



The impact of COVID-19 on apprentices and trainees

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Executive Summary

The outbreak of COVID-19 has led to the greatest dislocation in the labour market for many decades. While unemployment has remained pleasingly low, the disruption to ordinary life and business has been immense. The purpose of this paper is to speculate on the impact of COVID-19 on the number of apprentices and trainees and the consequent supply of skills.

We have all become familiar with the modelling that has been undertaken by public health officials for the purpose of predicting the number of infections and deaths from COVID-19. We also use modelling for our speculations. Our interest is primarily on the supply of newly trained workers to occupations. This depends on the number of completions of the relevant apprenticeships and traineeships. We observe the number of commencing apprentices and trainees and historical relationships between completions and commencements. Based on these historical relationships we predict the impact of changes in apprentice and trainee numbers on occupational labour supply.

Governments moved very quickly in 2020 to introduce programs to underpin the system, at a time in which the labour market was in turmoil. Subsequent increases in the level of commencements support the notion that the policies were broadly successful in increasing commencements.

However, the story is a little more complicated, and it is necessary to delve into occupational level data. To this end we constructed a 22 level occupational classification. In terms of commencements, we saw increases between the 12 months ending March 2019 (to represent the pre-COVID-19 situation) and the corresponding period two years later. In many occupations a serious decline in the first year was more than offset by increases in the next. In particular, commencement numbers were unseasonably high in the December quarter 2020, and seasonably high in the March quarter 2021. There were though a small number of occupations which saw overall declines over those two years: sports and service workers (down 59.4 per cent), storepersons (down 58.3 per cent), road and rail drivers (down 37.1 per cent), and machine and stationary plant operators (down 14.5 per cent).

One of the side effects, which one could suggest was not intended, was an increase in commencements in a number of occupations for which perhaps COVID-19 offered little threat. In this context we saw very large increases in commencements among numerous occupations. Commencements increased by more than 100 per cent among managers and professionals, and by more than 50 per cent among health and welfare support workers, engineering, ICT and science technicians, protective service workers and clerical and administrative workers. It is unlikely that this was intended and perhaps suggests that the government programs had a significant dead weight loss, with payments welcomed by employers but not necessarily increasing the level of training where it was needed.

Commencements are a leading indicator of what is happening in apprenticeships and traineeships, but it is completions that indicate the level of skills formation. To investigate what is likely to occur over the next few years in this regard we modelled the level of completions as an outcome of commencement levels, taking into account the lags in the system (most apprenticeships take 3-4 years while traineeships take 1-2 years). Not surprisingly, given our observation that commencements had increased, our projections suggest that there is no reason to be worried about the numbers of completions in coming years. However, to interpret our projections in a more considered way we focussed on two aspects of the system.

The first is that the apprenticeship and traineeship system plays a very variable role in the overall level of skills formation. Only in a few trade occupations does it play a dominant role. In others, it plays a minor but substantive role with the number of graduates from VET other than from the apprenticeship and traineeship system significantly more important and in others it plays a trivial role.

The second aspect is that the apprenticeship and traineeship system has evolved in a way which has seen the numbers of apprentices and trainees suffer very significant decline over a long period. So, we see managers, professionals, protective service workers in which 2019 levels of completions are around 10 per cent of less of peak levels. There are numerous occupations where 2019 levels are 20-30 per cent of peak levels; engineering, ICT and science technicians, other technicians and trades excluding hairdressers, health and welfare support workers, clerical and administrative workers, sales workers, machine and stationary plant operators, road and rail drivers, storepersons and labourers. By contrast, the system has been maintained or even expanded in a small number of occupations, namely construction trades, electrotechnology and telecommunications trades workers, food trades and mobile plant operators.

One of the implications of this is that support for the apprenticeship and traineeship system is very important for the skills formation in a small number of occupations, but less so more generally. This opens up the likelihood that much of the expenditure of the apprentice and trainee focussed COVID-19 programs is not really doing much for overall skills formation. But on a positive note, at least we do not need to worry about the impact of COVID-19 on the skills formation of those occupations where the apprenticeship and traineeship system is dominant, namely automotive and engineering, construction, electrotechnology and hairdressers.

The analysis though does raise some broader structural issues. The first is that the apprenticeship and traineeship system is a bit 'all over the place' in the sense that it comprises a core around the trades where it is a vital part of the skills formation system, and the remainder where it plays a small and sometimes trivial role in comparison to the broader VET sector (and higher education). For example, realistically trainees in professional and managerial occupations play an insignificant role in comparison to graduates from higher education. The implication is that significant subsidies are going to traineeships which are not playing a very important role in skills formation. There is little doubt that employers do react to incentives, but incentives will be wasteful when they drive behaviour which does not significantly contribute to the skill formation needs of the economy.

A second issue is that arguably apprenticeships and traineeships attract too much attention from government, in the sense that one gets the impression that they are the foundation of skills formation more generally. For example, we saw recent headlines trumpeting a boom in training. But we have shown that apprenticeships and traineeships play a very minor role in most occupations. There is a considerable risk that the non-apprenticeship/traineeship sector of VET is being neglected at the expense of the apprenticeship and traineeship system. Indeed, an obvious extension of this paper is to look at how VET has responded to COVID-19 and whether we face potential skill shortages in non-trade occupations. An obvious example is health and care occupations where obtaining practicums for students has been very difficult, directly because of COVID-19.

It should be noted that there is a gender dimension to this story. The trades, apart from the food trades and hairdressing is male dominated. Therefore, concentration on the trades at the expense of other occupations will favour men relative to women.

From the point of view of the VET sector, it cannot be healthy to concentrate so much attention on apprenticeships and traineeships. Policy makers need to recognise that apprenticeships and

traineeships, as important as they are in some trades, constitute a relatively small amount of VET effort, and that it is a mistake to think that increasing numbers of apprenticeships and traineeships will solve Australia's skills formation challenges.

Perhaps it is time to reassess the apprenticeship and traineeship system against the broader framework of middle level skills formation which is the *raison d'être* of Vocational Education and Training. It could be argued that VET has a limited future if it is characterised as an apprenticeship system. We also need to recognise that higher education is a mass education system now, and this impinges on the higher level VET qualifications. We also need to be aware that the immigration has taken a battering, and this will impact on skill shortages and replacement rates. The output of the VET sector will be even more critical in coming years. We need to think beyond apprenticeships and traineeships and provide vocational training which will address skill shortages more broadly.

1. Introduction

The outbreak of COVID-19 has led to the greatest dislocation in the labour market for many decades. While unemployment has remained pleasingly low, the disruption to ordinary life and business has been immense. The first case of COVID-19 in Australia was in January 2020. As I draft this paper, we have seen a serious outbreak of the more infectious Delta variety, with lockdowns and restrictions on interstate travel. No sooner than appearing to get on top of the pandemic, a loosening of travel restrictions was accompanied by the discovery of a new strain, Omicron. Despite increasing vaccination levels 'herd immunity' seems to be some way off and all the signs are that in any 'new normal' the disease will be endemic requiring ongoing booster vaccinations.

The purpose of this paper is to speculate on the impact of COVID-19 on the number of apprentices and trainees and the consequent supply of skills. We stress that this is speculation. We cannot know the exact impact until our economy and community have settled down and the data are in (noting that the latest data we have for apprentices and trainees relates to the March quarter 2021).

We have all become familiar with the modelling that has been undertaken by public health officials for the purpose of predicting the number of infections and deaths from COVID-19. We also use modelling for our speculations, based on a number of simple steps. Our interest is primarily on the supply of newly trained workers to occupations. This depends on the number of completions of the relevant apprenticeships and traineeships. We observe the number of commencing apprentices and trainees and historical relationships between completions and commencements. Based on these historical relationships we predict the impact of changes in apprentice and trainee numbers on occupational labour supply. We can also undertake sensitivity analysis and test the effect of modifying model parameters.

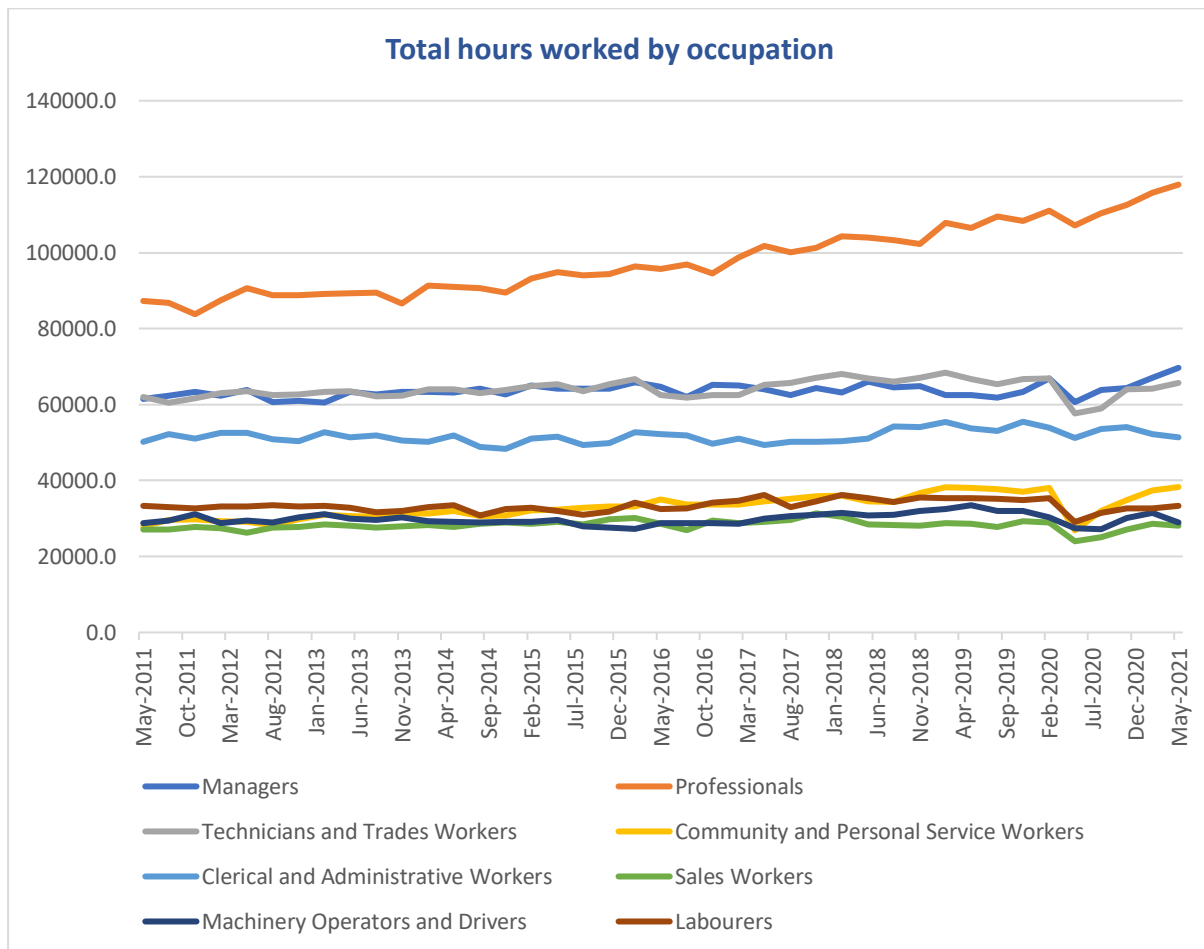
The structure of the paper is as follows. In the next section we provide some background information on economic activity since the beginning of 2020 when COVID-19 became a concern. We also document the steps that governments took to support the apprenticeship and traineeship system. In Section 3, we document how apprenticeship and traineeship numbers have travelled since the beginning of 2020. Section 4 sets out our model, while Section 5 presents our speculations under a variety of scenarios. We end with some concluding comments.

2. Background

Impact on economic activity

A simple way of showing the impact of COVID-19 on economic activity is to look at hours worked. In Figure 1 we plot the total hours worked (in all jobs) classified by occupation (major groups) over the last 10 years.

Figure 1: Total hours worked by occupation, 2011-2021



Source: Australian Bureau of Statistics (2021)

We see a very significant fall in the first half of 2020, followed by an uneven reversal. From this graph it is clear that the impact of COVID-19 has been very uneven, with some occupations barely affected.

Our interest is in the relationship between apprenticeships and traineeships and economic activity. To explore this, we construct a hybrid occupational classification which contains elements at the one, two and three digit levels of ANZSCO. This results in a classification with 22 occupations which better reflect the pattern of apprenticeships and traineeships. To get a feel for the impact of COVID-19 on economic activity we measure the change in both hours worked and employment between, first, May 2019 and May 2020, and second between May 2019 and May 2021. The latter shows the extent of the bounce back of activity after the initial lockdowns in 2020.

