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Is it 'dog days' for the young in the Australian labour market?[1]

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Abstract

The decade after the Global Financial Crisis (GFC) saw a substantial deterioration in employment outcomes for the young (aged 15 to 24 years) in Australia. From 2008 to 2019 their employment/population rate decreased by 4.3 percentage points, whereas the rate for the population aged 25 years and above increased by 1 percentage point. We argue that the major cause of the deterioration was the young being 'crowded out' from employment due to an increase in labour market competition. Adjustment to increased competition for the young also involved: being more likely to be employed part-time; being more likely to be long-term unemployed; starting their work careers in lower quality jobs; and needing increasingly to compete for jobs through activities such as unpaid internships.

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[1] The reference to 'dog days' is from Garnaut (2013).

1. Introduction

In the decade after the Global Financial Crisis (GFC) employment outcomes for the young in Australia worsened substantially relative to other age groups. Figure 1 shows annual data on the cumulative change in the employment/population (EMP/POP) rate for young (15-24 years), prime age (25-54 years) and older (55 years plus) workers, compared to 1993. The deteriorating labour market situation for the young post-GFC is immediately apparent. From 2008 to 2019 their EMP/POP rate decreased by 4.3 percentage points, whereas the rates for persons aged 25 to 54 years and 55 years and above increased by 1.1 and 4.1 percentage points respectively.

Our main contention is that worsening employment outcomes for the young in the decade following the GFC were caused primarily by increases in labour supply which have meant extra competition for jobs sought by the young, and resulted in them being 'crowded out' from employment. [2]

Poorer labour market outcomes for the young matter for several main reasons. First, the immediate well-being of the young is adversely affected by having lower income. Second, there is the danger of long-term scarring effects from entering the labour market at times when it is more difficult to get into work – with negative effects on future income and potential aggregate output.[3] Third, there may be spill-over effects from worsening employment outcomes for the young that have macro-economic implications – such as slowing the rate of adoption of new technologies (for example, Adao et al., 2020).

Our analysis starts by recognising that labour supply of the young is heterogeneous. Two main groups of young labour force participants are identified: first, full-time students who are mainly looking to work in part-time and relatively low-skill jobs; and

[2] For a previous episode where it has been argued that growth in labour supply of the young was the critical determinant of their employment outcomes, see Gregory and Duncan (1980).
[3] Andrews et al. (2020) present estimates of scarring effects for young graduates in Australia. Borland (2020a) reviews evidence on scarring effects in Australia; and for a survey of international evidence see von Wachter (2020).

second, those young people who are not attending education full-time (not studying or studying part-time) and looking for work commensurate with their education qualifications. Table 1 presents information on the distribution of young labour force participants between these groups. Full-time students who are employed part-time or looking to work part-time represent 37.2 per cent of total labour supply of the young. Those who are not attending education full-time are 60.7 per cent of labour supply. This latter group are predominantly (about two-thirds) working full-time or unemployed and looking for full-time work.

The next stage of our analysis is to describe the nature of competition faced by each group of young labour force participants, and how that competition increased in the decade following the GFC. We argue that this descriptive evidence is consistent with increases in competition (labour supply) making it more difficult for the young to obtain employment.

Young full-time students are shown to be concentrated in a subset of occupations in sales, hospitality and food preparation, where most competition comes from other young jobseekers. For this group, the main source of extra competition has been from rapid growth in international students and working holidaymakers in Australia.

Young people who are not attending education full-time exhibit more diversity in the types of jobs they are able to perform and are seeking – and hence competition is with labour force participants in prime age and older age groups with similar qualifications looking for the same type of job. Broad-based growth in labour supply – especially from the older population – has therefore been the main source of extra competition for the young who are not attending education full-time.

Other potential explanations for deteriorating employment outcomes for the young are also considered. One main alternative is business cycle conditions. Economic downturns always disproportionately adversely affect employment of the young. That is because the young are over-represented among jobseekers; and are having to make the transition into employment at a time when less new jobs are being created. The impact of business cycle conditions is relevant to the decade post-GFC since the growth

rate of aggregate employment slowed during this period. From 2008 to 2019 the average annual rate of growth in employment was 1.6 per cent; compared to 2.3 per cent from 1993 to 2008. [4] We show, however, that business cycle conditions are not sufficient to explain the deterioration in employment outcomes of the young. Nor are other potential explanations, such as changes in the industry or occupation composition of employment.

Our analysis concludes by describing other ways in which the young were affected by increased competition for jobs. Adjustment is also shown to have happened via the young: being more likely to be employed part-time; being more likely to be long-term unemployed; starting their work careers in lower quality jobs; and needing to compete for jobs through activities such as unpaid internships.

Worsening employment outcomes for the young in Australia in the decade following the GFC has been noted for some time (see for example, Rayner, 2016; Dhillon and Cassidy, 2018; Brotherhood of St. Laurence, 2018; Wood and Griffiths, 2019). Most recently, the Productivity Commission (2020) and de Fontenay et al. (2020) have explored why incomes of the young declined in the decade following the GFC. They find that the main explanation was a decrease in labour income, caused both by lower hours worked by and lower wages per hour paid to the young. Building on analysis in an earlier version of this paper, the Productivity Commission (2020) concludes that the decreases in hours worked and the hourly wage were due to an increasing imbalance between labour supply and labour demand. This imbalance is attributed mainly to slower economic growth after the GFC, with structural factors such as older workers delaying retirement also playing a role. The main consequences for the young are identified as a higher likelihood of working part-time and being forced to start their work careers lower on the occupation job quality ladder.

We make several important original contributions to the existing literature. First, we present a more detailed review of sources of increased labour market competition for the young. Second, we analyse the relative impact on employment outcomes of

[4] ABS, Labour Force Australia, catalogue no.6202.0, Table 1.

increased competition and business cycle influences. Third, we consider additional potential explanations for worsening labour market outcomes for the young post-GFC. Fourth, we undertake a comprehensive analysis of the ways in which labour market outcomes for the young have adjusted to increased competition.[5]

Our method for investigating employment outcomes for the young is descriptive – mainly assessing correlations between the timing of worsening employment outcomes for the young and changes in the set of potential explanations we examine. This approach has the major advantage that it allows us to encompass multiple perspectives on potential sources of increased labour market competition, on explanations for worsening employment outcomes for the young, and on how adjustment occurred. The trade-off is that we are not able to argue that we have identified a causal impact of increased labour supply that explains worsening employment outcomes for the young.[6]

In taking a descriptive approach, we rely mainly on aggregate-level data on labour market outcomes from the nationally representative Labour Force Survey conducted by the Australian Bureau of Statistics. Using this data source has the strength of making our analysis relevant to the entire Australian labour market; but sometimes imposes limitations on the level of detail with which labour market outcomes can be described.

Labour market outcomes of the young in Australia have received significant attention during the COVID-19 pandemic. With the onset of the virus, employment of the young fell dramatically, by 16.2 per cent from March to May 2020, compared to a decrease of 4.4 per cent for workers aged 25 years and above.[7] This happened because jobs held by the young are concentrated in industries most adversely affected by COVID-19 – such as accommodation and food services and arts and recreation services; and because a

[5] Another important difference between our study and Productivity Commission (2020) is the definition of young. We define the young population to be aged 15 to 24 years whereas the Productivity Commission include population aged 15 to 34 years.

[6] Studies for the United States by Mohnen (2019) and for Italy by Bertoni and Brunello (2020) use variation between local labour markets in (respectively) population aging and the effect of an increased official retirement age to identify the impact of increased labour supply from the older population on employment outcomes for the young.

[7] ABS, Labour Force Australia – Detailed, Table 01.

smaller proportion of young than older workers were eligible for the Job Keeper program due being more likely to work in short-term casual jobs (Borland and Charlton, 2020).[8] Our study does not examine how labour market outcomes for the young have been affected by COVID-19. We consider the decade prior to the pandemic; and the structural factor of increased competition that is the focus of our study is entirely separate from COVID-19. The influence of increased labour market competition will likely remain, even if recovery from COVID-19 was to completely undo its initial impact on the young.

The remainder of the paper is structured as follows. Section 2 presents the 'facts' on employment outcomes for the young in the decade following the GFC. Section 3 describes the labour market for the young – and identifies the two groups we focus on. Section 4 describes how labour market competition for the young has increased and the impact on their employment outcomes. Section 5 considers alternative potential explanations for deteriorating employment outcomes for the young. Section 6 lays out the channels through which adjustment to being crowded out of employment has occurred for the young. Section 7 presents concluding remarks.

2. Employment outcomes for the young 2008-19

In this section we summarise the main 'facts' on employment outcomes for the young in Australia following the GFC:

1] Employment outcomes for the young deteriorated substantially in the decade following the GFC – both in absolute terms and relative to older age groups.

Table 2 presents changes in the EMP/POP rate and annual hours of work per capita for young, prime-age and older workers for periods prior to and after the GFC.[9] First,

[8] Recovery, however, has brought stronger bounce-back in employment of the young than for older workers. By April 2021 the EMP/POP rate of the young had recovered to be at the same level as prior to COVID-19, similar to prime age and older age groups (ABS, Labour Force Australia, Tables 1, 13, 15).

[9] The starting year of 1993 coincides with an increasing EMP/POP rate for all age groups following the recession of the late 1980s/early 1990s.

looking just at the post-GFC period, it is evident that outcomes for the young deteriorated, both in absolute terms and relative to other age groups.[10] Second, comparing between the time periods shows how outcomes in the post-GFC period have departed from the prior trend for each age group. For all age groups, growth in the EMP/POP rate slowed or reversed following the GFC. But there was considerable variation between age groups in the extent of the shift. For the young, the average annual change in the EMP/POP rate was lower by 0.98 ppt after the GFC than before; whereas for those aged 25 years and above that decrease was only 0.39 ppt per year. Changes in average annual hours of work per person show a similar story. The slow-down in growth in hours per capita between the time periods prior to and after the GFC was 16.4 hours per year for the young, compared to only 10.5 hours for persons aged 25 years and above.[11]

2] The deterioration in employment outcomes for the young was pervasive - affecting males and females; sub-groups aged 15 to 19 years and 20 to 24 years; those in and not in full-time education; and with different levels of education attainment.

Figures 2a to 2d present information on changes in the EMP/POP rate for the young – disaggregated by gender, age, education attendance status and education attainment. The decrease in the EMP/POP rate for the young from 2008 to 2019 (August) was slightly larger for males than females (4.7 ppts compared to 3.2 ppts); almost identical for sub-groups aged 15-19 and 20-24 years (5.0 ppts and 4.9 ppts); larger for those not studying full-time than those in full-time education (3.4 ppts compared to 0.7 ppts); and larger for those whose highest education attainment is below Bachelor level (1.5 ppts

[10] Table 2 may appear at first sight to contain an error – that the change in the EMP/POP rate for the population aged 25 years plus does not lie between the changes for the sub-groups aged 25 to 54 years and 55 years plus. This is explained by compositional change – specifically, by a change in the shares of population aged 25 years plus accounted for by each sub-group. Over the sample period the share accounted for by the group aged 55 years plus has increased – and this group has a lower EMP/POP rate than for the group aged 25 to 54 years. This compositional change causes the EMP/POP rate for the whole group aged 25 years plus to be lower than for either of the sub-groups. A similar issue arises in interpreting Figures 2b and 2c.

[11] Appendix Figure 1 shows annual data on average annual hours from 1991 onwards for each age group.

for Bachelor degree graduates, 8.6 ppts for those with a Certificate/Diploma and 3.3 ppts for those with high school completion or below).

