Economic Impact of Uber Eats

Assessing the impact of Uber Eats on the restaurant sector and the wider New Zealand economy

NZIER final report to Uber

18 September 2020

About NZIER

NZIER is a specialist consulting firm that uses applied economic research and analysis to provide a wide range of strategic advice.

We undertake and make freely available economic research aimed at promoting a better understanding of New Zealand's important economic challenges.

Our long-established Quarterly Survey of Business Opinion (QSBO) and Quarterly Predictions are available to members of NZIER.

We pride ourselves on our reputation for independence and delivering quality analysis in the right form and at the right time. We ensure quality through teamwork on individual projects, critical review at internal seminars, and by peer review.

NZIER was established in 1958.

Authorship

Key points

Uber Eats commissioned NZIER to undertake analysis on the economic contribution of Uber Eats to the New Zealand economy, particularly with regards to participating restaurants. This analysis provides information about the benefits to different industries across New Zealand regions from increased activity in the industries involved in the supply chain of Uber Eats. This analysis also estimates the benefits to Uber Eats users from having a wider range of choices available to them.

Uber Eats improves the matching of restaurants to their customers

Uber Eats increases the choice of restaurant meals for customers, while for participating restaurants it increases the pool of potential customers it can reach. This improved matching of needs between participating restaurants and customers result in efficiency gains for both parties. For example, customers can put the time saved from not having to shop for and prepare meals towards more enjoyable activities, while participating restaurants can focus on preparing meals and leave the marketing of its offering and arranging delivery through Uber Eats. For drivers who deliver with Uber Eats, it provides an avenue to earn income.

Uber Eats is the major provider of Ready To Eat (RTE) services[1] in New Zealand

Uber Eats is currently a popular provider of RTE services in New Zealand[2]. They started providing services in Auckland, Wellington and Christchurch in 2017, followed by Hamilton, Tauranga and Dunedin in 2018[3].

RTE services have led to 0.27% higher growth in the restaurant sector

We estimate the availability of RTE services has led to a 0.27% growth in the restaurant sector. This equates to an increase in revenue of **$21.5 million for the restaurant sector in 2018**[4].

Lower prices more than offset by increased demand

We estimate the price of foods and beverages have decreased by 0.12% as a result of RTE services i.e. a $1.20 decrease in price for every $1000 purchase of food. However, this price decline has been more than offset by an increase in the *quantity* of orders for the Food and Beverage sector – more competition has stimulated demand. This results in a net increase in the Food and Beverage sector's GDP.

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[1]   Ready to eat services includes food delivery transactions made through online businesses that deliver or facilitate delivery of food on behalf of restaurants, bars, cafes and convenience food retailers. This includes Food Ninja, Menulog, Delivereasy, Gogo Express and JSS Express.

[2]   Based on Uber revenue data and MarketView data on spending on RTE services.

[3]   There are not enough data points to assess trends given Uber Eats is still relatively new to the market, but for the year to October Uber Eats revenue to spending on takeaways is 0.06%, while Uber Eats revenue to spending on supermarkets and dairies is 0.03%.

[4]   This incorporates the most up to date data available – up to 2018. Uber Eats was launched in Auckland, Wellington and Christchurch in 2017, and Hamilton, Tauranga and Dunedin in 2018.

Uber Eats increases the size of New Zealand economy by $162 million per year – this represents 3.4% of annual GDP in the restaurant sector[5]

After accounting for all the benefits to businesses across New Zealand and the consumer welfare gains, our estimates suggest that Uber Eats increases the size of the New Zealand economy by $162 million per year. Relative to annual GDP in the restaurant sector, this represents 3.4% of that.

UBER Eats services increase the annual revenue of each participating restaurant by an average of $59,599 in 2019[6]

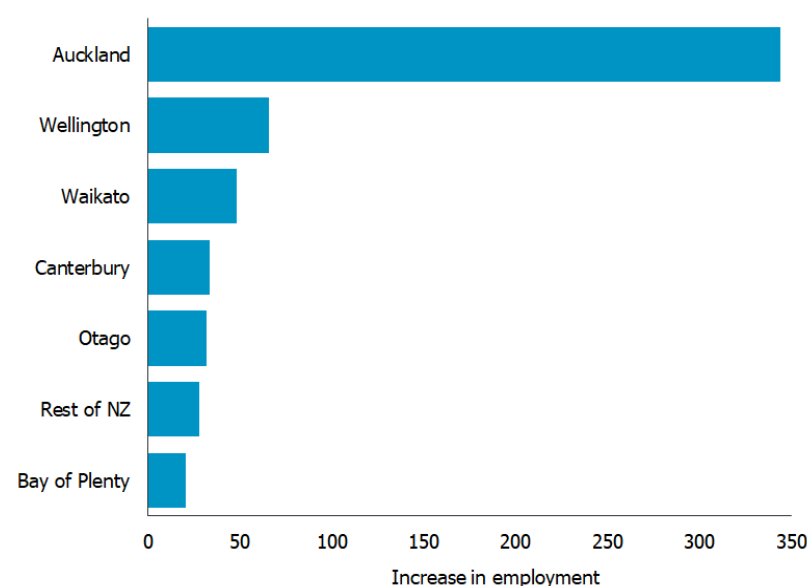The top three industries benefiting from RTE services consists of:

- Business services by $51.3 million

- Land transport services by $32.8 million

- Food and beverage services by $19.6 million.

With 80% of these benefits generated by Uber Eats.

RTE services have generated 517 new jobs across New Zealand

Each year, we estimate 517 New Zealanders are in jobs as a result of Ready To Eat services. The composition of the number of jobs in each region is illustrated in Figure 1.

Figure 1 Jobs created by RTE services across the regions
(2019 year)

Source: NZIER

We estimate 26% of Uber Eats' users are customers for the food services sector that would not have otherwise chosen to have a restaurant meal

While the option to use restaurant delivery services has been available for many years, the number of restaurants providing delivery services was limited before the emergence of RTE services. Our estimations suggest that 26.3% of Uber Eats orders are from consumers who would not otherwise have used dine-in or delivery services in the absence of Uber Eats services[7].

In 2019, Uber Eats services has improved New Zealanders' wellbeing by $4 million from less travelling time and $30 million from food preparation time savings

We estimate that New Zealanders' wellbeing has increased by $24 million over the last three years that Uber Eats services have been operating in New Zealand, reflecting the time saved from not having to travel to purchase and/or prepare the food – they can use this time for activities that they place a higher value on, e.g. working or playing sports. Given that 26.5% of that is purely due to the availability of Uber Eats services, the contribution of Uber Eats is $6.4 million (to the wellbeing of New Zealand households). Across the years that Uber Eats has been operating, this value to New Zealanders was $0.5 million in 2017, $2.3 million in 2018 and **$4 million in 2019.**

The benefits from this time saving directly attributable to Uber Eats consist of the benefit for customers who would not otherwise have had a restaurant meal in the absence of Uber Eats. This leads to **a total of $30 million value of time savings from lower cost of food preparation in 2019,** and totals $49 million of benefits over the past three years.

Auckland, Waikato and Canterbury regions have benefited the most

Across the regions, Auckland's economy benefits by $99 million, Canterbury economy benefits by $22 million and Wellington by $18 million. These benefits for the economy reflect the comparative advantages resulting from the existence of Uber Eats – drivers can focus on transporting the food, restaurants in preparing the meals and Uber Eats users on higher value activities such as work or leisure.

