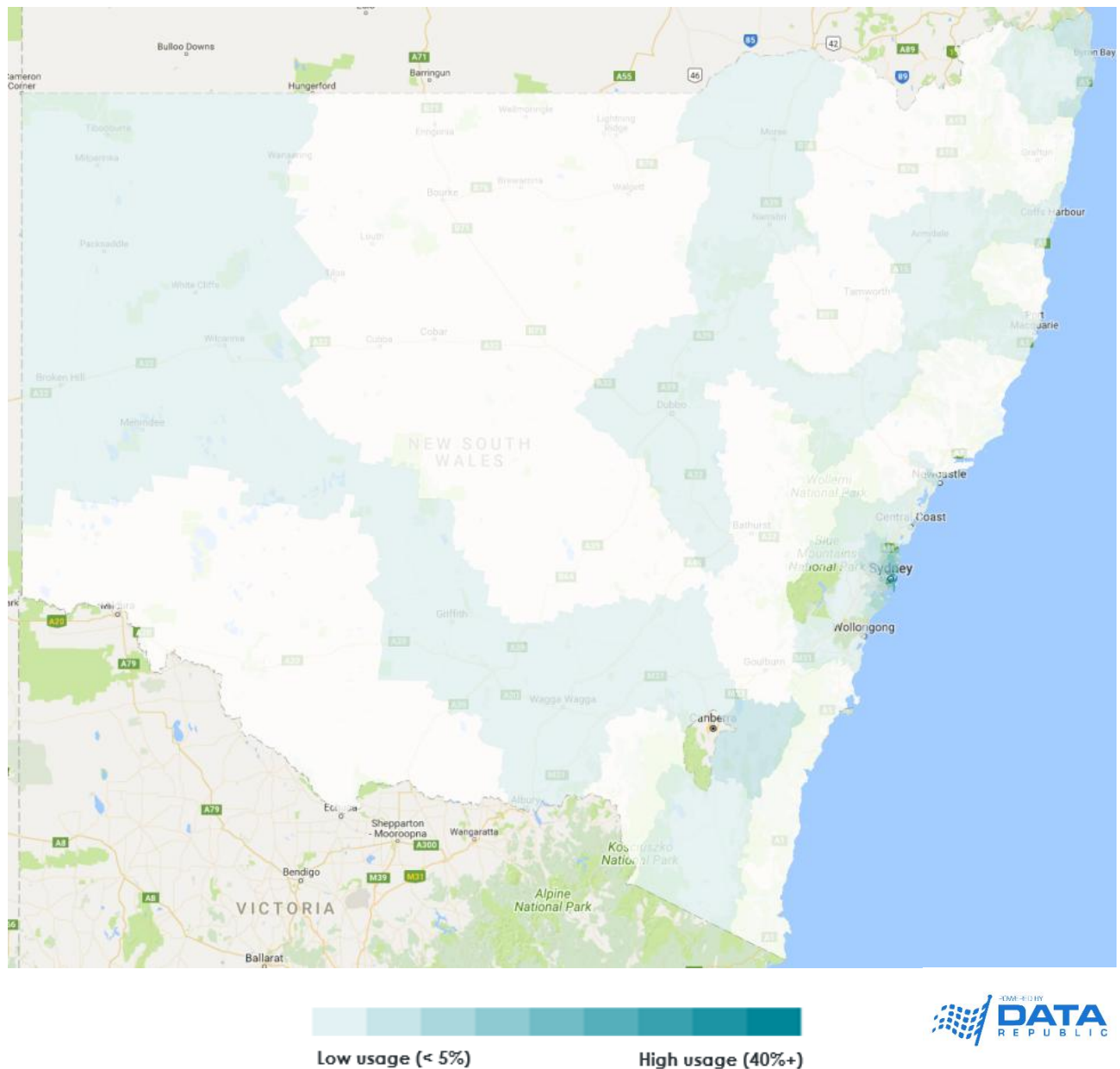


Figure 11 Proportion of point to point transport users using ride sharing in NSW, 2016/17



3.2 In areas in Sydney where ride sharing is popular, more than one in every three people have used a ride sharing service

Even in the most popular areas for ride sharing, there remains a higher proportion of people that use a taxi than ride sharing. However, of the customers that do use ride sharing, on average they are spending significantly more on ride sharing services than taxi services via electronic payment methods.

