

# Economic impacts of COVID-19 containment measures

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## Key findings

- This paper outlines our estimates of the direct impact on GDP from each of the COVID-19 alert levels.
- The impact ranges from an estimated 4 percent reduction in GDP under alert level 1 up to 37 percent of GDP under level 4.
- The impact is not uniform across the economy, with some sectors more heavily effected than others such as tourism.
- These estimates will inform our projections and scenarios going into the May *MPS*.

## Introduction

Containment measures are limiting the spread of COVID-19 and saving lives. One trade-off from introducing these measures is the economic cost. This paper estimates the direct costs to economic activity while the measures are in place. Any ongoing impacts to GDP, or to wellbeing<sup>1</sup> are beyond the scope of this analysis.

We estimate the impacts on GDP of the following measures:

- Lock down of all non-essential activity (alert level 4)
- Restrictions on trading activity (alert level 3)
- Border restrictions
- Domestic travel restrictions
- Mass gatherings and public venues

We use a range of information including from Stats NZ, other government agencies, and from talking to businesses and industry bodies. However, the information available is limited and we have made several judgements.

We find the direct impacts on GDP are substantial. Table 1 shows the estimates for each of the COVID-19 alert levels.<sup>2</sup> These estimates are relative to GDP with no restrictions in place or approximately the level of GDP prior to the COVID outbreak.

**TABLE 1: GDP REDUCTION WHILE COVID-19 ALERT LEVELS ARE IN PLACE**

Alert level	GDP reduction (%)
1	3.8
2	8.8
3	19
4	37

We estimate GDP is around 37 percent lower during the period of alert level 4 than it would have been without any restrictions. This means a lockdown for one quarter would reduce quarterly GDP by 37 percent. Over four and a half weeks that equates to \$10 billion of lost production, reducing annual GDP by 3.2 percent. For comparison, a similar period of time at alert level 3 equates to a fall of around \$5 billion in production relative to the same baseline, reducing annual GDP by 1.7 percent.

These estimates are similar, albeit generally slightly smaller, than the estimates in the Economic scenarios paper released by Treasury on April 14.<sup>3</sup>

1 See [treasury.govt.nz/information-and-services/nz-economy/higher-living-standards](https://treasury.govt.nz/information-and-services/nz-economy/higher-living-standards)

2 See [covid19.govt.nz/alert-system/covid-19-alert-system](https://covid19.govt.nz/alert-system/covid-19-alert-system)

3 See [treasury.govt.nz/sites/default/files/2020-04/c19-4265378-t2020-973-economic-scenarios-v3.pdf](https://treasury.govt.nz/sites/default/files/2020-04/c19-4265378-t2020-973-economic-scenarios-v3.pdf)

It should be noted there is significant uncertainty and limitations surrounding our estimates. We do not account for transitional impacts as we move from one alert level to another. We also do not factor in the decline in global economic activity that would have reduced New Zealand GDP without any containment measures.

We will continue to improve our estimates as more information becomes available.

## Estimating direct impacts of the containment measures

This section sets out the direct impact from each containment measure on GDP. These estimates capture the direct effects on the most affected industries. They exclude any flow-on effects to aggregate demand.

GDP is the preferred metric because it reflects income and spending in the economy and is comparable with other countries and over time. Further, we model the relationship between GDP and other variables such as employment and inflation.

### Lock down of non-essential activity (alert level 4)

The lockdown of non-essential industries means a large portion of the economy can no longer produce goods and services, which has a substantial impact on GDP. We estimate GDP to be around 37 percent lower during the lockdown.

We examined the contributions of industries to GDP and added up those whose output had been affected. In this context, we factored in two important considerations:

1. The portion of essential businesses that continue to operate.
2. The portion of non-essential businesses that are able to work from home.

