

Economic Impacts of the COVID-19 pandemic on the Bay of Plenty Region – Early Estimates for Bay of Plenty Regional Council

May 2020



Infometrics

Economics put simply

Authorship

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Executive Summary

This report provides an overview of the anticipated economic impacts of the COVID-19 pandemic on the Bay of Plenty Region.

COVID-19 presents the greatest economic shock in living memory. This contraction is set to be significantly larger than anything seen in New Zealand since the Great Depression.

All regions and districts will be hard hit by the pandemic. By comparison to other parts of New Zealand, the hit to the Bay of Plenty economy is not as harsh as other areas. Although primary sector activity is expected to soften, we expect primary sector exports will hold up better than most other exports.

However, some parts of the region, like Rotorua, face a much more substantial hit to their local economy, due to the higher concentration of economic activity focused on the tourism sector.

The Level 4 lockdown has brought much of the Bay of Plenty economy to a standstill. Consumer spending is lower than at the same time last year, although locals are still spending on foodstuffs. Heavy traffic flows indicate freight movements have also reduced in the region.

About 51% of the Bay of Plenty workforce were able to work during Level 4 (slightly lower than the national average of 53%). Under Level 3, we expect 74% of the workforce will be operational (in line with the national average of 74%).

Bay of Plenty's GDP is forecast to contract by 7.3% over the year to March 2021, compared with an 8.0% contraction in the national economy. Tourism related sectors are most affected, with large declines in economic output expected in transport, postal and warehousing, retail and wholesale trade, and accommodation and food services.

Table 1: Key indicators

Indicator	Bay of Plenty Region	New Zealand
Change in consumer spending (week ending 12 April 2020 compared to same period 2019)	-52.9%	-55.9%
Change in heavy traffic (week ending 9 April 2020 compared to 1 February 2020)	-60.4%	-59.7%
% working at Level 4	50.6%	52.8%
% working at Level 3	74.3%	74.2%
GDP % change, year to March 2021	-7.3%	-8.0%
Job losses, year to March 2021	-14,524	-250,522
Employment % change, year to March 2021	-9.2%	-9.8%
Unemployment rate, March 2021	8.7%	9.0%
Loss in total earnings, year to March 2021 (\$m)	-\$776	-\$14,197
Residential construction % change, year to March 2021	-10.5%	-18.8%
Non-residential construction % change, year to March 2021	-17.2%	-18.3%

We expect around 14,500 jobs to be lost in the Bay of Plenty regional economy by March 2021. Job losses will push the unemployment rate to 8.7% from its current rate of 4.3% but will remain below the national average.

Low-skilled workers will bear the brunt of the job losses, with nearly 7,000 low-skilled workers expected to lose employment.

Some occupations require relatively generic skills, which can allow workers in these occupations to move between industries. Once the recovery begins, there may be opportunities for these workers to be redeployed.

Lower tourism activity is also likely to see the largest reduction in Māori employment.

Around \$776m in earnings is expected to be lost due to job losses in the Bay of Plenty region over the year to March 2021.

Construction efforts are also likely to soften as population growth slows considerably and demand for additional housing diminishes.

Introduction

This report provides an overview of the anticipated economic impacts of the COVID-19 pandemic for the Bay of Plenty Region.

In this report, the Bay of Plenty Region comprises Rotorua District, Tauranga City, Western Bay of Plenty District, Kawerau District, Ōpōtiki District, and Whakatāne District.

The report includes an assessment of the headline impacts of the COVID-19 lockdown through April 2020, forecast changes to economic activity, employment, and other key indicators over the year to March 2021, information on potential mobility of labour between different industries, and the outlook for construction activity in the region.

The forecast analysis presented in this report draws on a suite of economic models maintained by Infometrics. Models are only as good as the assumptions we put into them and we have clearly outlined our key assumptions.

The report is intended to provide evidence-based information and analysis to Bay of Plenty Regional Council and its key stakeholders, that can inform short-term responses to the pandemic and support long-term planning activities. This report is accompanied by a spreadsheet set which contains all the data used to prepare this report plus additional data, as well as a set of additional insights including Infometrics' full national economic outlook and industry impacts.

The greatest economic shock in living memory

COVID-19 presents the greatest economic shock in living memory, and although the full extent of the shock is still to play out, it is clear that the economy will be irrevocably changed by this pandemic. The speed with which the economic outlook changed during March far exceeded anything experienced during the Global Financial Crisis (GFC) of 2008/09.

Infometrics is currently forecasting a 13% contraction in economic activity in the New Zealand economy between the December 2019 and June 2020 quarters, with most of the decline occurring in the June quarter due to the Level 4 lockdown. This contraction is set to be at least four times larger than anything seen before, so there is understandably considerable scope for error in this estimate. Over a slightly longer time horizon, our forecast is for an 8% contraction in economic activity over the year to March 2021.

By March 2022, we expect quarterly GDP to be 6.6% below its December 2019 level. We estimate the unemployment rate will peak at 9.5% in the September 2021 quarter, and will remain above 8% until the December 2023 quarter. In addition, underemployment is set to rise, while some of the unemployed will drop out of the labour force or seek out education opportunities in order to reskill. These factors will contribute to a decline in the labour participation rate, which we predict could fall to its lowest level since 2001.

Key assumptions

We have made the following assumptions when modelling the effects of the COVID-19 pandemic, the economic downturn, and the government's policy responses on the New Zealand economy.

- **Lockdown is 4½ weeks at Level 4 and 2 weeks at Level 3** - we have based our industry employment and output modelling on Level 4 being in place for 4½ weeks and Level 3 being in place for two weeks, with implicitly lower economic activity throughout the rest of the period.
- **Economic activity is constrained across the entire economy** - we estimate that, nationally, approximately 65% of economic activity can take place under Level 4. This estimate includes people that can work from home and those people working in essential services. Under Level 3, our estimate of potential economic activity taking place rises to 82%.
- **Global demand for food products will hold up but non-food exports will take a hit** – people still need to eat during a recession, which will limit the reduction in our food exports. We have allowed for a 16% contraction in non-food manufacturing export volumes over the coming year, and a 9.5% reduction in international demand for unprocessed forestry exports.
- **Foreign tourism tanks** – we have estimated a 91% reduction in foreign tourist spending in New Zealand over the coming year, and a similarly sized reduction in New Zealand tourists spending money overseas.
- **Domestic tourism spending will drop** – despite more New Zealanders choosing to have domestic holidays rather than travel overseas, we estimate a 21% decline in domestic tourism spending from the previous year.
- **International education revenue halves** – we estimate the number of international students at schools and tertiary education provider this year to be 79% of normal levels and predict a 49% reduction in international education revenue during the year to March 2021.
- **Domestic education demand will increase** – we have allowed for a lift in total demand for tertiary training from domestic students over the coming year of 8.3%, which is similar to what we saw following the GFC.
- **The housing market takes a hit** – our assumptions include an 11% drop in average house prices nationally between mid-2020 and the end of 2021.
- **Construction is also hit hard** – the housing market downturn will drag down the rate of residential construction nationally by nearly 20%, while non-residential construction activity will decrease by a similar magnitude. In contrast, prospects for civil construction are positive outside Level 4 lockdown conditions.
- **Government comes to the party** –our modelling includes a \$10b wage subsidy scheme and a further injection of \$2.5b through a one-off increase in social welfare benefits of \$25 per week.

A full description of the Infometrics modelling assumptions is provided in Appendix I.

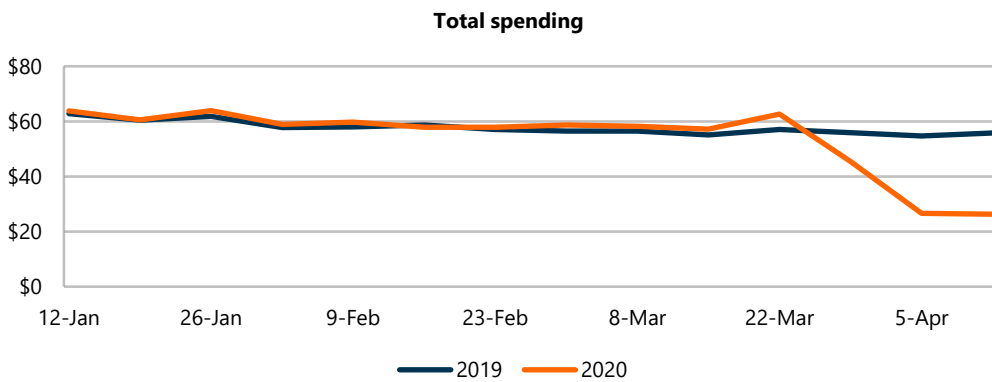
Level 4 lockdown has hit the Bay of Plenty economy

Like the rest of New Zealand, much of the Bay of Plenty economy has been closed by the Level 4 lockdown.