For example, people who live in the Eastern Suburbs – North region of Sydney spent 80 per cent more on ride sharing than they did on taxi services (via electronic payment methods) in 2016/17, (\$643 compared to \$348).

The average number of ride sharing transactions per customer is more than twice that of taxis across most of the ten areas shown in Table 9. Although ride sharing is not used by everyone, the customers that do use ride sharing, tend to use it significantly more than taxis.

Table 9 Key metrics for top ten most popular ride sharing areas in Sydney for 2016/17⁹

Statistical Area 3 name	Spend per customer		Transactions per customer		Proportion of residents using the service	
	Ride share	Taxi	Ride share	Taxi	Ride share	Taxi
Eastern Suburbs - North	\$643	\$348	30	12	46%	49%
Sydney Inner City	\$532	\$326	27	13	45%	48%
Leichhardt	\$513	\$345	22	11	43%	48%
Marrickville - Sydenham - Petersham	\$489	\$220	24	8	39%	41%
North Sydney - Mosman	\$475	\$384	20	11	40%	46%
Manly	\$446	\$385	19	10	39%	43%
Eastern Suburbs - South	\$477	\$268	23	9	36%	38%
Chatswood - Lane Cove	\$421	\$344	17	9	31%	35%
Botany	\$438	\$234	21	6	28%	29%
Canada Bay	\$415	\$270	17	8	28%	30%



3.3 The proportion of residents using ride sharing in Sydney is more than double the neighbouring urban regions of Wollongong, the Central Coast and Newcastle

Ride sharing services are currently operating in Sydney, Newcastle, Wollongong, Central Coast, Coffs Harbour, Byron Bay/Ballina and Wagga Wagga.¹⁰

In 2016/17, one in five Sydney residents used ride sharing compared to one in nine for Byron Bay and approximately one in eleven for residents of Wollongong, Newcastle and the Central Coast. In Albury, Tamworth, Port Macquarie and Wagga Wagga, ride sharing is much less popular, with only approximately one in every 15 residents used the service in 2016/17.

Taxi use is relatively more consistent across the regions, with the proportion of people who used a taxi in 2016/17 ranging from 17 per cent to 23 per cent. Whilst the proportion of people using ride sharing and taxis is similar in Sydney (20 per cent compared to 23 per cent), the difference is much greater further away from

⁹ As noted throughout the report, our estimates relate only to electronic transactions. As a consequence, they likely understate the amount customers spend on taxis services, due to the absence of cash transactions within the data. Ride sharing results may be overstated due to our inability to remove the effect of UberEats from the data.

¹⁰ IPART, *Issues paper – Taxi fares and licences from July 2018*, September 2017, p 23.

Sydney, with almost three times more people using taxis compared to ride sharing in Albury, Wagga Wagga, Port Macquarie and Tamworth.

Whilst the proportion of people using ride sharing in each region varies greatly, the trend that customers who do use ride sharing services tend to use it more than taxi services remains true for all nine regions.

Customers outside of Sydney spent significantly less on point to point transport, including both taxis and ride sharing. The average ride sharing customer in Sydney spends just over \$400 over 18 transactions on ride sharing, roughly double that of non-Sydney customers in both the amount spent and the number of transactions.

Table 10 Key metrics for nine regions across NSW in 2016/17¹¹

Region	Spend per customer		Transactions per customer		Proportion of residents using the service	
	Ride share	Taxi	Ride share	Taxi	Ride share	Taxi
Sydney	\$412	\$266	18	8	20%	23%
Byron Bay	\$224	\$135	12	5	11%	20%
Wollongong	\$184	\$144	9	5	9%	20%
Newcastle	\$192	\$144	10	5	9%	17%
Central Coast	\$194	\$148	9	5	8%	18%
Albury	\$239	\$126	12	5	7%	21%
Wagga Wagga	\$209	\$125	11	5	7%	22%
Port Macquarie	\$177	\$135	8	6	6%	17%
Tamworth	\$188	\$126	9	5	5%	18%



3.4 Ride sharing's share of the point to point transport market has increased across all regions from 2016 onwards

As at June 2017, ride sharing's share of electronic transactions in the point to point transport market varies between 40 per cent to 70 per cent across the nine regions.

