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New Zealand manufacturing

How have skills changed?

Mahuru 2020

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Author: Konrad Hurren

Making sense of the numbers

The economy from 2006 to 2018

New occupations filled
80,1630

New professionals and scientific technical workers
89,748

New skill level 1 workers
285,036

Growth in skill level 1 manufacturing workers
5.04 percent

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1 Introduction

This research report is part of a BERL series exploring the Census 2018 data. The focus of this report is on the changing skill levels in the New Zealand economy, especially the manufacturing sector.

The research question that we explored was "How has the skill level mix of occupations changed in the manufacturing sector between 2006 – 2018?"

This report begins by defining the scope and clarifying the definition of skill level. The main results are summarised in chapter two, followed by conclusions from the analysis. Finally the report concludes with some commentary on gaps in the analysis and suggestions for future research opportunities.

1.1 Definitions and scope

1.1.1 Scope

This research report focuses on the skill levels of occupations across the economy, specifically the changes in the proportion of employment accounted for by the manufacturing sector. The period from 2006 to 2018 was analysed. At present the only reliable measure of occupation available in official statistics is the Census. This limitation implies that we have three data points to consider (2006, 2013, and 2018).

We restrict our analysis to national level data to provide insight into the average across New Zealand. In section 3 we use data from the BERL database to identify which districts have the highest proportion of employment in manufacturing.

1.1.2 Skill level

Skill level is defined in the official Australian and New Zealand Standard Classification of Occupations (ANZSCO) and produced by the Australian Bureau of Statistics and Statistics New Zealand.

The skill level is described by ANZSCO:

"ANZSCO does not measure the skill level of an individual, rather it refers to the level of skill that is typically required to competently perform the tasks of a particular occupation. Skill level is an attribute of occupations, not of individuals in the labour force or of particular jobs. It is irrelevant whether a particular individual working in a job in a particular occupation has a certain amount of training or a particular level of competence or not. "

The ANZSCO classifies occupations into five skill levels (one through five). This scale can be treated like a ranking, level one is the highest, level five the lowest.

It is worth reproducing the scale as described:

Skill level one

Occupations at skill level one commensurate with a bachelor degree or higher qualification. At least five years of relevant experience may substitute for the formal qualification. In some instances relevant experience and/or on-the-job training may be required in addition to the formal qualification.

Skill level two

Occupations at skill level two commensurate with one of the following:

- New Zealand Register Diploma or
- Australian Qualifications Framework (AQF) Associate Degree, Advanced Diploma or Diploma.

At least three years of relevant experience may substitute for the formal qualifications listed above. In some instances relevant experience and/or on-the-job training may be required in addition to the formal qualification.

Skill level three

Occupations at skill level three commensurate with one of the following:

- New Zealand Register Level four qualification
- AQF Certificate four or
- AQF Certificate three including at least two years of on-the-job training.

Skill level four

Occupations at skill level four commensurate with one of the following:

- New Zealand Register Level two or three qualification or
- AQF Certificate two or three.

At least one year of relevant experience may substitute for the formal qualifications listed above. In some instances relevant experience may be required in addition to the formal qualification.

Skill level five

Occupations at skill level five commensurate with one of the following:

- New Zealand Register Level one qualification
- AQF Certificate one or
- Compulsory secondary education.

More detail can be found in Australian and New Zealand Standard Classification of Occupations First Edition published in 2006 and available at https://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/69651C2DD21FE15BCA2575DF001CB1CC/$File/12200_2006.pdf

2 Results

In this section the results of the analysis are presented. Reiterating, the research question that we explored was "How has the skill level mix of occupations changed in the manufacturing sector between 2006 – 2018?"