Table 1: Change in hours worked and employment between May 2019 and May 2021, by occupation

	Number of hours actually worked in all jobs		Employed	
	Change May 2019 to May 2020	Change May 2019 to May 2021	Change May 2019 to May 2020	Change May 2019 to May 2021
Managers	-2.9	11.5	4.1	14.7
Professionals	0.6	10.7	0.8	9.4
Engineering, ICT and Science Technicians	-3.6	4.1	1.1	3.2
Automotive and Engineering Trades Workers	-13.1	-0.4	-9.0	-1.4
Construction Trades Workers	-13.8	-9.0	-8.7	-8.8
Electrotechnology and Telecommunications Trades Workers	-10.0	0.1	-3.0	2.3
Food Trades Workers	-39.0	4.0	-21.7	3.0
Skilled Animal and Horticultural Workers	9.5	11.7	10.9	5.8
3911 Hairdressers	-38.2	-16.2	-22.8	-11.9
Other technicians excl hairdressers	-12.1	-5.6	-2.2	-3.2
Health and Welfare Support Workers	-21.9	-6.2	-9.3	2.9
Carers and Aides	-10.3	8.2	-4.4	6.8
Hospitality Workers	-67.4	2.8	-53.2	-0.4
Protective Service Officers	1.1	1.6	5.4	1.7
Sports and personal Service Workers	-67.8	-16.8	-47.4	-11.9
Clerical and Administrative Workers	-4.8	-4.3	-1.2	-3.7
Sales Workers	-15.9	-1.5	-11.6	-2.1
Machine and Stationary Plant Operators	-12.1	-10.5	-5.2	-9.3
Mobile Plant Operators	-23.0	-16.6	-17.6	-15.6
Road and Rail Drivers	-23.6	-17.0	-15.5	-15.9
Storepersons	-3.3	-2.0	-0.2	-1.0
Labourers	-17.9	-5.9	-10.9	-3.6
Total	-9.6	12.4	-5.7	2.1

Source: Australian Bureau of Statistics (2021)

Not surprisingly hours worked have changed more than employment numbers, with more pronounced downturns and rebounds. We note that, under both measures, total economic activity has recovered from the initial downturn. However, the pattern across occupations is very uneven. The occupations worst affected by the downturn are mobile plant operators, road and rail drivers, sports and personal service workers, hairdressers, machine and stationary plant operators and the construction trades.

Government support for apprentices and trainees

Governments were very quick to respond to the pandemic, with the major program being the JobKeeper wage subsidy program, announced on 30 March 2020, aimed to keep Australians in jobs and to support businesses affected by the pandemic. The scheme was initially estimated to cost \$130 billion but was revised down by \$60 billion in May 2020. In the first phase of JobKeeper, from 30 March 2020 to 27 September 2020, the scheme covered \$1500 per fortnight of an eligible employee's wages. The scheme was extended from 28 September 2020 to 28 March 2021, but at reduced rates, and was targeted to businesses that continued to experience significant impacts (Hall 2021). In addition to JobKeeper, apprentices and trainees were targeted specifically (Hall 2021):

- The *Supporting Apprentices and Trainees* wage subsidy program was announced on 12 March 2020, estimated at \$1.3 billion, and was expanded by \$1.5 billion as part of the JobTrainer skills package, announced on 16 July 2020. The program provided financial support to small and medium-sized businesses to enable them to retain their existing apprentices and trainees, and to new employers of any size if they re-engaged an apprentice or trainee who had been displaced from a small or medium-sized business. The program provided a wage subsidy of 50 per cent of the eligible apprentice or trainee’s wages paid between 1 January 2020 and 31 March 2021, up to a maximum of \$7000 per quarter.¹
- The *Boosting Apprenticeship Commencements* wage subsidy program was announced as part of the 2020–21 Federal Budget, with a \$1.2 billion allocation over four years, originally capped at 100,000 places. This scheme supports employers and group training organisations who engaged a new apprentice or trainee on or after 5 October 2020. The wages of eligible apprentices and trainees are subsidised by 50 per cent for a 12-month period from the date of commencement between 5 October 2020 and 30 September 2021, up to a maximum of \$7000 per quarter. In March 2021, the program was extended to remove the 100,000 cap on places and provide support for up to 12 months. The program was further extended in the Federal Budget with a further \$2.7 billion announced to cover new commencements until 30 March 2022.
- The *Apprentice and trainee re-engagement register* was developed to connect potential employers with apprentices and trainees who had lost their job. The register is open to apprentices and trainees who were in a training contract with a small business on 1 March 2020 and subsequently lost their job. It was later expanded to include those who were in a training contract at 1 July 2020 and subsequently lost their job, along with apprentices from medium sized businesses.

State and territory governments also implemented a range of support measures in addition to those provided at the federal level².

3. Impact on apprenticeship and traineeship numbers

It is a little difficult to get a clear picture of apprenticeship and traineeship activity over the period of COVID-19. This is for a couple of reasons. The first is that commencement data are very seasonal with the March quarter typically having a large uplift in commencements. March quarter 2020 corresponded to the beginning of COVID-19, but one would not necessarily expect employers to react immediately. The second reason is that, as noted earlier, the government acted very quickly in introducing an additional wage subsidy for apprentices and trainees for new apprentices and trainees after October 2020. This implies that the direct effect of COVID-19 was for a short period, following the seasonably high March quarter. That said, the very large increase in suspensions in the March quarter 2020 suggests that many employers were very nervous about the economic outlook. A further difficulty is employer and individual behaviour may offset each other – withdrawals (by apprentices or trainees) are

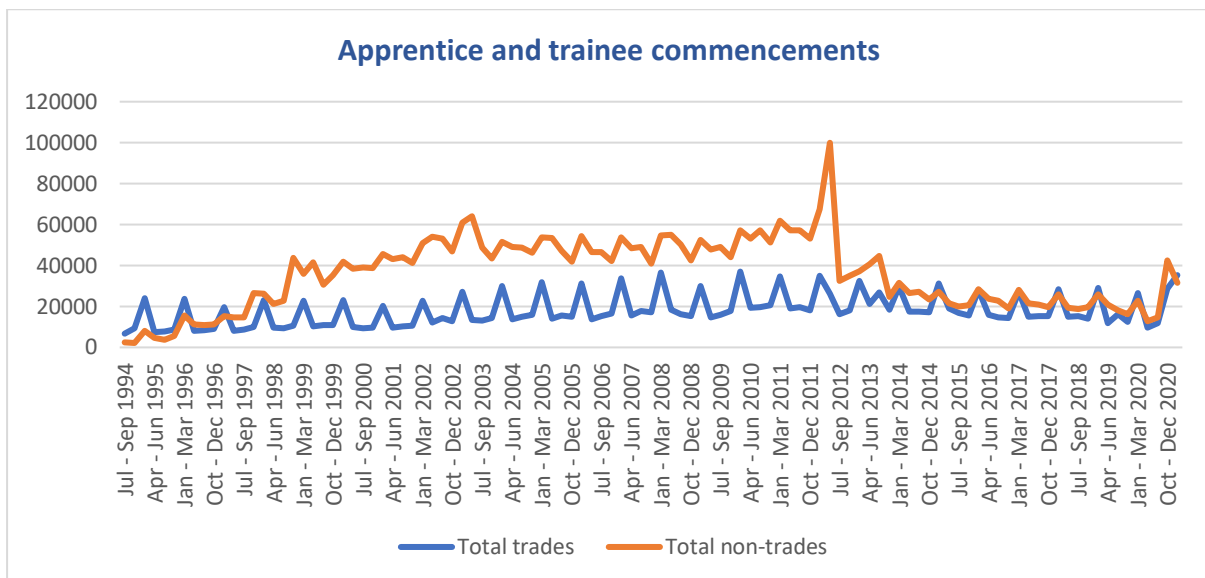
¹ Note that employers and Group Training Organisations that received a subsidy to either retain or re-engage an apprentice or trainee under Supporting Apprentices and Trainees continued to be eligible for other incentives available under the Australian Apprenticeships Incentives Program (see https://www.australianapprenticeships.gov.au/sites/default/files/2020-03/QA%20Supporting%20Apprentices%20and%20Trainees_18032020_WEBVERSION.pdf). It is also worth noting that, from 1 July 2019, an additional payment was made available (the Additional Identified Skills Shortage payment) for employers and apprentices in ten occupations experiencing national skills shortages (carpenters and joiners, plumbers, hairdressers, airconditioning and refrigeration mechanics, bricklayers and stonemasons, plasterers, bakers and pastrycooks, vehicle painters, wall and floor tilers and arborists).

² Details can be found at <https://www.voced.edu.au/vet-knowledge-bank-timeline-australian-vet-policy-initiatives>.

likely to be lower in times of uncertainty while cancellations (by employers) may be higher. We also saw a very large increase in suspensions.

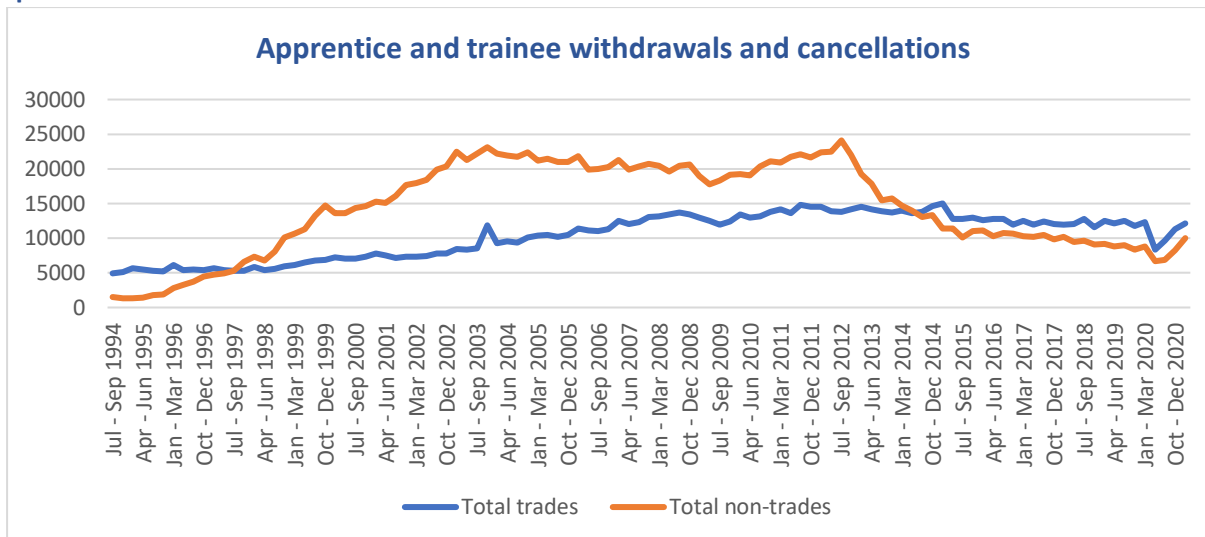
We present three graphs to describe what happened. The first is quarterly commencements, the second is quarterly withdrawals and cancellations and the third is quarterly suspensions. In these graphs we present the totals for apprentices (the trades) and trainees (none-trade occupations).

Figure 2: Apprentice and trainee commencements September quarter 1994 to March quarter 2021



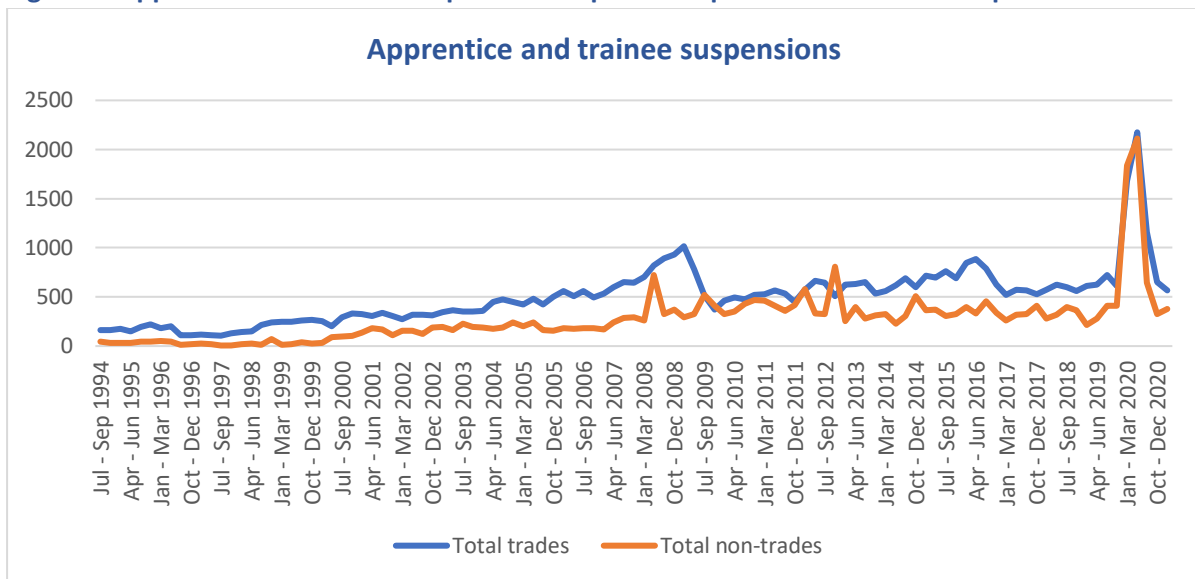
Source: National Centre for Vocational Education Research (2021a)

Figure 3: Apprentice and trainee withdrawals and cancellations September quarter 1994 to March quarter 2021



Source: National Centre for Vocational Education Research (2021a)

Figure 4: Apprentice and trainee suspensions September quarter 1994 to March quarter 2021