The growth in the ride sharing service share of total point to point transport services in Sydney appears to have stabilised at around 60 per cent of the electronic spend, and 70 per cent share of electronic recorded transactions. In most other regions, we anticipate that ride sharing's share can be expected to continue to grow over the coming months, as the trends have not yet stabilised like they have for Sydney.

¹¹ As noted throughout the report, our estimates relate only to electronic transactions. As a consequence, they likely understate the amount customers spend on taxis services, due to the absence of cash transactions within the data. Ride sharing results may be overstated due to our inability to remove the effect of UberEats from the data.

Ride sharing's share of electronic spend is consistently lower than its share of electronic transactions across the regions and likely arises because of the lower number of recorded transactions for taxis in the analysis¹². It might also be influenced by ride sharing services being generally cheaper than equivalent taxi services, or that ride sharing trips are typically shorter than taxi trips.

Interestingly, the data shows that residents of Byron Bay and Wollongong have a higher share of ride sharing compared to residents of Newcastle and the Central Coast. This seems unusual, especially considering that Uber launched in Byron Bay in October 2016 and Wollongong in March 2017, compared to Newcastle and the Central Coast where it launched in April 2016. This might reflect residents of Wollongong Byron Bay and Wollongong making more use of ride sharing in other locations (eg, Sydney) than residents of Newcastle or the Central Coast.

Figure 12 Share of total electronic transaction spending on point to point transport services by region, 2015/16 to 2016/17