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[7]   This also captures the increased spending of Uber Eats users on the app.

Figure 2 Benefits of Uber Eats across the regions

(2019 year)

Region	GDP ($millions)
Auckland	$98.9m
Canterbury	$22.2m
Wellington	$17.8m
Waikato	$12.8m
Otago	$3.6m
Bay of Plenty	$2.4m
Rest of NZ	$4.5m
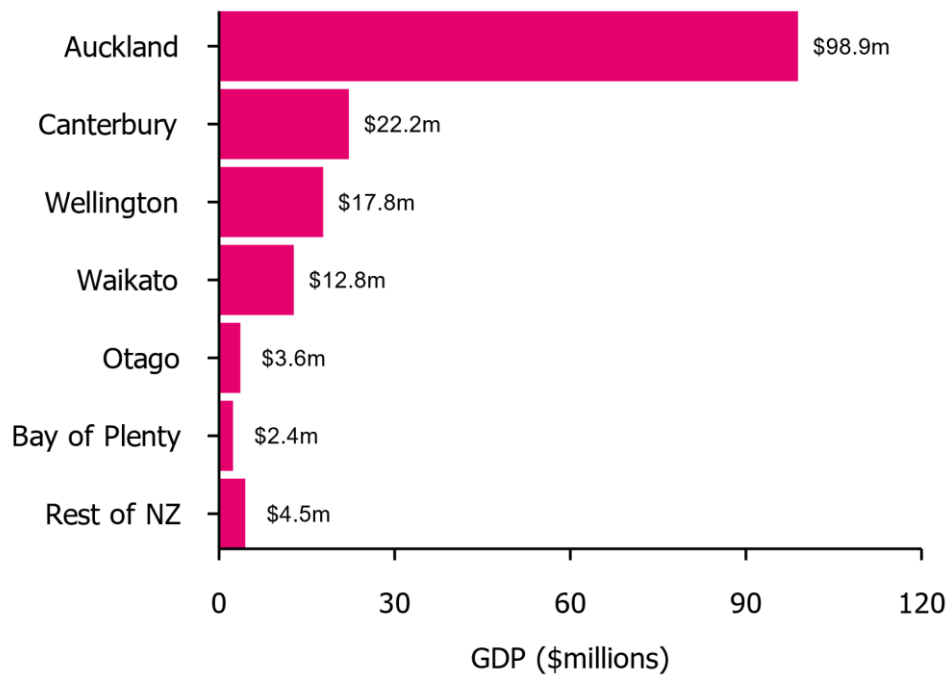
Source: NZIER

The economic contribution of Uber Eats should rise significantly in the coming years

Our analysis of Uber Eats revenue data suggests a higher adoption of the services in the coming years. This is because New Zealand is still in the early stages of the adoption of RTE services, and we expect that the demand for these services to reach its peak in the coming years. However, different regions will be at different stages of market maturity.

Recent developments relating to the COVID-19 outbreak have implications for the adoption of delivery and RTE services, and in turn the benefits for Uber Eats users in the form of increased wellbeing. Although the shutdown of all restaurants and cafes during Alert Level 4 meant these delivery services could not operate, the relaxation of restrictions under Alert Level 3 in allowing takeaways and deliveries should see an acceleration in the adoption of Uber Eats. Greater adoption of Uber Eats has the potential to lead to higher economic benefits.[8]

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[8]   The relationship between adoption of RTE services and economic benefits to the economy is not one-to-one. Estimating the impact of future adoption and the potential impact of COVID-19 is out of scope of this analysis.

Contents

1   Introduction

Uber Eats asked NZIER to assess the contribution of Uber Eats to the New Zealand economy. Ready to Eat (RTE) services have provided a new choice for workers and households to receive a wider range of foods delivered to them.

Uber Eats is currently the major provider of RTE services in New Zealand. They started providing services in Auckland, Wellington and Christchurch in 2017, followed by Hamilton, Tauranga and Dunedin in 2018[9].

At a high-level, the RTE services lead to:

- An increase in demand for restaurant food

- Higher economic activity for the drivers in the transport sector

- An increase in the size of the financial services sector

- A shift in activity from households' grocery shopping to wholesale grocery shopping by the restaurants.

In addition to that, there will be welfare gains for customers from less time spent travelling to pick up food, preparing their meals and cleaning up the dishes.

The shift from the household preparation of meals to consuming a restaurant meal is captured as an increase in GDP, partly reflecting the fact that the value of food preparation by household is not recorded within GDP figures. However, beyond this the benefits extend to households which choose RTE services making better use of their time than that spent on preparing a meal, picking up their takeaway order or travelling to dine in at a restaurant. Our estimates capture the benefits arising from the fact drivers who deliver with Uber Eats can transport the food more efficiently and Uber Eats' participating restaurants can prepare meals more efficiently, leaving Uber Eats users to get on with activities that they place a higher value on such as work or leisure.

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[9]   Although Menulog entered the NZ market in 2012, its original offering is slightly different from Uber Eats in providing a platform for customers to order from restaurants which offer pick up or to use its own delivery staff.

2   Background

There are a wide range of outputs from the RTE services. Given that RTE services have just emerged in recent years, there are few research studies available about them. In this section, we provide a short review of the relevant literature.

Uber Eats is a disruptive technology in the food industry leading to significant changes to the way that consumers and industries operate.

RTE services are significantly different from the already available restaurant delivery services, particularly in the way that they have led to higher economic efficiencies – unlike restaurants operating their own delivery service using their own delivery staff, drivers who deliver with Uber Eats can more easily fit in more trips for orders from different restaurants.

In addition to the generated economic efficiencies, Uber Eats provides more choices for consumers. The impact of availability of choices to the consumers is likely to be substantial. Hasuman and Sidak (2005)[10] estimated the consumer benefits from the opening of a major supermarket. Their results suggest that while higher competition lowers prices by 5%, there is a substantial increase in consumers' welfare from additional variety of foods, which is worth 20% of expenditure on food.

The preliminary results of a survey of Australian restaurants' experience with Uber Eats by Professor Alex Frino suggests that *"[Uber Eats] shifts food preparation from unpaid labour at home to paid labour in restaurants"* (Financial Review, 2019).[11]

Research carried out by AlphaBeta Australia for Uber Eats Australia finds that 'App Delivery' (which is equivalent to the RTE services we are assessing) has brought $2.6 billion of trade for restaurants in Australia. AlphaBeta estimates 70% of spending on delivery apps would not otherwise have been spent in a restaurant, and also helps to smooth out restaurant revenue across the week (with more usage of delivery apps on off-peak days such as Sunday)[12].

There has been publicity recently over the potential negative outcomes arising from RTE services. First, some news articles reported lower margins for participating restaurants. The articles were based on interviews with some restaurant owners. It is clear that the RTE services increase the number of choices for consumers, and also increases competition in the food and beverage sector. The impact on total revenue of the food and beverage sector, however, is not clear at the outset. Our analysis will investigate this net impact.

Second, some health practitioners are worried about the potential negative impact on the health of consumers from having easier access to fast food. RTE services provide more choices for consumers. However, given many fast food operators already provide delivery services, it may be that most of the customers would consume fast food even in the absence of RTE services such as Uber Eats.