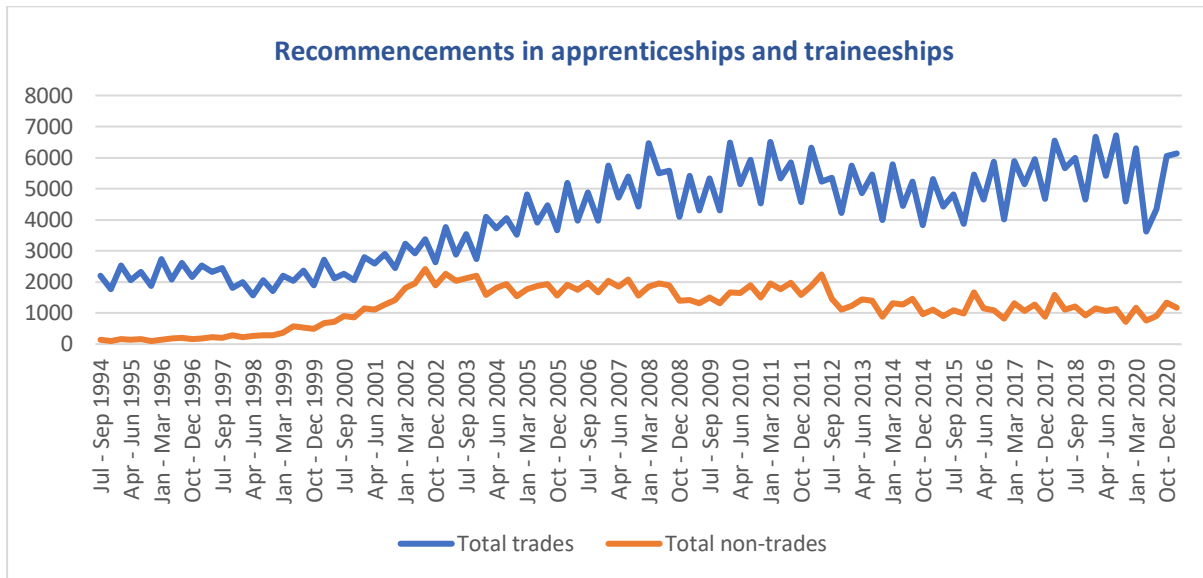


Source: National Centre for Vocational Education Research (2021a)

We see that the data for 2020 showed signs of a possible dislocation of the apprenticeship and traineeship system. Commencements were down historically a little on data a year earlier in each of the first three quarters of 2020. In addition, suspensions hit historical highs in the first two quarters of 2020 (although it must be said that the numbers were still relatively small). Cancellations and withdrawals did not increase, perhaps suggesting that any nervousness of employers was more than offset by nervousness of apprentices and trainees - early 2020 was not a good time to leave a job. At the same time, the JobKeeper program no doubt had a positive impact on allowing apprentices and trainees to maintain their employment.

As to whether the record number of suspensions would be likely to have any long-term effect, we point out that the numbers are relatively small compared to the number of recommencements where a contract has commenced as the continuation of an apprenticeship or traineeship in the same qualification, as shown in Figure 5.

Figure 5: Apprenticeship and traineeship recommencements, 1994-2020



Source: National Centre for Vocational Education Research (2021a)

We see that recommencements are concentrated in the trades, no doubt reflecting that an apprenticeship in the trade is linked to occupational training, rather than a particular job which is likely to be the case for most traineeships.

The above discussion suggests that the government may well have had good reason to be nervous about the outlook for apprenticeship and traineeship training. However, the government response, with its foundation program the *Boosting Apprenticeship Commencements* wage subsidy program, at an aggregate level has more than offset any possible decline in the number of apprentices and trainees. The commencements in December quarter 2020 and March quarter 2021 are well above historical figures of the last six or seven years.

However, it is worth digging a little. In Table 2 we present data for the 22 occupations we defined earlier. We concentrate on three time points, March quarters of 2019, 2020 and 2021. The first is chosen to be the base, representing pre- COVID-19. We focus on commencements which are the best leading indicator of the health of the apprentice and trainee system.

Table 2: Changes in apprentice and trainee commencements, March quarter 2019 to March quarter 2021

	Per cent change March 2019 to March 2020	Per cent change March 2020 to March 2021	Per cent change March 2019 to March 2021
1 Managers	2.9	144.4	151.4
2 Professionals	-2.8	192.9	184.6
31 Engineering, ICT and Science Technicians	7.3	63.1	75.0
32 Automotive and Engineering Trades Workers	-5.6	12.7	6.4
33 Construction Trades Workers	-13.5	36.3	17.8
34 Electrotechnology and Telecommunications Trades Workers	-8.4	16.0	6.2
35 Food Trades Workers	-9.0	17.0	6.5
36 Skilled Animal and Horticultural Workers	-4.8	47.6	40.5
391 Hairdressers	-0.1	34.5	34.4
39 Other technicians and trades excluding hairdressers	-18.3	64.0	33.9
41 Health and Welfare Support Workers	23.3	27.3	57.0
42 Carers and Aides	9.6	23.0	34.9
43 Hospitality Workers	-15.3	37.9	16.9
44 Protective Service Workers	43.9	4.5	50.4
45 Sports and Personal Service Workers	-20.2	-49.1	-59.4
5 Clerical and Administrative Workers	-3.4	58.2	52.8
6 Sales Workers	-7.5	50.7	39.4
71 Machine and Stationary Plant Operators	-13.1	-1.7	-14.5
72 Mobile Plant Operators	9.0	12.2	22.3
73 Road and Rail Drivers	-20.7	-20.7	-37.1
74 Storepersons	-26.1	-43.6	-58.3
8 Labourers	-11.2	22.9	9.2
Total	-7.5	28.5	18.8

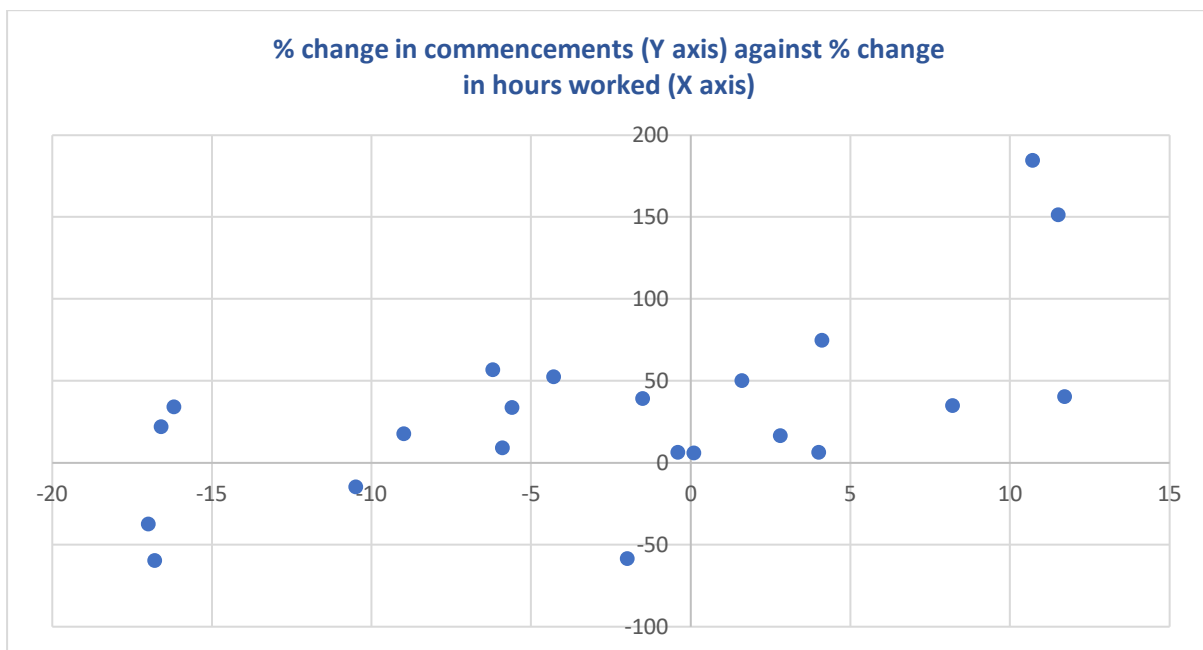
Source: National Centre for Vocational Education Research (2021a)

We see that overall there was a decline of 7.5 per cent between the March quarter of 2019 and a year later in apprentice and trainee commencements, with falls exceeding 10 per cent among construction workers, other technicians and trades (excluding hairdressers), hospitality workers, sports and personal service workers, machinery and stationary plant operators, road and rail drivers, storepersons and labourers. By contrast there were increases exceeding 10 per cent among health and welfare support workers and protective service workers (43.9 per cent increase). These increases perhaps reflect the immediate increase in demand for lower skilled health workers and security personnel.

Overall, there was a sizable rebound the following year, and in March 2021 the number of commencements was 18.8 per cent higher than two years earlier. Apprentice and trainee commencements increased in most occupations with increases of over 50 per cent among health and welfare support workers, protective service workers, and clerical and administrative workers. This presumably reflects labour demand in these areas, and one could speculate that employers have been very willing to take on trainees and take advantage of the available wage subsidies. The longer term impact of COVID-19 though is seen in commencement numbers in a handful of occupations, notably sport and personal service workers (down 59.4 per cent), storepersons (down 58.3 per cent), road and rail drivers (down 37.1 per cent) and machinery and stationary plant operators (down 14.5 per cent). These occupations largely line up with those in Table 1 for which the overall impact of COVID-19 on employment has been negative.

We suggest that there are two drivers for the shift in commencements. The first is labour demand – COVID-19 has had a very uneven effect on different occupations. The second is the willingness to take on apprentices and trainees, most likely reflecting the incentive offered by governments. So, for example, we see very large increases in managerial and professional trainees associated with modest increases in labour demand. Another example is hairdressers where we have seen an increase of over 30 per cent in the number of apprentices between March 2019 and March 2021 at a time when employment in this occupation has declined significantly. In Figure 6 we show the percentage change in commencements (March 2019 to March 2021) against the change in hours worked (May 2019 to May 2021) for the occupations in the earlier tables.

Figure 6: Change in the number of commencements (12 months ending March 2019 to March 2021) and total hours worked (May 2019 to 2021)



Source: Australian Bureau of Statistics (2021), National Centre for Vocational Education Research (2021a)

All occupations where labour demand has gone up have seen an increase in commencements. Of those occupations where demand is still down in 2021 on 2019 levels (May data), the majority have seen an increase in commencement numbers. In fact, there are only four occupations, all of which saw a decline in labour demand, where we have seen a decline in commencements between 2019 and 2021: sports and service workers (down 59.4 per cent), storepersons (down 58.3 per cent), road and rail drivers (down 37.1 per cent), machine and stationary plant operators (down 14.5 per cent).

4. Projections of the number of completions

Commencements are a leading indicator of apprenticeship and traineeship activity, but from the point of view of the level of skills in the work force it is completions that matter. However, the effect of COVID-19 on the number of completions will not be apparent for some years, depending on the length of training. This varies across occupations, with the common length of training being three to four years among apprenticeships and one to two for traineeships.

We construct a simple model which relates the number of completions to the number of commencements in earlier years. We have data spanning the 12 months ending March 1996 to the most recent data and relate the completions in one year to the commencements in that year and

previous years (up to four). We present the coefficients in the next table, noting that those coefficients that are not statistically significant are set to zero. Note that if we sum the coefficients of commencements we obtain an estimate of the overall completion rate, or rather the completion rate that is the average of the period for which we have data.