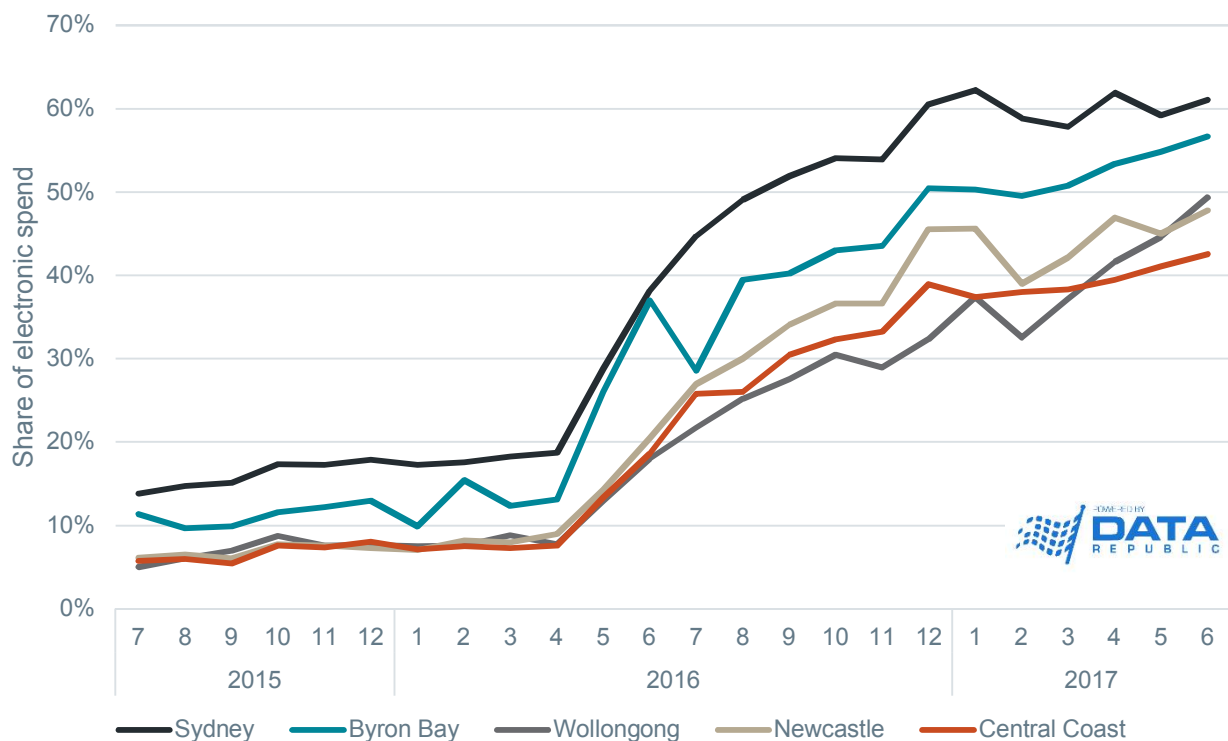
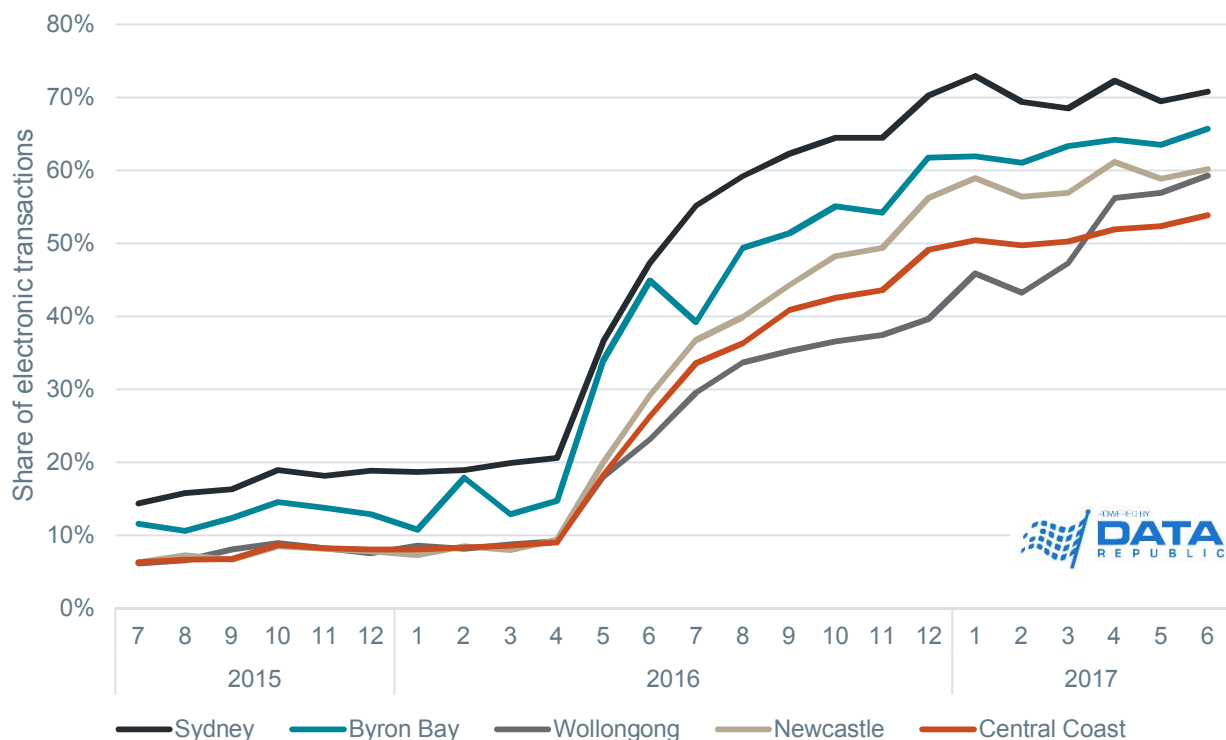


Figure 13 Share of total number of electronic transactions on point to point transport services by region, 2015/16 to 2016/17



3.5 Ride sharing has grown the point to point transport service market in most regions across New South Wales where ridesharing operates

Figure 14 below compares the average amount spent per person on ride sharing services and taxi services in 2016/17 and 2015/16.

In all nine regions, the total amount spent per person on taxis has marginally increased whereas the amount spent per person on ride sharing has increased significantly.

This shows that in most areas, customers have continued to make use of taxi services despite the legalisation of ride sharing services. However, much of the observed growth in the use of point to point transport services across the regions have been captured by ride sharing providers.

This supports the previous finding that the introduction of ride sharing services has grown the overall point to point transport market, rather than taken rides from the traditional taxis market and holds true for these nine regions across NSW.

The share of electronic spend and the estimate of amount spent per person in Figure 14 and Table 11 are likely to be understating taxi's share due to the lack of cash and other forms of payments, including Cabcharge and business spend. Ride sharing's share of the market is likely to be overstated due to the limitation where UberEats cannot be separated from Uber ride share transactions.