Consumer spending has fallen off a cliff

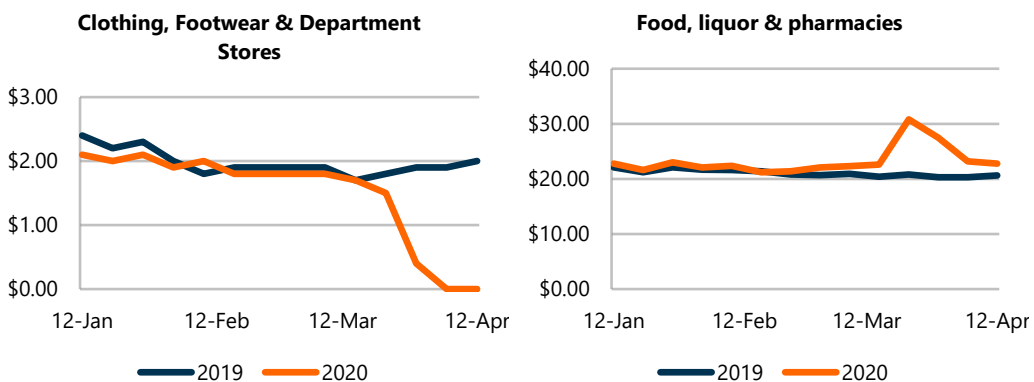
Consumer spending in the Bay of Plenty increased in the lead up to the Level 4 lockdown on 25 March 2020, with Marketview data showing a 9.6%pa rise in spending on the Paymark system for the week ending 22 March. During the week the lockdown began (the week ending 29 March), consumer spending in the region fell by nearly 20%pa.

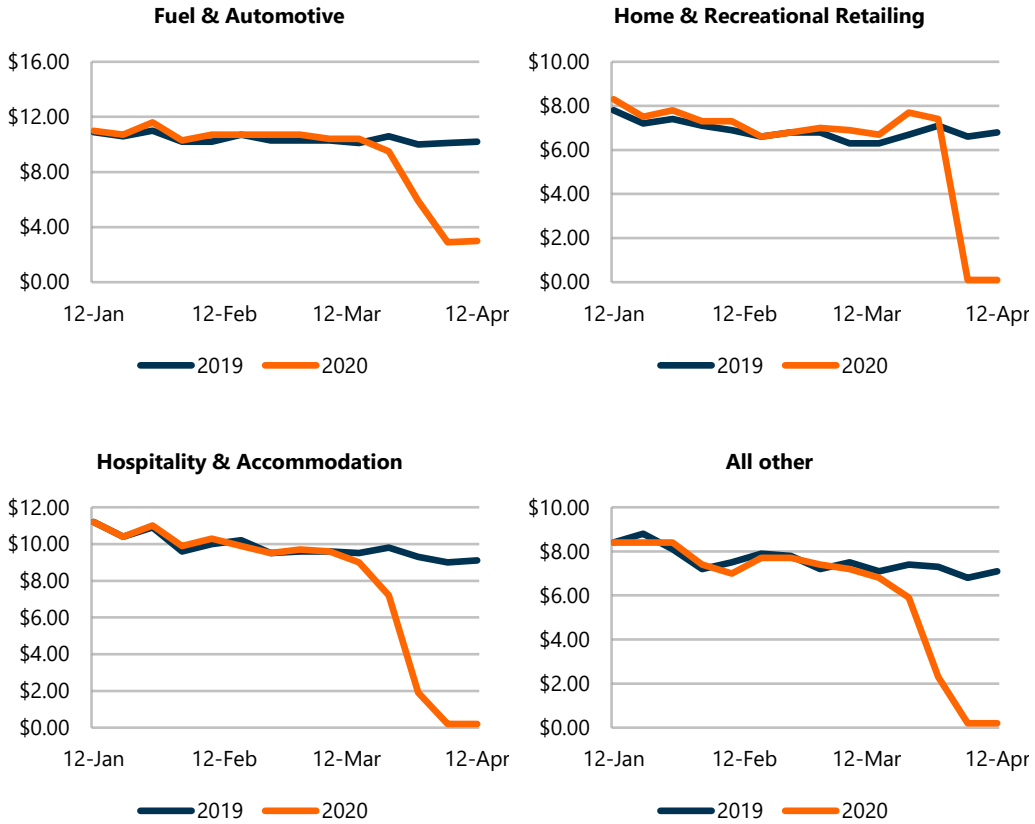
Graph 1: Consumer spending, weekly total, \$m



Spending levels have continued to decline during lockdown, with spending over the week ending 12 April being 53% lower than the same week in 2019. Spending over the 20 days between 23 March and 12 April was 41% lower than in 2019.

Graph 2: Consumer spending, weekly total, \$m, by category



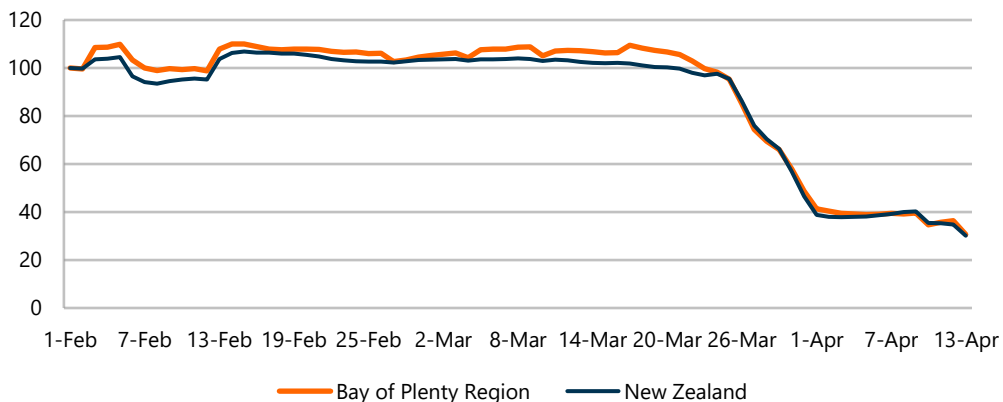


With all but essential services closed, retail spending activity falls were broad-based. Fuel and automotive spending fell steeply, from over \$10m per week to around \$3m per week. Food, liquor, and pharmacy spending remains the only spending class to remain above 2019 levels, with a 11%pa lift in weekly spending over the week to 12 April 2020.

Traffic flows have dwindled

According to NZTA data, heavy traffic flows in the region dropped sharply as non-essential businesses closed, and goods movement softened.

Graph 3: Heavy traffic flows, Index, 1 Feb 2020 = 100



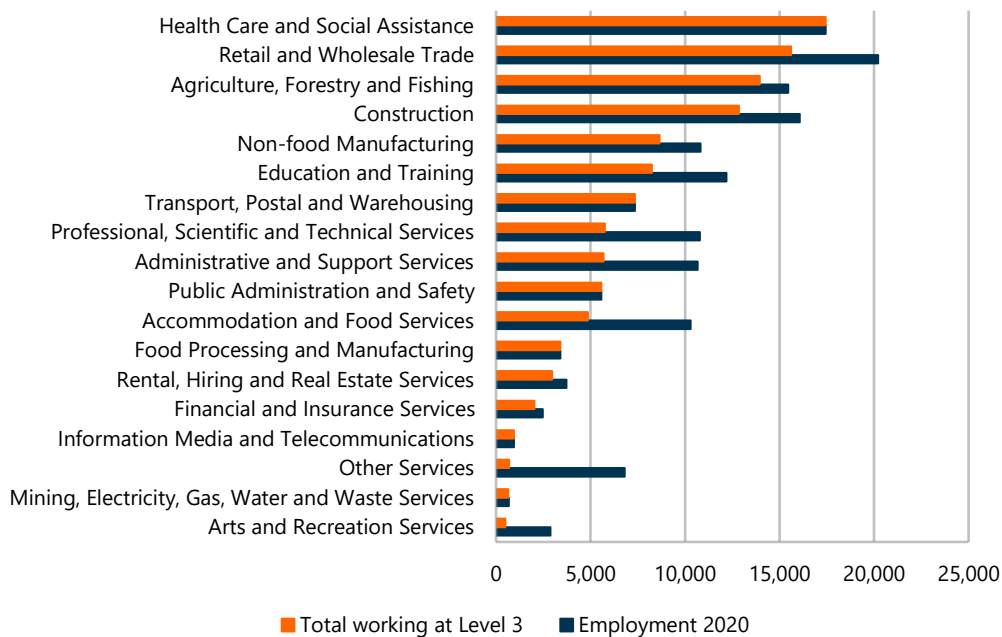
Heavy traffic flows indicate the level of freight movement, and correlate with economic activity. Bay of Plenty’s heavy traffic flows in the middle of lockdown had fallen to around 30% of the level recorded for the week ending 1 February 2020, in line with the national fall in heavy traffic movements.