Table 4: Modelling annual completions - coefficients of annual commencements

	t	t-1	t-2	t-3	t-4	Completion rate (%)
1 Managers		0.425	0.171			59.6
2 Professionals		0.314	0.297			61.0
31 Engineering, ICT and Science Technicians	0.164	0.196	0.209			56.9
32 Automotive and Engineering Trades Workers				0.288	0.327	61.5
33 Construction Trades Workers				0.191	0.372	56.3
34 Electrotechnology and Telecommunications Trades Workers		0.406		0.223		63.0
35 Food Trades Workers	0.214				0.209	42.3
36 Skilled Animal and Horticultural Workers		0.320	0.192			51.2
391 Hairdressers		0.263		0.271		53.4
39 Other technicians and trades excluding hairdressers	0.157	0.274	0.171			60.2
41 Health and Welfare Support Workers		0.255	0.391			64.6
42 Carers and Aides		0.400	0.153	0.107		66.0
43 Hospitality Workers		0.359		0.121		48.0
44 Protective Service Workers		0.481		0.075		55.5
45 Sports and Personal Service Workers		0.568		0.052		62.0
5 Clerical and Administrative Workers	0.007	0.358	0.177	0.029		57.1
6 Sales Workers		0.367		0.132		49.9
71 Machine and Stationary Plant Operators		0.223	0.310	0.053		58.7
72 Mobile Plant Operators		0.150	0.182	0.302		63.4
73 Road and Rail Drivers	0.065		0.421	0.104		59.1
74 Storepersons		0.180	0.399			57.8
8 Labourers		0.289		0.214		50.3

Source: derived from National Centre for Vocational Education Research (2021a)

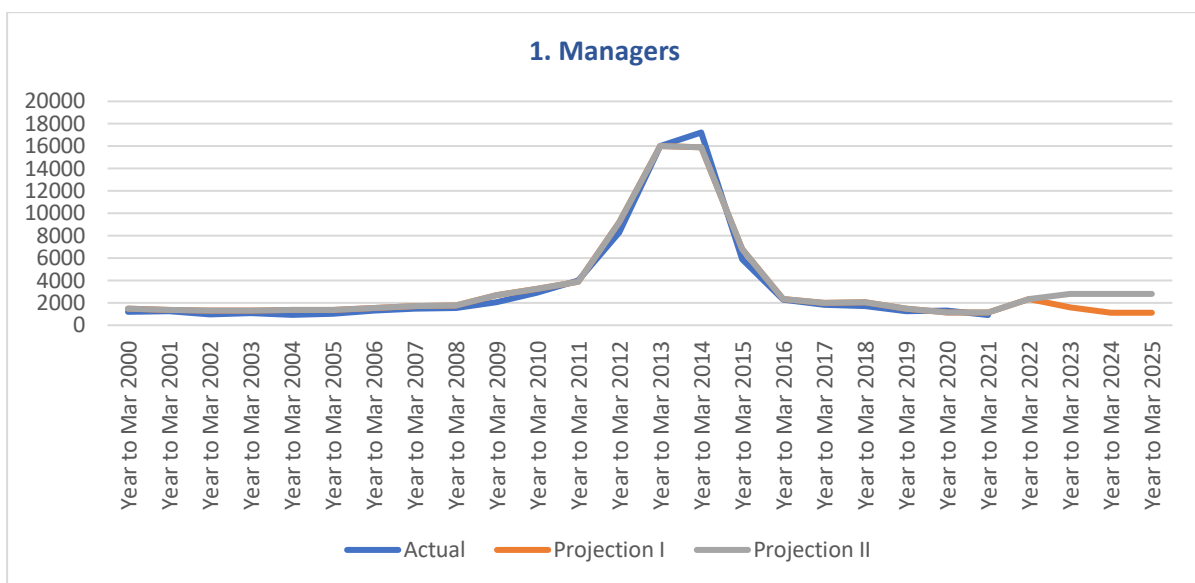
The above table of coefficients is easy to explain. For example, the expected number of completions in management trainees is obtained from aggregating 42.5 per cent of commencements in the previous year and 17.1 per cent of commencements in the year before that. Thus, the flow through from commencements to completions is fairly quick for management trainees. By contrast, completions in construction trades are estimated by aggregating 19.1 per cent of commencements three years earlier and 37.2 per cent four years earlier- most apprenticeships in construction take four years. The relationship between completions and commencements varies very considerably across occupations, with the relationship affected by the expected duration (1-2 years for traineeship, 3-4 years for most apprenticeships), the extent of part-time working arrangements, and the extent of accelerated progress and recognition of previously learnt skills.

The point of these models is to produce projections of completions for the next few years in order to assess the impact of COVID-19 on skills, at least in terms of newly qualified workers from the

apprenticeship and traineeship system. However, in order to calculate these projections, we need to make assumptions about the continuing levels of commencements. We adopt two sets of assumptions. The first is that commencements return to 2019 level (for the 12 months to March 2022) and remain at this level for the projection period. The second is commencements remain at their level as at the 12 months to March 2021. Under both scenarios we project out to the 12 months ending March 2025.

The simplest way of presenting these projections is graphically. This has the benefit of putting the projections in an historical context, which is very important given that government policies have waxed and waned in terms of providing incentives for apprenticeships and traineeship. The state of the labour market also has had a major impact. We present the graphs for each of the occupations we have previously defined.

Figure 7.1: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Managers



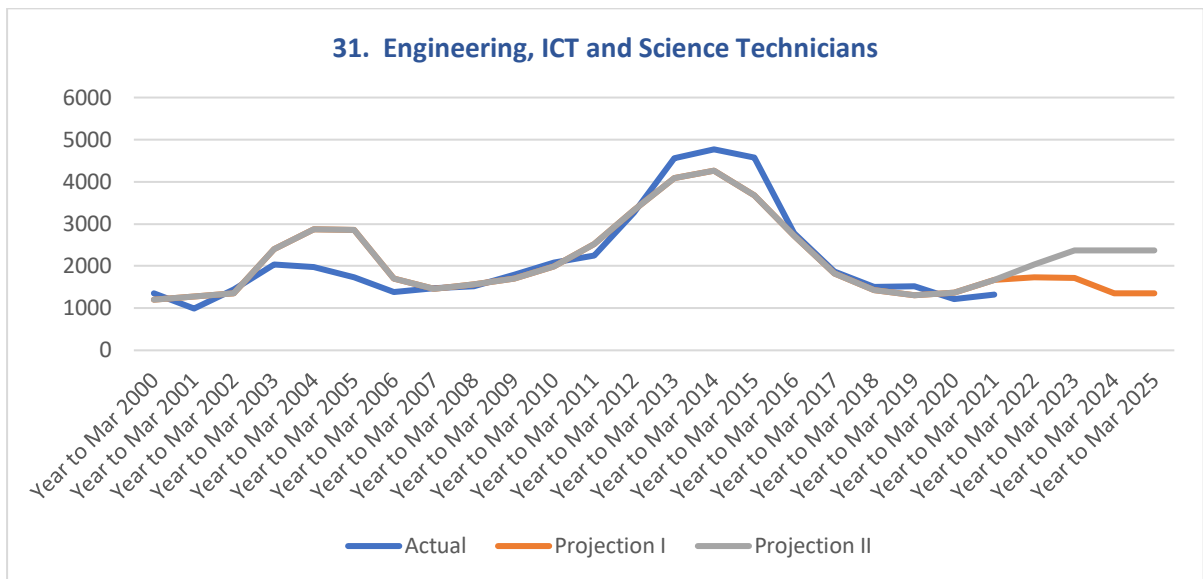
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.2: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Professionals



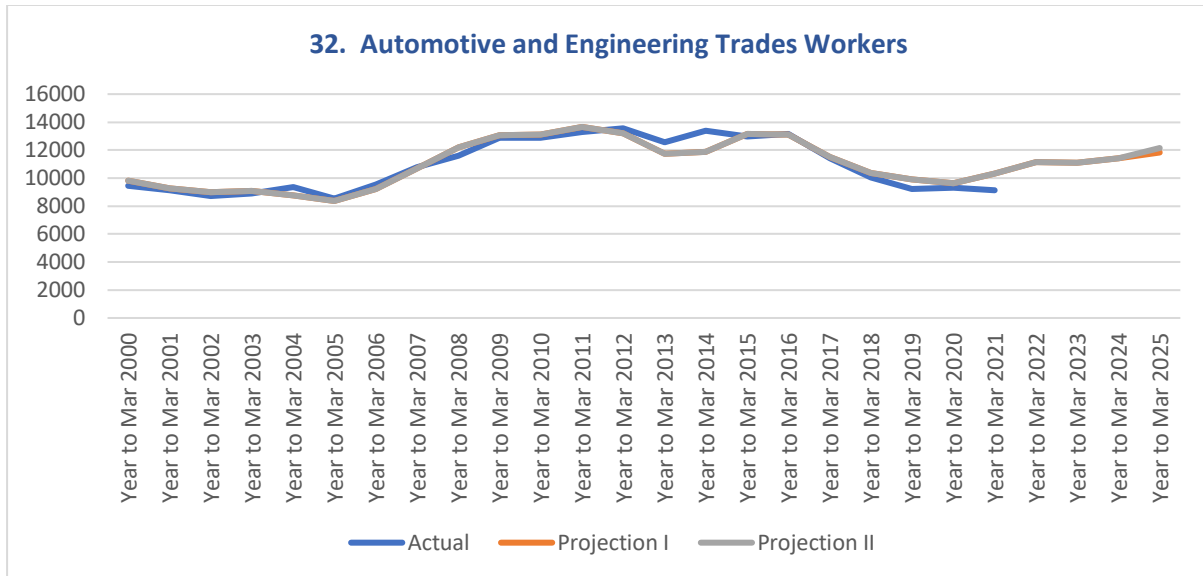
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.3: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Engineering, ICT and Science Technicians



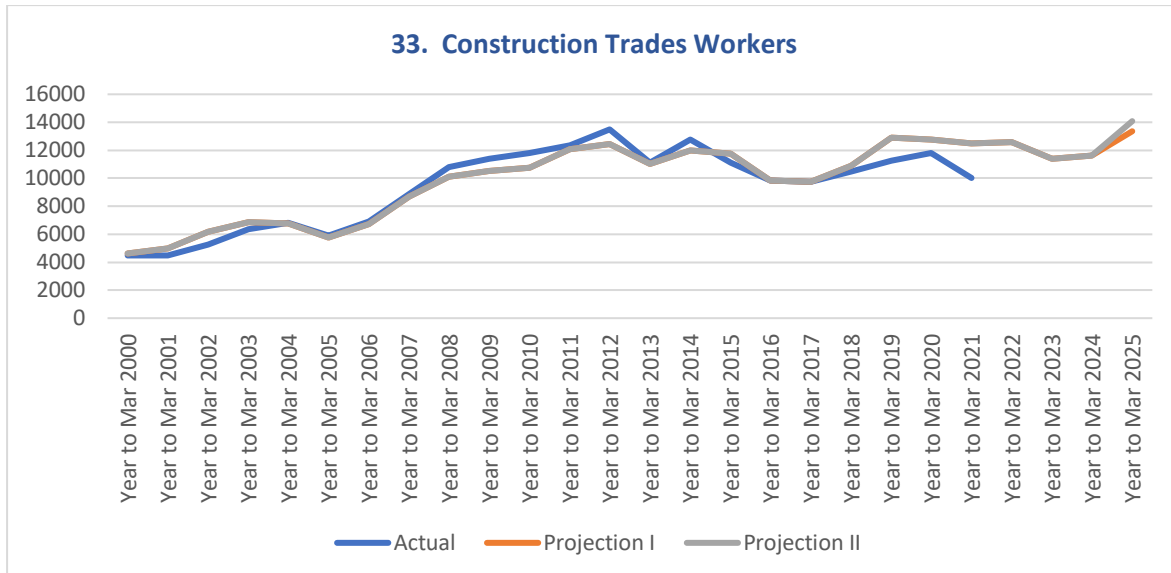
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.4: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Automotive and Engineering Trades Workers



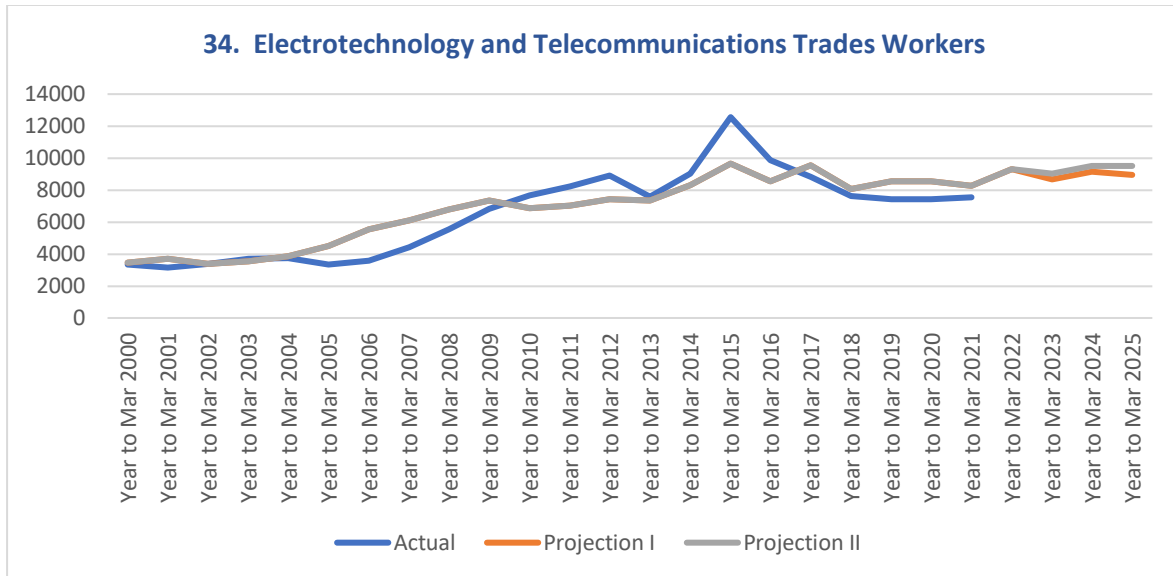
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.5: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Construction Trades Workers