3] The deterioration in employment outcomes for the young post-GFC is an experience Australia has shared with other developed countries. Where Australia differs is in the weakness of recovery from that decline.

Figure 3 shows the EMP/POP rate for the young for selected developed countries. A sharp decline in the EMP/POP rate post-GFC is common to all countries (although for some, such as the United States and Great Britain, that decline was underway prior to the GFC). What is notable about Australia is the weakness of subsequent recovery. Whereas the EMP/POP rate for the young in Australia in 2019 was still over 4 ppts below 2008, in other countries by 2019 the rate either had almost recovered or surpassed its level at the time of the GFC.[12]

3. The labour markets for the young

Heterogeneity exists in the types of jobs being sought by young labour force participants and hence in the degree and type of labour market competition they face.[14] It is not too much of a simplification to represent that heterogeneity by dividing young labour force participants into two categories: full-time students who are seeking part-time low-skill jobs in a relatively small set of occupations; and those young who are not attending education full-time (not attending or attending part-time) and likely to be seeking work (mainly full-time) in a more diverse set of occupations matching their education qualifications.

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[12] Appendix Figures 2a and 2b present EMP/POP rates for persons aged 25-54 years and 55-64 years for the same set of countries. Similar changes occurred for those age groups in the other countries as in Australia: the EMP/POP rate for the group aged 25-54 years declines a little immediately following the GFC but quickly recovers; and the EMP/POP rate for the group aged 55-64 years grows steadily over the whole period from 1993 with only minimal evidence of slowing post-GFC.

[14] Another aspect of heterogeneity is in the labour force participation rate of the young population. In 2016 the rate was 26.1 per cent for the population aged 15 years, rising to 72.1 per cent for those aged 19 years, and then about 75 per cent for the age group from 20 to 24 years. See Appendix Figure 3.

Figure 4 provides a perspective on the type of jobs being sought by the two groups of young labour force participants – attending and not attending education full-time - and the nature of competition they face, using data on the distribution of employment by 2-digit occupation from the 2016 Census. From the figure it is possible to infer: first, the extent to which each group of young workers is concentrated in specific occupations; and second, the extent to which workers in other age groups are employed in the same occupations as those groups of young workers.

For the young who are attending education full-time, employment is concentrated in a subset of occupations. Just four occupations - sales assistants and salespersons; hospitality workers; food preparation assistants; and sales support workers - account for 62.0 per cent of employment of young full-time students. As well, within these occupations, employment of the young is a relatively large share of total employment, 40.6 per cent. Hence, young full-time students are concentrated in jobs where the most substantial source of competition is from other young labour force participants.

For the young who are not attending education full-time, employment is less concentrated; for example, the four largest occupations account for 25.9 per cent of employment. In addition, this group works in occupations where the young are a smaller share of total employment, 28.2 per cent. This suggests that young workers who have completed their education or studying part-time are spread more widely across occupations, and likely to be exposed to greater competition from older age groups.

4. Increasing competition for the young

For the young who are in full-time education, the main source of increased labour market competition in the decade after the GFC was from within their own age group – from an increased number of young international students and holiday travellers seeking part-time work. Figure 5a shows the proportionate growth in labour force participants aged 15 to 24 years who are Australian-born and immigrants. Between 2004 and 2019 the annual rates of growth in labour force participants in these groups

have been respectively 0.6 per cent and 3.9 per cent.[15] Over the same period, immigrants have accounted for 52.6 per cent of growth in the labour force aged 15 to 24 years, despite being only 12.6 per cent of that labour force in 2004.[16] What is also critical is that the occupational composition of employment of recent young immigrants (aged 15 to 24 years who arrived in the last 2 years) is similar to full-time students of the same age (Australian-born and immigrants who had not arrived in the past 2 years).[17]

Young newly arrived immigrants are therefore most likely to be seeking jobs in the same small set of occupations into which it has been shown that young persons in full-time education are partially segmented. This suggests that the large increase in labour supply by young immigrants post-GFC substantially increased competition for employment in those occupations. Such a claim may seem to contradict studies of the labour market consequences of migration to Australia which generally find little overall impact – a finding usually explained by the contributions of migrants to labour demand and labour supply being about equal.[18] The difference here is that the extra labour

[15] Note that data from the ABS Labour Force Survey reported for the population aged 15-24 years include international students and working holidaymakers who are in Australia for 12 months or more. The scope of the Labour Force Survey is the 'the usually resident civilian population of Australia aged 15 years and over' where usual residence is defined as: '…all people, regardless of nationality or citizenship, who usually live in Australia, with the exception of foreign diplomatic personnel and their families. It includes usual residents who are overseas for less than 12 months. It excludes overseas visitors who are in Australia for less than 12 months' (ABS, Population FAQs; accessed at: https://www.abs.gov.au/websitedbs/D3310114.nsf/home/Population+FAQs)

[16] Rapid growth in labour force participants who are immigrants aged 15 to 24 years in the post-GFC period appears to derive from several sources: first, increasing numbers of international students (see Appendix Figure 4); second, the introduction in 2008 of a new temporary visa category (485) for graduates from Australian higher education institutions – for which the number of visa holders increased from 22,895 in 2014-15 to 91,776 in 2018-19 (Birrell and McCloskey, 2019); third, relaxing of financial capacity conditions for student visa (Birrell, 2019, pp.6-7); and fourth, the working holiday maker visa streams (417 and 462). Analysis of Census data for 2006 and 2016 indicates that the growth in labour force participation by immigrants aged 15 to 24 years is due to increases from full-time students aged 15-19 and 20-24 years, and by non-students aged 20 to 24 years – see Appendix Table 1.

[17] Appendix Figure 5 shows the distribution of employment by occupation for immigrants aged 15 to 24 years in 2016. The Duncan dissimilarity index between the groups is 0.316 (Karmel and McLachlan, 1988). See also Birrell and McCloskey (2019, Table 2).

[18] Recent examples are Breunig et al. (2017); and Productivity Commission (2016).

market supply from young immigrants has been concentrated in low-skill part-time jobs in retail and accommodation and food services industries; whereas, the extra labour demand they generate is dispersed across the labour market.

As a rough indicator of the consequences of growth in labour supply by young immigrants for balance between labour demand and labour supply, Figure 5b shows the relative growth in hours worked in retail and food and accommodation services industries and in the number of full-time students aged 15 to 24 years in Australia from 2002 onwards. Hours worked and full-time student numbers show similar growth during the early 2000s. But there has been an increasing divergence in the post-GFC period.

For young persons who are not attending education full-time, increased labour market competition has come from relatively strong and steady growth in aggregate labour supply – driven by increasing labour force participation of the population aged 25 years and above. A variety of explanations are given for growth in labour supply of the population aged 25 years and above – including: (i) their increasing share of the population; (ii) increasing female participation due to factors such as increases in education attainment, changes to social norms, increased availability of part-time jobs, household debt-servicing costs and government policies relating to childcare; and (iii) older workers delaying retirement due to pension eligibility and superannuation preservation ages increasing, improved health and changes in work preferences and norms (Connolly et al., 2011; Reserve Bank of Australia, 2018, pp.33-34).

In the years prior to the GFC the increase in labour supply was outpaced by employment growth. However, following the GFC that pattern has reversed. This has meant that the rate of labour underutilisation – the proportion of available hours of labour supply that are not being utilised in employment (reflected in unemployment or under-employment) - has increased.[19]

[19] Appendix Figure 6a shows growth in labour force participation for young, prime age and older populations from 1993 to 2019. The reversal in the balance between growth in labour demand and labour supply can be seen in Appendix Figure 6b which shows the ABS hours-based rate of labour underutilisation from 1994-95 to 2018-19.

The increasing gap between labour supply and employment following the GFC has had a disproportionate negative impact on employment outcomes for the young. This can be seen from a decomposition of changes in annual hours worked per person in Australia in pre- and post-GFC periods. The results are reported in Table 3. The decomposition attributes the total change in hours worked to: (i) changes in the age composition of the population; and (ii) changes in annual hours worked within age group categories.

Quite different outcomes across the two time periods are evident. From 1993 to 2008 there was sufficient positive growth in aggregate annual hours worked per person to allow strong growth in hours worked by persons aged 25 to 54 and 55 plus years, without a crowding-out impact on the young population.[21] But from 2008 to 2019 there was overall negative growth in annual hours worked per person. With hours worked still growing for the population aged 55 years and above, this forced the adjustment onto prime age and younger populations – with the largest contribution to the decline in hours coming from young. In fact, keeping in mind that the 25 to 54 years age group is three times larger than the group aged 15 to 24 years, the results from the decomposition imply that, on a per person basis, the crowding out effect for the young has been about six times larger than for the prime age population.

The disproportionate impact on the young of the increasing gap between labour supply and labour demand is explained by how available jobs are allocated. At any point in time jobs are not simply rationed among age groups according to their shares in the labour force. Instead, older workers have an incumbency advantage in their existing jobs, compared to the younger population who are making the transition to employment. Hence the older population has a first-mover advantage in taking up growth in aggregate employment (via for example delaying retirement); and the younger population are a residual claimant whose employment opportunities will only

[21] The negative contribution of age composition to annual hours worked can be explained as follows: The share of older workers in the population is increasing; and those older workers have average annual hours of work below other age groups. Hence, other things equal, the impact of the change to the age composition of the population would be to decrease economy-wide average annual hours of work.

expand when aggregate employment growth exceeds the extra employment being taken by older population.[22]

An incumbency advantage for older workers in taking up extra labour demand can derive from several sources – for example, the experience and firm-specific human capital they have accumulated; that their productivity is known; and that employers can avoid costs of new hiring. For the same reasons, as well as their greater likelihood of being in permanent employment, older workers are also more likely to be protected against dismissal when labour demand decreases.[23] The idea of older workers having an incumbency advantage over the younger population who are trying to make the transition from education to work is akin to insider-outsider models of the labour market.[24]

5.1 Background

Thus far, we have described how worsening employment outcomes for the young post-GFC coincided with a downturn in labour demand and growth in labour supply of groups with whom they were competing for jobs. But, of course, correlation does not establish causality. First, the worsening employment outcomes for the young population could be due to other influences such as: a] effects of the business cycle; b] changes in the industry/occupation composition of employment that favour older workers; and/or c] an increased rate of growth in the creation of part-time jobs,

[22] It may also be that the incumbency advantage of older workers is increasing over time as they become, in performing tasks that require higher levels of education attainment, increasingly substitutable for the younger population. For example, Appendix Table 2 shows that whereas in 1996 only 6.9 per cent of the population aged 55 to 69 years had a Bachelor's degree or higher compared to 11.7 per cent for those aged 20 to 24 years, by 2016 the order of these percentages had reversed to 20 per cent and 15.4 per cent respectively. However, this argument is weakened to the extent that the skills provided by a Bachelor's degree to young and older workers differ because of advances in technology.

[23] For employees aged 15 to 24 years, 46 per cent are in permanent jobs compared to 82.9 per cent and 77.8 per cent for employees aged 25 to 54 years and 55 years plus respectively (ABS, Characteristics of Employment 2019, Tablebuilder).

[24] See for example, McDonald and Solow (1985) and Blanchard and Summers (1986).

together with new jobs being disproportionately obtained by the young, implying a decrease in their average hours worked. Second, causality could run in the opposite direction: from the young population to other age groups. A decrease in labour supply or employment of the young would allow older workers to remain in their jobs for longer or to take up available job vacancies. An initial decrease in the labour supply of the young might have occurred for several reasons: a] an increase in education participation; b] an increased value of their leisure time; or c] young workers having skills that are less well matched to available jobs.