We compiled this information from a variety of sources. The Ministry of Business Innovation and Employment (MBIE) have produced a list of essential services to help identify the industries that continued to operate. We also use MBIE's estimates of the proportion of people working from home. We applied detailed industry GDP data from Stats NZ to the identified industries that contain essential services, as well as the services that support them (typically relating to the supply chain of an essential service that will still be operating).<sup>4</sup>

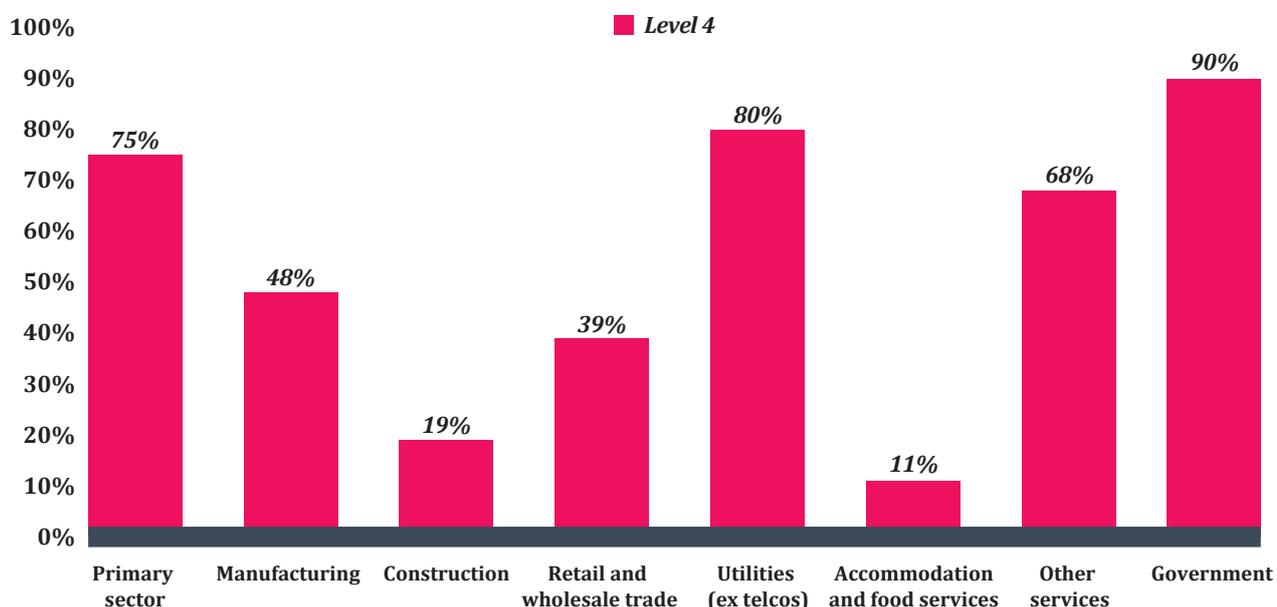
We have also cross-checked our estimates with other related government department analysis and discussed these with individual businesses. The business engagement was particularly directed towards firms in sectors that were most affected by the alert level restrictions. This was to gauge what activity was actually taking place in the different sectors of the economy under the higher alert levels.

Figure 1 shows output by industry as a share of its pre-COVID-19 level. A value of 100 percent means that the industry is producing the same as it normally would. A lower value indicates output has fallen because of the closure of non-essential businesses or reduced productivity.

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<sup>4</sup> Where granularity is not available in the 57 detailed industry groups covered by Stats GDP data, we use the more detailed 2013 GDP input-output tables from Stats. In a few instances where the input-output tables do not provide industry contributions, we have had to make judgement.

**FIGURE 1: GDP BY INDUSTRY DURING LOCKDOWN (AS PERCENT OF ITS PRE-CORONAVIRUS LEVEL)**



Production in all industries has been affected in some way compared with pre COVID-19 levels. An important assumption for our estimate of level 4 is that social distancing requirements restrict production for essential businesses by 20 percent, which is consistent with a general assumption used by MBIE.<sup>5,6</sup>

Accommodation and food services and construction are the most heavily affected industries. Our discussions with these businesses indicated some activity was able to continue but only at very low levels (emergency only) of between 5 and 20 percent of typical capacity (we have assumed 10 percent, but there is still some ability to work from home). This disruption ripples back through their supply chains, partially impacting manufacturing, and retail and wholesale trade.

Aggregating these industry effects resulted in an estimated 37 percent reduction in GDP during alert level 4. Treasury’s economic scenarios incorporate a slightly larger reduction of around 40 percent in GDP during alert level 4.