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[10]   Hausman, J. A., & Sidak, J. G. (2005). Did mandatory unbundling achieve its purpose? Empirical evidence from five countries. *Journal of Competition Law and Economics*, 1(1), 173-245.

[11]   Financial Review, 2019. Why restaurants hate Uber Eats. retrieved from: https://www.afr.com/technology/why-restaurants-hate-Uber-eats-20190716-p527lt.

[12]   AlphaBeta (February 2020) *Growing the pie*

3   Methodology

Our framework is based on the decision tree for consumers in their choice of consuming a meal (Figure 3). An individual has a choice between restaurant (RS) and home cooked meals. If the person chooses a home cooked meal, then he or she will be purchasing the inputs from the supermarket (SM) and either eat the precooked meal or prepare it at home. The increasing popularity of food preparation delivery kits such as My Food Bag is also captured in this outcome. The preparation of home cooked meals requires an investment in time, which is the value added by the household (HH_va)).

The household meal is made at an average cooking time (t_cook). The value of cooking food at home is equal to the hourly rate of a generalist worker valued at the minimum wage rate of $17.7 as at March 2020.[13] This provides an indication of the production value of a home meal for the people who have started to use restaurant meals since the introduction of RTE services.

As we illustrate in Figure 3, in the case of the individual choosing a restaurant meal, then he or she will either dine in or takeaway. If he or she chooses to takeaway, then there will be a choice between pickup or delivery. If he or she chooses delivery then it will be done either by the restaurants' own delivery staff (RS_d) or through a ready to eat service provider (RTE), including Uber Eats.

Figure 3 Decision tree for having a meal
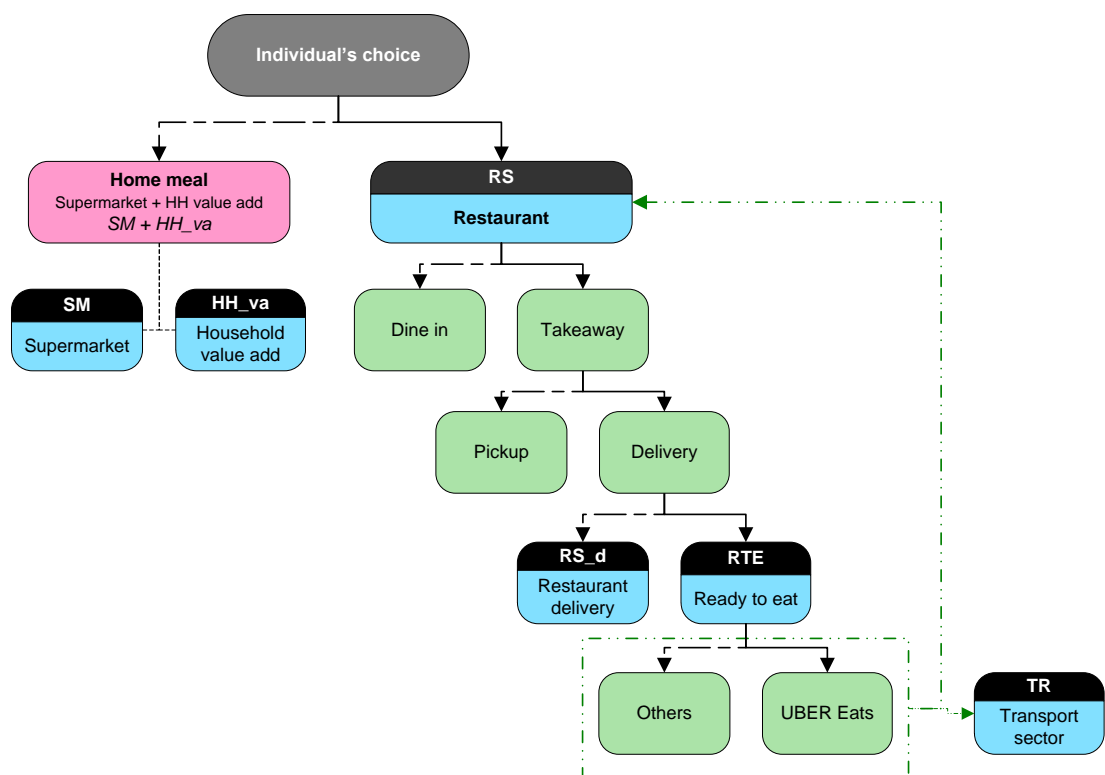
Source: NZIER

In the process of decision making, the person considers the final cost of the options, including implicitly the accounting and the economic (opportunity) costs. When an individual chooses RTE over other options (such as RS and home meal), it indicates that the final cost of RTE is less than the other options.

In a decision between restaurant delivery (RS_d) and RTE, the main driver of cost is the *preference* and the *delivery cost*. The delivery cost for RTE is often smaller than RS_d and pick-up because the driver who is delivering with RTE does not need to complete a round trip for a single order – i.e. he or she travels from the restaurant to the delivery address and can then service the next delivery in the same trip.

In the choice between delivery and pickup, the individual chooses based on *his opportunity cost* versus the monetary cost of delivery (i.e. how much is the value of his time versus the cost of delivery). The choice between RS and home meal is based on the individual's *preference for restaurant food* and *his opportunity cost* compared to the monetary cost of the RS option.

According to this, before the emergence of RTE services, the economic value of a meal prepared at home (SM + HH_va) is equal to the price of restaurant food with delivery (P_RS_d).[14]

With the emergence of the RTE services, there are more choices available to consumers, which leads to increased efficiencies and competition. As a result of the increased competition, the effective price for final consumers decreases and they decide to choose RTE services instead of other options. This leads to a consumer surplus as shown in the figure below.

Figure 4 Consumer surplus from a decrease in the effective price of meal consumption
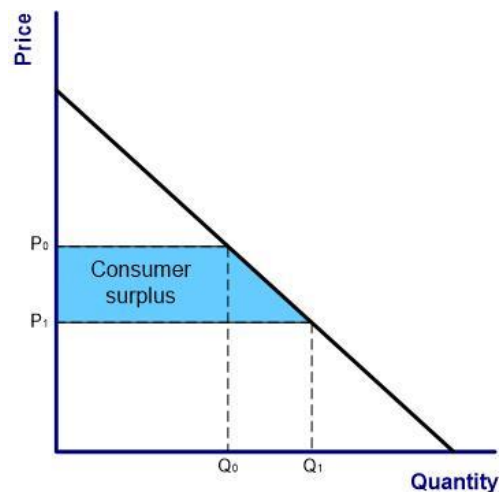
Source: NZIER

Based on the figures above, the total economic impact (EI) of RTE services is equal to:

$$EI = \Delta RS + \Delta TR - \Delta[SM + HH_{va}] + CS \qquad (1)$$

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[14]   This excludes the value of preference for home meal.

where, ΔRS is the change in the GDP of the **restaurant sector** as a result of emergence of RTE se, ΔTR is the change in **transport sector**, $\Delta[SM + HH_{va}]$ is the change in the GDP of supermarkets and the households' value added to the economy, and CS is the **consumer surplus** derived from RTE services.