In this section, we consider these alternative explanations for the deterioration in employment outcomes for the young post-GFC. It is important to reiterate that our analysis is descriptive – focusing on correlations between the timing of changes in employment and the potential alternative explanations. Hence, we do not claim to establish a causal relation between changes to labour supply and employment outcomes for the young. Nevertheless, we do believe that our analysis provides a convincing rebuttal of the potential alternative explanations.

5.2 Business cycle

Worsening employment outcomes for the young post-GFC are not simply a reflection of the business cycle. Figure 6 shows the difference in EMP/POP rates for populations aged 15-24 years and 25-54 years adjusted to identify post-GFC structural influences on employment. The series is detrended and cyclically adjusted using data from 1978-2008. Hence, a value of zero for the series in years following 2008 would imply that the EMP/POP rate for the population aged 15-24 years evolved relative to the EMP/POP rate for those aged 25-54 years following the same trend and with the same cyclical sensitivity as exhibited between 1978 and 2008.[26] In fact, the series declines substantially after 2008. This implies that there has been a sustained decrease in the EMP/POP rate for the population aged 15-24 years compared to 25-54 years after 2008 that cannot be attributed to a prior trend or cyclical influences, and hence must be due to a structural influence that has only arisen post-GFC . The decrease is about four

[26] See Appendix for extra details.

percentage points, a sizable amount; and the negative effect has been slightly larger for the young population aged 20-24 than 15-19 years.

5.3 Industry and occupation composition of employment

Changes in employment outcomes for the young have not been due to changes in the industry or occupation composition of employment favouring old over young workers. Table 4 shows actual and hypothetical average annual rates of employment growth for young, prime-age and older workers for 1993-2008 and 2008-2019. The hypothetical growth rates in employment for each age group are constructed assuming (i) the share of employment by industry (occupation) remained as it was in the base year within each age group and (ii) employment in each industry (occupation) grew at its actual rate. Slower growth in employment for the young could be explained if, for example, employment growth after the GFC was much slower in industries (occupations) in which young people are concentrated. The results in Table 4, however, show limited differences in the impact of changes in the industry or occupation composition of employment on growth rates in employment by age. Compositional changes are entirely unable to explain the slowdown in employment growth for younger people post-GFC. Whereas actual annual growth in employment for young workers post-GFC was only 0.24 per cent, if young workers had experienced average rates of growth in employment for the industries and occupations in which they worked, their annual rate of employment growth would have been about 1.5 per cent, similar to the older age groups.

5.4 Part-time employment

The decrease in annual hours worked by the young relative to older age groups cannot be explained by their employment outcomes being affected disproportionately by acceleration in the rate of creation of part-time jobs post-GFC. The difference between the rates of growth in part-time and full-time employment did increase post-GFC (2008 to 2019) compared to pre-GFC (1993 to 2008) – 3.0 per cent compared to 2.4 per cent. However, if part-time and full-time employment of the young had increased from 2008

to 2019 at the same rate as overall, their annual hours per capita would have risen by 7.4 hours, compared to the actual decrease of 12.5 hours.

5.5 Education participation

Increased education participation by the young does not appear to explain their worsening employment outcomes. If anything, the rate of growth in full-time education participation by the population aged 15-24 years has slowed post-GFC. This can be seen from Figure 7 which presents participation rates in all full-time education and in full-time tertiary education. Increases in the proportion of the young in full-time education therefore have had a slightly smaller negative effect on their EMP/POP rate in the period following 2008 than in prior years. This is shown in Table 5 which presents findings from a decomposition of sources of changes in the EMP/POP rate for the population aged 15 to 24 years based on full-time education participation status. The effect of increasing participation in full-time education was to decrease the EMP/POP rate of the young by -0.18 ppt per year post-GFC compared to -0.25 ppt per year from 1993 to 2008. The main source of the decrease in the EMP/POP rate for the young post-GFC was instead within-group decreases in the EMP/POP rates - both for those attending education full-time and those not attending full-time. For example, full-time students experienced an increase in their EMP/POP rate of 0.49 ppt per year from 1993 to 2008, but a decline of 0.05 ppt per year post-GFC.

5.6 Value of time not in paid work

It is unlikely the deterioration in employment outcomes for the young relative to other age groups post-GFC is explained by the young withdrawing their labour in response to an increase in the opportunity cost of time spent in paid work. First, the decline in employment for the young has been accompanied by an increase in their rates of unemployment and under-employment. From 2008 to 2019, when the EMP/POP rate of the young decreased by 4.3 percentage points, the proportion who were either unemployed or under-employed rose by 7.1 percentage points. This suggests that the decline in employment has been involuntary rather than driven by an increased value of leisure. Second, we are not aware of any direct evidence that the value of time spent out

of paid work has risen. Some research for the United States has suggested that withdrawal from the labour force in the 2010s – especially by young males – may have been due to an increase in the value of leisure time due to the availability of video games (for example, Aguiar et al., 2021 and Krueger, 2017). Based on the limited evidence available, it does not seem this has been a major influence on labour force participation in Australia.[27] Third, there are other factors such as a decrease in child-bearing by women aged under 25 years, that would be associated with an increase in labour supply by the younger population (AIHW, 2020).

5.7 Mismatch

Saying anything about the role of mismatch in explaining labour market outcomes for the young is difficult. Mismatch, whereby the young lack the level or field of education qualification or the experience/training required for new jobs being created, would effectively represent a decrease in their labour supply. A problem, however, is that mismatch may be endogenous to crowding out of the young. For example, if employers are choosing from a larger pool of job applicants, they may be able to impose higher hiring standards such as needing postgraduate qualifications or experience in the job. This might be interpreted as the young not having skills that match with jobs being created, but really is just a manifestation of crowding out. Easier to interpret are arguments that the young increasingly have the wrong field of qualification for jobs being created. An example is analysis by Norton (2016) which argues that the Australian higher education system has over-produced science, information technology and engineering graduates. The supporting evidence for this type of mismatch is strong, but the timing of the onset of mismatch does not coincide with the GFC, nor is the extent of mismatch sufficient to explain the size of decrease in total employment of the young.

6. Extra channels of adjustment

[27] Appendix Tables 3a and 3b present descriptive information on time spent video-gaming by the Australian population for separate age groups. There is no evidence that the incidence or time spent on video-gaming has increased post-GFC. However, it is important to acknowledge that usage of video games gives only a partial perspective on the impact of digital hobbies, let alone on the broader set of determinants of the value of leisure.

6.1 Types of adjustment

Crowding-out of the young from employment implies some type of further labour market adjustment must occur. That adjustment could take several forms. First, with a decrease in hours of work available to the young, one of two types of adjustment must happen. Either the available hours of employment for the young need to be spread over a larger number of workers (for example, via an increase in the proportion of the young in part-time work); or a larger proportion of the young must be out of employment – spending extra time in education, unemployed or out of the labour force. Second, the increasing imbalance between demand and supply for younger workers can also imply some adjustment in the quality of jobs they obtain. For example, the proportion of young workers placed in jobs for which they are over-qualified may rise; or aspects such as the incidence of casual employment be affected. Third, greater competition to obtain employment may be manifested in the young being forced to 'pay' for the benefits of obtaining a job quickly through practices such as unpaid internships. It is also likely that deteriorating employment outcomes for the young have caused adjustment outside the sphere of work – such as delaying leaving the parental home.

6.2 Part-time work

There is a deal of evidence that an increased incidence of part-time work is an important way in which adjustment for the young has happened. First, the share of part-time employment increased rapidly for young workers post-GFC; and much quicker than for older workers. Figure 8 shows that the share of part-time employment increased by 11 percentage points for workers aged 15 to 24 compared to only 5 percentage points for those aged 25 years and above. Even controlling for growth in the share of the young in full-time study does not affect the finding that they have experienced double the size of increase in the share of part-time employment than older workers.[28] Second, Bachelor graduates are increasingly needing to make a transition to

[28] It is important to distinguish between an increase in part-time employment as a source of decreased hours worked by young people and as a channel of adjustment to the imbalance between labour demand and labour supply. In the previous section, accelerated growth in total

full-time work via a part-time job. Figure 9 shows the proportion of Bachelors' degree graduates in full-time employment 4 months and 3 years after graduation. For the cohort who graduated in 2006, 81 per cent had full-time jobs 4 months later and 92 per cent after 3 years. But for the most recent cohort for whom data are available, graduates in 2016, the corresponding numbers are 70 percent and 90 per cent. That is, the proportion transiting to full-time employment via a part-time job has doubled over the decade. Third, it appears that much of the extra part-time employment of the young is involuntary – as shown in the rise in underemployment among young workers. From 2008 to 2019 the rate of under-employment (hours adjusted) for young workers increased from 10.3 per cent to 16.6 per cent. In the post-GFC period the pace of growth in underemployment for the young has increased, due both to a faster rate of increase in the share of part-time employment and an increased proportion of part-time workers stating that they are underemployed.[29]

6.3 Activities out of work ‑ Unemployment; Education

There is also evidence that adjustment to being crowded out from employment occurred through the young spending extra time out of employment. This appears to have happened mainly via an increase in the incidence of long-term unemployment (spell of unemployment lasting for 12 months or more). The idea that there has been an upward movement in the rate of long-term unemployment post-GFC beyond what

part-time employment, together with the fact that young workers account for an above-average share of part-time employment, was considered as a potential cause of decreased hours worked by the young. That is, an exogenous increase in the rate of growth in total part-time employment, and hence in part-time employment for persons aged 15 to 24 years, was considered as a cause of a decrease in hours worked by the young. In this section, an increase in part-time employment of the young is regarded as an endogenous response (an adjustment mechanism) to an increasing imbalance between labour demand and labour supply.

[29] Appendix Figure 7 shows the relation between the share of part-time employment and the rate of under-employment for young workers. Appendix Table 4 presents results from a regression model of the relation between the rate of underemployment and share of part-time employment – which finds an increased impact of growth in part-time employment on the incidence of underemployment post-GFC.

would have been expected is supported by inspection of actual rates of long-term unemployment by age which are presented in Figure 10.[30]

Determining whether adjustment has occurred via an increase in education participation by the young is not straightforward – mainly because it is difficult to identify the counter-factual of how participation would have evolved in the absence of worsening employment outcomes for the young. As has been noted, if anything it appears that the rate of growth in full-time education participation has decreased post-GFC. A more nuanced perspective, however, may come from comparing the size of increase in full-time education participation for those young people who are not employed to the decrease in the proportion of the young who are employed and not in full-time education. This comparison is shown in Table 6 for the period from 2008 to 2019. Growth in the proportion of the young in full-time education did largely offset the decrease in the proportion employed and not in full-time education for the 15-19 years age group. However, that did not happen for the group aged 20-24 years.

6.4 The quality of work

Not much investigation of changes in the quality of jobs held by the young has been undertaken in recent times. The main evidence available is from de Fontenay et al. (2020) who from an analysis of HILDA data conclude that on average younger workers started in lower status occupations and were slower to move up the occupation ladder post-GFC than in previous years.