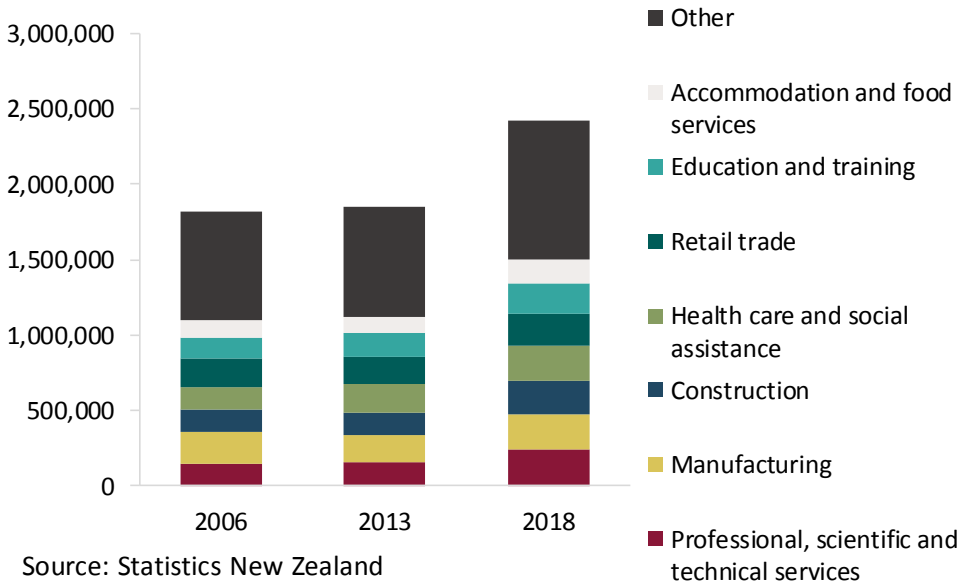
The results are presented as follows:

- The employment counts of every sector in the economy, as well as the skill level distribution
- Manufacturing sector growth between 2006 and 2018
- Finally, focus on the largest sector in manufacturing - food product manufacturing, and the fastest growing sector in manufacturing - beverage and tobacco product.

2.1 Employment growth from 2006 to 2018 in New Zealand

In 2006 there were 1,816,299 people employed in New Zealand rising to 2,418,258 people in 2018. In Figure 2.1 the employment counts are summarised for New Zealand for each of the last three Censuses (2006, 2013, and 2018). The largest single industry in terms of employment switched during this time from manufacturing, to professional, scientific and technical services. The rest of the 19 industries, aggregated into "Other", has grown from 729,975 people employed to 919,881.

Figure 2.1 Employment counts, New Zealand total



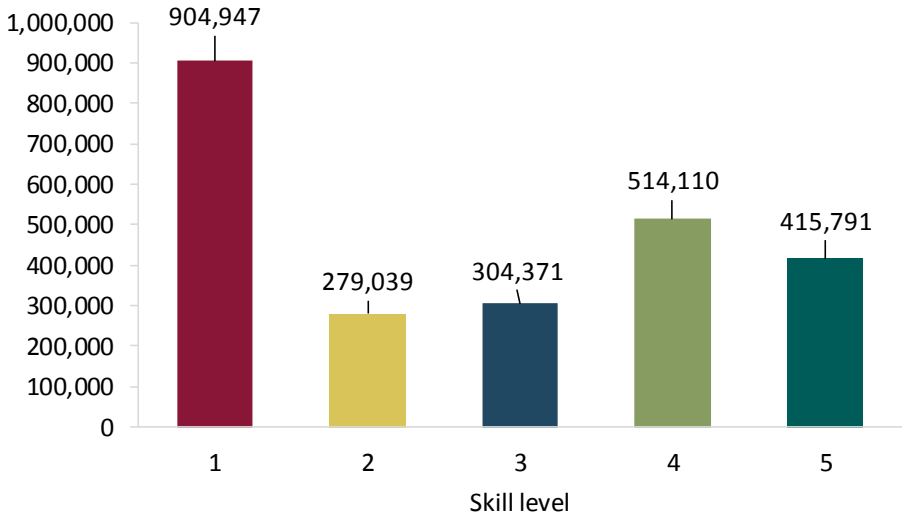
Source: Statistics New Zealand

2.2 Employment by skill level in 2018

Next, we shift from employment to skill levels. Figure 2.2 summarises the counts of people employed by the skill level of their occupation. According to the 2018 Census there were 904,947 people employed in occupations of skill level one (high skilled). This represents 37 percent of all employment, as summarised in Figure 2.3.