The wellbeing impact of RTE services is greater than the RTE price plus the opportunity cost of travel to the restaurant (that otherwise, would not provide delivery services) and is less than the economic (opportunity) cost of a return trip to the restaurant.

In addition to that, the RTE services increase competition, and decrease the effective menu price. That is the restaurants' share of delivery cost. We do not directly use the price impact of increases in competition of restaurants as a result of RTE services.[15] We use the price impact to understand, how big is the change in quantity from the total increase in GDP of restaurant businesses.

Comparing regions with and without Uber Eats

We first estimate the impact from Uber Eats on the restaurant sector in the cities that adopted Uber Eats against those that did not have Uber Eats services available. However, in order to distinguish between changes in demand for restaurant foods as a result of Uber Eats services and the general increase in demand for the restaurant sector, we adjust the change in economic activities of the restaurant sector for:

- Changes in population: this is the main driver for demand for food

- The potential wealth effect: because individuals feel wealthier, they increase their consumption of restaurant food

- The state of the restaurant sector: as a change in demand can be different in a region with generally a smaller restaurant sector compared to a region with a bigger restaurant sector

- The impact on the rest of the economy: as a general increase in economic activity in a region may lead to an increase in demand for restaurant food.

After controlling for these factors, we find a clear distinction in GDP of the restaurant sector for regions with and without Uber Eats. We capture the difference between the two areas' growth rate to capture the impact of Uber Eats on the economic activity of the restaurant sector – as illustrated in Figure 5.

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[15] We do not have any information about the price of food in New Zealand. However, our model captures the impact on prices from increase in demand for the restaurant sector and that will be presented in our final estimates of economic impact of RTE services.

Figure 5 Increase in the restaurant sector's activities in regions serviced by Uber Eats compared to the regions without Uber Eats[16]
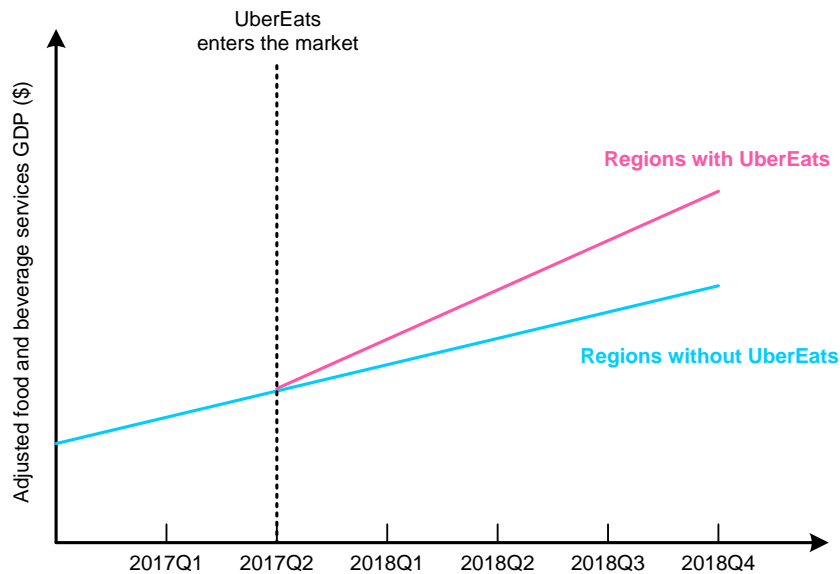
Source: NZIER

The households that start consuming restaurant meals because of the emergence of RTE will benefit from:

- Food preparation and clean-up time savings: the value of household production of meals is equal to the average time required for preparation multiplied by the hourly rate of a general consumer (as represented by the minimum wage)

- Travel time saving: the opportunity cost of the individuals to travel to the restaurant for picking up the food

- The allocation of the households' time to more productive activities: the member of the household would value the time savings at a rate equal to his or her opportunity cost (as represented by the wage of his or her occupation).

NZIER's CGE model

For the estimation of the economy-wide effects, we use The Enormous Regional Model of the New Zealand economy (TERM-NZ). NZIER's TERM-NZ model is a bottom-up CGE model of the New Zealand economy and its 15 regions. TERM-NZ is based on a Stats NZ's Input-Output table that identifies the structure of the industries involved. It contains information on 106 industries, 201 commodities and 15 regions. It therefore offers a unique capability to show the contribution of Uber Eats to the economy.

TERM-NZ treats New Zealand's regions as separate economies. This means that we are able to account for region-specific inter-linkages between industries, as well as their links to households (via the labour market), local and central government, capital markets, the rest of New Zealand (via inter-regional trade) and the global economy (via imports and exports).

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[16]   This incorporates the latest data available to date.

We will use the static version of our regional CGE model, TERM-NZ, so that we compare the economy before and after a policy option is applied. There is no time dimension in the static model, so we do not look at how the economy adjusts to a new equilibrium.

To estimate the impact of Uber Eats we modelled a scenario that shocks the economy if Uber Eats were not exist in different regions in New Zealand. Our 'what if' scenario changes the size of the restaurant sector (food delivery), food retailers and supermarkets, services (Uber as a service provider), and transportation in the economy. For example, without UBER Eats, income for food retailers and supermarkets could have been higher because people would buy ingredients and cook them at home. Also, people would spend less on food delivery, cost of transportation (Uber drivers) and UBER.

A visual representation of TERM-NZ is shown in Figure 6. It highlights how the model is able to capture the multidirectional relationships between the various parts of each regional economy and how they interact with the rest of New Zealand and rest of the world.

We impose the impact of RTE services to our CGE model based on our estimation of the impact of RTE on the restaurant sector, the transport sector and the supermarkets,[17] measured using the methodology described above.

Figure 6 NZIER's TERM-NZ model
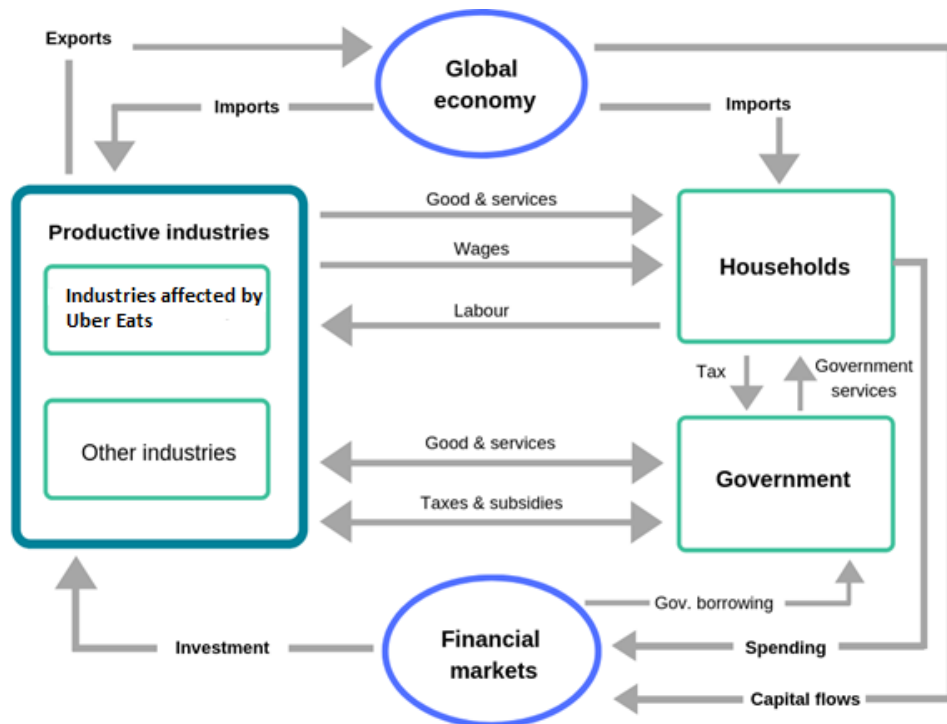
Source: NZIER

For further technical details on our CGE modelling see Appendix A.