Growth in labour supply may also be a major factor underlying the apparent increase in the incidence of wage theft in Australia during the 2010s, known to be concentrated in

[30] Appendix Figure 8 shows the deviation of the rates of unemployment and long-term unemployment for the young from predicted values based on the relation with the same series for labour force participants aged 25 to 54 years from 1978 to 2008. The series can be interpreted as showing the extent to which there is 'excess variation' in the rates beyond what would be predicted by the normal pattern of cyclical variation (with 'normal' being represented by the years prior to the GFC). Both series show positive deviations from what would have been predicted based on pre-GFC outcomes. But the pattern in the rate of unemployment is rather haphazard. The rate of long-term unemployment, on the other hand, shows a more consistent upward deviation, of about one-half of a percentage point.

those industries such as accommodation and food services where extra labour supply of immigrants has most affected the balance between labour supply and labour demand.[31] Recent anecdotal evidence of higher wages for workers in this industry due to labour shortages associated with decreased temporary migrants following the onset of COVID-19 also support this hypothesis.[32]

Another aspect of the quality of work that may have been more affected by the weaker labour market position of the young is the incidence of casual employment. Table 7 presents information on the proportion of employees in casual work for time periods prior to and after the GFC by age. The incidence of casual employment for the young did increase relative to older workers post-GFC. However, a growing gap in the incidence of casual employment between young and older employees was already happening prior to GFC. As well, most of the increase in casual employment for the young post-GFC can be attributed to the rise in their part-time employment share.[33] Hence, there does not appear to be much evidence that increasing incidence of casual employment has been an extra dimension of adjustment.

6.5 Behaviour to get a job

Where there are young jobseekers who are involuntarily excluded from employment, and employment provides higher utility than being out of employment, that difference in utility would be expected to incentivise young jobseekers to engage in extra competition to obtain employment. Unpaid internships and work experience appear a classic example of this type of competitive behaviour. Recent survey and job

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[31] Appendix Table 5 documents the increasing number of actions taken by the Fair Work Ombudsman over the past decade. Although it is important to note that the increase may in part reflect greater awareness of wage theft and stronger regulatory action by the Fair Work Ombudsman.

[32] See for example, Piovesan (2020).

[33] For employees aged 15 to 24 years in 2019 the incidence of casual employment was 19.4 per cent for those employed full-time compared to 80.0 per cent for those in part-time employment. A shift-share analysis of the change in the incidence of casual employment for the young from 2014 to 2019 finds that 2.1 percentage points of the overall increase of 2.7 percentage points can be attributed to the increasing share of part-time employment over that period (ABS, Characteristics of Employment 2014 and 2019, Tablebuilder).

advertisement data suggest that over one-half of young people had done unpaid work experience (Oliver et al., 2016; Tweedie and Ting, 2018). Most internships were of relatively short duration (such as two days per week for up to three months); about one in ten required a payment to the employer (average of $945); and the main industries offering internships were advertising, media and public relations; ICT; and accounting, banking and finance. That doing unpaid work experience is driven by a desire for employment is demonstrated by about one-quarter of these experiences being associated with an offer of paid employment. While the current prevalence of unpaid internships cannot be doubted, we are not able to comment on the extent to which the incidence has grown over time since the GFC.

6.6 Adjustment outside the labour market

Poor labour market outcomes for the young are also forcing them to adjust behaviours outside the sphere of work. The proportion of the young (aged 18 to 29 years) living in their parental home has increased over time – rising from about 50 to 55 per cent for males between 2008 to 2019 and 45 to 55 per cent for females over the same period (Vera-Toscano, 2019). This rise can be attributed to a growing proportion of the young in full-time study; but factors such as deteriorating employment outcomes and the cost of housing are also likely to play a role (Wood and Griffiths, 2019). Delayed entry to the labour market by the young, and hence slower accumulation of assets, is also seen as an explanation for the increasing age at which households are commencing to have children (Rayner, 2016).

7. Conclusion

The young in Australia experienced quite substantial deterioration in their employment outcomes in the decade following the GFC. This cannot be explained solely by slow growth in aggregate employment during this period. Our argument is that the extra factor which explains poor employment outcomes for the young is strong growth in labour supply from international students, and from the prime age and older populations. We have shown that adjustment by the young to being crowded out appears to have occurred via an increase in the incidence of part-time employment and

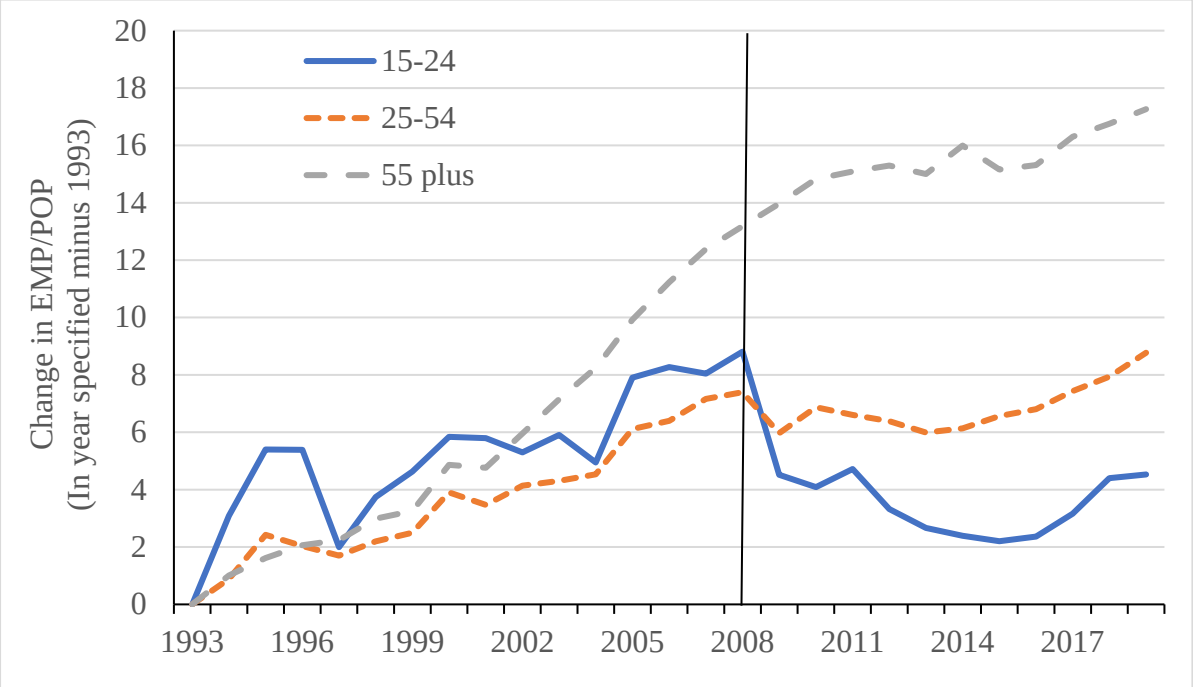
long-term unemployment, as well as by the need to spend extra time and resources to compete for employment.

It is important to say that we are not forecasting permanently worsening employment outcomes for the young. The labour market position of the young in Australia today is a result of both changes to labour demand and labour supply. Was there to be more rapid growth in aggregate employment (as happened prior to the GFC), then even with the incumbency advantage enjoyed by older workers, young workers would see improved employment outcomes. At the same time, in making forecasts of the labour market outlook for the young, it is also necessary to consider what may happen to labour supply. In the years prior to the onset of COVID-19 there had been strong growth in aggregate labour supply[34]; and relatively high rates of growth in the population aged 15-24 years had been projected for the 2020s.[35] The impact of COVID-19, of course, has been to substantially reduce that projected growth.

[34] See Borland (2020b).

[35] Appendix Figure 9 shows the actual and projected rates of growth in the population aged 15 to 24 years from 1992-93 to 2033-34.

Figure 1: Change in Employment/Population rate from 1993, By age, Australia, 1993 to 2019 (August)



Notes/Sources: i] Changes are calculated for August in each year compared to August 1993; ii] ABS, Labour Force, Australia, Detailed – Electronic Delivery, catalogue no.6291.0.55.001, Table 01.

Table 1: Share of total labour force aged 15-24 years, By age, labour force status and education attendance status, 2016

	Full-time employed + Unemployed looking for full-time employment	Part-time employed + Unemployed looking for part-time employment
Attend education full-time		
15-19 years	0.6	22.5
20-24 years	1.6	14.7
Not attend education full-time		
15-19 years	7.8	6.2
20-24 years	32.2	14.5

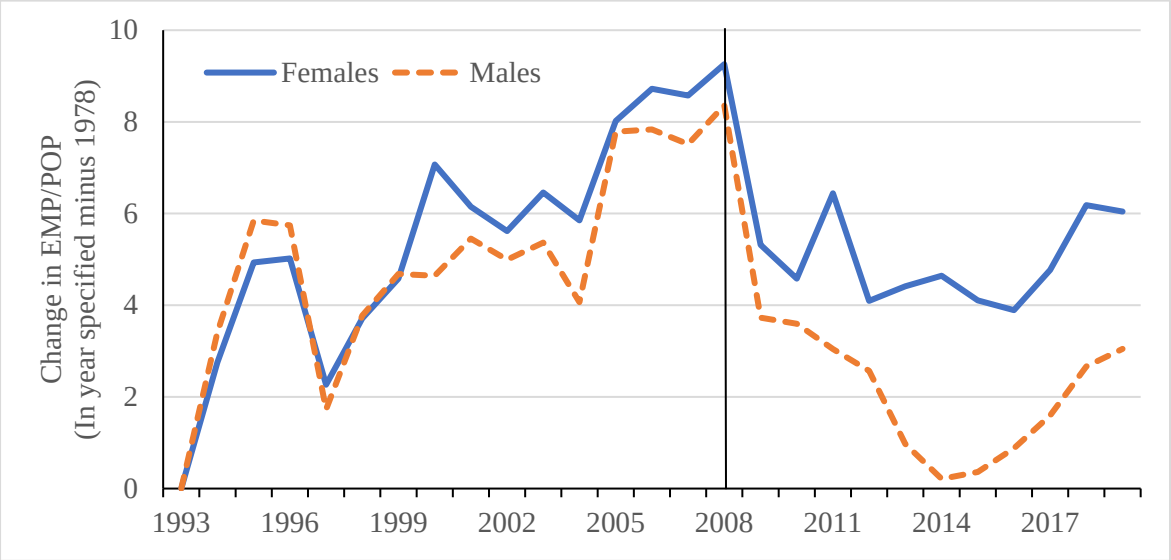
Source: ABS, 2016 Census Tablebuilder.