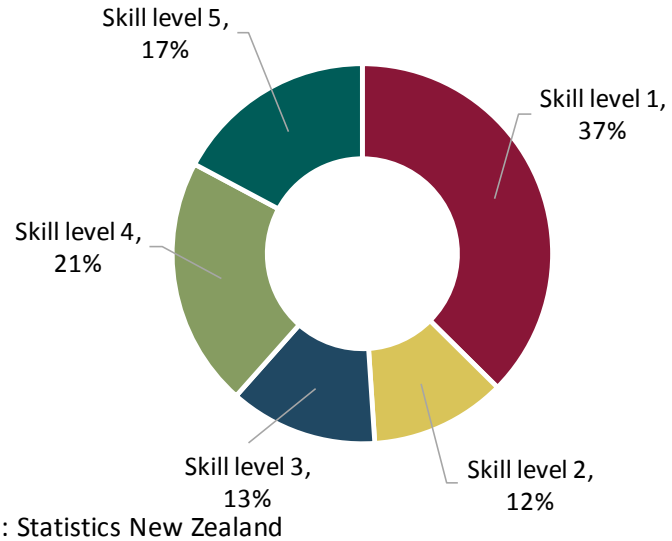
The 2018 Census also reveals that there were 415,791 people employed in occupations of skill level five (low skilled). This skill level is composed of labourers and tasks that do not require a formal education. This represents 17 percent of the 2018 workforce.

Figure 2.2 Employment by skill level, entire economy, 2018



Source: Statistics New Zealand

Figure 2.3 Skill levels, entire economy, 2018



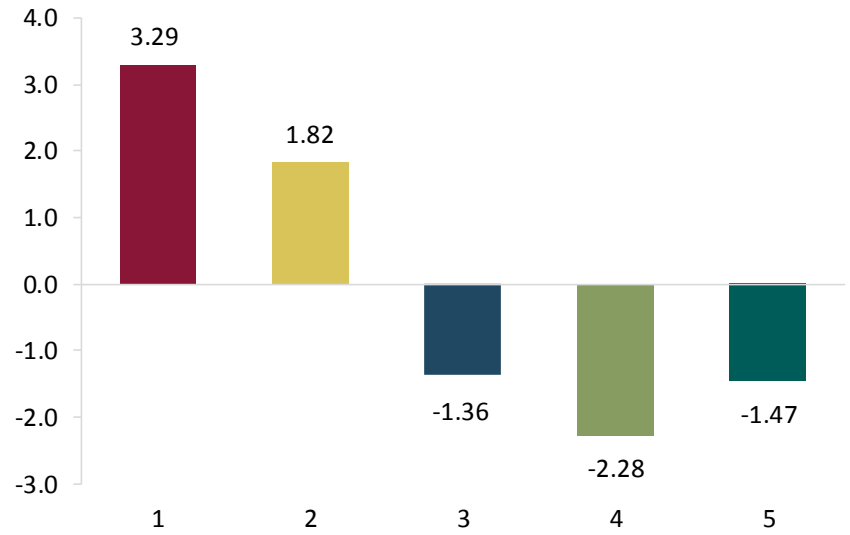
Source: Statistics New Zealand

2.2.1 Changes in skill level from 2006 to 2018

To logically reflect the change in skill levels between 2006 and 2018, we focussed on the percentage point change between the periods at each skill level. This is summarised in Figure 2.4.

This summary reveals that the economy is slowly moving towards highly skilled occupations. Occupations at skill level one have grown by 3.29 percentage points. Skill level two have grown 1.82 percentage points while the lower skilled occupatons make up a lower proportion of the economy. With level four occupations decreasing by 2.28 percentage points and level five occupations decreasing by 1.47 percentage points.