The OECD also examined the potential impact of lockdowns on economies, including New Zealand. Based on the contribution to GDP from a standardised set of affected industries, it estimated the impact on New Zealand would be around 30 percent of GDP, well within the ballpark of our own estimate.

### Restrictions on trading activity (alert level 3)

Our estimate of the economic impacts of alert level 3 is based on the Government guidelines announced on April 16. While non-essential businesses are able to open, a number of restrictions remain in place around social distancing. This limits firms’ activity, particularly for those that are reliant on face-to-face contact with customers.

We estimate GDP will be 19 percent lower during alert level 3 compared with no restrictions. However, the impact on firms is highly uncertain during this period. As seen in level 4, the guidelines are likely to be refined further as the consequences of the restrictions are better understood.

5 See the technical appendix for the breakdown of the listed essential services and the application to impacted industries and a more granular industry specification than presented in Figure 1.

6 The impact on GDP may be larger for some sectors because of fixed costs in the production process. These fixed costs would continue to occur even if firms stopped production entirely. Therefore, a lower level of value add for GDP could occur.

In our estimates for level 3, we assume that offices will continue to remain closed, consistent with the Government's guidelines. If a person is unable to work from home and the work does not require direct contact with others, they can go back to work.

Under this assumption:

- Retail trade of non-essential items can resume if it is contactless i.e. online sales.<sup>7</sup>
- Wholesale trade and manufacturing will support what retail can sell over and above what is essential.
- General manufacturing can resume but productivity will remain limited due to distancing requirements (90 percent of typical activity).
- Non-essential construction can resume, but will be constrained due to distancing requirements. Heavy construction will generally be slightly less affected than other sectors (95 percent).<sup>8</sup> However, construction services will remain slightly more restricted due to distancing requirements (80 percent). We also assume the primary sector will be able to operate at 95 percent because distancing requirements will generally be less restrictive.
- Wholesale trade will support the activity in both the manufacturing and construction sectors.
- Accommodation and food services resume to varying degrees. Hotels will remain closed but takeaway food stores and some restaurants will be able to deliver or operate a click-and-collect service. However, the distancing requirements in commercial kitchens and the removal of face-to-face ordering will reduce production.

Another important assumption is that productivity will be 10 percent lower for sectors where we have not made explicit assumptions, whereas we assumed productivity would be 20 percent lower at alert level 4. This reflects the greater flexibility and therefore the additional opportunity for firms to be more productive at level 3.

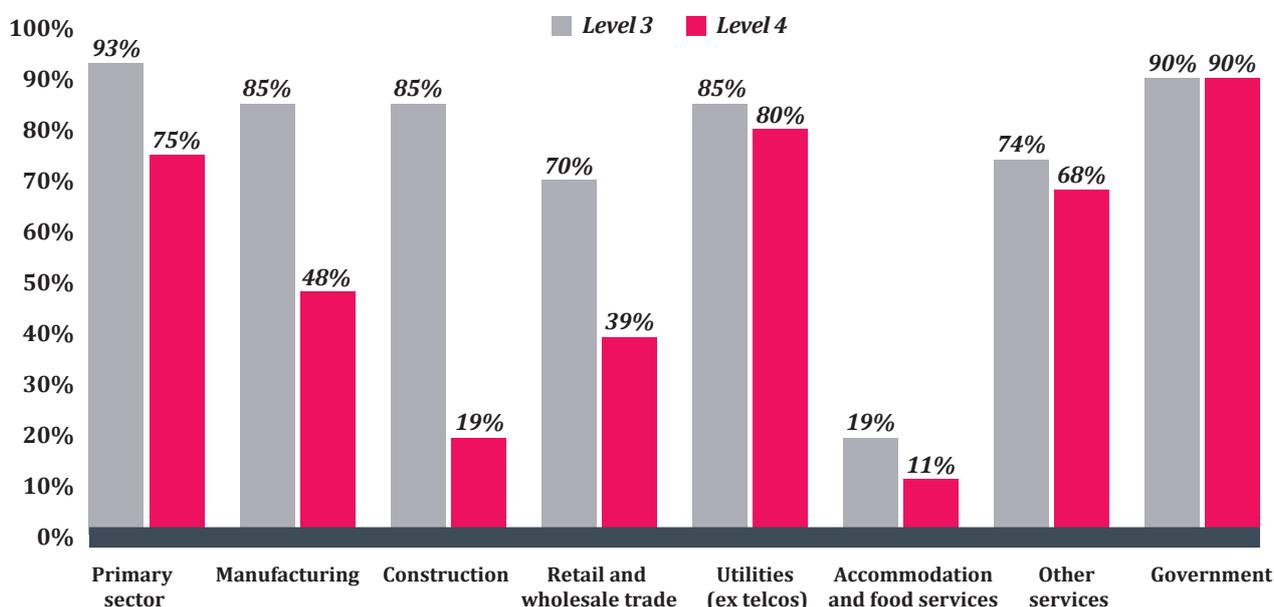
Figure 2 shows the estimated sectoral impact of being at alert level 3 compared with level 4. The overall aggregate impact on GDP is a 19 percent reduction compared with no restrictions. If level 3 was in place for four weeks, lost production during this period would reduce annual GDP by 1.7 percent.