74% of the workforce will be working at Level 3

We estimate that during the Level 4 lockdown, approximately 51% of the total Bay of Plenty Region workforce could operate, either by working from home, or being employed in essential services. In the national economy, around 53% could work.

At Level 3, we expect around 74% of the local workforce to be operational.

Graph 4: Workforce operating at Alert Level 3



Bay of Plenty Region faces a hard hit

All districts and regions in New Zealand will be hard hit by the pandemic. The worst hit will be districts that are heavily exposed to international tourism including Queenstown, Mackenzie, Westland, and Kaikōura. By contrast, the least affected districts are those whose economies are dominated by the primary sector and with large food manufacturing sectors including South Waikato, Western Bay of Plenty, Manawatū, and Taranaki Districts.

Bay of Plenty's manufacturing sector, with a greater exposure to forestry relative to the national average, puts the area in the middle of these two extremes.

A few factors will support the Bay of Plenty economy.

Primary exports are holding up

Despite the widespread turmoil in international markets, New Zealand's exports of food products are holding up and for some commodities even growing slightly. Agriculture, forestry, and fishing is Bay of Plenty's third-largest industry, employing 9.7% of the local workforce. Continued primary export activity is likely to support the region's economic recovery, with 75% of economic output in the primary sector coming from non-logging and forestry activities.

Food production will continue

People still need to continue eating during a recession which means the food manufacturing sector will not be as hard hit as the rest of the economy. Around 25% of Bay of Plenty Region's manufacturing sector by output is concentrated on food manufacturing, which will support employment.

However, tourism sector will see a greater hit

Around 30% of tourist spending in the Bay of Plenty over the year to January 2020 was from foreign tourists, lower than the New Zealand average of 42%. We expect, once restrictions are relaxed and more usual economic activity resumes, that domestic tourism will bounce back to a degree even as international tourist will likely remain unavailable for some time.

However, some areas, like Rotorua, have both a greater concentration of tourism activity in the local area, and are more focused on international tourism. Over the year to January 2020, 41% of Rotorua's tourism spending was from international tourists. The reduction in tourism activity will see some sectors, like transport, retail, accommodation, and hospitality, experience the largest job losses.

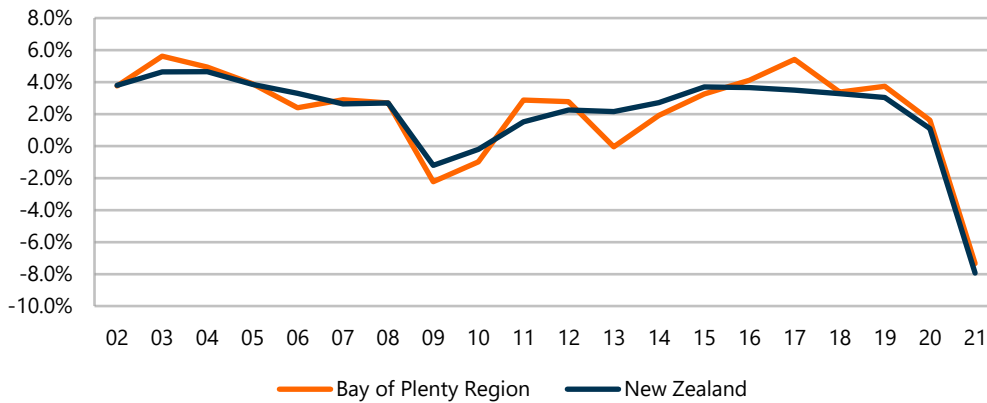
And so will international education

Bay of Plenty does have some exposure to international education which will also take a hard hit due to the pandemic. The region accounts for 3.9% of New Zealand's international education students and has the 6th highest regional concentration, with the five top regions have between 5.2% and 61% of all international students. Collectively the top five regions account for 88% of all international students in New Zealand.

Bay of Plenty's economy will contract by 7.3%

Bay of Plenty's GDP is forecast to contract by 7.3% over the year to March 2021, compared with 8.0% in the national economy.

Graph 5: GDP Growth, 2002-2021

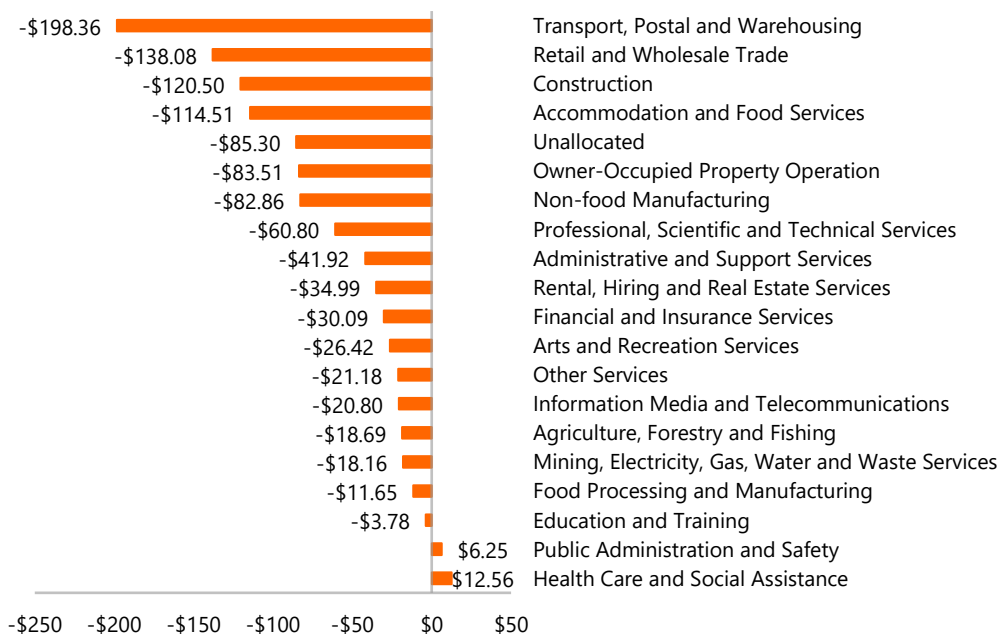


Transport and retail take the biggest hit

The largest declines in the Bay of Plenty Region will take place in the transport, postal and warehousing industry (-\$198m), alongside retail and wholesale trade (-\$138m), construction (-\$120.5m), and accommodation and food services (-\$114.5m).

Although we expect there could be a rise in health care and social assistance, and public administration and safety, these increases are minor.

Graph 6: Change in GDP, \$m, 2020-2021



Transport, postal, and warehousing has been significantly affected by the pandemic. The largest effects are on air transport and scenic and sightseeing transport due to the downturn in tourism activity. As is the case for accommodation and food services, these effects will continue long after the lockdown ends. Other parts of the transport and logistics industry have been weakened by factors such as reduced commuter travel and cutbacks in distribution and freight requirements caused by the lockdown. Some of these effects will start to reverse out with a pick-up in online spending outside Level 4, but this positive influence on activity is likely to be outweighed by the reduction in overall spending caused by job losses and lower incomes.

Retail and wholesale trade has experienced a significant drop in demand under Level 4, and restrictions will remain in place under Level 3 as well. These effects are not being felt equally, with supermarkets enjoying periods of higher-than-usual demand. Other businesses that can sell online will be able to operate under Level 3, although we do not expect spending patterns during this period to be normal. The declines in tourism activity and other discretionary spending will also be felt disproportionately by retailers selling more luxury or higher-end products.

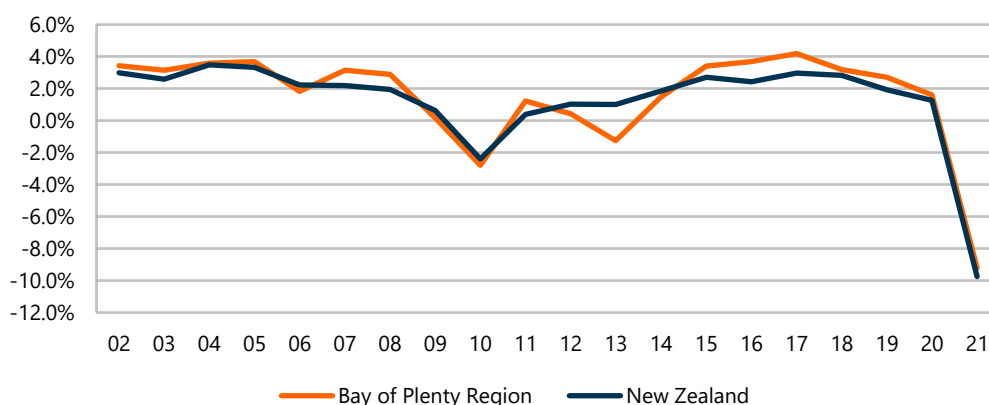
Construction activity was close to peaking even before the COVID-19 pandemic occurred. Rising unemployment, falling house prices, slower population growth, and tighter bank lending conditions will all weigh on activity over the next 1-2 years across both the residential and non-residential subindustries nationally. Prospects for infrastructure look more promising given the government's desire to use this channel to try and stimulate the economy's recovery.