Table 2: Employment/Population rate and Annual hours per capita, By age, 1993 to 2019

	15-24 years	25 plus years	25-54 years	55 plus years
Average annual change in EMP/POP (ppts)				
1993 to 2008	+0.59	+0.46	+0.49	+0.88
2008 to 2019	-0.39	+0.07	+0.13	+0.37
Difference between time periods	-0.98	-0.39	-0.36	-0.51
Average annual change in Annual hours/POP				
1993 to 2008	+3.90	+6.55	+8.17	+13.01
2008 to 2019	-12.45	-3.95	-2.06	+3.95
Difference between time periods	-16.35	-10.50	-10.23	-9.06

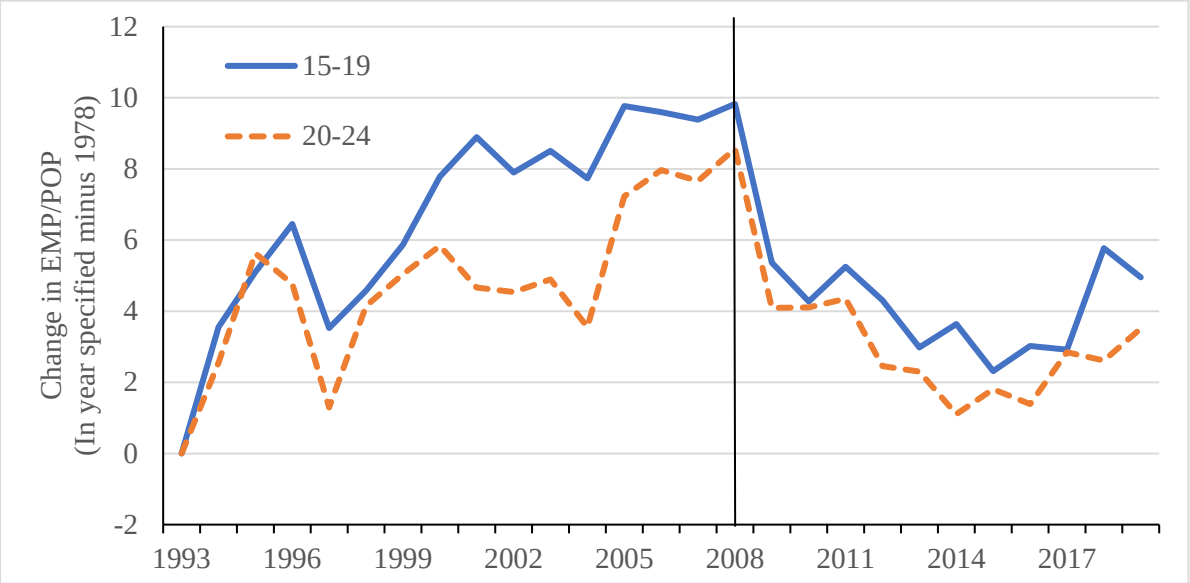
Notes/Sources: 1] Average annual change in EMP/POP: i] August to August; ii] ABS, Labour Force, Australia, Detailed – Electronic Delivery, catalogue no.6291.0.55.001, Table 01; 2] Average annual change in Annual hours/POP: i] Hours: Calendar years; Population: August; ii] ABS, Labour Force, Australia, Detailed – Electronic Delivery, catalogue no.6291.0.55.001, Table 01 and EM1a.

Figure 2a: Change in Employment/Population rate from 1993, Persons aged 15-24 years, By gender, 1993 to 2019 (August)



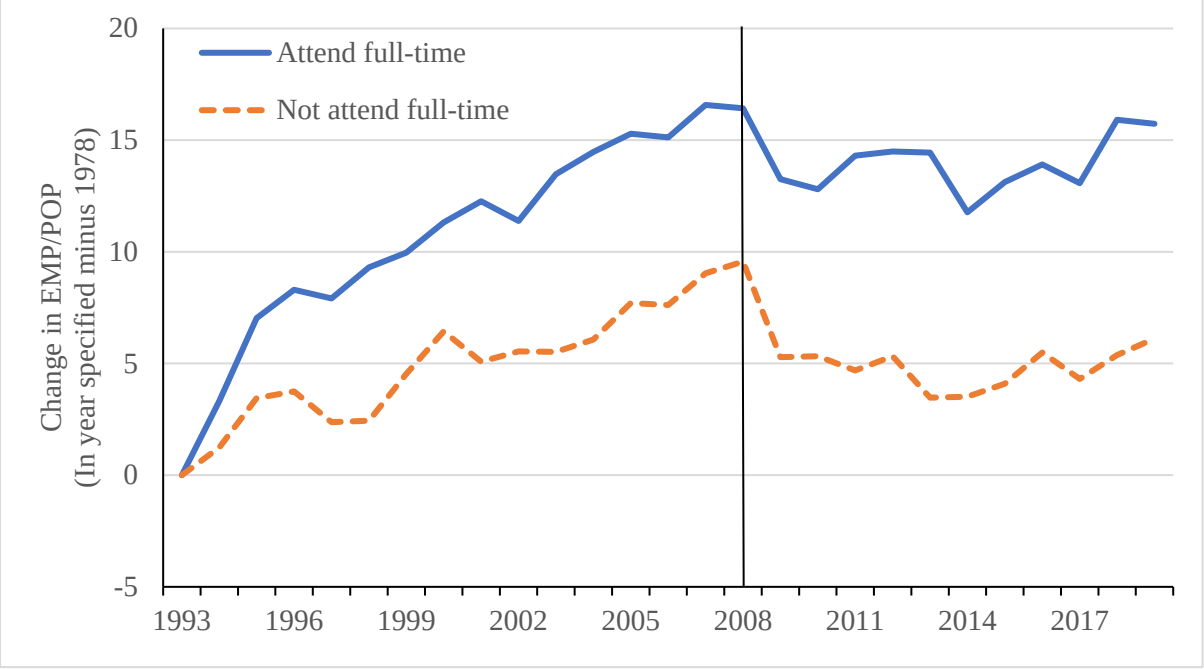
Notes/Sources: i] Changes are calculated for August in each year compared to August 1993; ii] ABS, Labour Force, Australia, Detailed – Electronic Delivery, catalogue no. 6291.0.55.001, Table 01.

Figure 2b: Change in Employment/Population rate from 1993, Persons aged 15-24 years, By age, 1993 to 2019 (August)



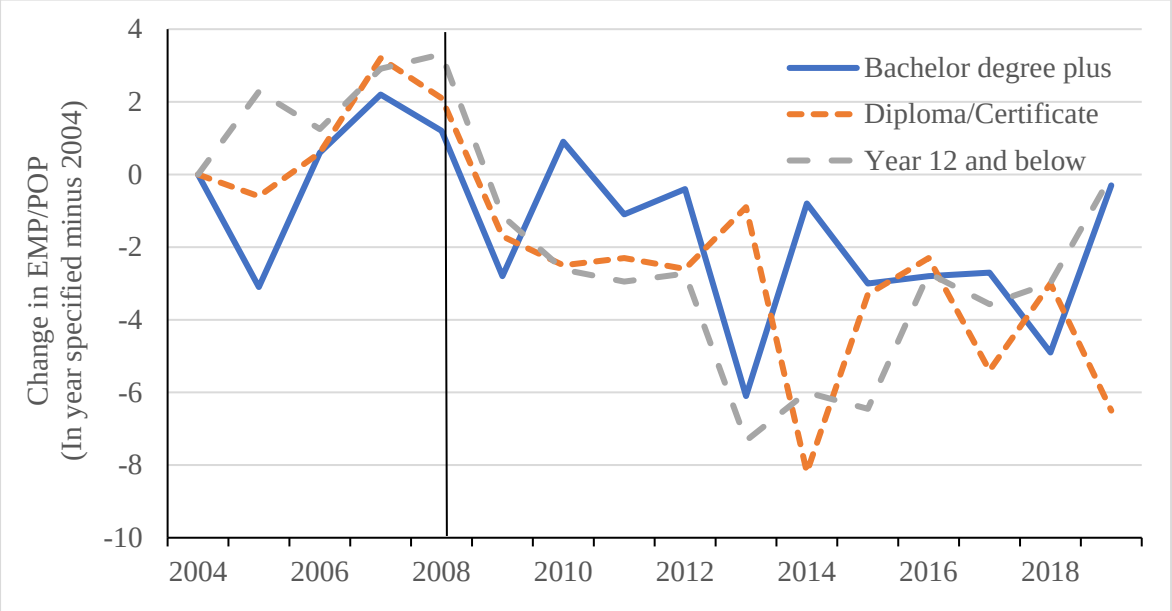
Notes/Sources: i] Changes are calculated for August in each year compared to August 1993; ii] ABS, Labour Force, Australia, Detailed – Electronic Delivery, catalogue no.6291.0.55.001, Table 01.

Figure 2c: Change in Employment/Population rate from 1993, Persons aged 15 to 24 years, By education participation status, 1993 to 2019 (May)



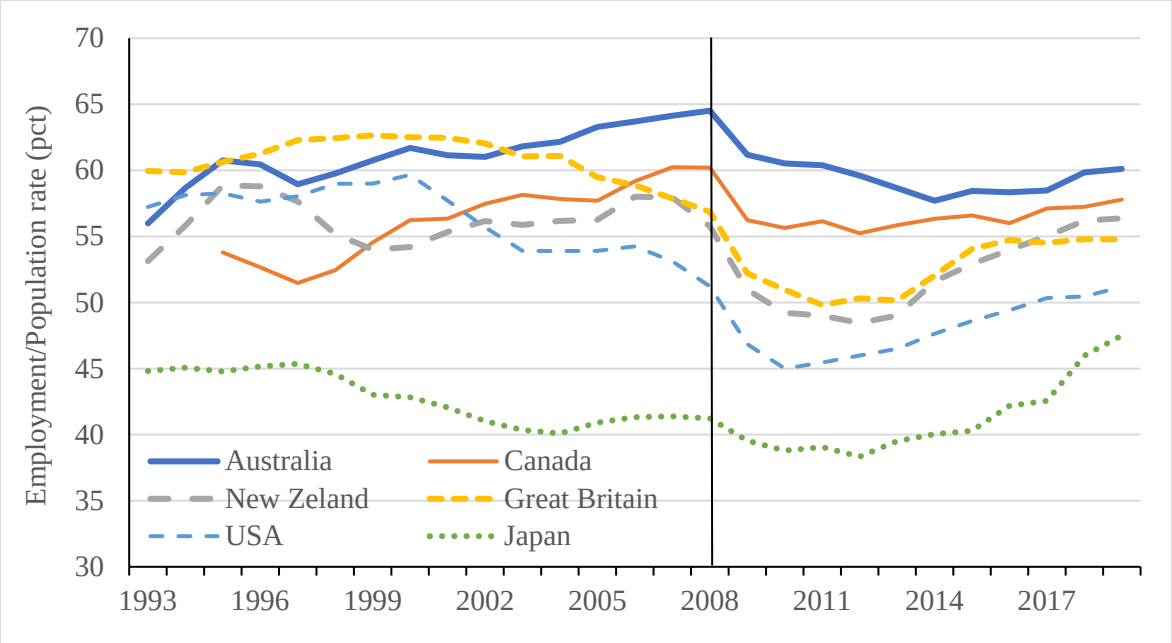
Notes/Sources: i] Changes are calculated for May in each year compared to May 1993; ii] ABS, Labour Force, Australia, catalogue no.6202.0, Table 15.