The impacts on the Māori economy under alert levels 3 and 4 are roughly similar to the impacts on overall GDP. Māori businesses are more concentrated in the primary and manufacturing sectors. During alert level 4, the Māori economy's GDP falls by 38 percent based on industry shares calculated in 2013, while level 3 would imply a 21 percent fall.

7 [BNZ/Marketwatch](#) data suggests online retail sales are typically around 8 percent of total retail trade. We assume this will increase to 25 percent during level 3 as firms find ways to trade without face-to-face contact with customers.

8 This is consistent with our conversations with businesses about what has been seen in the Australian heavy construction industry.

**FIGURE 2: GDP BY INDUSTRY DURING LEVELS 3 AND 4 (AS % OF PRE-CORONAVIRUS LEVEL)**



As the alert levels are relaxed to level 2 and then 1 there will still be direct impacts on production, although these will be less widespread. The key disruptions to economic activity are:

- the border closure affecting tourism and migration;
- limiting domestic travel where it is not essential; and
- banning mass gatherings.

We address each component individually below before estimating what impact they will have on economic activity at alert level 1 and 2.

### Closing the border to international travel

International tourism is an important driver of economic activity in New Zealand. Based on the tourism satellite account, overseas visitors contributed approximately 4.4 percent to GDP in the year to March 2019.

This estimate includes spending by international students who are studying here for less than 12 months. Adding overseas students who stay longer than a year adds another 0.1 percent to our estimate.

Table 2 summarises the contributions from international tourists and students, assuming the contributions are proportional to their expenditure (for a total contribution of 4.5% of GDP).

The border closure also affects spending by New Zealanders travelling overseas. Domestic tourism expenditure on air passenger transport totalled \$2.8 billion in the year to March 2019. Assuming a third of this is affected, we estimate GDP would decline by around 0.2 percent.

The technical appendix provides more detail about how these estimates were calculated.

**TABLE 2: GDP CONTRIBUTIONS FROM INTERNATIONAL TOURISTS AND STUDENTS**

Year to March 2019 quarter	Value add % GDP
International Tourists	3.4
International Students	1.1
Affected domestic tourism	0.2
<b>Total</b>	<b>4.7</b>

The fall in international tourism is also likely to affect the Māori economy. In 2013, tourism (both international and domestic) made up about 4 percent of the Māori economy.<sup>9</sup> Anecdotal evidence suggests overseas tourism as a proportion of the Māori economy has grown since then.

<sup>9</sup> See Te Puni Kōkiri 2013, *Māori Economy Report 2013*, [www.tpk.govt.nz/en/a-matou-mohiotanga/business-and-economics/maori-economy-report-2013](http://www.tpk.govt.nz/en/a-matou-mohiotanga/business-and-economics/maori-economy-report-2013)

### *Permanent and long-term migrants*

Over recent years, net immigration has added around 1 percent to the population each year. This increases the labour supply as well as boosting investment and spending.

Closing the border would disrupt the plans of those wanting to migrate to (and from) New Zealand. The net inflow would likely be significantly reduced while the border is closed, perhaps to near zero.