Accommodation and food services will be heavily affected by the COVID-19 pandemic and its aftermath. The disappearance of international tourism and declines in domestic tourism and other discretionary spending are key factors in the industry's contraction. Activity will continue to be severely constrained under COVID Alert Level 3, while domestic travel will also remain restricted under Level 2.

Employment will shrink by 14,500 jobs

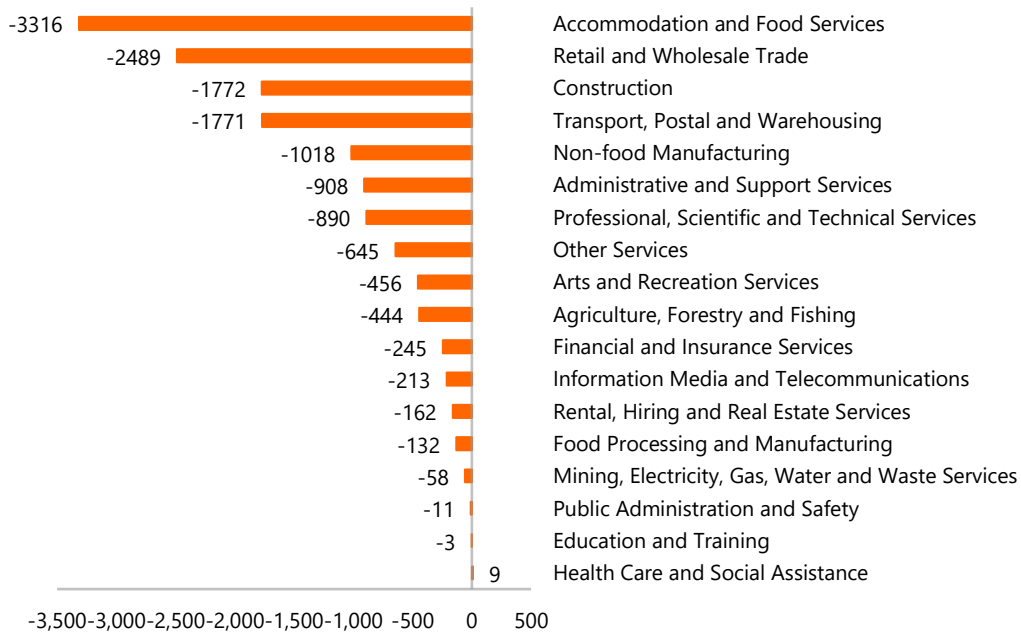
Employment in the Bay of Plenty is expected to decline from around 157,700 in the year to March 2020 to approximately 143,200 in the year to March 2021, a decline of 9.2%, or around 14,500 jobs. This compares to an economy-wide decline in employment of 9.8%.

Graph 7: Employment Growth, 2002-2021



The bulk of these job losses are forecast to be in the accommodation and food services industry (-3,316 jobs), alongside retail and wholesale trade (-2,489 jobs), construction (-1,772 jobs), and transport, postal and warehousing (-1,771 jobs). The large drop in accommodation and food services, and retail and wholesale trade, reflects the broader drop in tourism activity in the Bay of Plenty region.

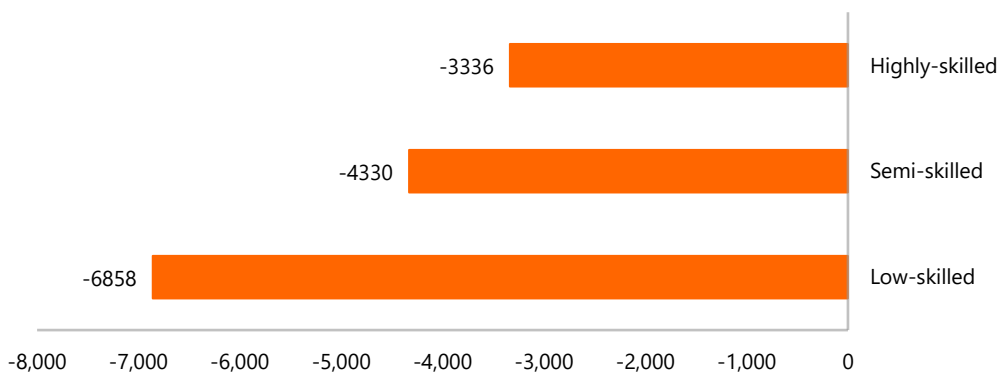
Graph 8: Change in employment by broad industry, 2020-2021



Low skilled jobs to be hit the most

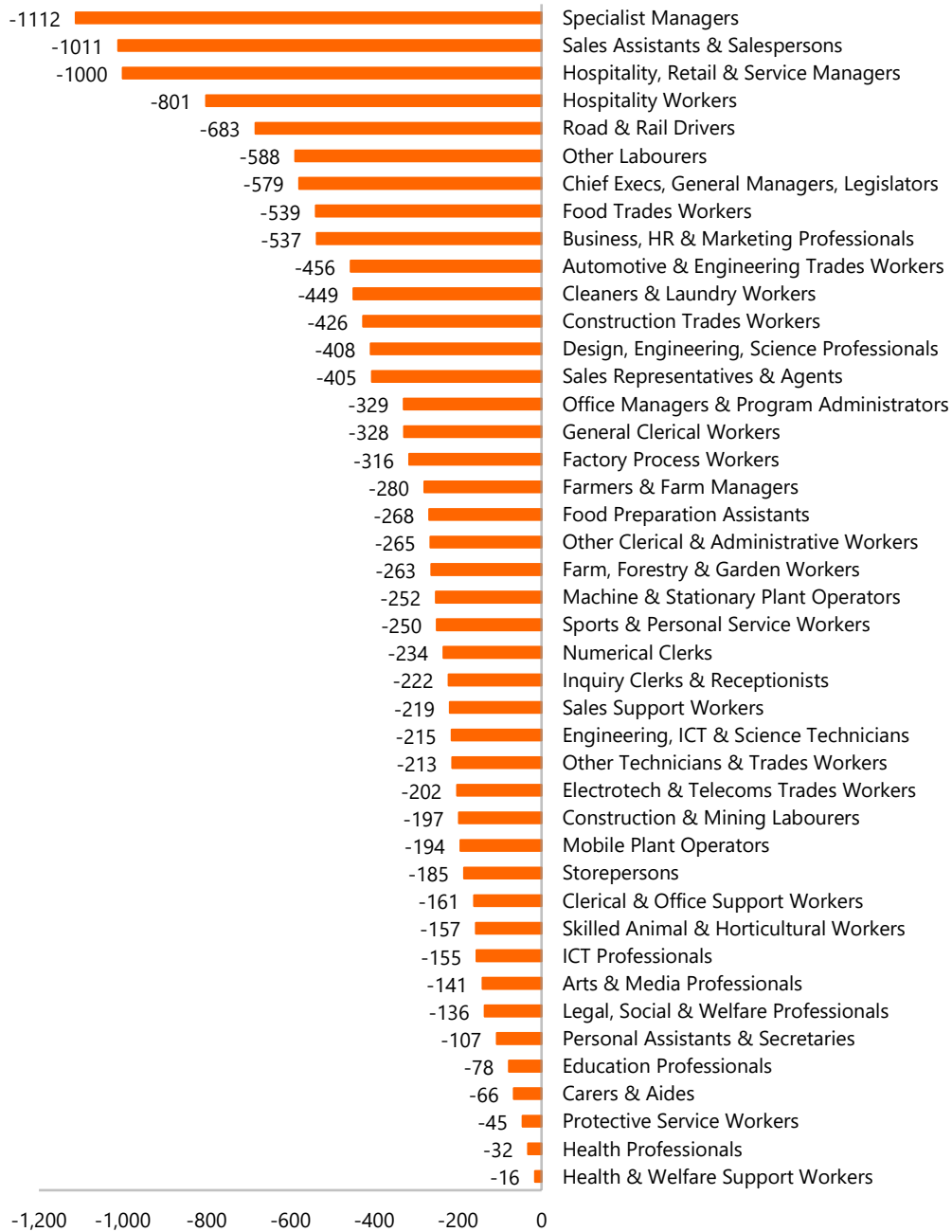
The highest number of job losses is projected to occur in low-skilled employment, with nearly 7,000 job losses expected.