Figure 2d: Change in Employment/Population rate from 2004, Persons aged aged 15 to 24 years not in full-time study, By education attainment, 2004 to 2019 (May)



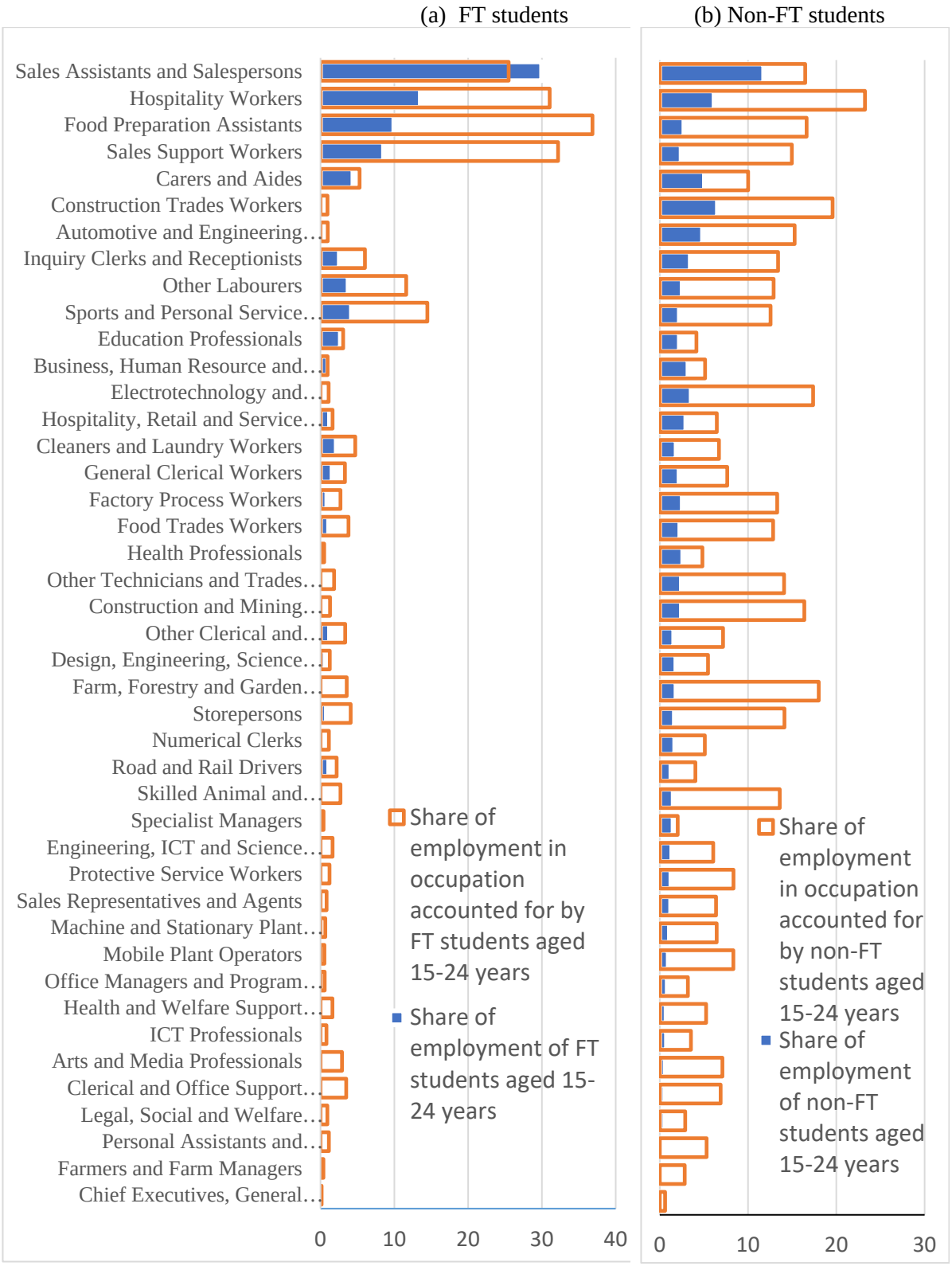
Notes/Sources: i] Changes are calculated for May in each year compared to May 2004; ii] ABS, Education and Work, Table 34; iii] Employment equals persons in FT employment/FT study + FT employment + PT employment/PT study. Population equals employment + persons not engaged in study or employment. Persons in FT study and partially engaged are excluded from the population.

Figure 3: Employment/Population rate, Persons aged 15 to 24 years, Selected countries, 1993 to 2019



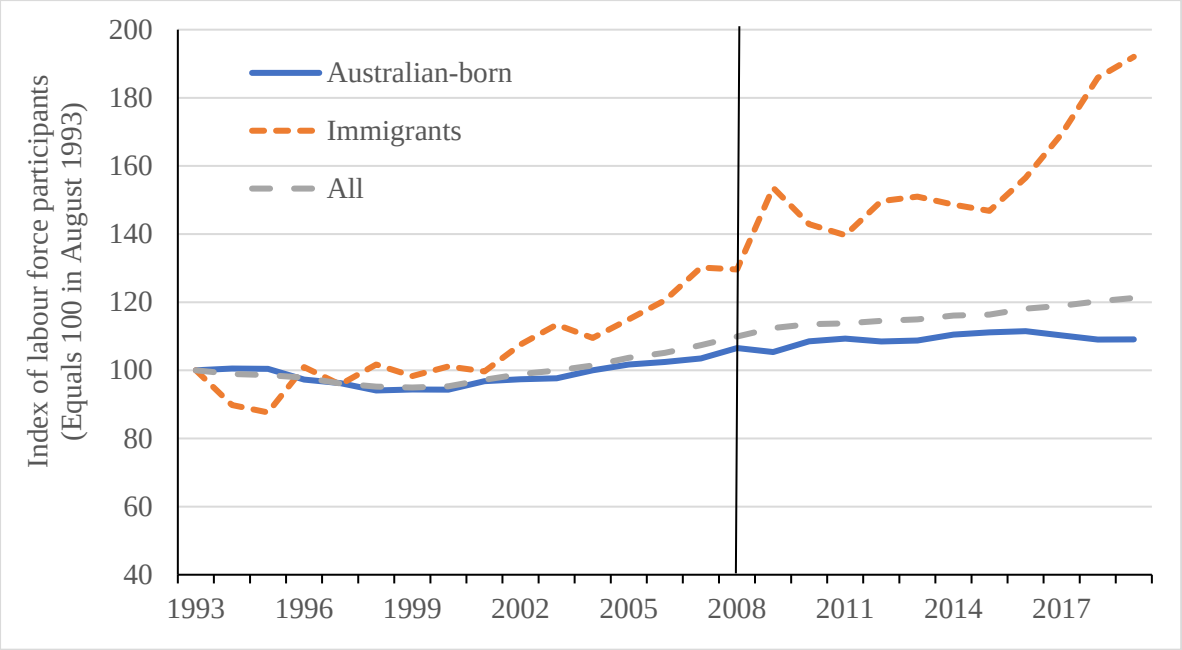
Notes/Sources: https://data.oecd.org/emp/employment-rate-by-age-group.htm#indicator-chart

Figure 4: Distribution of employment by occupation, Persons aged 15-24 years attending and not attending education full-time, 2016



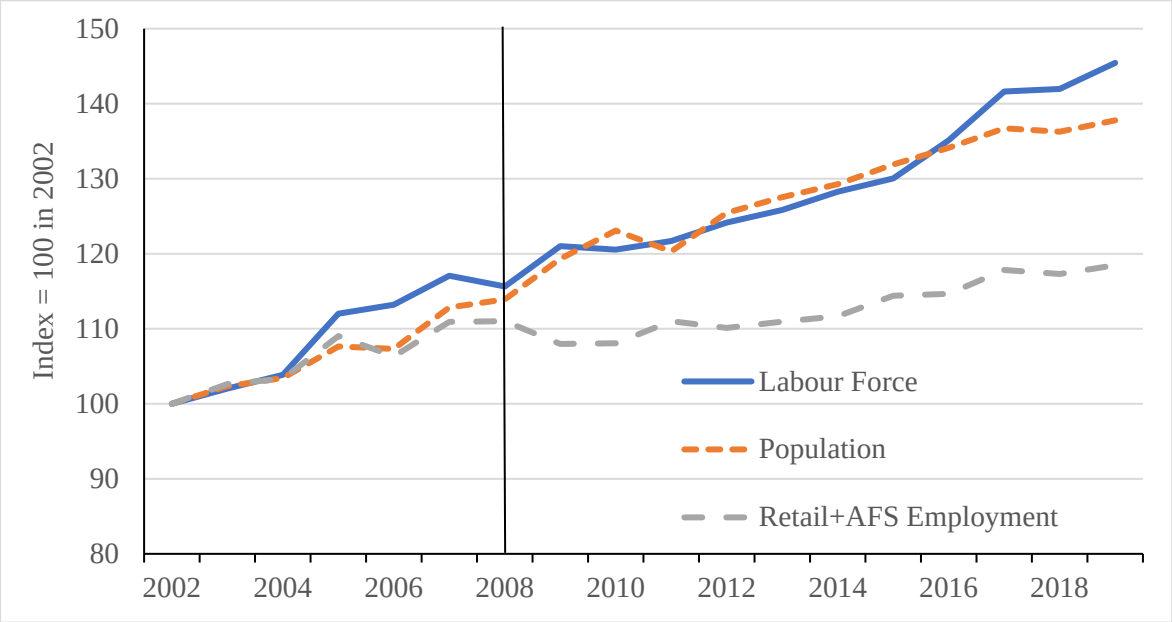
Source: ABS, 2016 Australian Census, Tablebuilder.

Figure 5a: Labour force participants aged 15 to 24 years, By country of birth, 1993 to 2019 (August)



Source: ABS, Labour Force Australia, Detailed – Electronic Delivery, catalogue no.6291.0.55.001, LM5.

Figure 5b: Potential labour supply (Full-time students aged 15 to 24 years) and total annual hours of employment in retail and accommodation and food services, 2002 to 2019



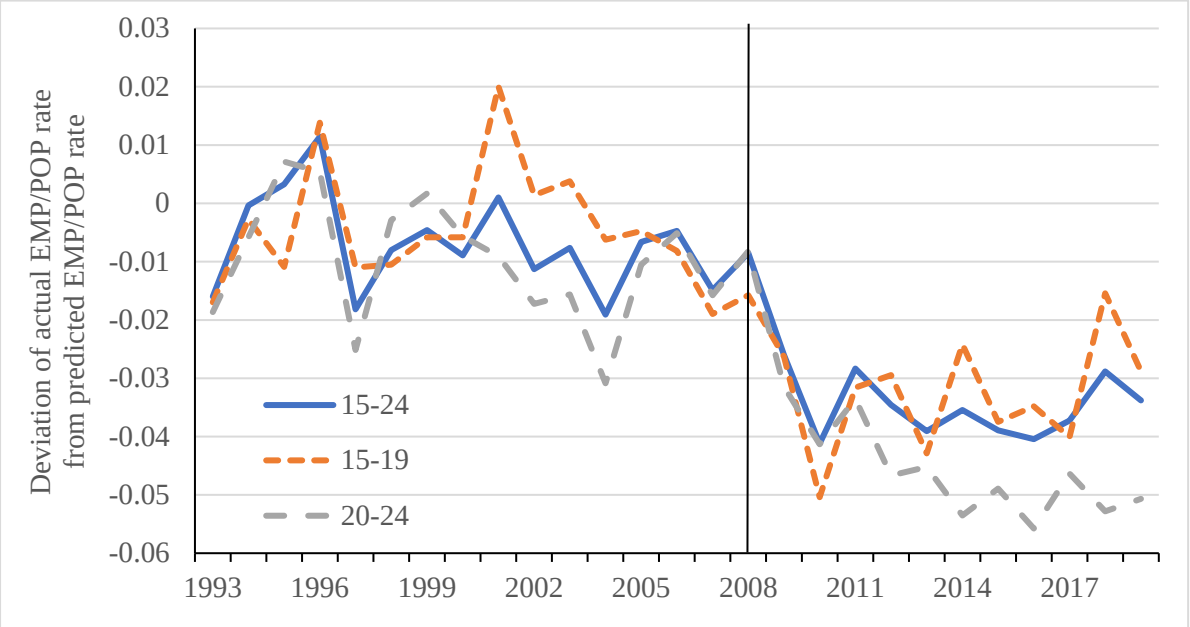
Source: 1] Labour force/Population of full-time students aged 15-24 years – August: ABS, Labour Force Australia, catalogue no.6202.0, Table 13; 2] Total annual hours worked – ABS, Labour Force Australia, Detailed, Quarterly, catalogue no.6291.0.55.003, EQ11.