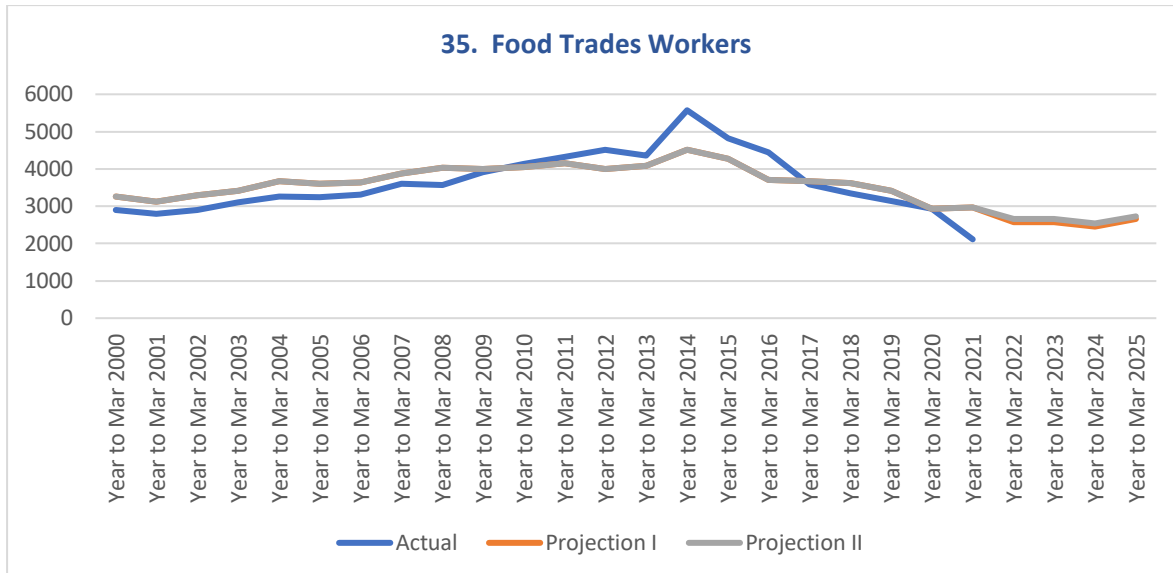
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.6: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Electrotechnology and Telecommunications Trades Workers



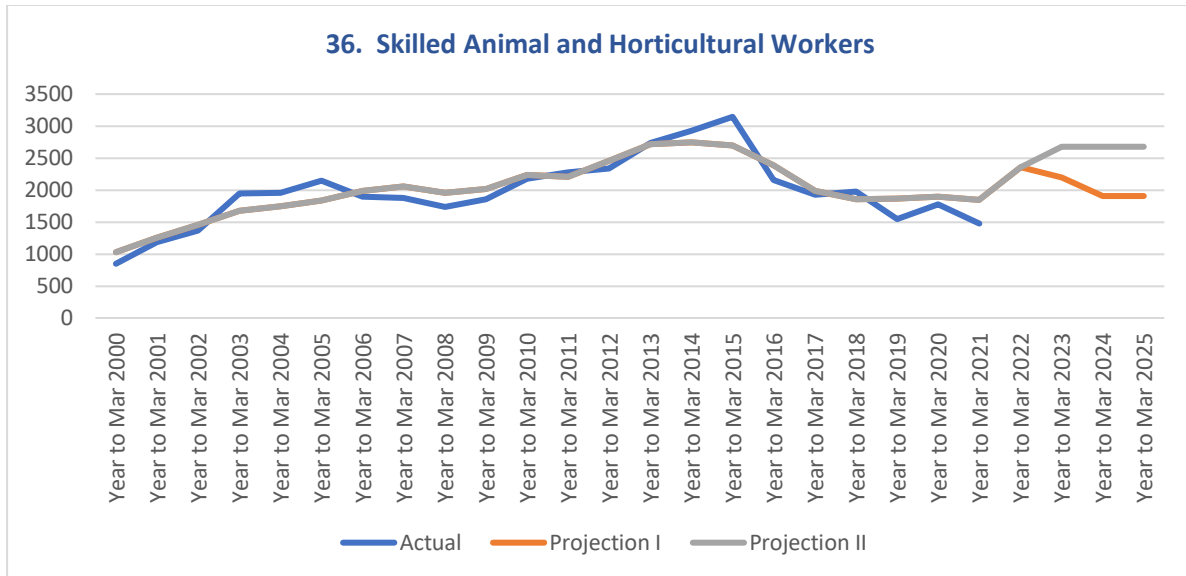
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.7: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Food Trades Workers



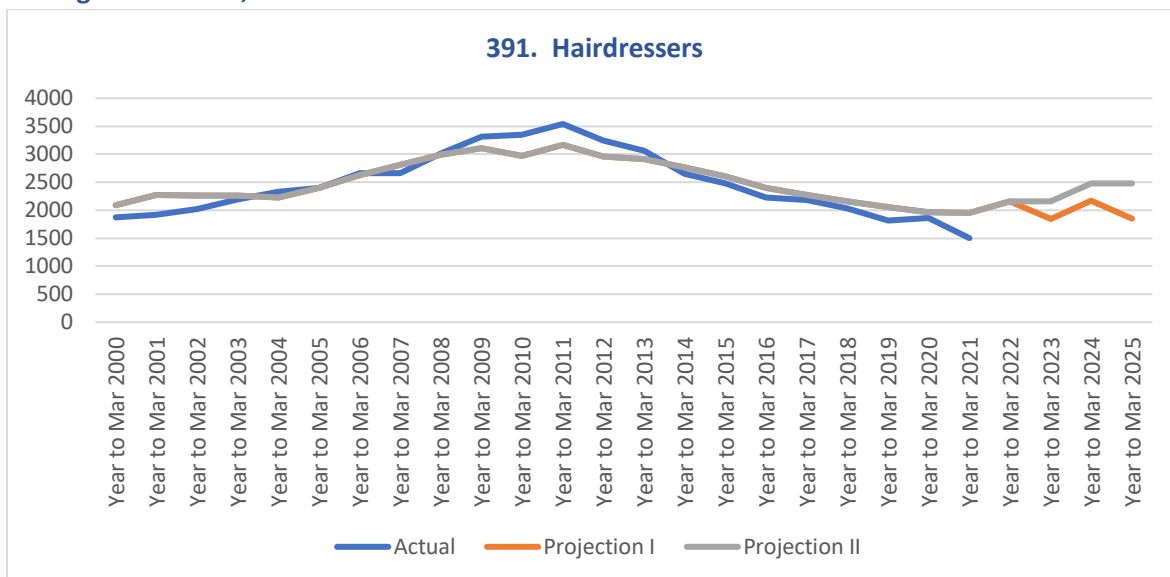
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.8: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Skilled Animal and Horticultural Workers



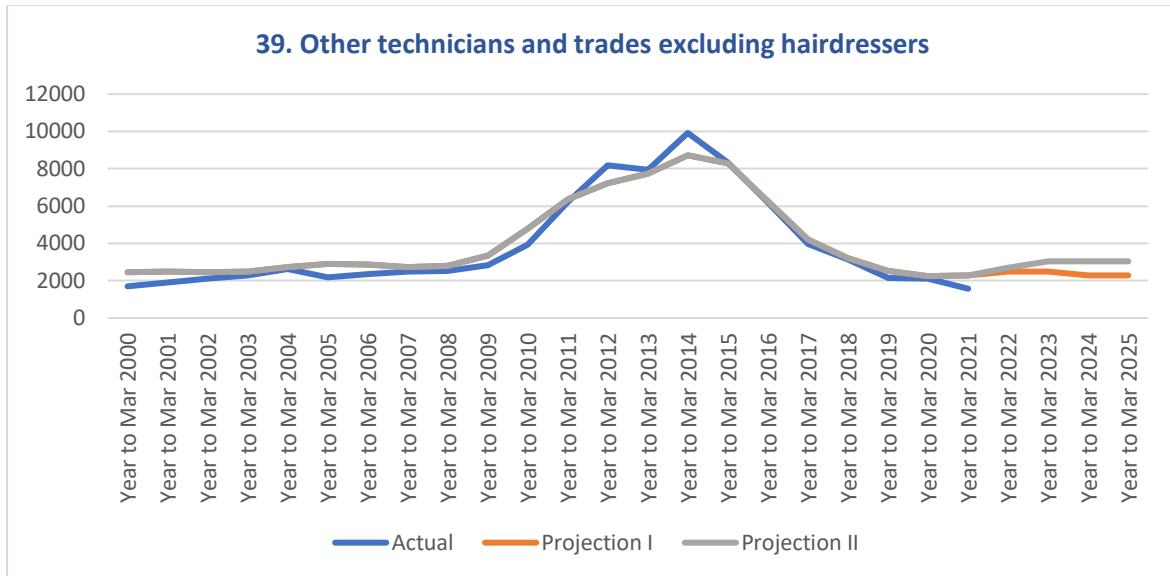
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.9: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, hairdressers



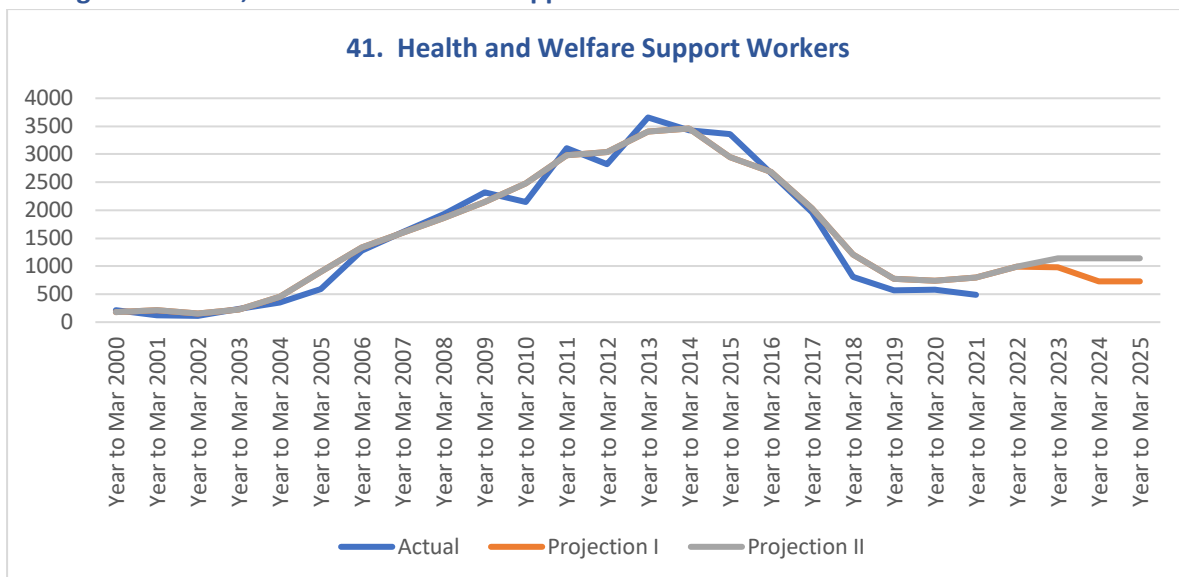
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.10: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Other Technicians and Trades excluding Hairdressers



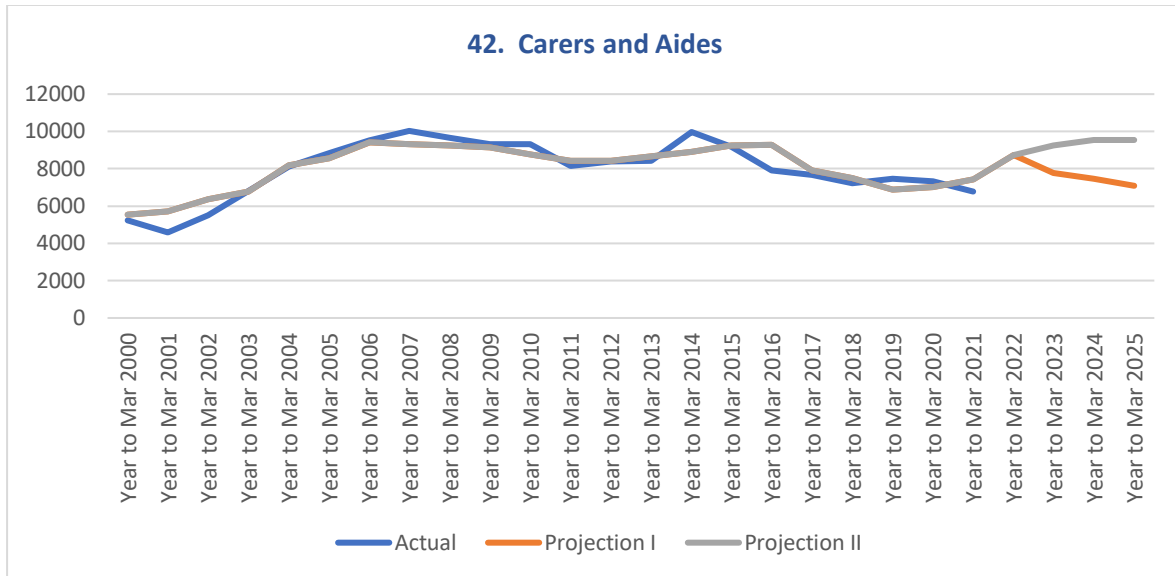
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.11: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Health and Welfare Support Workers