Figure 2.4 Skill level change, entire economy 2006 - 2018

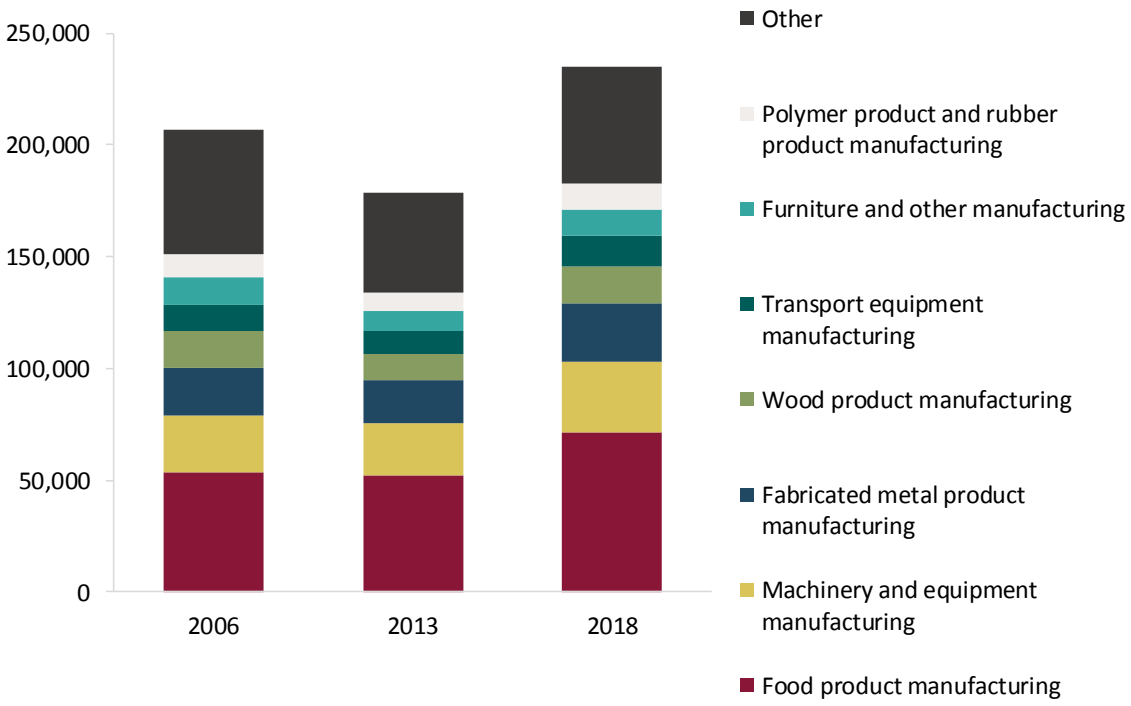


Source: Statistics New Zealand

2.3 Manufacturing sector employment

In this section the focus shifts to the manufacturing sector. In Figure 2.5 the counts of employment in manufacturing industries in 2006, 2013 and 2018 are summarised. In 2006 there were 207,126 people employed in manufacturing, this has grown to 235,323 in 2018.

Figure 2.5 Employment counts, manufacturing



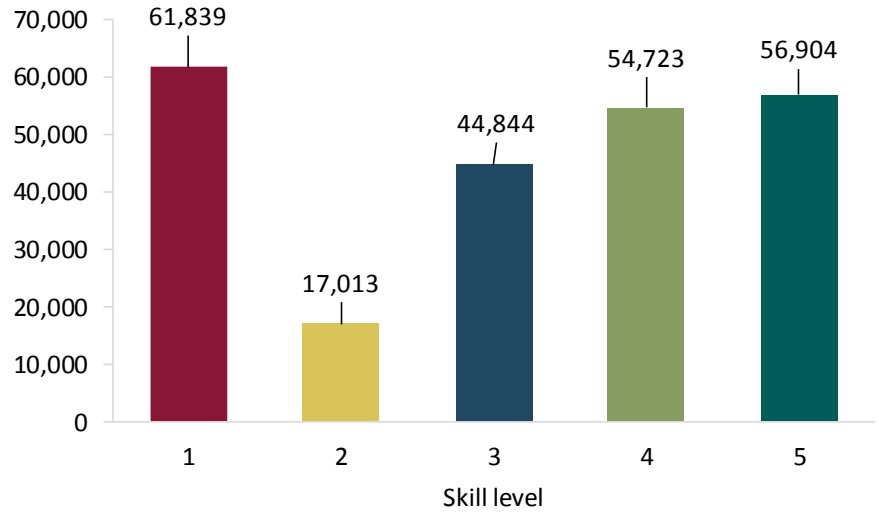
Source: Statistics New Zealand

2.4 Skill level employment in manufaturing sector (2018)

The skill level of people employed in the manufaturing sector is shown in Figure 2.6.