Table 3: Decomposition of sources of annual rate of growth in annual hours worked per person, 1993 to 2019

	1993 to 2008	2008 to 2019
Total change	+0.79	-0.38
1] Age composition	-0.30	-0.21
2] Annual hours per person:		
55 years plus	0.49	0.11
25-54 years	0.51	-0.10
15-24 years	0.09	-0.20

Notes/Sources: i] Hours: Calendar years; Population: Monthly average across calendar year; ii] ABS, Labour Force, Australia, Detailed – Electronic Delivery, catalogue no.6291.0.55.001, Table 01 and EM1a.

Figure 6: Variation in the Employment/Population rate not explained by pre-2008 trend and cyclical factors, Persons aged 15-24 years, 1993 to 2019 (August)



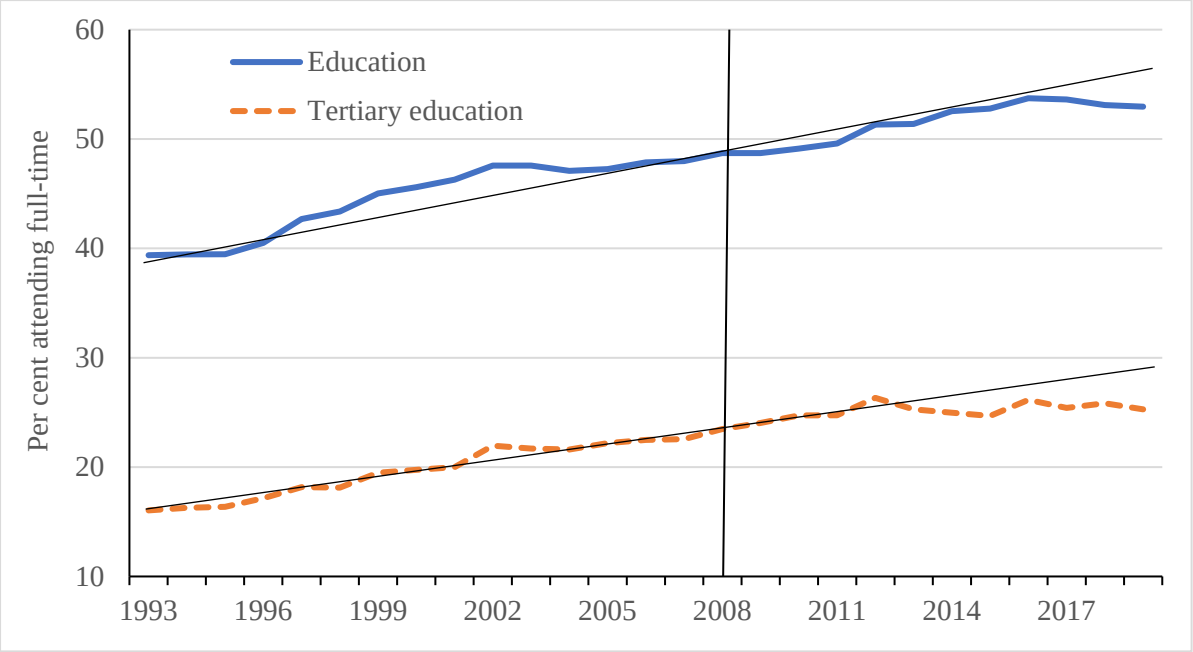
Source: ABS, Labour Force, Australia, Detailed – Electronic Delivery, catalogue no. 6291.0.55.001, Table 01. For details of construction, see Appendix 2.

Table 4: Impact of employment growth by industry and occupation on employment growth by age, Annual average rate of growth, 1993 to 2019

	15-24 years	25-54 years	55 plus years
1993-2008			
Actual	1.54	1.84	6.20
Hypothetical – Holding share of employment by age within industry constant	2.31	2.30	2.15
Hypothetical – Holding share of employment by age within occupation constant	2.14	2.33	2.22
2008-2019			
Actual	0.24	1.49	4.00
Hypothetical – Holding share of employment by age within industry constant	1.53	1.75	1.74
Hypothetical Holding share of employment by age within occupation constant	1.51	1.78	1.69

Note: Employment by industry and occupation is calculated as the average across the four quarterly observations for each year.
Source: ABS 6291.0.55.003, EQ12 (Industry) + EQ07a (Occupation).

Figure 7: Full-time education participation, Persons aged 15-24 years, 1993 to 2019 (May)



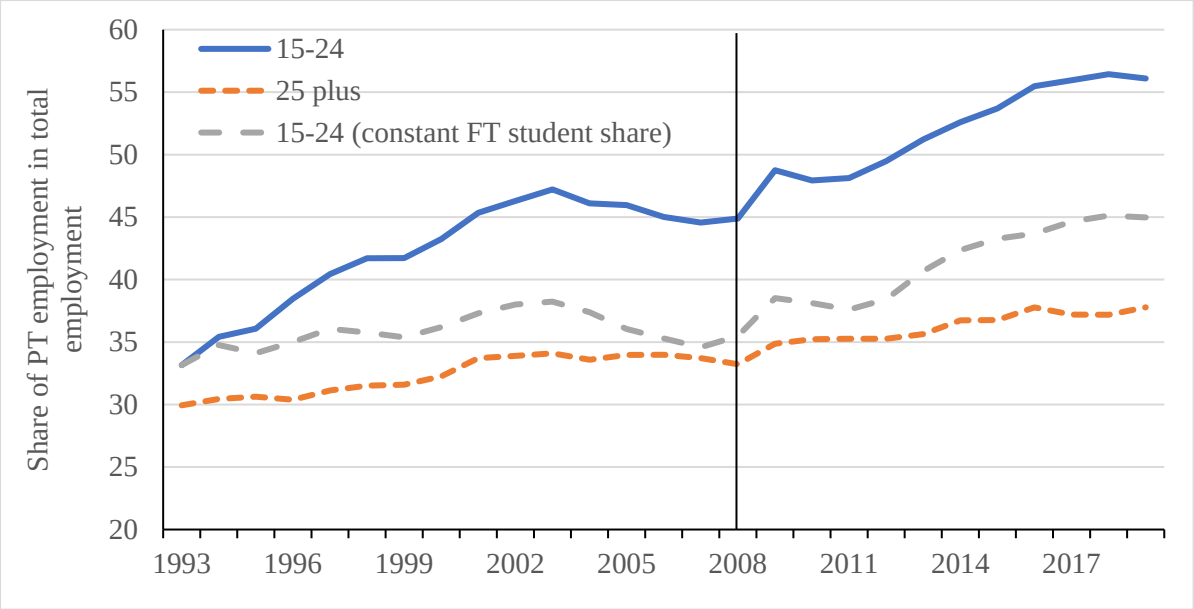
Source: ABS, Labour Force, Australia, catalogue no. 6202.0, Table 15.

Table 5: Decomposition of changes in Employment/Population rate by full-time education participation status, Persons aged 15 to 24 years, 1993 to 2019 (August)

	Average annual change	Impact of composition of FT students/ non-FT students	Impact of change in EMP/POP for FT students	Impact of change in EMP/POP for non-FT students
1993 to 2008	0.59	-0.25	0.49	0.35
2008 to 2019	-0.39	-0.18	-0.05	-0.17

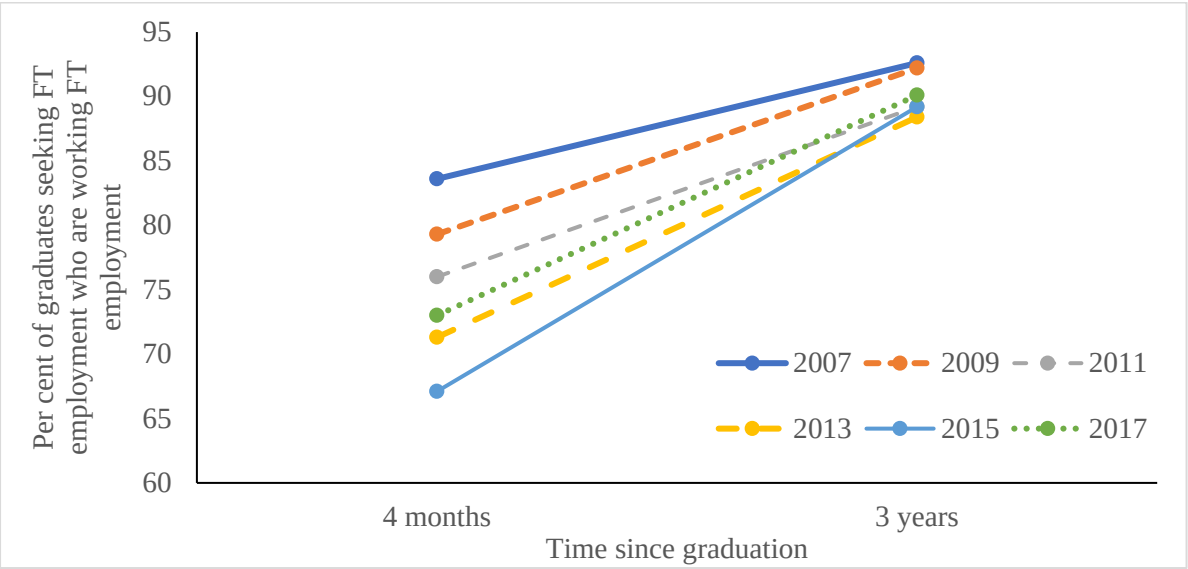
Source: ABS, Labour Force, Australia, catalogue no.6202.0, Table 15.

Figure 8: Share of part-time employment in total employment, By age, 1993 to 2019 (August)



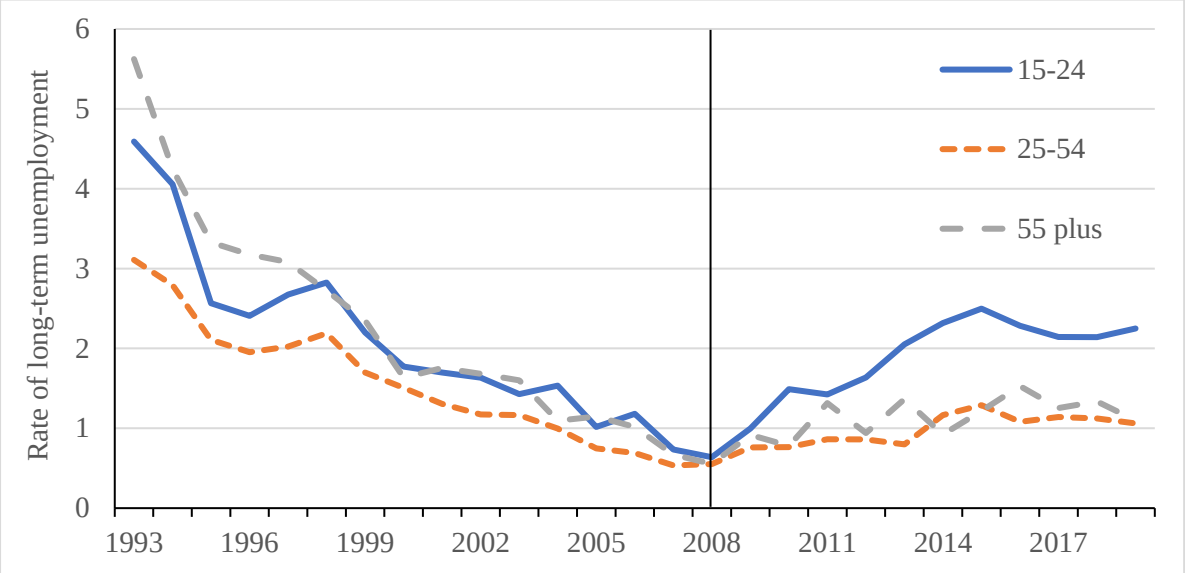
Note: Series '15-24 (constant FT student share)' is calculated by applying the share of FT students in total employment in 1993 (0.2105) to the actual PTE/E shares for FT students and non-FT students in each year.
Source: 15-24 years: ABS, Labour Force, Australia, catalogue no.6202.0, Tables 13 and 15; 25 years plus: ABS, Labour Force, Australia, Detailed – Electronic Delivery, catalogue no.6291.0.55.001, Table 01.