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[17] To estimate the loss to the supermarkets, we use the average price of each meal for meal kits and multiplied that by the number of orders for RTE services.

3.1 Data sources

We base our analysis on Stats NZ data on GDP, business demographics (including employment) and population. We used Time-use survey 2009-2010 from Stats NZ to estimate the time savings from not having to prepare a meal at home as a result of choosing to consume a restaurant meal instead.

In addition, Uber Eats provided access to Uber Eats transactions for each restaurant/customer in New Zealand. The data was available for March 2017 to December 2019, providing information on 11,102,600 transactions and 3,408 restaurants. The location of restaurants and customers were available at the suburb (area unit) levels.

We were provided with access to Marketview data by Verisk Financial. This is used to understand the share of Uber Eats from the RTE market.

4 What Uber Eats transactions tell us about consumption patterns

In this section, we provide an overview of the specific factors of demand for Uber Eats services. We find that people living in high income areas tend to make higher-value orders and also order more frequently. Figure 4 shows the number of orders made by households in Auckland suburbs according to its population and income decile. This includes all orders made between 6pm to 12am over the years of 2017-2018.

Demand for Uber Eats services is significantly higher in the tenth income decile compared to other income deciles. The increase in the number of orders, however, is not directly proportional with income as we move up the income levels. In fact, the median number of orders amongst the seventh- and eighth-income deciles is lower than that in the sixth income decile.

Figure 7 Uber Eats is used most by people living in the high-income areas[18]
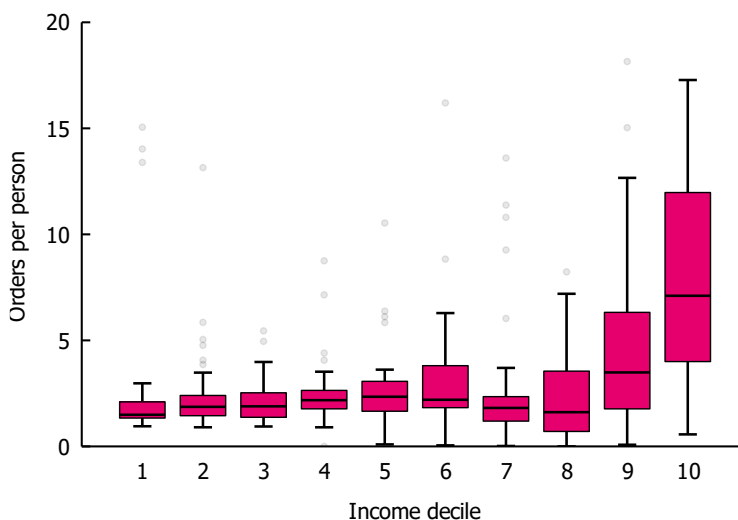
Source: NZIER

In terms of the amount spent in each order, we see a slightly different trend as we move up the income levels. The average order value in higher decile income areas is slightly higher than in lower income deciles. This means high-income households tend to use Uber Eats services more often and also tend to place higher-value orders.

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[18] The centre line shows the median orders per person.

Figure 8 High-income areas also order more per transaction
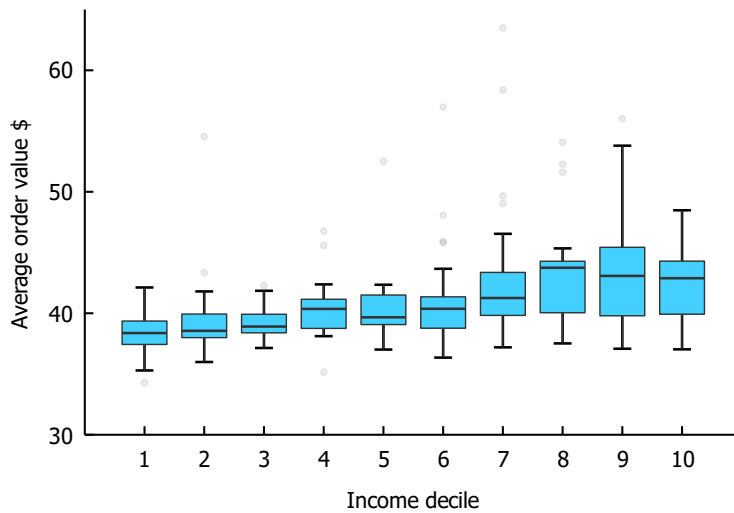
Source: NZIER

We looked at the number of orders for each suburb at different times of the day. To adjust the observed demand for population, we divided the number of orders for each suburb by the population of the suburb (orders' origin). We categorised the adjusted number of orders per capita to ten ranked groups (deciles). Figure 9 shows the distribution of the deciles across a range of suburbs in Auckland city for before and after 6pm. Accordingly, demand changes significantly at different times of the day. For example, in the Auckland Airport area (Mangere South) demand is significantly higher during the working hours compared to after hours. This illustration shows the contribution of Uber Eats services to workers during working hours[19] and the potential productivity gains from the availability of Uber Eats services.

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[19] By decreasing their time allocated to preparing food or commuting to a restaurant. This is particularly important in the areas with poor access to food services, where the users are provided with only a few choices of food delivery available to them in reasonable distance.