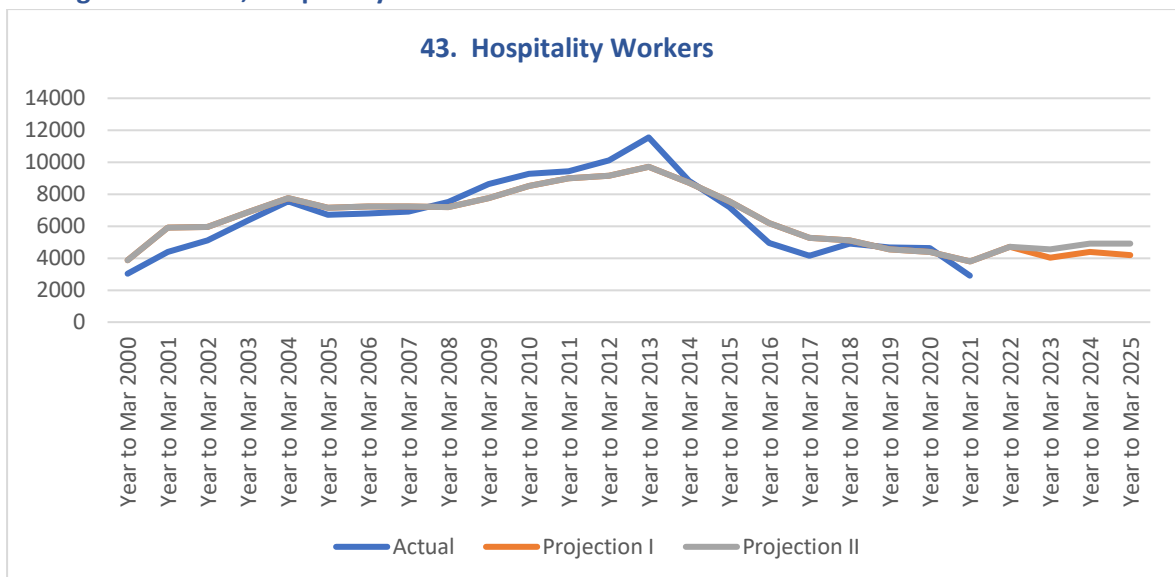
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.12: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Carers and Aides



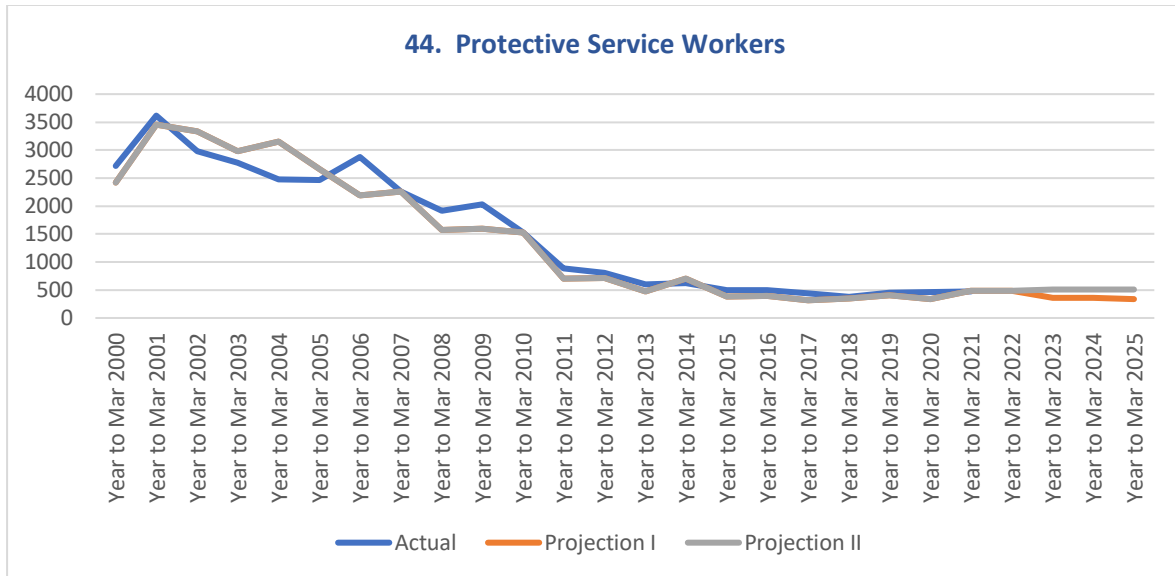
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.13: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Hospitality Workers



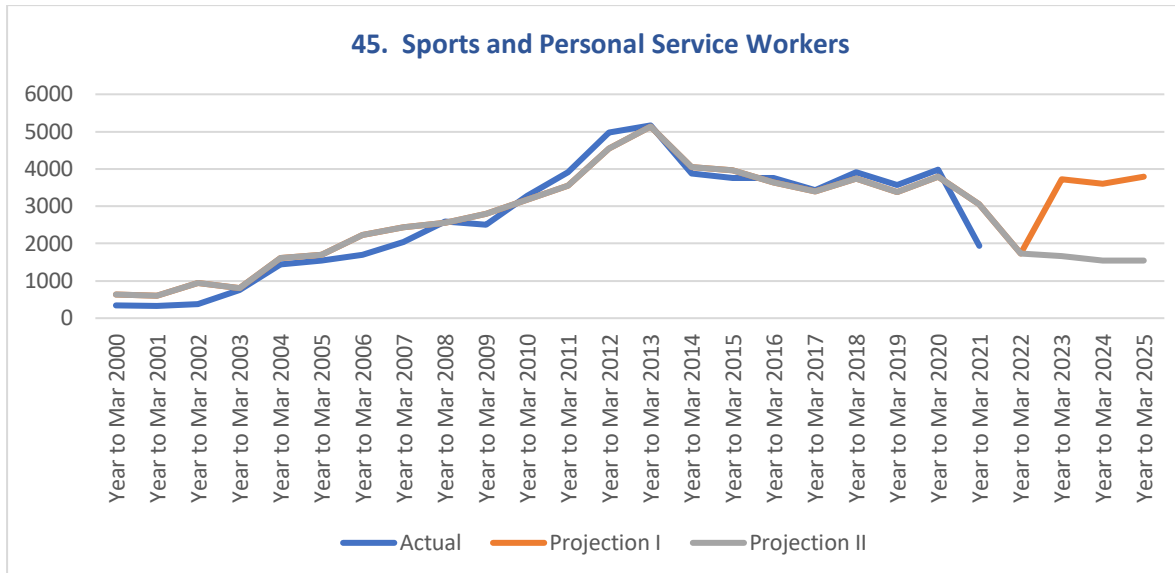
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.14: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Protective Service Workers



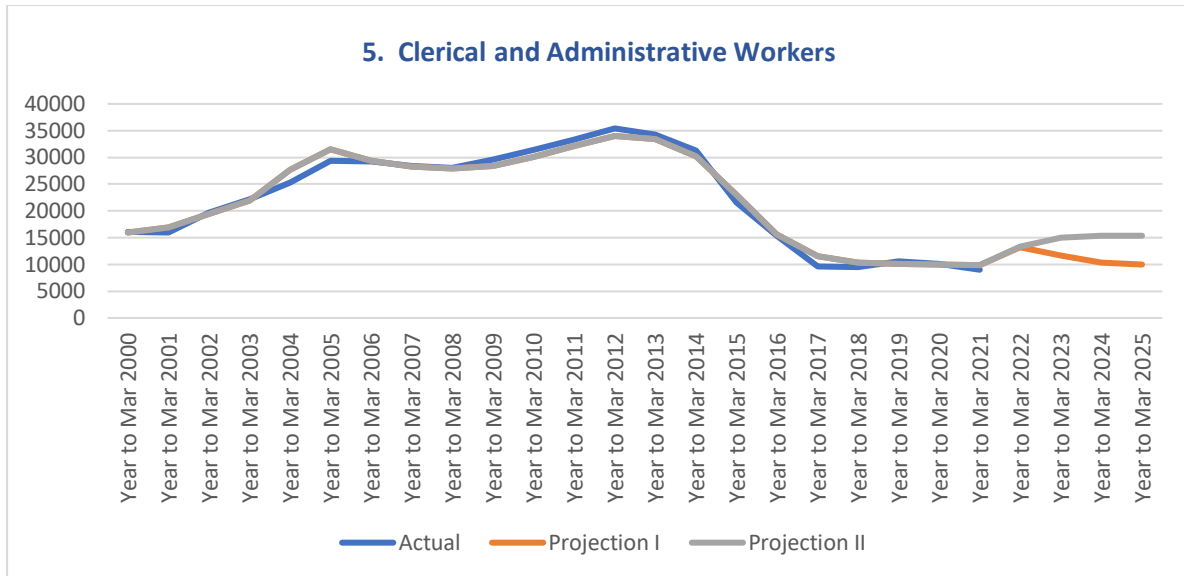
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.15: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Sports and Personal Service Workers



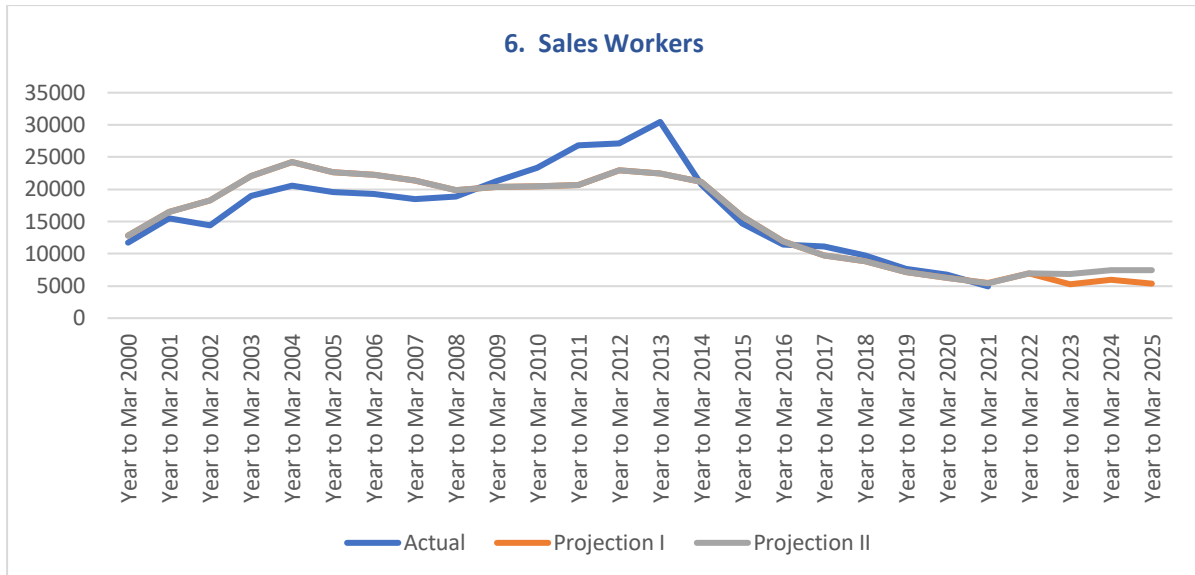
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.16: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Clerical and Administrative Workers



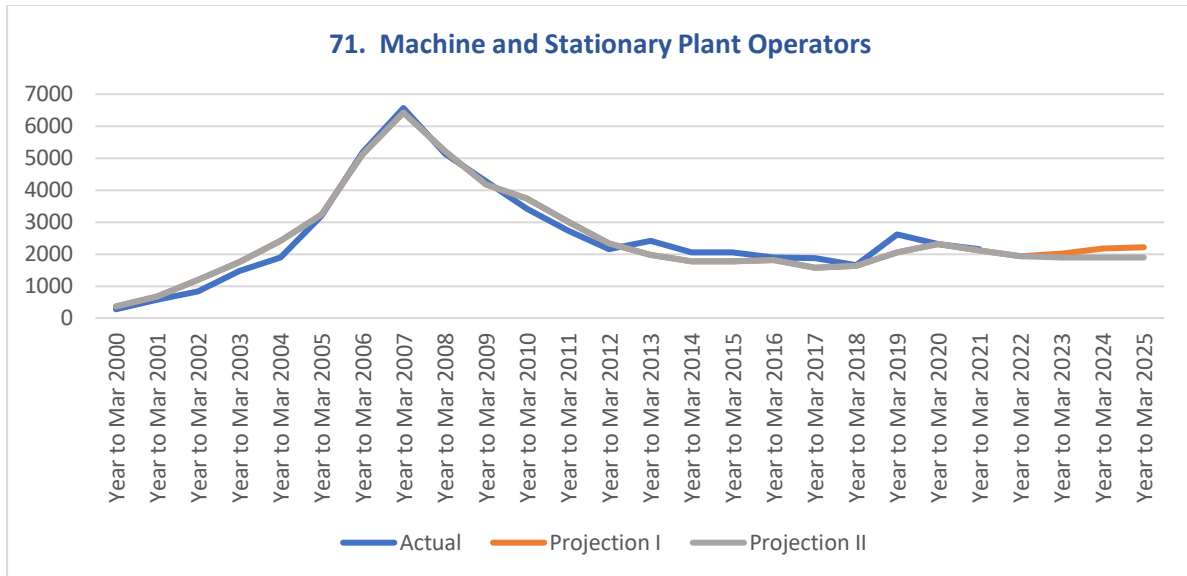
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.17: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Sales Workers