A reduced number of immigrants would result in long term consequences for the NZ economy, with a cumulative impact on GDP while border restrictions remained in place. For example, closing the border for three months would reduce GDP by 0.25 percent while closing it for a year would reduce GDP by 1 percent.

### **Restricting domestic travel**

Domestic travel will experience restrictions under alert levels 1 and 2. The majority of domestic tourism is by households, but businesses and the government

also contribute. A reduction in domestic travel will affect spending, particularly on transport, food and accommodation, retail sales and other tourism products.

The assumptions relating to how much domestic travel is restricted under alert levels 1 and 2 is detailed below. Domestic tourism contributes 6 percent of GDP, a larger share than international tourism. The technical appendix outlines how this was calculated from information in the tourism satellite account.

### **Mass gatherings and public venues**

The arts and recreation component of GDP is impacted by the restrictions on mass gatherings and the additional requirements on public venues. Within this, we identified the specific GDP sub-components that would be most affected (Table 3). These contribute about \$2 billion dollars to the economy or 0.7 percent of GDP. While affected, many of these identified groups are likely to continue experiencing some activity, even with public venues being closed and all mass gatherings cancelled.

**TABLE 3: MASS GATHERINGS AND PUBLIC VENUES CONTRIBUTION TO GDP**

Sector	Value add \$mil
Amusement and Other Recreation Activities n.e.c.	404
Amusement Parks and Centres Operation	142
Creative Artists, Musicians, Writers and Performers	331
Health and Fitness Centres and Gymnasia Operation	349
Horse and Dog Racing Administration and Track Operation	240
Other Horse and Dog Racing Activities	153
Performing Arts Operation	118
Performing Arts Venue Operation	126
Sports and Physical Recreation Venues, Grounds and Facilities Operation	213
Museum Operation	104
Nature Reserves and Conservation Parks Operation	71
Zoological and Botanical Gardens Operation	20
<b>Total</b>	<b>2,270</b>
<b>Share of GDP</b>	<b>0.7%</b>

## GDP implications of COVID-19 alert levels

In this section, we use data and sometimes judgement to determine how binding the various restrictions have been and will be in the future. The impacts of some restrictions will depend on what other limits are set at the same time.

For example, domestic travel restrictions would have little additional impact if alert level 4 was already in effect.

Table 4 summarises our estimate of the impact on GDP during periods at each of the COVID-19 alert levels.

**TABLE 4: GDP IMPACTS AT COVID-19 ALERT LEVELS**

Level and restriction	Assumption: How binding?	GDP impact
Level 1		3.8%
Border restriction	<p>We assume two weeks in self-isolation would severely reduce tourist numbers but a few would still come or remain here (this may depend on the length of time the restriction is in place). Over time, we assume the international tourism contribution to GDP falls to 10 percent of its original level.</p> <p>We assume the GDP contribution of international students falls to half its original level.</p> <p>Domestic tourism linked to overseas travel falls to a negligible level.</p> <p>If alert level 1 was implemented with a stricter border closure for an extended period, GDP could fall by up to another 1 percentage point.</p>	3.8%
Level 2		8.8%
Border closure	<p>The border is closed to international tourists, severely affecting the tourism sector. We assume the contribution to GDP from international tourism falls to 5 percent of its original level. This accounts for foreigners already in the country before the restrictions were enacted.</p> <p>We assume the GDP contribution from international students falls to one third of its original level</p>	4.0%
Restrictions on mass gatherings and public venues	<p>We assume these restrictions would reduce production in related industries by half. The proportion impacted is uncertain, and some groups would fare better than others. However, the marginal impact of this restriction is small compared to the other restrictions.</p>	0.3%
Avoid non-essential domestic travel	<p>Domestic tourism is also restricted at this alert level. We assume a 75 percent reduction.</p> <p>It is unclear how much domestic travel is essential and would still take place. However, it is likely to be a relatively small. In addition, domestic tourism linked to overseas travel would fall.</p>	4.5%