Graph 9: Change in employment by skill level, 2020-2021



This correlates with the expected declines by occupation, with high levels of job losses projected for low-skilled occupations such as sales assistants and salespersons, hospitality workers, food trades workers, and others.

Graph 10: Change in employment by occupation, ANZSCO Level 2, 2020-2021



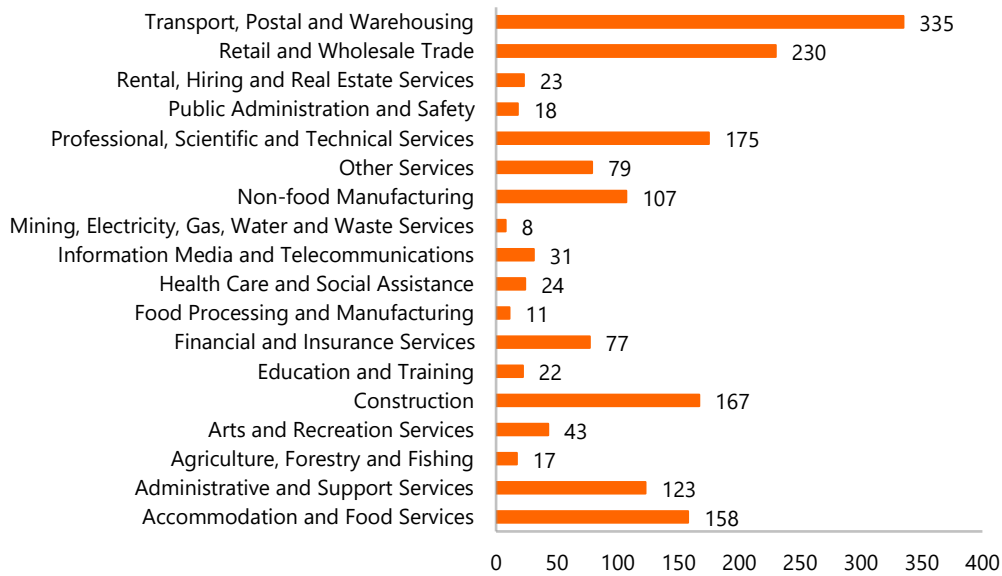
Equally, job losses are still expected in highly skilled occupations such as specialist managers and hospitality, retail and service managers, as lower levels of tourist activity reduce jobs across the wider sector.

But some jobseekers can move industries

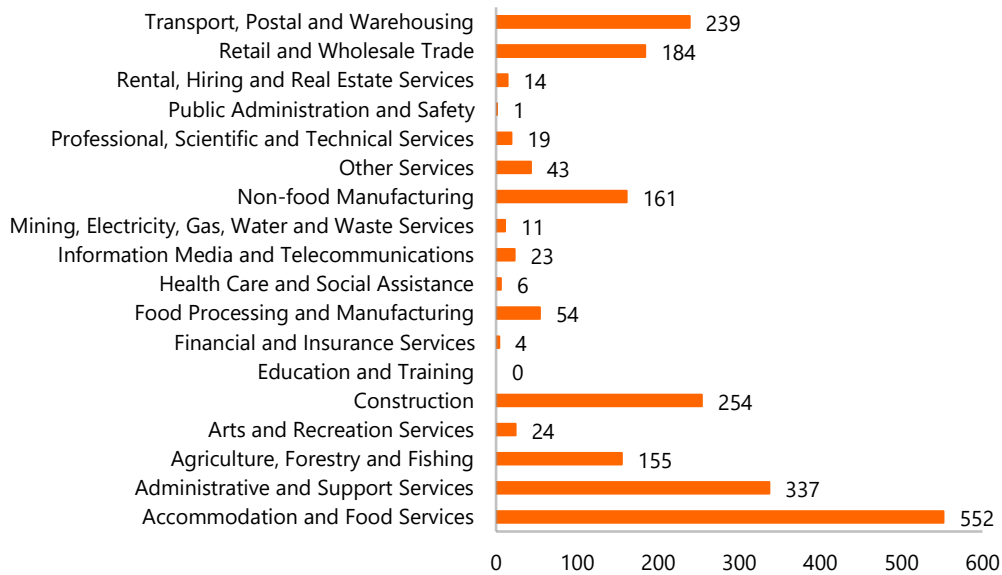
Certain occupations such as clerical and administration workers, and labourers require relatively generic skills, which can allow workers in these occupations to move between industries. Opportunities for these workers may arise in some industries in the Bay of Plenty as the recovery begins.

Here, we analyse job losses in these occupation groups across the region’s industries to identify potential labour sources for employers who might have job vacancies. For example, clerical and administrative workers who have lost their jobs in the transport, postal and warehousing, or retail and wholesale trade industries, might find opportunities in food processing and manufacturing, health care and social assistance, or education and training where fewer job losses are expected.

Graph 11: Job losses in 'Clerical and administrative worker' occupations by broad industry, 2020-2021



Graph 12: Job losses in 'Labourer' occupations by broad industry, 2020-2021

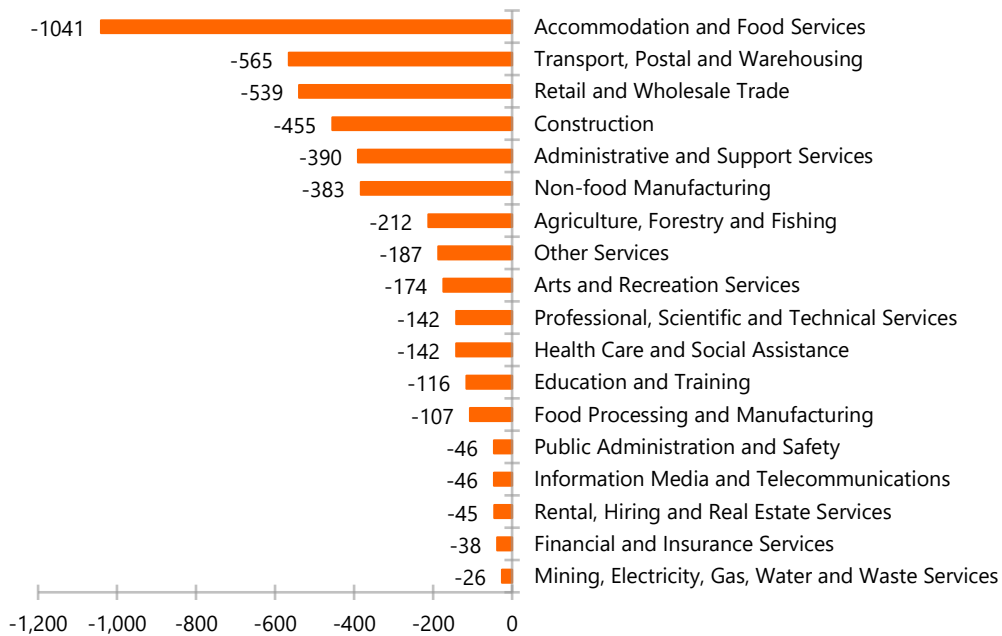


In coming years, we will be able to identify opportunities for jobseeker mobility into industries that are starting to recover.

Māori households will also be hard hit

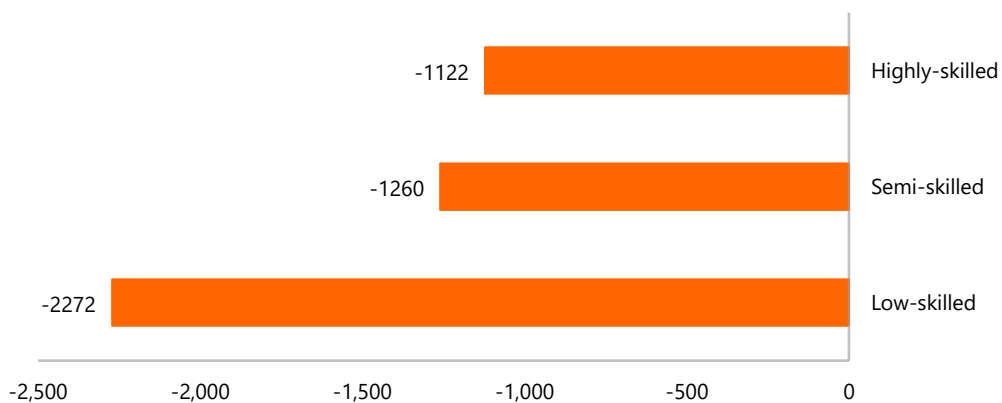
The principal impacts on Māori employment in the Bay of Plenty are slightly different to the wider regional economy, reflecting a different profile of employment for Māori. We expect that the highest job losses for Māori will be in the accommodation and food services (-1,041 jobs), transport, postal and warehousing (-565 jobs) and retail and wholesale trade (-539 jobs) industries.