Figure 9 Order concentration during working hours and after hours
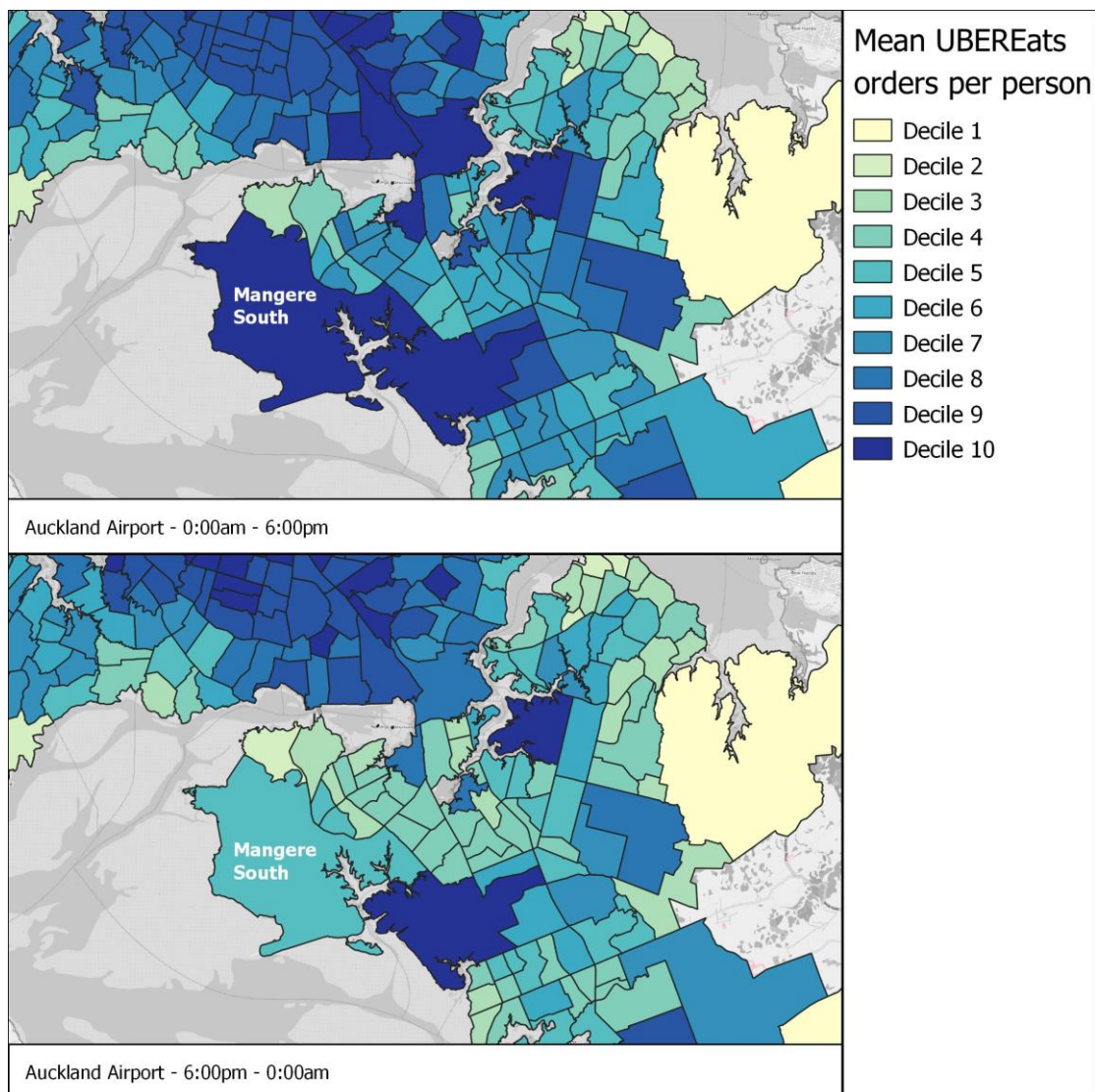
Source: NZIER, Open Street Map

Figure 10 Uber Eats orders per person are most concentrated in the CBD
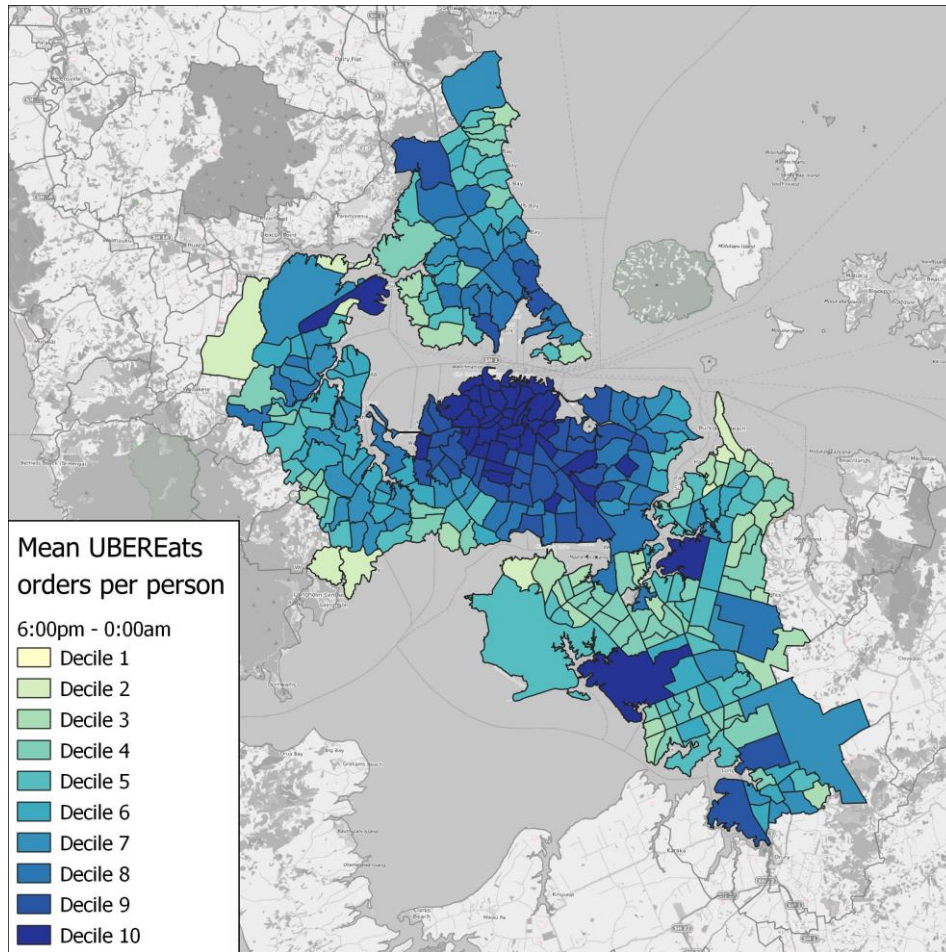
Source: NZIER, Open Street Map

We find that during the weekday Uber Eats orders peak at the times of 12pm (lunch time) and 7pm (dinner time). There is also a weekday effect where more orders are made later in the work week, particularly Friday. Orders during the weekends show a relatively smoother consumption pattern over the day as people tend to be less restricted given workers do not have to consume meals based around their work schedule.

Figure 11 More orders are made later in the work week
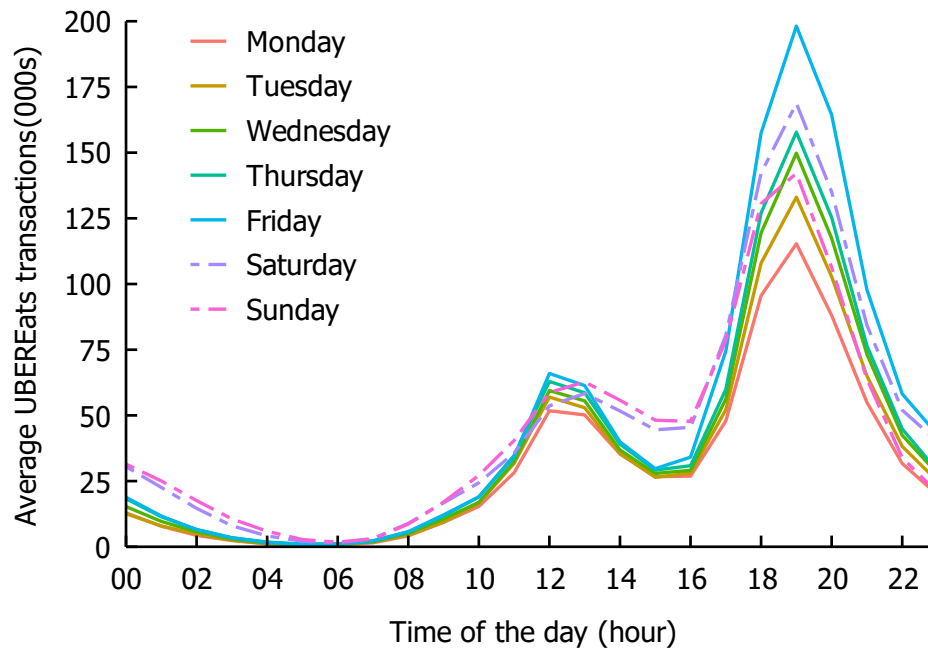
Source: NZIER, Uber Eats

Since Uber Eats was introduced in Auckland in 2017, each user has recorded an average of 22 orders.