Level and restriction	Assumption: How binding?	GDP impact
Level 3 (see Table A2 in Technical Appendix for details)		19%
Border closure	To avoid double counting, we assume there is no additional impact from restrictions on domestic and international tourism and mass gatherings over and above the impact of restrictions on business.	0%
Ban mass gatherings		
Limit domestic travel		
Restrictions on businesses (and closure of public venues)	At level 3, businesses can only operate if they can do it safely, maintaining distancing requirements and without direct face-to-face contact with customers. Some business are closed at this level, including public venues. Many businesses are able to open but we assume they are less productive due to distancing. For example, people on a production line needing to be 1 metre apart.	19%
Level 4 (see Table A2 in Technical Appendix for details)		37%
Border closure	To avoid double counting, we assume there is no additional impact from restrictions on domestic and international tourism and mass gatherings over and above business closures.	0%
Ban mass gatherings		
Limit domestic travel		
Close non-essential businesses (including educational facilities and public venues)	We assume that the only binding restriction during alert level 4 is the lockdown of all non-essential businesses.	37%

## Conclusion

The containment measures for COVID-19 will have substantial direct effects on economic activity while they are in place. The ongoing impacts are not included in this analysis and, even with significant support from fiscal and monetary policy, these would add to the overall economic costs.

One factor to consider in this analysis is that the estimates of the direct impacts may be overstated because the decline in global economic activity and international travel would have reduced economic activity in New Zealand even without any containment measures.

We will continue to improve our estimates as new information becomes available.

## Technical Appendix

**TABLE A1: LOCKDOWN INDUSTRY APPLICATION**

Essential service	Industry impacted	Detailed industry impacted	Emergency only
Accommodation	Accommodation and Food Services	Accommodation	Y
Border	Public administration and safety	Public administration	
Local and national government	Public administration and safety	Public administration	
Foreign government	Public administration and safety	Public administration	
Courts, tribunals	Public administration and safety	Public administration	
Public safety and national security	Public administration and safety	Public Order, Safety and Regulatory Services/Defence	
Health	Health care and social assistance	All	
Social services	Health care and social assistance	All	
Financial services	Financial and Insurance Services	All	
Building and construction	Construction	Construction Services (exc. Land development, structure services building completion services).	Y
		Heavy and Civil Engineering Construction	Y
Education	Education and Training	All	
Fast moving consumer goods	Retail trade	Food Retailing (supermarkets in GDP data)	
	Wholesale trade	Grocery, Liquor and Tobacco Product Wholesaling	
	Retail trade	Other Store-Based Retailing (includes electronics, clothing and pharma)	Y
Primary industries, including food and beverage production and processing	Agriculture, Forestry and Fishing	All (ex wool and logging, fishing, hunting and trapping and aquaculture)	
	Manufacturing	Beverage and Tobacco Product Manufacturing	
	Manufacturing	Food Product Manufacturing	
	Manufacturing	Machinery and Equipment Manufacturing	Y
	Wholesale trade	Machinery and Equipment Wholesaling	Y
	Wholesale trade	Basic Material Wholesaling (includes agg chemicals and grain product wholesaling, also wool, timber grain, metal and mineral)	Y

Essential service	Industry impacted	Detailed industry impacted	Emergency only
	Other services	Repair and Maintenance	Y
	Retail trade	Motor Vehicle and Motor Vehicle Parts Retailing	Y
Science	Professional, scientific and technical services	Professional, Scientific and Technical Services (only science research services and Vet services, 2/8)	
	Wholesale trade	Machinery and Equipment Wholesaling (small part, Other machinery and equipment)	
Transport and logistics	Transport, Postal and Warehousing	Road, rail and other transport and transport services	Operating at 50% broadly in line with heavy traffic index
	Transport, Postal and Warehousing	Air and space transport	Y
	Transport, Postal and Warehousing	Warehousing and storage services	
	Transport, Postal and Warehousing	Postal and courier services	Operating at 60% consistent with business visits
	Manufacturing	Transport Equipment Manufacturing	Y
	Manufacturing	Machinery and Equipment Manufacturing	Y
	Wholesale trade	Motor Vehicle and Motor Vehicle Parts Wholesaling	Y
	Wholesale trade	Machinery and Equipment Wholesaling	
	Retail trade	Motor Vehicle and Motor Vehicle Parts Retailing	
	Other services	Repair and Maintenance	
Utilities and communications, including supply chains	Electricity, gas, water and waste services		
	Information media and telecommunications	All (ex motion picture and sound recording, exhibition and production, but distribution will continue with online)	
	Retail trade	Fuel retailing	
	Mining	Oil and Gas Extraction	Y
	Mining	Coal Mining	Y
	Manufacturing	Pulp, Paper and Converted Paper Product Manufacturing	Y
	Manufacturing	Printing	Y
	Manufacturing	Petroleum and Coal Product Manufacturing	Y
	Manufacturing	Basic Chemical and Chemical Product Manufacturing	Y
	Manufacturing	Primary Metal and Metal Product Manufacturing	Y
	Wholesale trade	Basic Material Wholesaling	