Graph 13: Change in Māori employment by broad industry, 2020-2021



The largest declines in employment by skill level for the Bay of Plenty's Māori population are forecast to occur in low-skilled roles (-2,272 jobs).

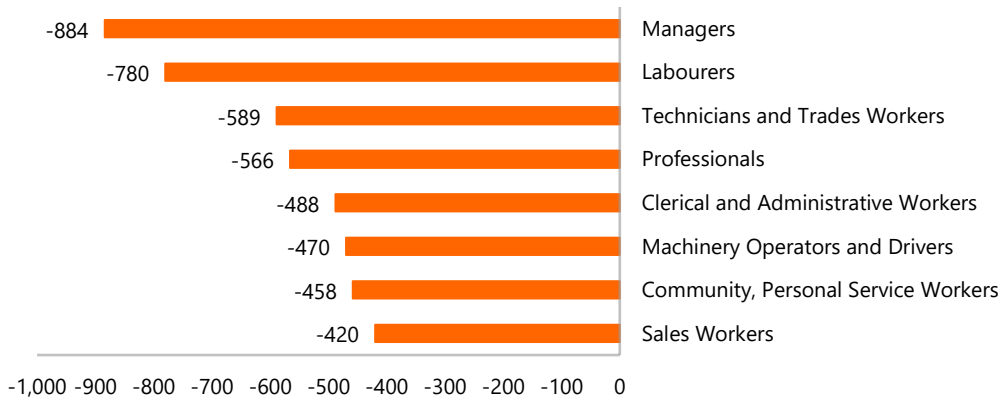
Graph 14: Māori employment changes by skill level, 2020-2021



The general age and skills profile of New Zealand’s Māori and Pasifika populations correlates with high levels of both younger and lower-skilled employees. This suggests that employment declines may have a disproportionate impact in these communities.

Māori employment data is available only by ANZSCO Level 1 occupations. Based on this classification, the largest declines in Māori employment in the Bay of Plenty are forecast to take place amongst managers (-884 jobs), labourers (-780 jobs), and technicians and trade workers (-589 jobs).

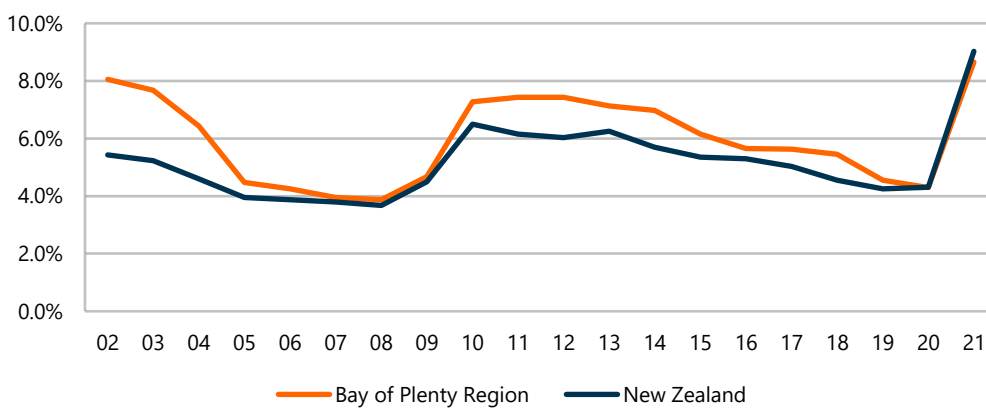
Graph 15: Māori employment changes by occupation, ANZSCO Level 1, 2020-2021



Job losses will push unemployment to 8.7%

Bay of Plenty’s overall unemployment rate is forecast to rise from 4.3% over the March 2020 year, to 8.7% in March 2021. This compares to a forecast national unemployment rate by March 2021 of 9.0%.

Graph 16: Unemployment rate, annual average

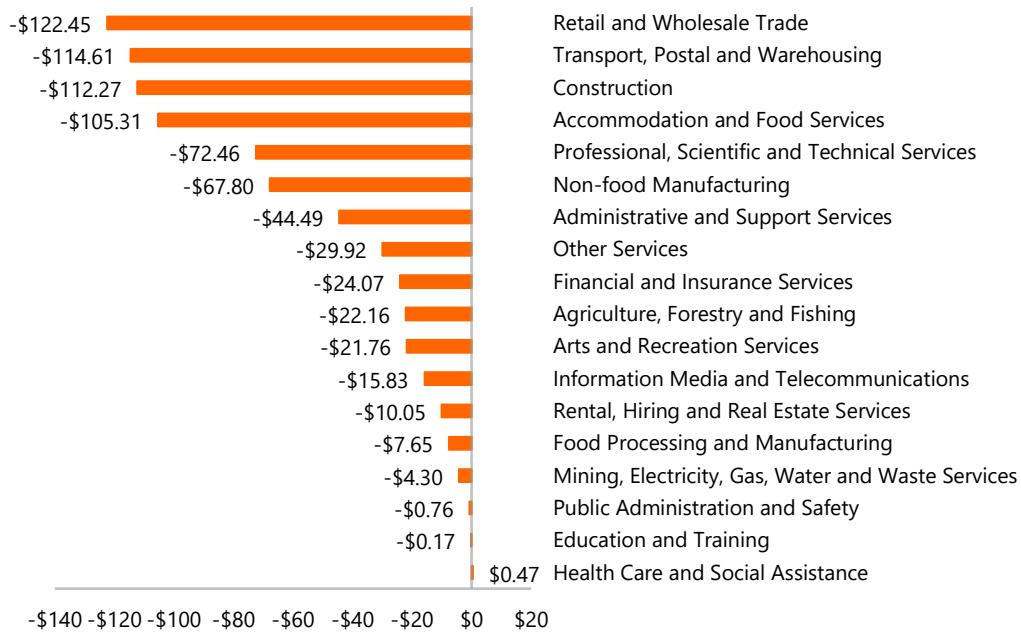


And will result in lost earnings of \$776m

Earnings across the Bay of Plenty economy are forecast to decline by \$776m in the year to March 2021. The largest declines are expected to occur in the retail and wholesale

trade (-\$122m), transport, postal and warehousing (-\$115m), construction (-\$112m), and accommodation and food services (-\$105m) industries.

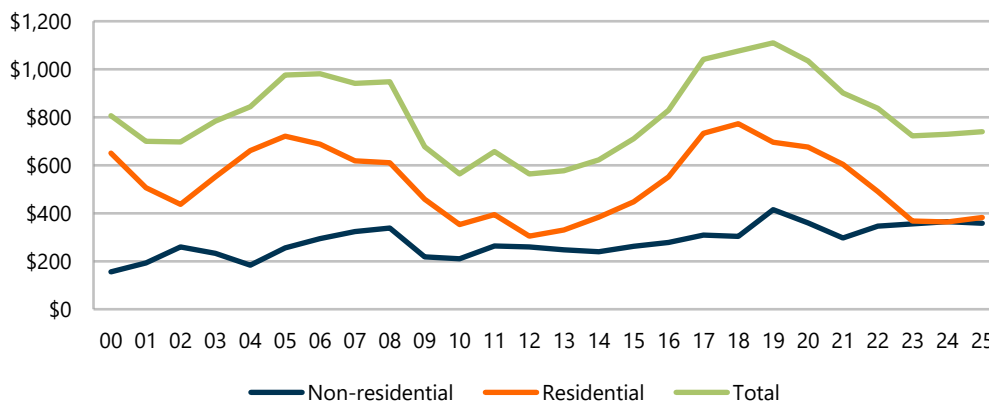
Graph 17: Earnings changes by broad industry, \$m, 2020-2021



Construction levels expected to decline

According to the Infometrics Regional Construction Outlook, Bay of Plenty's construction sector is set to slow as the impact of COVID-19 hits employment, net migration slows, and the drivers of building activity soften. Residential activity is expected to fall away quickly as lower near-term demand for housing reduces construction efforts.

Graph 18: Construction work put in place, real \$m (2009/10 prices), annual totals



Some thoughts on recovery

Although the economic effects of COVID-19 will reverberate around the economy for years, our estimates point towards a slightly lower hit to the Bay of Plenty economy than the national average.

In this section we briefly outline some of the measures or ideas that local and regional leaders might consider moving forward:

Local coordination and action important

During times of economic upheaval, business stress and a focus on survival can hamper the ability for businesses to undertake wider actions to support their ability to operate in a changed market environment. This change in focus is understandable given the need to protect jobs, but also provides a need for local leadership and coordination to provide support to businesses through trying circumstances.

Local leaders should look to enhance or establish an organisation or group to provide clear advice to businesses over business operations and restrictions, health and safety advice, and connections to financial, human resources, and related expertise and support, among other elements.