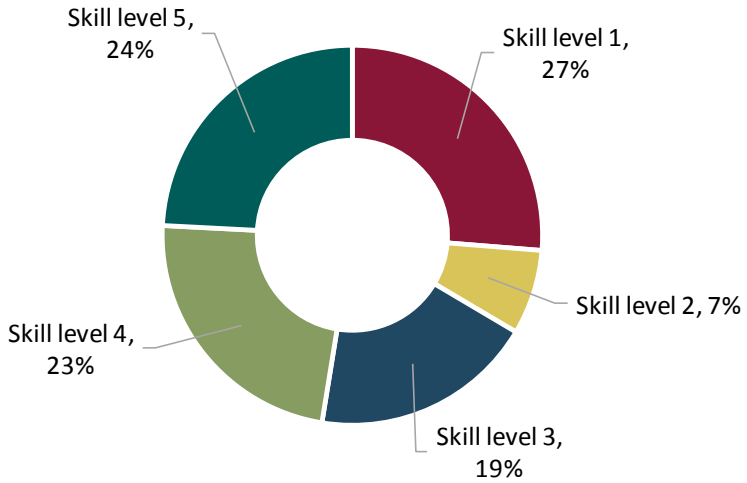
The manufacturing sector looks different from the rest of the economy (Figure 2.2). Similar to the economy as a whole, occupations at skill level one are the largest group, accounting for 61,839 people (27 percent). However, the lower skilled occupations also account for large proportions of employment in this industry. Occupations of skill level three account for 44,844 people (19 percent), level four 54,723 (23 percent) people, and level five accounts for 56,904 (24 percent) people.

Figure 2.6 Employment counts by skill level, manufacturing, 2018



Source: Statistics New Zealand

Figure 2.7 Skill levels, manufacturing 2018



Source: Statistics New Zealand

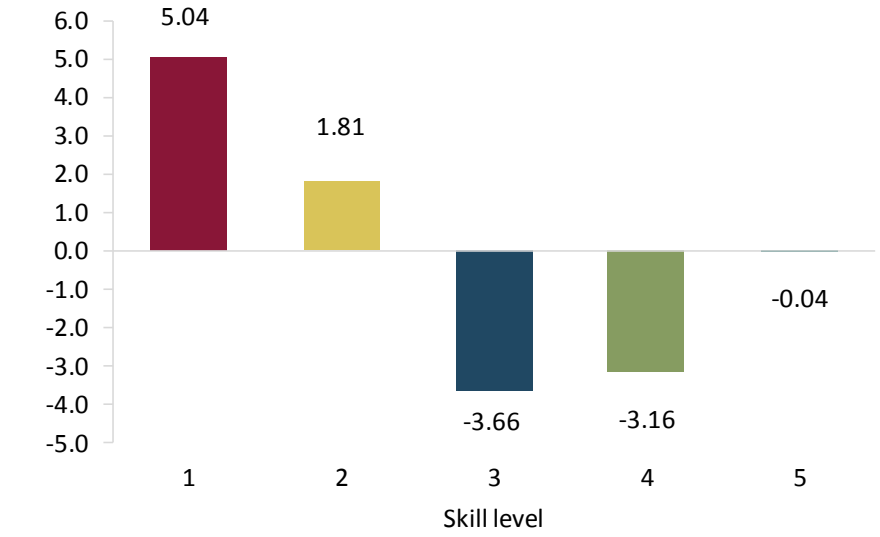
2.4.1 Changes in skill level in manufacturing sector

To summarise the change over time for the manufacturing sector the same methodology was used as in the previous section. Occupations at skill level one have grown the fastest in manufacturing, by 5.04 percentage points (in 2006 these occupations accounted for 21 percent of occupations in manufacturing, they now account for 26 percent).[1]

Occupations of skill level two have grown by 1.81 percentage points. While all three lower skilled level occupations have fallen. Level three skilled occupations now account for 3.66 percentage points fewer people. Level four account for 3.16 percentage points less. The lowest skilled (level five) has not changed significantly between 2006 and 2018.

This analysis shows that, broadly speaking, there has been a shift towards higher skill levels in the manufacturing sector.