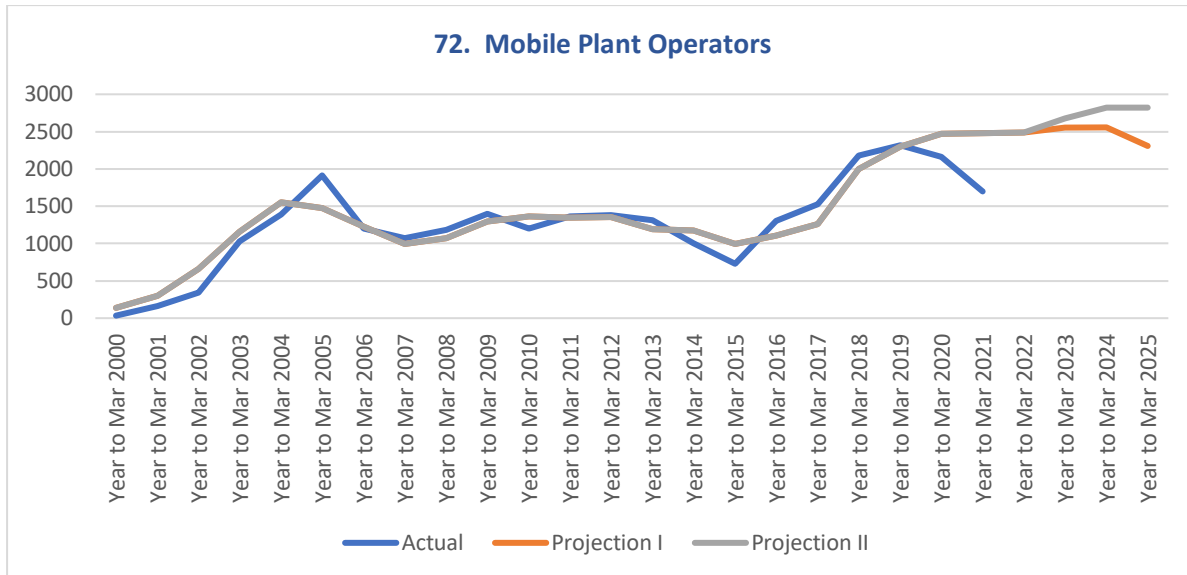
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.18: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Machine and Stationary Plant Operators



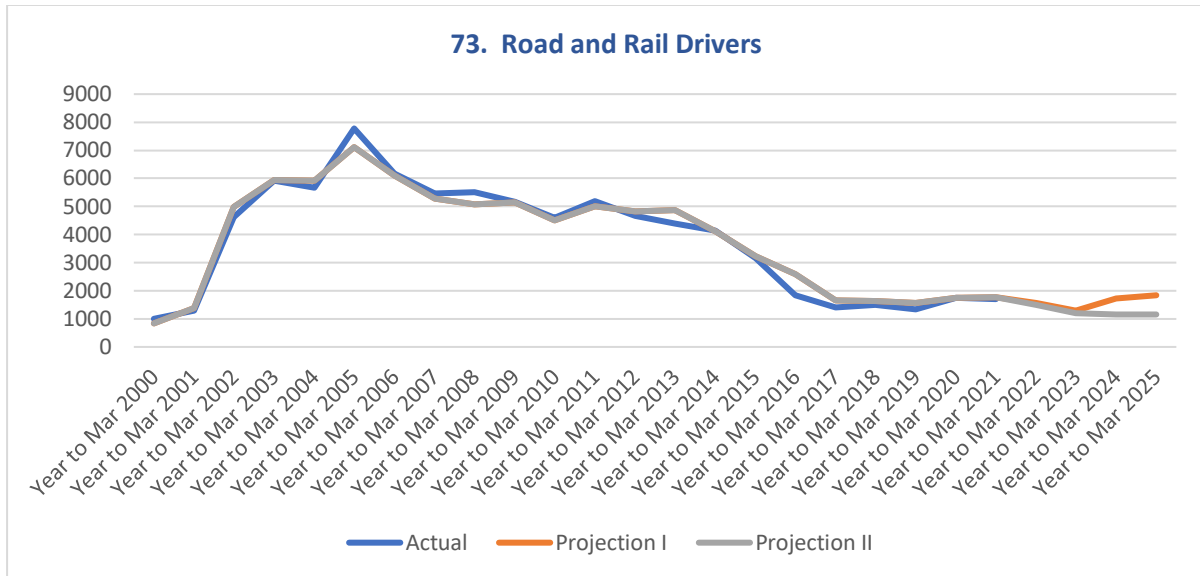
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.19: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Mobile Plant Operators



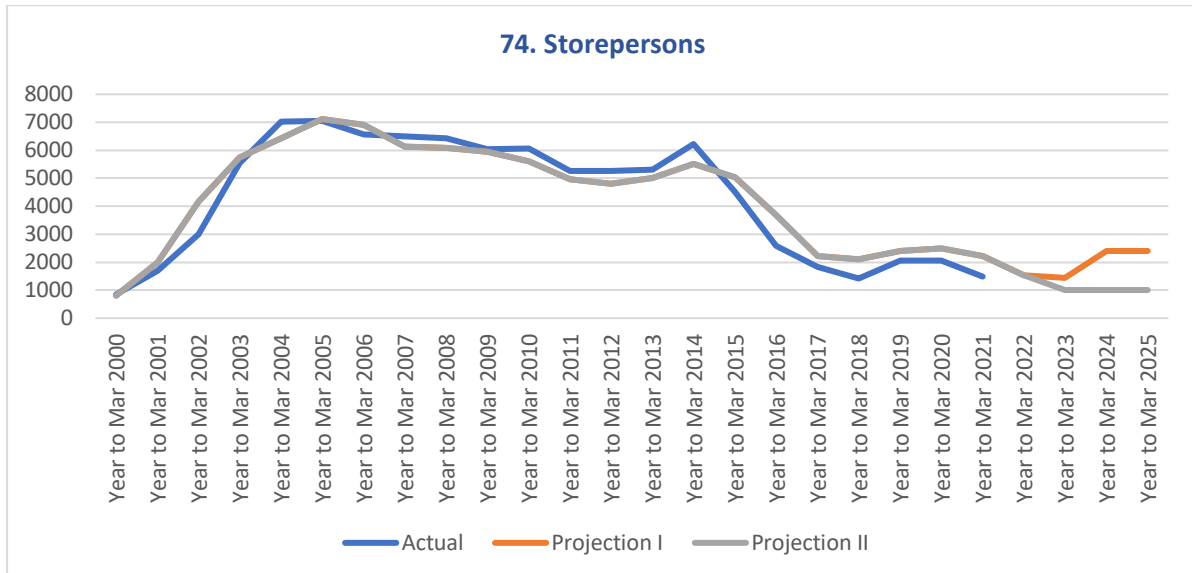
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.20: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Road and Rail Drivers



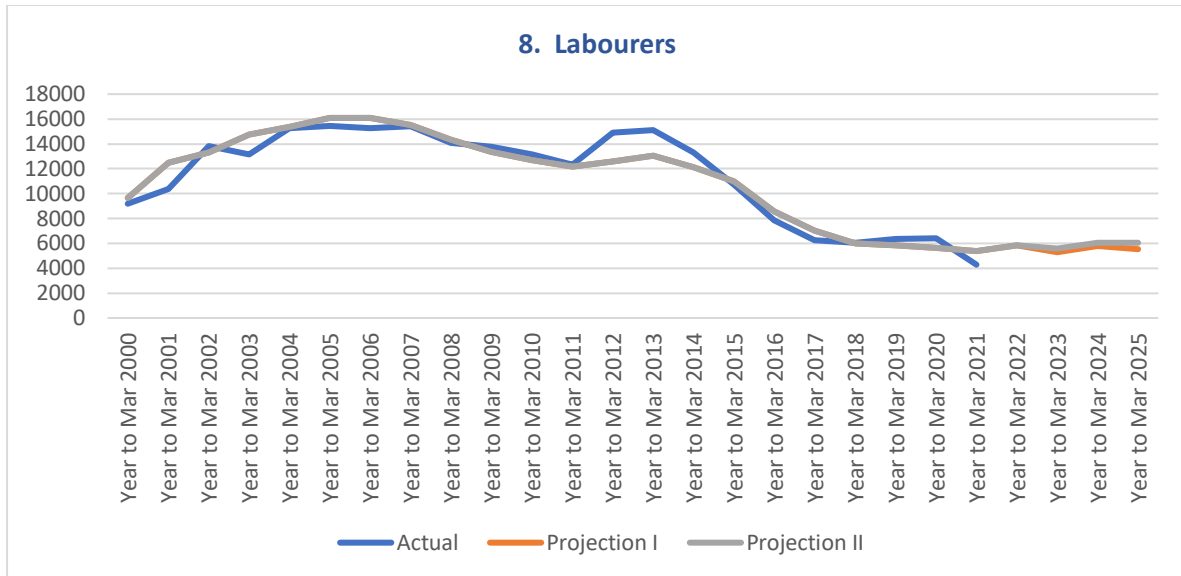
Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.21: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Storepersons



Source: derived from National Centre for Vocational Education Research (2021a)

Figure 7.22: Projections of annual completions of apprenticeships and traineeships to the 12 months ending March 2025, Labourers



Source: derived from National Centre for Vocational Education Research (2021a)

Before we discuss the above graphs we provide further information on the salience of the apprenticeship and traineeship system. In particular we are interested in the size of the flow of new graduates from the apprenticeship and traineeship system into the occupational labour market, and the importance of apprenticeship and traineeship graduates relative to the overall number of graduates from the VET sector. This enables us to form a judgment about the importance of the apprenticeship and traineeship system in respect of occupational labour markets. It also allows us to comment on whether the changes in the number of commencements in apprenticeships and traineeships are material in the overall scheme of skills acquisition in occupational labour markets.

Table 4: Relative size of apprentice and trainee completions

	Total employed, May 2019 ('000)	A&T completions, year to March 2019	Apprentice and trainee completions as % of employed	Completions of apprentice and trainee undertaking off-the-job training as % of VET completions 2018, TVA data	A&T completions (12 months ending March 2019) as proportion of 2018 TVA completions
Managers	1531.0	1281	0.1	2.4	2.8
Professionals	3133.7	276	0.0	0.3	0.4
Engineering, ICT and Science Technicians	264.8	1518	0.6	4.4	5.4
Automotive and Engineering Trades Workers	363.6	9236	2.5	38.5	56.2
Construction Trades Workers	405.9	11256	2.8	39.8	50.8
Electrotechnology and Telecommunications Trades Workers	242.0	7424	3.1	50.0	63.6
Food Trades Workers	192.4	3134	1.6	18.3	19.5
Skilled Animal and Horticultural Workers	132.5	1542	1.2	9.4	11.4
3911 Hairdressers	77.7	1811	2.3	44.1	57.3
Other technicians excl hairdressers	137.0	2145	1.6	6.4	8.1
Health and Welfare Support Workers	145.5	564	0.4	1.2	1.1
Carers and Aides	570.2	7479	1.3	8.3	8.7
Hospitality Workers	312.5	4655	1.5	14.7	18.4
Protective Service Officers	159.2	450	0.3	0.6	1.8
Sports and personal Service Workers	240.4	3576	1.5	7.1	8.3
Clerical and Administrative Workers	1757.3	10589	0.6	7.1	8.4
Sales Workers	1110.5	7670	0.7	26.8	28.4
Machine and Stationary Plant Operators	179.2	2604	1.5	21.1	33.5
Mobile Plant Operators	171.6	2317	1.3	17.1	20.3
Road and Rail Drivers	410.9	1332	0.3	23.2	23.6
Storepersons	141.8	2068	1.5	30.8	34.2
Labourers	1241.3	6371	0.5	7.3	8.7
Total	12921.1	89298	0.7	10.0	12.1

Source: derived from Australian Bureau of Statistics (2021), National Centre for Vocational Education Research (2021a and b))

From this table we see that the apprenticeship and traineeship system is not uniformly important across these occupational groupings. The simplest way to make sense of this is to rank occupations by the contribution that the apprenticeship and traineeship system makes to the training output of VET. Such a ranking is provided in the Table 5.

Table 5: Relative size of apprentice and trainee completions, sorted by contribution to VET awards in an occupation

	Total employed, May 2019 ('000)	A&T completions, year to March 2019	Apprentice and trainee completions as % of employed	Completions of apprentice and trainee undertaking off-the-job training as % of VET completions 2018, TVA data	A&T completions (12 months ending March 2019) as proportion of 2018 TVA completions
Electrotechnology and Telecommunications Trades Workers	242	7424	3.1	50	63.6
3911 Hairdressers	77.7	1811	2.3	44.1	57.3
Automotive and Engineering Trades Workers	363.6	9236	2.5	38.5	56.2
Construction Trades Workers	405.9	11256	2.8	39.8	50.8
Storepersons	141.8	2068	1.5	30.8	34.2
Machine and Stationary Plant Operators	179.2	2604	1.5	21.1	33.5
Sales Workers	1110.5	7670	0.7	26.8	28.4
Road and Rail Drivers	410.9	1332	0.3	23.2	23.6
Mobile Plant Operators	171.6	2317	1.3	17.1	20.3
Food Trades Workers	192.4	3134	1.6	18.3	19.5
Hospitality Workers	312.5	4655	1.5	14.7	18.4
Skilled Animal and Horticultural Workers	132.5	1542	1.2	9.4	11.4
Carers and Aides	570.2	7479	1.3	8.3	8.7
Labourers	1241.3	6371	0.5	7.3	8.7
Clerical and Administrative Workers	1757.3	10589	0.6	7.1	8.4
Sports and personal Service Workers	240.4	3576	1.5	7.1	8.3
Other technicians excl hairdressers	137	2145	1.6	6.4	8.1
Engineering, ICT and Science Technicians	264.8	1518	0.6	4.4	5.4
Managers	1531	1281	0.1	2.4	2.8
Protective Service Officers	159.2	450	0.3	0.6	1.8
Health and Welfare Support Workers	145.5	564	0.4	1.2	1.1
Professionals	3133.7	276	0	0.3	0.4
Total	12921.1	89298	0.7	10	12.1

Source: derived from Australian Bureau of Statistics (2021), National Centre for Vocational Education Research (2021a and b))

We undertake a rough characterisation by considering the contribution of apprenticeship and traineeship completions to the total awards from VET in the relevant occupation. This suggests that we can divide occupations as follows:

Occupations in which apprenticeships and traineeships dominate the graduates from the VET sector and are clearly important for the skills renewal of the occupation. This is defined as being greater than 50 per cent of VET awards in the occupation. The occupations in this group are all trades: automotive and engineering, construction, electrotechnology and hairdressers. We note that in each of these occupations the apprenticeship and traineeship completions represent at least 2 per cent of the employment in that occupation.