The compilation or creation of a public business register or marketplace, to provide greater exposure of local businesses to other businesses and consumers, could also enhance a 'buy local' campaign by identifying the local businesses and their goods and services on offer.

Lifestyle and affordability provide an attractive package

As New Zealand starts to move from response to recovery, there is the potential for increased levels of domestic migration. We anticipate that increased unemployment and high costs of living in urban centres might provide a competitive edge for regions offering lower property prices and high-quality lifestyle attractions. This trend is likely to be reinforced by an increased capacity for working remotely, as the pandemic has forced many organisations to improve their systems and practices in this area.

The Bay of Plenty's position with increased interactions between Auckland and Hamilton, alongside lifestyle benefits and greater local affordability, are likely to assist with the region's ability to attract talent once the recovery begins.

Skills development and retention will be key

Increased unemployment will lead to increased interest in tertiary and vocational education. Constrained economic conditions will present fewer opportunities for school leavers and recent graduates to enter the workforce, while recently unemployed workers will explore options for retraining and up-skilling. Under these conditions, the government's Reform of Vocational Education (RoVE) process will assume even greater importance than was the case before the recession.

While much of the detail around the RoVE process is yet to be finalised, local government support for the process will be critical in promoting economic recovery and enhancing future resilience in the local workforce.

Councils and key regional stakeholders will need to play a leading role in implementing the RoVE outcomes. In particular, they will need to be centrally involved in the establishment and operation of structures such as the Regional Skills Leadership Groups (RSLGs), that will be a critical outcome of the RoVE process.

Links with industry leaders will be critical to facilitate education and training that has people work-ready and able to move into employment with minimal disruption once job opportunities start to appear again.

Infrastructure development is an opportunity

Central government has prioritised the identification of 'shovel ready' infrastructure projects that can assist in economic recovery across the country. These projects are likely to be funded through a range of support mechanisms, including Crown Infrastructure Partners, New Zealand Upgrade Programme and possibly even a realignment of the Provincial Growth Fund in the future.

In addition to an immediate focus on these 'shovel ready' projects, we believe that regions have a window of opportunity to develop projects with somewhat longer implementation timeframes. If sufficiently ambitious, such projects can provide a step change in the economic development trajectory of regions. Projects that fall into this category might include enhanced water management, localised renewable energy generation and distribution, and transportation infrastructure such as inland ports or customs-controlled areas, the latter particularly viable around Tauranga.

Local government will play a critical role in any recovery

Bay of Plenty Regional Council, District Councils, and other local and regional organisations will play a critical role in supporting local communities over the coming months and years. Some of the measures that the Council and its partners might consider include:

- Maintaining levels of operational expenditure and, where possible, accelerating already funded capital projects to continue spending in the local economy
- Working to enhance local economic activity and supply chains, potentially through implementing preferential procurement policies to support local businesses rather than those located outside the region (or even outside New Zealand)
- Increased or maintained investment in community development activities, particularly in vulnerable and highly impacted communities, with a focus also on volunteering opportunities to retain 'soft skills' for those who lose their jobs and are seeking employment
- Highly localised destination marketing activities, aimed firstly within the region's communities, and subsequently being extended to neighbouring communities and further afield in New Zealand

- The coordination and extension of business support services, particularly in partnership with economic development agencies, local chambers of commerce, industry bodies and organisations such as the Regional Business Partners Network or Business Mentors New Zealand
- Maintaining a balance between rates increases required to fund ongoing and future activities and increasing financial stress in the community. A lower, but sustained, track of rates rises provides greater certainty to the economy than a zero rates rise followed by a continued higher debt load or double-digit rates growth during the recovery phase
- Leveraging off the existing local public asset base through prudent borrowing against assets or depletion of financial reserves in the short to medium term
- Support for local vocational and tertiary education providers to promote reskilling within local communities, alongside leadership and coordination of key business leaders to understand areas of additional employment through the recovery phase
- Support for and participation in bodies such as the Regional Skills Leadership Groups
- Developing a comprehensive pipeline of infrastructure projects beyond the most obvious 'shovel-ready' projects that might already be under consideration through various central government support measures. A 10-year plan of capital projects, with the ability to both scale up or down the size of the project, and bring forward or push back the start date of the project, will enable Councils to be nimble and responsive
- The development of comprehensive local wellbeing-based economic development strategies, in line with government's Living Standards Framework and other international best practice in the field of wellbeing economics

These and other activities, although unable to avert the inevitable unemployment increases and economic distress, can somewhat mitigate the worst impacts of the recession, increase the resilience of the Bay of Plenty community, and support economic recovery in the longer term.

Appendix I. Forecast Assumptions

We have made the following assumptions when modelling the effects of the COVID-19 pandemic, the economic downturn, and the government's policy responses on the New Zealand economy.

Lockdown is 4½ weeks at Level 4 and 2 weeks at Level 3

Following the Prime Minister's announcement on April 20 of the expected timeline for the COVID Alert Level 4 and Level 3 conditions, we have based our industry employment and output modelling on Level 4 being in place for 4½ weeks and Level 3 being in place for two weeks.

Across the entire economy, we estimate that approximately 65% of economic activity can take place under Level 4. This estimate includes people that can work from home and those people working in essential services. Under Level 3, our estimate of potential economic activity taking place rises to 82%. Obviously, the effects of Alert Levels 3 and 4 on specific industries vary significantly.

We have not made economy-wide adjustments for conditions in Alert Levels 1 or 2 because the constraints on activity are much less widespread. Instead, we have made specific targeted adjustments to industries associated with tourism (see below). These industries will be the most heavily and directly affected by COVID-19 over the medium term, almost irrespective of the alert levels implemented by the government at any particular point in time.

Sustained global demand for food, but non-food exports will be knocked hard

Forecasts of global economic growth for 2020 are being rapidly revised lower due to the COVID-19 pandemic, lockdown conditions, and negative effects on economic activity around much of the world. Between February and April, Consensus forecasts for global growth during 2020 have slumped from +2.3% to -2.5%. We expect further revisions in coming months will take this figure to -5.0% or below.

This downturn will have some effect on New Zealand's agricultural export prices for products such as dairy, meat, and horticulture. However, the fact that people still need to eat during a recession will limit the pressure on our agricultural producers. Furthermore, the drop in the New Zealand dollar, from US67c at the start of the year to below US60c, has offset some of the decline in international prices.

The most pressure will come on non-food exports such as forestry and manufactured products. Putting aside the disruption to movements of goods that occurred early in the year with the shutdown of ports in China, weaker incomes and spending around the world will limit both business and consumer demand for manufactured products.

During 2009, we saw a 5.9% decline in New Zealand's non-food manufactured export volumes. With the current global downturn being significantly larger than the Global Financial Crisis (GFC), we have allowed for a 16% contraction in volumes over the coming year. Alongside this drop, we have also assumed a 9.5% reduction in international demand for unprocessed forestry exports such as logs.

Foreign tourism tanks by 91%

We expect New Zealand's borders to effectively remain closed for a year, with either complete closures or, at a minimum, a mandatory 14-day quarantine requirement for people arriving from overseas. However, we also recognise that there is scope for a trans-Tasman or wider Polynesian travel "bubble" to be introduced later in the year if COVID-19 infection conditions allow. We have assumed that this "bubble" could be implemented from December onwards, and could result in 50% of usual tourist travel on NZ-Australia and NZ-Pacific Island routes.

Travel up until November will be very limited – we have allowed for visitor numbers to be at just 0.8% of their usual levels. This figure allows for a small amount of non-holiday travel, and it is equivalent to total international arrival numbers (including returning New Zealanders) for the week to 14 April 2020. We have also maintained this assumption for countries outside Australia and the Pacific Islands beyond November 2020, on the basis that COVID-19 case numbers overseas will warrant ongoing strict controls. The allowance for small visitor flows in and out of New Zealand recognises there will be some people who are required to travel for work purposes.

Taken together, these assumptions result in an estimated 91% reduction in foreign demand for tourism over the coming year, and a similarly sized reduction in New Zealand demand for international tourism.

Domestic tourism spending drops by 21%

With New Zealanders effectively unable or unwilling to travel overseas during the coming year, at least some of the pool of \$5.4b that was spent on international tourism during 2019 is likely to be spent on holidays within New Zealand instead.

Having looked at domestic and international tourism spending patterns, we estimate that total spending on a holiday in New Zealand is likely to be about 69% of what would be spent on an equivalent holiday overseas. Some of this gap arises because a domestic holiday will naturally involve less spending on airfares. Furthermore, people on holiday within their own country also tend to spend less, on average, on both accommodation and eating out.

Reallocating this proportion of overseas tourism spending by New Zealanders to domestic spending results in a total pool of about \$21b of potential spending for the coming year. However, the economic downturn will have a negative effect on people's willingness to spend on travel and holidays. For example, there was an 8.6% drop in annual spending on restaurants and hotels between March 2008 and December 2009 during the GFC.