While this transaction data provides some indication of the impact of the different factors driving demand of Uber Eats services, there is a significant overlap between the impact of these factors. We isolate the impact of each factor on the number of orders using regression analysis.[20] Our results suggest that the distance to providers of Uber Eats services and the income levels of Uber Eats users are the main drivers of demand for Uber Eats services. Areas with a higher proportion of individuals earning 50k-70k have significantly higher demand for Uber Eats services than all other income brackets. However, in the areas with a smaller number of providers available in close proximity, the high-income households tend to have higher demand relative to the low-income households.[21]

After accounting for these factors, we do not find population (i.e. the number of people) of the suburbs as the main driver of demand of Uber Eats services.

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[20]   The full results of this is shown in Appendix B.

[21]   The reported effect is based on a correlation. Therefore the higher demand by the higher income groups in the areas with lower access to providers may also be because the residents of those areas are generally in the higher income groups.

5 Results

After gaining an understanding of the high-level impact of the introduction of Uber Eats on restaurant sector GDP, and how Uber Eats customers use their service, we estimate the economic impact of RTE and Uber Eats services.

We first provide our estimates of the impact of RTE services on demand for the restaurant sector. Then we present the impact of RTE services on households. In the last section we present our estimates of the additional economy-wide effects of RTE services.

5.1 RTE services boosted the growth of the restaurant sector economy by 0.27%

As discussed earlier, we compared the size of the restaurant sector in regions with Uber Eats services before and after the introduction of Uber Eats. To isolate the impact of Uber Eats, we adjusted our result for changes in population, the potential wealth effect, and the state of the restaurant sector as well as the rest of the economy. After controlling for these factors, we find Uber Eats services have led to growth in the restaurant sector of 0.27%, compared to the counterfactual where Uber Eats did not exist. This equates to **$21.5 million more revenue for the restaurant sector in 2018**.

5.2 26.3% of Uber Eats users are new customers for the restaurant sector

As shown in Figure 3, there are a range of choices available for an individual in how they consume a meal, including cooking at home, dining at a restaurant, and using delivery and RTE services. While the option to use restaurant delivery services has been available for many years, the number of restaurants providing delivery services was limited before the emergence of RTE services. Our estimations suggest that 26.3% of Uber Eats orders are from consumers who would not otherwise have used dine-in or delivery services in the absence of Uber Eats services. This means they are new customers for the participating restaurants who contribute to revenue growth in the restaurant sector, and also capture the increased spending that result from using Uber Eats.

Our analysis of Uber Eats data found that restaurants which used Uber Eats had an average increase in revenue of $59,599 in 2019.

5.3 In 2019, Uber Eats services improved New Zealanders' wellbeing by $4 million from less travelling time and $30 million from food preparation time savings

It is difficult to put a dollar value on individuals' consumption of different goods and services. However, the minimum amount that individuals will be better off as a result of their use of Uber Eats services is equal to the amount of time saved in not having to pick up their food (either as ingredients or as a prepared meal), prepare their meal, and clean up.

We estimate that New Zealanders have gained a minimum of $24 million in happiness dollars from time saved in not having to travel to pick up their food over the last three years that Uber Eats services has been operating in New Zealand. Given that 26.5% of that is purely due to the availability of Uber Eats services, the contribution of Uber Eats is $6.4

million. Across the years that Uber Eats has been operating, this value to New Zealanders was $0.5 million in 2017, $2.3 million in 2018 and **$4 million in 2019**.

The preparation of food and clean up takes an average of 46 minutes of New Zealanders' time per day. The average time spent purchasing goods is 18 minutes per day and the time spent to travel to buy the goods is 15 minutes per day.[22] We assume that one-third of this total time of 79 minutes is spent preparing one meal. That is equal to 26 minutes per meal. Assessing the value for customers who use Uber Eats directly as a result of the availability of this service shows **a total of $30 million in time savings from the lower cost of food preparation in 2019** and $49 million in benefits over three years.

5.4   Uber Eats has increased the size of the NZ economy by $162 million

Our wider economic impact analysis suggests that Uber Eats and its associated services have led to a $162 million increase in the GDP of New Zealand.[23] The availability of RTE services increases[24]:

- National household consumption by $93 million

- National income by $33 million

- And exports by $127 million.

The change in the size of other regional economies is illustrated in   Table 1. RTE services increased household consumption in Auckland by $51 million.

After Auckland, the main regions benefiting from Uber Eats services are Waikato and Canterbury with a boost of 0.051% and 0.054%, respectively, to their GDP.

The industries benefiting from RTE services consists of:

- Business services by $51.3 million

- Land transport services by $32.8 million

- Food and beverage services by $19.6 million.[25]

For more details on the impact on different sectors of the economy see   Table 2. The results suggest a slight decrease in economic activity of business services and transport services in the rest of New Zealand. This is because the emergence of RTE services leads to better (more productive) job opportunities in other regions, which attracts skilled labour force from the rest of New Zealand to the regions with available opportunities. The supermarkets and food retailers lose $11.76 million of their GDP.

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[22]   Time-use survey 2009-2010 (Stats NZ).

[23]   That means that Uber Eats has increased the size of the economy by $162 million and will keep maintaining that size of the economy in the subsequent years – assuming that there will be no increase in adoption of their services in the coming years.

[24]   In our estimation we have accounted for the potential loss to the Supermarkets from less purchase of groceries by households. We presented our estimated components in equation (1).

[25]   The reason for smaller benefit to the food and beverage sector compared to our initial estimate of $21.5 million benefits to the restaurant sector from RTE services is the decrease in the size of this sector in the regions that RTE services are not provided.