**TABLE A2: LEVEL 3 AND 4 IMPACTS BY INDUSTRY**

Industry	% of GDP typically	L4 % with working from home considered	L3 % with working from home considered
Accommodation and Food Services	2.3%	0.3%	0.5%
Administrative and support services	2.1%	0.5%	0.6%
Agriculture, forestry, and fishing	6.1%	5.2%	5.7%
Arts and recreation services	1.5%	0.3%	0.3%
Construction	6.5%	1.3%	5.6%
Education and training	4.9%	4.4%	4.4%
Electricity, gas, water and waste services	3.3%	2.6%	3.0%
Financial and insurance services	6.2%	5.0%	5.6%
Health care and social assistance	6.4%	5.8%	5.8%
Information media and telecommunications	2.8%	2.0%	2.6%
Manufacturing	11.6%	5.6%	10.4%
Mining	1.3%	0.3%	1.2%
Other services	2.0%	0.5%	1.0%
Professional, scientific and technical services	8.6%	4.7%	5.3%
Public administration and safety	4.4%	4.0%	4.0%
Rental, hiring, and real estate services	14.8%	13.6%	13.6%
Retail trade	4.8%	1.8%	2.7%
Transport, postal and warehousing	5.0%	2.9%	3.8%
Wholesale trade	5.4%	2.2%	4.9%
<b>Total</b>	<b>100%</b>	<b>62.8%</b>	<b>80.9%</b>

## Calculations for international and domestic tourism

Table A3 outlines how we use the information in the tourism satellite account to estimate the contributions to GDP from domestic and international tourism (which includes international students here for less than one year).

At a high level, our estimate is the value added roughly attributable to international and domestic tourists added to the GST paid on purchases by each. We break down total tourism value add based on the international and domestic tourism expenditure excluding GST.

The value add component includes both direct spending by tourists as well as the indirect spending which captures flow on effects to supplier industries.

**TABLE A3: CALCULATING INTERNATIONAL AND DOMESTIC TOURISM CONTRIBUTIONS TO GDP**

Year to March 2019 quarter	International	Domestic	Total
Expenditure excluding GST	15,391	21,668	<b>37,059</b>
<i>Expenditure share (used to portion total value add)</i>	41.5	58.5	
Value add (direct and indirect)	11,350	15,978	<b>27,328</b>
GST paid on purchases	1,771	2,028	<b>3,799</b>
Total = value add + GST	13,121	18,006	<b>31,127</b>
Total contribution % GDP	4.4	6.0	<b>10.3</b>

The difference between exports of education services in the Balance of Payments (BoP) and spending by international students in the tourism satellite account (TSA) is assumed to be the contribution from students here

for longer than one year. To get the value add from this component, we assume a quarter of the additional expenditure is imported in line with the import share for total tourism expenditure.

**TABLE A4: DECOMPOSING INTERNATIONAL VISITOR CONTRIBUTION TO GDP**

Year to March 2019 quarter	Tourists	Students	Total
Less than 12 months	13,263	3,899 (TSA)	<b>17,162</b>
More than 12 months		503	
Total spending (inc GST)	13,263	4,402 (BOP)	<b>17,665</b>
<i>Share of spending (%)</i>	75	25	
Value add % GDP	3.4	1.1	<b>4.5</b>

To calculate the impact of the border closure on domestic tourism, we assume a third of domestic expenditure on air passenger transport is affected. This includes both domestic flights linked to international flights

and international flights by domestic airlines. Of this, we assume imports make up 30 percent, based on the 2013 input-output tables. The remaining contribution to annual GDP is around \$700 million or 0.2 percent of GDP.