Figure 2.8 Skill level change, manufacturing, 2006 - 2018



Source: Statistics New Zealand

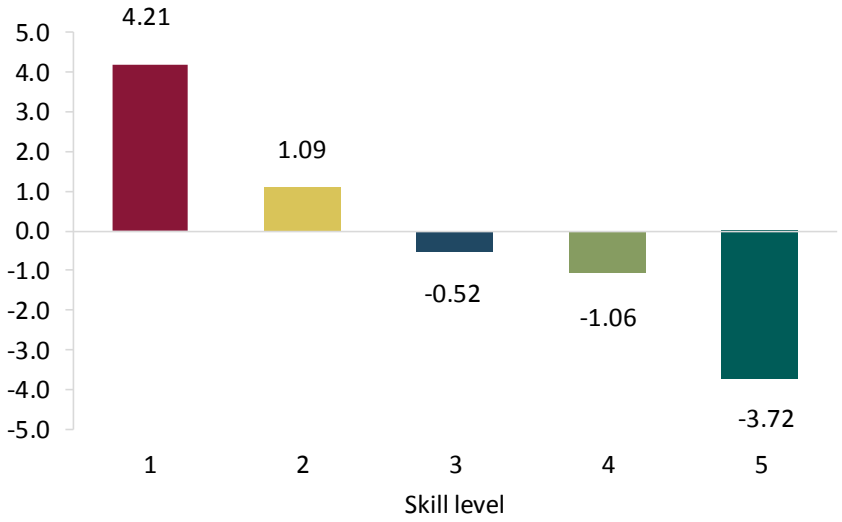
2.4.2 Largest and fastest growing subsectors in manufacturing industry

Finally the largest and fastest growing sub sectors within the maufacturing industry were analysed. The first is the food product manufacturing industry, which is the largest industry in the sector in terms of employment, and has grown 53,145 to 71,553 people, between 2006 and 2018. This change represents 18,408 new jobs and a growth rate of 34 percent.

The skill level composition of this industry has changed in much the same way as the manufacturing sector in general, with more people now being employed in skill level one occupations and less in the lower skill levels. As shown in Figure 2.9, level one occupations account for 4.21 percentage points more than in 2006, while level five occupations account for 3.72 percentage points less.

[1] One percentage point difference is explained by the way Excel rounds data for pie charts.

Figure 2.9 Skill level change in food product manufacturing

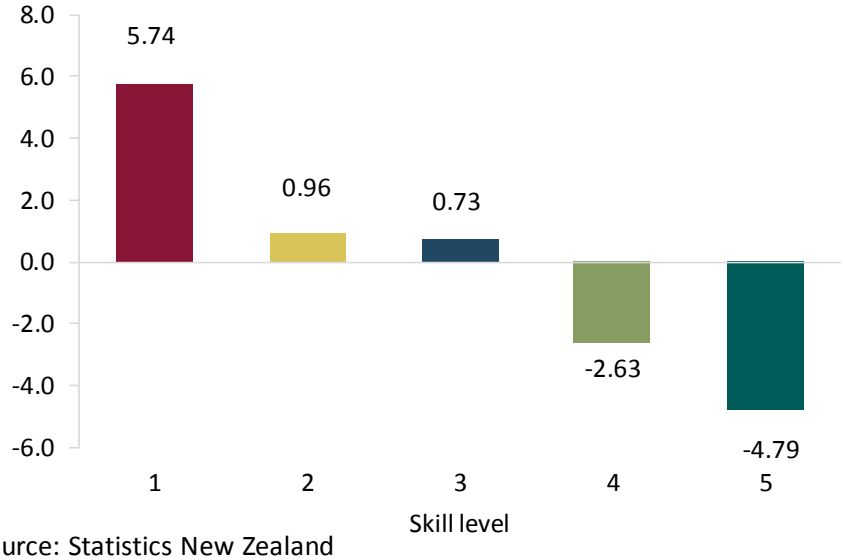


Source: Statistics New Zealand

Finally, the fastest growing industry in the manufacturing sector was analysed. This industry is beverage and tobacco product manufacturing. While this industry has only grown from 4,716 people employed in 2006 to 7,995 people in 2018, this growth represented a 69.5 percent (3,279 people) difference.

The skill level changes echo what has been described above, with the proportion of people being employed in level one skill occupations growing against those employed at level four or five occupations. Level one occupations now account for 5.74 percentage points more employment in beverage and tobacco product manufacturing, while levels four and five account for 2.63 and 4.79 percentage points less, respectively. This is summarised in Figure 2.10.

Figure 2.10 Skill level changes in beverage and tobacco manufacturing



Source: Statistics New Zealand

This research has not included any calculations of lower level industries within the ANZSIC classification. However, data from BERL's own employment database reveals that between 2006

and 2018, soft drink manufacturing employment grew 10.5 percent, beer manufacturing grew 126.9 percent, and wine manufacturing grew 18.6 percent. At the other end, tobacco manufacturing employment shrunk 12.8 percent.