Figure 14 Average amount spent per person on point to point services across the nine regions for 2016/17 and 2015/16

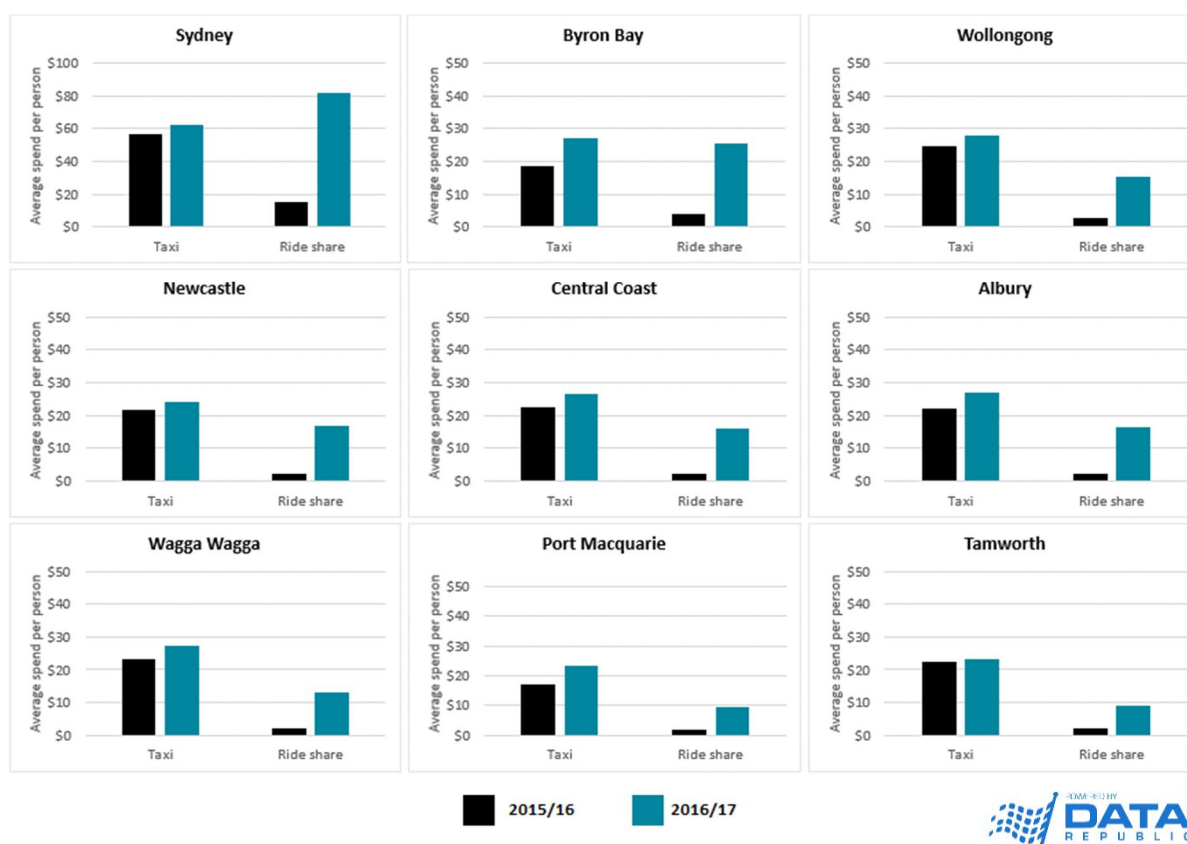


Table 11 Average amount spent per person and share of electronic spend on point to point services across the nine regions

Region	2015/16				2016/17			
	Average spend per person		Share of electronic spend		Average spend per person		Share of electronic spend	
	Ride share	Taxi	Ride share	Taxi	Ride share	Taxi	Ride share	Taxi
Sydney	\$15	\$56	21%	77%	\$81	\$63	57%	43%
Byron Bay	\$4	\$19	16%	81%	\$25	\$27	48%	51%
Wollongong	\$3	\$25	9%	81%	\$15	\$28	35%	59%
Newcastle	\$2	\$22	9%	87%	\$17	\$24	40%	58%
Central Coast	\$2	\$23	9%	84%	\$16	\$27	36%	60%
Albury	\$2	\$22	9%	90%	\$16	\$27	37%	61%
Wagga Wagga	\$2	\$23	8%	88%	\$13	\$27	33%	66%
Port Macquarie	\$2	\$17	9%	90%	\$9	\$23	30%	70%
Tamworth	\$2	\$22	8%	91%	\$9	\$23	30%	69%

A1. Description of the data used

A1.1 Data overview

The data which we have used for this project is non-personally-identifiable, transaction-level card data provided by our data partner Data Republic and sourced from Westpac Banking Corporation. As such, the market share or representation of customers is expected to be around a quarter of all possible customers (eligible for a credit card).