The second group are occupations in which apprenticeships and traineeships do not dominate the graduates from the VET sector but provide a substantial contribution. This is defined as between 15 per cent and 50 per cent of VET awards in the relevant occupation. The occupations in this group are: food trades, hospitality, sales, machine and stationary plant operators, mobile plant operators, road and rail drivers and storepersons. We note that in most of these occupations apprenticeship and traineeship completions form more than 1.2 per cent of employment in that occupation. The exceptions are sales (0.7 per cent) and road and rail drivers (0.3 per cent), suggesting that the training system is not so important for these occupations.

The third group are occupations in which apprenticeships and traineeships make a small but noticeable contribution to graduates from the VET sector. This is defined as greater than 5 per cent (but less than 15 per cent) of VET awards. The occupations in this group are engineering, ICT and science technicians, skilled animal and horticultural workers, other technicians (excluding hairdressers), carers and aides, sports and personal service workers. We note that the apprenticeship and traineeship system contributes low percentages of completions relative to total employment in three of these occupations, notably labourers (0.5 per cent), clerical and administrative workers (0.6 per cent) and engineering ICT and science technicians (0.6 per cent).

The final group are occupations in which the apprenticeships and traineeships make a trivial contribution to the skills pool of the relevant occupation. We define this as contributing less than 5 per cent of VET awards in that occupation. The occupations in this group are managers, professionals, protective service workers and health and welfare support workers. In each of these occupations, the apprenticeship and traineeship system completions represent less than 0.4 per cent of employment in the occupation.

We now make a number of observations concerning our projections of completions. The first is that there have been very large changes in the number of completions over the last twenty years. These are not random fluctuations but significant structural changes; in many occupations the apprenticeship and traineeship system is training far fewer people than has been the case in earlier periods. The timing of these declines is quite varied. For example, the peak of completions for storepersons was in 2004, and we have observed significant declines from 2014. Road and rail drivers is another occupation which has seen a long term decline from 2005. The majority of occupations have seen declines, with very few exceptions. A notable exception is construction.

A second observation is that our projections of completions does not continue in general the long term decline. That is, the recent increase in commencements should arrest the long-term decline and this is especially the case if the recent levels of commencements are maintained.

A third observation is that our model 'over predicts' 2021 completion numbers in many of the occupations (noting that the model is fitted on completion data up to 2020). This suggests two possibilities. The first is that our models have estimated completion rates which are a little high. The second is that the NCVER data on completions, which is based on an estimate of how quickly the data are reported, will be revised upward in due course.

Rather than provide a blow by blow discussion of the projections for each occupation we compile a summary table which provides the peak number of completions for each occupation, 2019 levels and the two projection for 2025. The intention here is to give a snapshot of the long term structural changes as well as likely movements over the next few years.

Table 6: Apprentice and Trainee Completions- trends and projections (12 months to March quarter)

	Peak year	Peak number	2019	2019 as % of peak	Projection I as % of 2019	Projection II as % of 2019
1 Managers	2013	16010	1505	9.4	74.2	186.6
2 Professionals	2009	3054	264	8.6	122.3	347.9
31 Engineering, ICT and Science Technicians	2014	4264	1313	30.8	102.9	180.2
32 Automotive and Engineering Trades Workers	2011	13654	9897	72.5	119.3	122.7
33 Construction Trades Workers	2019	12896	12896	100.0	103.6	109.2
34 Electrotechnology and Telecommunications Trades Workers	2015	9654	8564	88.7	104.5	111.0
35 Food Trades Workers	2014	4514	3406	75.4	77.8	80.3
36 Skilled Animal and Horticultural Workers	2014	2746	1865	67.9	102.4	143.8
391 Hairdressers	2011	3168	2050	64.7	90.0	120.9
39 Other technicians and trades excluding hairdressers	2014	8720	2507	28.8	90.5	121.2
41 Health and Welfare Support Workers	2014	3460	778	22.5	93.4	146.6
42 Carers and Aides	2006	9412	6894	73.3	102.6	138.4
43 Hospitality Workers	2013	9714	4566	47.0	92.0	107.5
44 Protective Service Workers	2001	3455	409	11.8	83.1	125.0
45 Sports and Personal Service Workers	2013	5134	3381	65.9	112.1	45.5
5 Clerical and Administrative Workers	2012	34000	10111	29.7	99.2	151.5
6 Sales Workers	2004	24229	7134	29.4	75.3	104.9
71 Machine and Stationary Plant Operators	2007	6422	2059	32.1	107.0	91.4
72 Mobile Plant Operators	2020	2468	2295	93.0	100.5	122.9
73 Road and Rail Drivers	2005	7112	1577	22.2	116.7	73.4
74 Storepersons	2005	7114	2411	33.9	99.7	41.5
8 Labourers	2006	16088	5825	36.2	95.4	104.1

Source: derived from National Centre for Vocational Education Research (2021a)

From the table it is easy to see the overall picture. Numbers of completions in recent years are far below peaks which occurred at different years over the last twenty. There are only a few occupations where 2019 levels had the same order of magnitude as the peaks, notably construction trades, electrotechnology and telecommunications trades workers, food trades and mobile plant operators. We observe a number of occupations where the attempt to make the apprenticeship and traineeship system an important part of the skills formation process has clearly failed or been abandoned, notably managers, professionals, protective service workers in which 2019 levels are around 10 per cent of less of peak levels. There are numerous occupations where 2019 levels are 20-30 per cent of peak levels; engineering, ICT and science technicians, other technicians and trades excluding hairdressers, health and welfare support workers, clerical and administrative workers, sales workers, machine and stationary plant operators, road and rail drivers, storepersons, and labourers.

We also see that the projections, which are based on recent year commencements and assumptions about continuation at these levels, in general suggest that there is no particular reason to be concerned about the apprenticeship and traineeship system. The only occupations where we expect the 2025 levels to be less than those in 2019 are the food trades irrespective as to whether the commencements return to 2019 levels or say at the 2021 levels, and sports and personal service workers if the decline in commencements seen in 2021 continues. Note that neither of these occupations fall in the category of occupations where the apprenticeship and traineeship system is a dominant source of graduates (the food trades are in the 'substantial but not dominant' category and sports and personal service workers are in the 'small but noticeable' category). Overall, the projections suggest that the policies introduced

by governments to address COVID-19 have more than achieved maintenance of the apprenticeship and traineeship system, with only a couple of exceptions in occupations which do not rely that much on the output of the system.

4 Final comments

The purpose of this paper was to look at the apprenticeship and traineeship system in the time of COVID-19. Governments moved very quickly in 2020 to introduce programs to underpin the system, at a time in which the labour market was in turmoil. Subsequent increases in the level of commencements support the notion that the policies were broadly successful.

However, the story is a little more complicated, and it is necessary to delve into occupational level data to understand what has occurred. To this end we constructed a 22 level occupational classification. In terms of commencements, we saw increases between the 12 months ending March 2019 (to represent the pre-COVID-19 situation) and the corresponding period two years later. In many occupations a serious decline in the first year was more than offset by increases in the next. In particular, commencement numbers were unseasonably high in the December quarter 2020, and seasonably high in the March quarter 2021. There were though, a small number of occupations which saw overall declines over those two years: sports and service workers (down 59.4 per cent), storepersons (down 58.3 per cent), road and rail drivers (down 37.1 per cent) and machine and stationary plant operators (down 14.5 per cent).

One of the side effects, which one could suggest was not intended, was an increase in commencements in a number of occupations for which perhaps COVID-19 offered little threat. In this context we saw very large increases in commencements among numerous occupations. Commencements increased by more than 100 per cent among managers and professionals, and by more than 50 per cent among health and welfare support workers, engineering, ICT and science technicians, protective service workers and clerical and administrative workers. It is unlikely that this was intended and perhaps suggests that the government programs had a significant dead weight loss, with payments welcomed by employers but not necessarily increasing the level of training where it was needed.

Commencements are a leading indicator of what is happening in apprenticeships and traineeships, but it is completions that indicate the level of skills formation. To investigate what is likely to occur over the next few years in this regard we modelled the level of completions as an outcome of commencement levels, taking into account the lags in the system (most apprenticeships take 3-4 years while traineeships take 1-2 years). Not surprisingly, given our observation that commencements had increased, our projections suggest that there is no reason to be worried about the numbers of completions in coming years. However, to interpret our projections in a more considered way we focussed on two aspects of the system.

The first is that the apprenticeship and traineeship system plays a very variable role in the overall level of skills formation. Only in a few trade occupations does it play a dominant role. In others, it plays a minor but substantive role, with the number of graduates from 'non-apprentice and trainee' VET significantly more important. And in others it plays a trivial role.

The second aspect is that the apprenticeship and traineeship system has evolved in a way which has seen the numbers of apprentices and trainees suffer very significant decline over a long period. So, we see managers, professionals, protective service workers in which 2019 levels of completions are around 10 per cent of less of peak levels. There are numerous occupations where 2019 levels are 20-30 per cent of peak levels; engineering, ICT and science technicians, other technicians and trades excluding

hairdressers, health and welfare support workers, clerical and administrative workers, sales workers, machine and stationary plant operators, road and rail drivers, storepersons and labourers. These declines reflect a range of factors including a removal of government incentives for existing workers in some occupations (around 2012-13), the increasing importance of higher education and structural change in the labour market. By contrast, the system has been maintained or even expanded in a small number of occupations, namely construction trades, electrotechnology and telecommunications trades workers, food trades and mobile plant operators.

One of the implications of this is that support for the apprenticeship and traineeship system is very important for the skills formation in a small number of occupations, but less so more generally. This opens up the likelihood that much of the expenditure of the apprentice and trainee focussed COVID-19 programs is not really doing much for overall skills formation. But on a positive note, at least we do not need to worry about the impact of COVID-19 on the skills formation of those occupations where the apprenticeship and traineeship system is dominant, namely automotive and engineering, construction, electrotechnology and hairdressers.

The analysis, though, does raise some broader structural issues. The first is that the apprenticeship and traineeship system is a bit 'all over the place' in the sense that it comprises a core around the trades where it is a vital part of the skills formation system, and the remainder where it plays a small and sometimes trivial role in comparison to the broader VET sector and higher education. For example, trainees in professional and managerial occupations play an insignificant role in comparison to graduates from higher education. The implication is that significant subsidies are going to traineeships which are not playing a very important role in skills formation. There is little doubt that employers do react to incentives, but incentives will be wasteful when they drive behaviour which is not significantly contributing to the skill formation needs of the economy.

A second issue is that arguably apprenticeships and traineeships attract too much attention from government, in that there is a perception that they are the foundation of skills formation more generally. For example, we saw recent headlines trumpeting a boom in training.³ But we have shown that apprenticeships and traineeships play a very minor role in most occupations. There is a considerable risk that the non-apprenticeship/traineeship sector of VET is being neglected at the expense of the apprenticeship and traineeship system. Indeed, an obvious extension of this paper is to look at how VET has responded to COVID-19 and whether we face potential skill shortages in non-trade occupations. An obvious example is health and care occupations where obtaining practicums for students has been very difficult, directly because of COVID-19.

It should be noted that there is a gender dimension to this story. The trades, apart from the food trades and hairdressing, are male dominated. Therefore, concentration on the trades at the expense of other occupations will favour men relative to women.

From the point of view of the VET sector, it cannot be healthy to concentrate so much attention on apprenticeships and traineeships. Policy makers need to recognise that apprenticeships and traineeships, as important as they are in some trades, constitute a relatively small amount of VET effort, and that it is a mistake to think that increasing numbers of apprenticeships and traineeships will solve Australia's skills formation challenges.

³ Hon Stuart Robert MP media release 19 November 2021: "With the economy firing again, hundreds of thousands of jobs available and billions of dollars of skills funding on the table this is a once in a generation opportunity for Aussies to get into a career that will last a lifetime". (<https://ministers.dese.gov.au/robert/morrison-governments-record-funding-skills-and-training-delivers-trade-apprentices-highest>)

Perhaps it is time to reassess the apprenticeship and traineeship system against the broader framework of middle level skills formation which is the *raison d'être* of Vocational Education and Training. It could be argued that VET has a limited future if it is characterised as an apprenticeship system. We also need to recognise that higher education is a mass education system now, and this impinges on the higher level VET qualifications. We also need to be aware that the immigration has taken a battering, and this will impact on skill shortages. The output of the VET sector will be even more critical in coming years. We need to think beyond apprenticeships and traineeships and provide vocational training which will address skill shortages more broadly.

5 References

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