Table 1 Macroeconomic impacts of RTE services

CGE Outputs (% increase directly as a result of RTE services)

Economic indicator	Auckland	Wellington	Canterbury	Waikato	Otago	Bay of Plenty	Rest of NZ
GDP	0.091%	0.051%	0.016%	0.044%	0.054%	0.028%	0.008%
Exports	0.231%	0.103%	0.118%	0.229%	0.134%	0.112%	0.079%
Employment	0.043%	0.025%	0.011%	0.024%	0.027%	0.015%	0.006%
Household consumption	0.086%	0.052%	0.025%	0.049%	0.056%	0.032%	0.015%

Source: NZIER

Table 2 Change in industry output ($ millions)

Industry	Auckland	Wellington	Canterbury	Waikato	Otago	Bay of Plenty	Rest of NZ
Business Services	$41.9	$2.3	-$0.6	$7.7	$9.0	$0.5	-$9.6
Land transport services	$27.5	$1.3	-$0.8	$5.0	$5.5	$0.2	-$5.9
Food and beverage services	$14.3	$0.8	-$0.2	$2.5	$2.9	$0.2	-$1.0
Wholesaling	$2.3	-$0.1	-$0.1	$0.0	-$0.0	-$0.1	-$0.1
Retail	$1.0	-$0.0	-$0.1	$0.1	$0.1	-$0.0	-$0.1
Gas and water supply	$0.2	$0.0	$0.0	$0.1	$0.0	$0.0	$0.3
Accommodation	-$0.9	-$0.1	-$0.0	-$0.2	-$0.2	-$0.0	-$0.0
Finance and insurance services	-$3.0	-$0.2	-$0.1	-$1.3	-$0.4	-$0.1	-$0.3

Source: NZIER

Our estimated results also suggest a 0.12% decrease in the price of food and beverages in New Zealand compared to the situation when RTE services were not provided in the economy. This price effect is resulted from increased competition amongst restaurants. However, as we presented above, the overall impact of changes in price and quantity, is positive for the food and beverage sector. Therefore, the size of the food and beverage sector has increased but the prices have decreased – more competition has stimulated demand in the sector. This has generated positive welfare gains as we captured in our outcomes for households above (in household consumption figures). The changes in prices for different regions is illustrated in Table 3.

Table 3 Impact on the price of food and beverage

	Auckland	Wellington	Canterbury	Waikato	Otago	Bay of Plenty	Rest of NZ
Impact on price of food and beverage	-0.18%	-0.11%	-0.11%	-0.08%	-0.05%	-0.04%	-0.04%

Source: NZIER

Appendix A Description of NZIER's CGE model

We used our NZ-TERM ('The Enormous Regional Model') CGE model of the New Zealand economy and its regions for this economic impact analysis.

NZIER's NZ-TERM has been built in consultation with CGE experts at the Centre of Policy Studies (COPS) which is now based at Victoria University, Melbourne. COPS is well-regarded internationally and recognised as a world leader in CGE modelling. For more details, see their website.

The TERM model includes 106 industries, 201 commodities and 15 regions. We usually aggregate the industries and commodity groups to broader groups depending on the focus of the study.

NZ-TERM is a bottom-up regional CGE model which treats each region as a separate economy. All regions are linked via inter-regional trade in commodities and movements in labour and capital. The model captures the various inter-linkages between sectors, as well as their links to households (via the labour market), the government sector, capital markets and the global economy (via imports and exports). Key features of the model are:

- Each industry can produce a number of different commodities.

- Production inputs are intermediate commodities (domestic and imported) and primary factors (labour, land and capital).

- The demand for primary factors and the choice between imported and domestic commodities are determined by Constant Elasticity of Substitution (CES) production nests. This means an increase in price of one input shifts sourcing towards another input.

- Intermediate goods, primary factors and other costs are combined using a Leontief production function. This means the proportion of production inputs is held constant for all levels of output.

- The production mix of each industry is dependent on the relative prices of each commodity. The proportion of output exported or consumed domestically is also dependent on relative prices.

- Within each region, any changes to the economy have multiple direct and indirect (flow-on) impacts, including beyond the sectors initially affected. So, for example, changes to the Waikato economy due to changes in land use patterns will flow on to other regions.

- Price changes (e.g. wage increases, shifts in the exchange rate) as a result of a change to the regional economy in one sector also affect all other sectors, both within the region and across the rest of the country.

A.1.1 Closure

As we noted above, in any CGE model, it is important to understand which factors have been allowed to vary and which remain fixed **by assumption** (also known as exogenous variables). The particular combination of fixed factors is known as the closure.

A.1.2   Short run closure

We have used a static CGE model, but with a short run closure. The reason for using short run closure is that Uber Eats recently entered to NZ market, therefore there was not enough time for investment decisions to affect capital stocks.

The Short run closures[26] include:

- **Labour market adjustment** – we hold national real wage fixed to base levels but allow for employment to vary by industry and region via adjustment in national employment.

- **Capital mobility** – Short term is not long enough for investment decisions to greatly affect the useful size of the sectoral capital stocks. For example, new buildings take time to be made.

Appendix B Estimated results

Using regression analysis, we estimated the impact of a range of factors on the number of orders. The outcomes are the logarithm of the number of orders in a suburb. The factors that we used for estimating the number of orders include:

- Proportion of residents in the suburb with different income levels

- Population of residents in the suburb

- Percentage of the providers located within different distances from the destination (suburb)

- The (logarithm of) number of Uber Eats providers

- The interaction between (logarithm of) the number of Uber Eats providers and the population of the suburb.

The results of our estimations are presented in the table below. Some of these factors are both the reason for higher demand for Uber Eats services and the outcome of having more providers nearby that suburb. There is also a significant location choice factor that may affect our results, i.e. people who appreciate access to restaurants may reside in suburbs with better access to food services.

We presented the results for suburbs with 200 or more providers as well as the suburbs with a smaller number of providers. This provides some insights on the potential drivers of higher demand for Uber Eats services.

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[26]   In this section variables being fixed to base levels means relative to future pre-simulation levels.

Table 4 Estimation results – factors of demand for Uber Eats services

All conditions	Estimate		Std.error
% of incomes - 30k - 50k	-0.0011	**	0.0003
% of incomes - 50k - 70k	0.0018	***	0.0005
% of incomes - 70k or more	-0.0005	**	0.0001
% of Uber Eats providers - Within 1km - 3km	2.4889	***	0.5092
% of Uber Eats providers - Within 1km or less	3.3855	***	0.6786
% of Uber Eats providers - Within 3km - 5km	1.6140	**	0.5041
Log of population	0.5660	*	0.2771
Log of Uber Eats providers	0.7216		0.4880
Log of Uber Eats providers: Log of population	0.0474		0.0594
Intercept	-3.4354		2.2148

More than 200 providers	Estimate		Std.error
% of incomes - 30k - 50k	-0.0003		0.0003
% of incomes - 50k - 70k	0.0005		0.0005
% of incomes - 70k or more	0.0004	**	0.0001
% of Uber Eats providers - Within 1km - 3km	-8.8100		5.2347
% of Uber Eats providers - Within 1km or less	-7.2814		5.2405
% of Uber Eats providers - Within 3km - 5km	-9.6670		5.2319
Log of population	0.6470		0.5559
Log of Uber Eats providers	1.0170		0.8323
Log of Uber Eats providers: Log of population	-0.0438		0.0995
Intercept	9.1850		5.7504

Less than 200 providers	Estimate		Std.error
% of incomes - 30k - 50k	-0.0013	**	0.0005
% of incomes - 50k - 70k	0.0020	**	0.0007
% of incomes - 70k or more	-0.0005	*	0.0002
% of Uber Eats providers - Within 1km - 3km	2.0499	***	0.5802
% of Uber Eats providers - Within 1km or less	3.0243	***	0.7943
% of Uber Eats providers - Within 3km - 5km	1.2071	*	0.5722
Log of population	0.4335		0.4513
Log of Uber Eats providers	0.6512		0.8123
Log of Uber Eats providers: Log of population	0.0847		0.0978
Intercept	-2.9091		3.5818

Significance codes: *** 0.001, ** 0.01, * 0.05

Source: NZIER