This unique data is of unprecedented volume and granularity, which requires rules and frameworks to guide its usage to ensure that the privacy of individuals and companies are protected. The key privacy protection clauses are:

- aggregated analyses, results and insights may only reflect units of no less than five customers;
- individual merchants cannot be identified unless consent is provided by the respective company; and
- merchants must be analysed in groups of three or more, without any single merchant having greater than 75 per cent market share.

Where these requirements are not met, no results can be provided to ensure the anonymity and privacy of both individuals and companies are protected.

To identify the transactions within the data that are relevant to the point to point transport industry, the transactions are filtered via a Merchant Category Code (MCC) which is a 4-digit numeric code used to identify the type of business conducted by a merchant and is implemented when a new merchant account is setup with their financial institution. The relevant MCC for this analysis is 4121, 'Taxicabs and Limousines'. Further additions, exclusions and granular breakdowns to classify transactions into the categories of taxis, ride sharing and hire car services are completed by Westpac due to privacy protection clauses which do not allow third party users of the transactional data to identify individual merchants and their associated spend.

A1.2 The banking transactional data

The transactional data contains one line of data for every transaction made within the MCC 4121 from July 2015 to September 2017, and the relevant fields for this analysis are:

- hashed customer identifier;
- hashed merchant identifier;
- transaction amount;
- date and time of the transaction;
- location of the customer at the Statistical Area 1 (SA1) level; and
- location of the merchant at the Statistical Area 2 (SA2) level.

Transactions of one dollar or less were found in the data and have been excluded from the analysis. These are due to banking authorisation charges implemented by ride share companies to validate the customers' credit or debit card and do not reflect an actual amount spent by a customer on ride sharing.

A1.3 Key data limitations

Below we set out the key limitations of the transactional data that has been used to conduct the analysis as set out in this report. While this data does not perfectly capture the point to point transport market over the period, it does allow us to analyse trends over time, which provide insights on likely trends across the entire point to point transport market.

The effects of cash are not taken into consideration

The data is sourced from credit card transactions and any payments in cash are not captured in this analysis. This means that the results are likely to understate the size of the total market by not including those transactions paid by cash. It follows that all of our results relate to services paid via electronic payment methods.

The use of electronic payments for taxi has been growing as a proportion of taxi transactions

The use of electronic payments instead of cash to pay for taxis has been growing over time, and as a result, growth results for taxis shown in this analysis may overstate actual growth if customers are simply switching from cash to card for their payment method.

The data only includes retail consumer credit and debit cards

Taxi and/or ride sharing spending on business credit cards or Cabcharge are not included in this analysis. This means that the analysis will under-represent spending on taxis as any trips paid for by a business card or Cabcharge is not included. It follows that our results relate to consumer use of point to point transport services paid via electronic payment methods.

The analysis provides insights on spending patterns by geographic region based on where customers live, rather than where the service was provided

Whilst the data provides information on the location of the merchant, this information is not the same as the location of the provision of services by that merchant within the point to point transport market. This is because, the merchant location is typically the headquarters or registered business address for the merchant.

To provide insights on geographic spread of transactions, we have analysed the data based on where customers live. This means that the analysis includes instances where a rural customer used ride sharing or taxis in the Sydney CBD or even in another state.

The data is susceptible to how companies opt to setup their accounts to receive payment

As the data is sourced from credit card payments to merchants, it is also susceptible to how companies opt to setup their accounts to receive payment. As an example, we uncovered during our data checks that sometimes UberEats can appear as a ride sharing transaction¹² and so spend attributed to the ride sharing may be slightly inflated. The size of UberEats relative to Uber is unknown and the proportion of UberEats transactions that appear as a ride sharing transactions is also unknown.

¹² Uber Help website, <<https://help.uber.com/h/fe547761-4384-42d4-8531-4cfb0e0e523e>>, viewed on 1 November 2017.



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