Furthermore, there have been severe limitations on people's ability to travel domestically during the 6½ weeks of Level 3 and Level 4 lockdown, and these restrictions will only be partially relaxed when we move to Alert Level 2. We note that The Treasury's Scenario 1

assumes we could remain in Alert Levels 1 and 2 for a total of 10 months, although the specific timings across each of these Alert Levels is not stated.

Taking all these considerations together, we estimate that spending on domestic holidays over the coming year could be constrained by 35%. After incorporating the increased pool of potential spending due to a lack of international travel, these constraints imply a 21% decline in domestic tourism spending from the previous year.

International education revenue halves

Data up to 2018 shows that, for international fee-paying students in New Zealand, 50% were enrolled at Single Data Return (SDR) providers such as universities and polytechnics, 31% were enrolled at non-SDR providers that largely cater to international students, and 20% were enrolled at primary and secondary schools. We have made differing assumptions about how each of these providers will be affected.

We have assumed that non-SDR providers will be knocked heavily, with the relatively short nature of many of their courses meaning they are not conducive to students being quarantined for two weeks on arrival in the country. We expect an 82% reduction in student numbers over the coming year, with virtually all the surviving revenue arising from students who were already in the country before border restrictions were implemented. This assumption is based on media reports suggesting about 3,000 of the 17,000 students that would normally be trained at English language schools during the year were already here and being taught when the border closures occurred.

In early April, Universities New Zealand's chief executive Chris Whelan stated that universities are facing a 25-33% reduction in international student numbers this year. In our view, this expected decline might prove to be too small, particularly given that there must be serious doubts about the mid-year intake of students that would normally occur in July. We have opted for a bigger reduction in international student revenue across all SDR providers, with universities retaining 62% of their international student revenue this year – mostly thanks to students who were already in the country in January and February. Our figure has also been informed by Immigration NZ's visa approval data for March, which showed a 43% reduction in student visa approvals compared with March 2019.

International education at a primary and secondary level will be less affected by the pandemic and border closures, given that the school year started in early February before most of the effects of COVID-19 appeared in New Zealand. We are aware that some students will have chosen to return home, and that students that might have come later in the year will now not do so. We have allowed for the number of international students at schools this year to be 79% of normal levels.

Taken together, these figures imply a 49% reduction in international education revenue during 2020, which we have included in our modelling.

Domestic education picks up some of the slack

During periods of labour market weakness, there is an increased propensity of people to leave, or stay out of, the workforce and undertake study instead. For example, between 2008 and 2010, the number of domestic equivalent full-time tertiary students (EFTS) increased from 235,100 to 254,500, a rise of 8.3%. This lift contrasts with the periods of

labour market strength between 2004 and 2008, and again between 2012 and 2018, when domestic EFTS numbers fell by 3.3% and 10.4% respectively.

Demographic factors, such as the number of school leavers, can also play a role in determining overall student numbers. Between 2008 and 2010, over half the increase in student numbers could be attributed to a lift in the number of students completing secondary school compared with three years prior. In contrast, since about 2012, the number of Year 13 students has been relatively stable, meaning that any changes in total tertiary student numbers now are more a reflection of economic conditions or other factors influencing training choices, such as the government's tertiary fees-free scheme.

Bearing these factors in mind, we have allowed for a similar lift in total demand for tertiary training over the coming year as we saw following the GFC. However, the change in demographic trends compared with a decade ago means that the implied increase in underlying demand for training will be greater than in the wake of the GFC.

House prices and construction activity take a hit

The substantial rise in unemployment associated with many of the outcomes summarised above will have a significant negative effect on the housing market. Furthermore, border closures for the next year mean that net migration will be close to zero, and population growth is set to drop to a 30-year low of 0.5%pa. These results will limit the number of potential buyers in the housing market as well as considerably reducing underlying demand for new housing.

Our assumptions include an 11% drop in average house prices between mid-2020 and the end of 2021. We note that house price falls in the short-term will be restrained by the mortgage holiday scheme that the government has negotiated with retail banks. Nevertheless, this housing market downturn will drag down the rate of new residential construction, particularly given that banks are likely to be very reluctant to finance property development over the next year. Nationally, we estimate the value of residential building work put in place to decline by 19% over the year to March 2021.

Non-residential construction activity will also come under downward pressure given declines in key drivers for space such as employment, household spending, and tourism activity. We estimate the value of non-residential work put in place to decline by 18% over the year to March 2021

In contrast, prospects for civil construction are positive outside Level 4 lockdown conditions. Nevertheless, we are cautious about the potential for an immediate lift in activity caused by government stimulus and increased spending. Although there is likely to be faster growth in infrastructure activity over the medium term, we anticipate that planning, design, and consenting requirements will prevent more rapid growth in work until 2022.

Government stimulus includes \$10b wage subsidy and benefit increases

We have made allowances for two major government initiatives in our modelling. The first of these initiatives is the wage subsidy scheme, which represents a cash injection of approximately \$10b to businesses to help meet their labour costs. The total fiscal cost of this scheme has risen over time, although the rate of increase appears to have slowed over the last week or so.

We note that there could be scope for the scheme to be extended beyond 12 weeks for selected businesses that continue to be negatively affected under Alert Level 2, although the government has not made any strong signals about an extension at this stage. Indeed, an extension of the scheme might not be sufficient to secure the ongoing viability of many businesses that are dependent on tourism activity anyway.

The second initiative we have included in our modelling is the one-off increase in social welfare benefits of \$25 per week. This change represents a boost to aggregate household incomes of around \$2.5b. In tandem with the wage subsidy scheme, this additional money from the government will mitigate the negative effects of falling employment on overall household incomes. In doing so, the policies will also limit the decline in household consumption spending that results from the economy's downturn.

There is obviously significant potential for additional government stimulus to be introduced in coming weeks and months. Further fiscal initiatives are likely as the public health response to the COVID-19 pandemic becomes less critical and more of the policy focus turns to measures that could help drive the economic recovery. The government's 2020 Budget is due to be announced on May 14, and this date will be a key one.

At this stage, we have not made any specific allowance for additional fiscal measures. In our view, it is likely that their effectiveness in accelerating economic growth is likely to be limited within the next 12 months. We expect the negative effects of the pandemic, the lockdown, and the failures of tourism and hospitality businesses will continue to ripple through the economy for some time. These effects will weigh heavily on business and consumer confidence, influencing spending and investment decisions, and reducing the immediate effectiveness of any government initiatives designed to try and boost economic growth.

Appendix II. Broad approach to modelling the impact of COVID-19 on the local economy

Infometrics has drawn on a range of econometric and statistical model to measure the potential impact of COVID-19 on regional economies.

Forecasting the macroeconomy

Infometrics maintains a macroeconomic forecasting framework that underpins our five-year forecasts of activity across the national economy. Our framework accounts for the relationships between different sectors of the economy and their responsiveness to one another. These include the labour market, households, businesses, government, the international trade sector, and financial markets.

In times of economic upheaval, we refine the output from the framework based on expert input from our forecasting team, their knowledge of rapidly changing trends in the economy, and the insights we gain from our interactions with central government, Councils, Economic Development Agencies and private sector clients.

Overseeing the forecasting process and framework is Gareth Kiernan, who has been forecasting the New Zealand economy for more than 20 years. The framework provides quarterly forecasts of GDP, employment, unemployment, and a range of other macroeconomic indicators up to 2025.

Measuring impacts on individual industries

The pandemic will affect industries differently. To measure this, we have used Infometrics' general equilibrium (GE) model, which is designed to measure the impact of economic shocks on individual industries. We introduce shocks to the model, including a sharp decline in foreign tourism, declines in international education and non-food commodity exports, and a fall in productivity across affected industries. We also temper these shocks through the introduction of support measures such as the wage subsidy and an increase in benefit payments.

The GE model estimates the combined impact of these factors on future economic output and employment across 54 industries. In this sense, the GE model breaks down the national macroeconomic forecasts of GDP and employment to industry level.

Infometrics' GE model is maintained by one of New Zealand's foremost econometricians, Dr Adolf Stroombergen.

Measure the impact on regions and districts

Regions will also be impacted differently by COVID-19. Those with a large tourism industry, for example, will be hardest hit. To measure regional impacts, we draw on our Regional Forecasting Model (RFM), an econometric model that breaks down national industry forecasts to territorial authority level.

The RFM draws on historic trends, patterns and relationships, and projects these into the future. It creates multiple forecast models for every territorial authority and industry combination and using machine learning techniques, selects and applies the model which is historically determined to have best predictive ability. It then produces forecasts of GDP and employment across 54 industries for each territorial authority up to a predetermined point in the future, e.g. 2025 or 2030.