All of these industries have a greater proportion of people employed in level one skilled occupations.

3 A local government lens

We expect the trend of increasing employment in skilled occupations to continue. However, due to the "coarse" nature of Census data we were not able to extend the full analysis down to district level. A district level in this case is useful as it allows local government to understand the economy of their area at a more detailed level.

Districts across New Zealand differ in proportions of primary industries, manufacturing, or higher level service sectors. BERL's database was used to provide a district level overview of the concentration of employment in manufacturing in general and also in food product manufacturing.

BERL's database revealed that in the Kawerau District 42 percent of employment was accounted for by employment in manufacturing. This was the highest concentration in New Zealand. The second highest was South Taranaki District with 33 percent of employment accounted for by manufacturing. Carterton, South Waikato, and Matamata-Piako Districts were ranked third, fourth, and fifth, with 30, and 25 percent of employment accounted for by manufacturing, respectively. The proportion of employment accounted for by manufacturing for New Zealand in general was almost 11 percent.

Table 3.1 Manufacturing employment as a proportion of total employment, top five districts, 2019

	Manufacturing	
Rank	District	Proportion of total employment
1	Kawerau	42.08
2	South Taranaki	33.08
3	Carterton	30.45
4	South Waikato	25.33
5	Matamata-Piako	24.99
	New Zealand total	10.86

We found that particularly the food product manufacturing sector has exhibiting strong growth in high skilled occupations. The top district for food product manufacturing employment was South Taranaki, with 28 percent of employment being accounted for by food product manufacturing. This was followed by Wairoa with 23 percent, Central Hawke's Bay with 22 percent, Matamata-Piako with 19 percent, and Clutha with 18 percent. The average proportion of employment accounted for by food product manufacturing across New Zealand was about four percent.

Table 3.2 Food product manufacturing employment as a proportion of total employment, top five districts, 2019

	Food Product Manufacturing	
Rank	District	Proportion of total employment
1	South Taranaki	27.56
2	Wairoa	23.08
3	Central Hawke's Bay	21.87
4	Matamata-Piako	18.76
5	Clutha	18.17
	New Zealand total	3.57

4 Conclusions

"How has the skill level mix of occupations changed in the manufacturing sector between 2006 – 2018?"

Within the manufacturing sector, people employed at skill level one (high skilled) were the largest group, accounting for 61,839 people (27 percent) but the lower skilled occupations also accounted for large proportions of employment in this industry. Occupations at skill level three accounted for 44,844 people (19 percent), level four 54,723 (23 percent) people, and level five accounted for 56,904 (24 percent) people.

From 2006 to 2018 there has been a move towards higher skilled occupations within the manufacturing sector. Level one occupations (high skilled) accounted for 5.04 percentage points more employment in the manufacturing sector in 2018 compared to 2006. This is higher than the average for the economy in general, level one occupations accounted for 3.29 percentage points more employment between 2006 and 2018.

Our analysis showed that the districts with the largest concentration of manufacturing employment were Kawarau, South Taranaki, Carterton, South Waikato, and Matamata-Piako.

This research has shown that for the economy in general, there has been a shift towards higher skilled occupations with the proportion of employment accounted for by skilled occupations growing while the proportion for lower skilled jobs falling. It is worth noting that the total number of employment has also risen and the official unemployment rate has stayed relatively stable over this time.

4.1 Gaps

Skills versus education and qualifications

The ANZSCO skill levels measure the skill level of the occupation, not of the worker. They are loosely related to qualification levels under the assumption that generally people self-select into the occupation to which their qualifications are best aligned. However the link is not direct. Moreover, the link between qualifications, education and skills is also only indirect with the assumption that education confers skills onto workers which can be reliably signalled using qualifications. We assume these indirect links are sufficient to reliably use ANZSCO skill data to make inferences. However, at present, this assumption cannot be tested using publicly available data.

4.2 Further research

A further area for research is what, if any, effect does increasing skill have on income? Census data is too "coarse" to answer this in any interesting way but we could conceivably use Statistics New Zealand's Integrated Data Infrastructure to answer this question.

Pursuing this route we could add a number of other research questions, such as looking at skill levels of occupation and qualifications or education. As well as skill levels and length of time unemployed.