Figure 9: Share of new Bachelors' degree graduates in full-time employment, 4 months and 3 years after graduation, 2006(09) to 2016(19)



Source: Graduate Careers Australia, GradStats, Accessed at: http://www.graduatecareers.com.au/research/researchreports/gradstats/; Quality Indicators for Learning and Teaching, Graduate Outcomes Survey, Accessed at: https://www.qilt.edu.au/about-this-site/graduate-employment

Figure 10: Rates of long-term unemployment, By age, 1993 to 2019 (August)



Source: ABS, Labour Force Australia, Detailed – Electronic Delivery, catalogue no. 6291.0.55.001, UM3.

Table 6: Change in proportions of population by employment and full-time education status, Persons aged 15-24 years, 2008 to 2019 (August), ppts

	15-19 years	20-24 years
Males		
Employed + Not attending full-time education	-7.3	-8.4
Not employed + Attending full-time education	+5.1	+2.2
Females		
Employed + Not attending full-time education	-4.4	-7.4
Not employed + Attending full-time education	+5.1	+4.9

Source: ABS, Labour Force, Australia, Detailed – Electronic Delivery, catalogue no. 6291.0.55.001, Table 03.

Table 7: Proportion of employees in casual employment, By age, 2000 to 2019

	15-24 years	25 plus years	Difference
2000	46.3	22.4	+23.9
2008	47.1	18.1	+29.0
2019	54.0	18.1	+37.9

Sources: 2000-08: ABS, Employee Earnings, Benefits and Trade Union Membership, Australia, catalogue no. 6310.0; 2019: ABS, Characteristics of Employment, Australia, Tablebuilder.

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Appendix – Construction of series in Figure 6

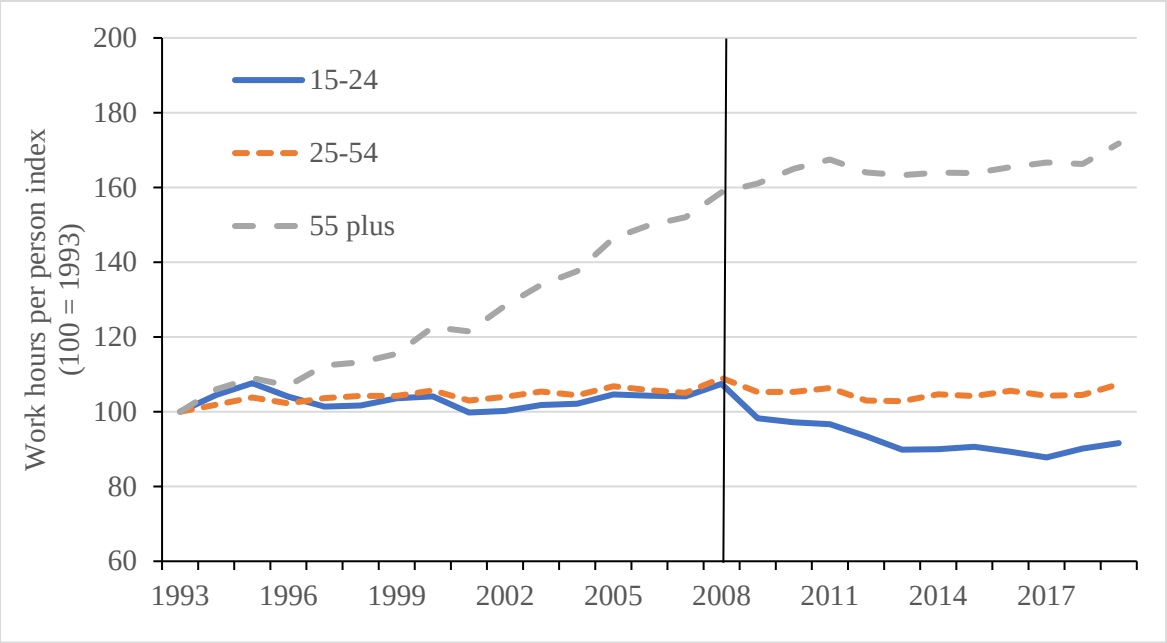
Steps:

1. Data on annual (August) EMP/POP rates for populations aged 15-24 and 25-54 years constructed from ABS, Labour Force Australia, Detailed – Electronic Delivery, catalogue no. 6291.0.55.001, Table 01.
2. Detrend both series using their trends for 1978 to 2008. (Note that the findings from this exercise are not sensitive to using alternative sensible time periods for detrending – such as from peak-to-peak: 1989 to 2008).
3. Calculate the difference in the cumulative change in each detrended EMP/POP series from 1978. This series can be interpreted as the difference in cyclical variation in EMP/POP rates for the 15-24 and 25-54 age groups. (Post-2008 this interpretation holds provided that the trends in EMP/POP rates from 1978 to 2008 capture trends post-2008.)
4. Regress the difference in the series from step [3] on the rate of unemployment. Use the estimated regression model to calculate a predicted series. This predicted series is the difference in cyclical variation in EMP/POP rates for populations aged 15 to 24 and 25 to 54 years that can be explained by the business cycle. It incorporates the feature of labour market dynamics that EMP/POP rates display decreasing cyclical sensitivity with age.
5. Calculate the difference between the actual difference in cumulative change in EMP/POP rates (from step [3]) and the predicted difference in cumulative change in EMP/POP rates (from step [4]).

The series constructed in step [5] can be interpreted as showing the impact of structural influences post-2008 on the relative change in EMP/POP rates for populations aged 15 to 24 and 25 to 54 years. The detrending and cyclical adjustment based on data for 1978 to 2008 are intended to remove the influence of structural and cyclical influences from that period. If that was being done perfectly, the series from step [5] would be zero from 1978 to 2008. While this condition does not hold, the average deviation is small – only 0.3 percentage point. On the assumption that trends and cyclical influences on EMP/POP rates remain the same following 2008, it should also be that the series is zero in that time period. However, the actual average deviation in 2019 is -3.5 percentage points.

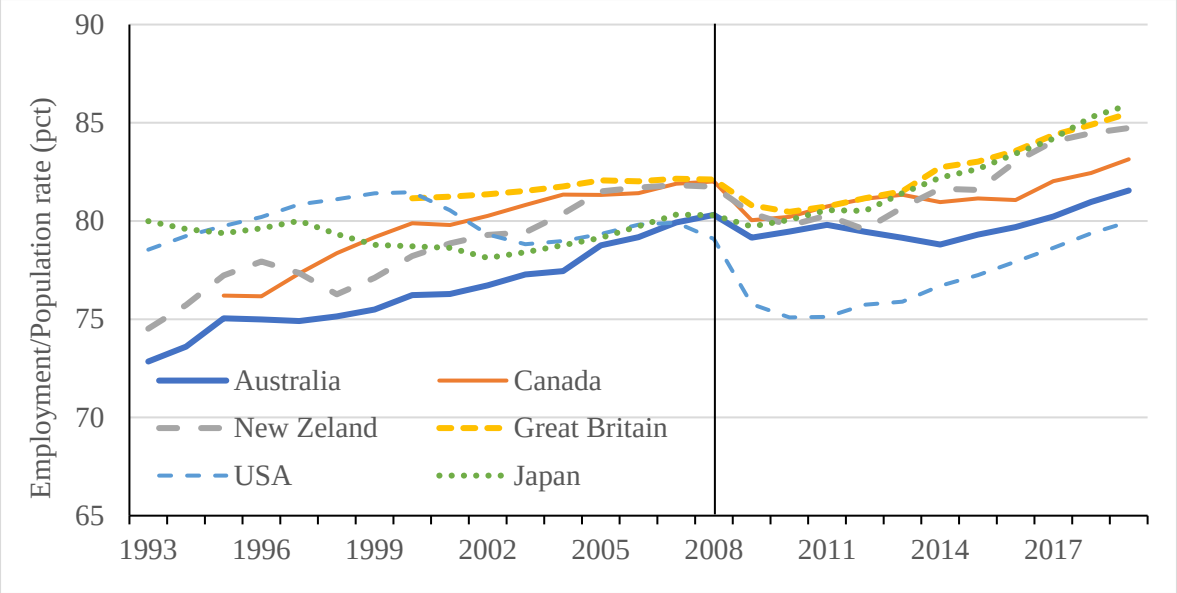
Appendix – Extra results

Appendix Figure 1: Annual hours of work per person, By age, 1993 to 2019



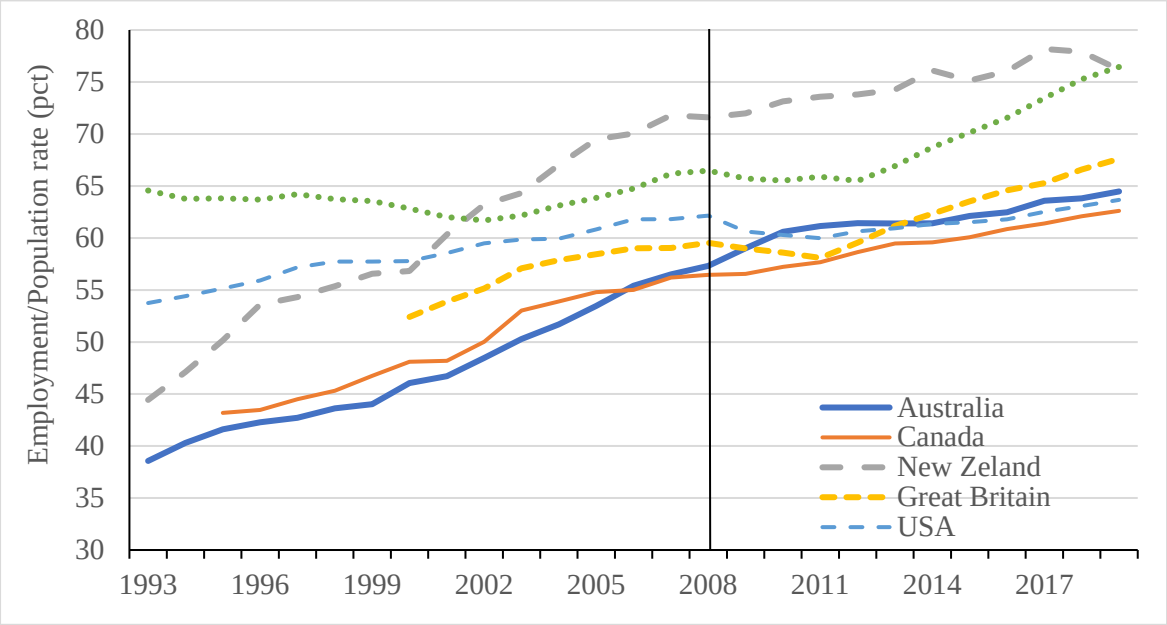
Notes/Sources: i] Hours: Calendar years; Population: Average over calendar year; ii] ABS, Labour Force, Australia, Detailed – Electronic Delivery, catalogue no.6291.0.55.001, Table 01 and EM1a.

Appendix Figure 2a: Employment/Population rate, Persons aged 25 to 54 years, Selected countries, 1993 to 2019



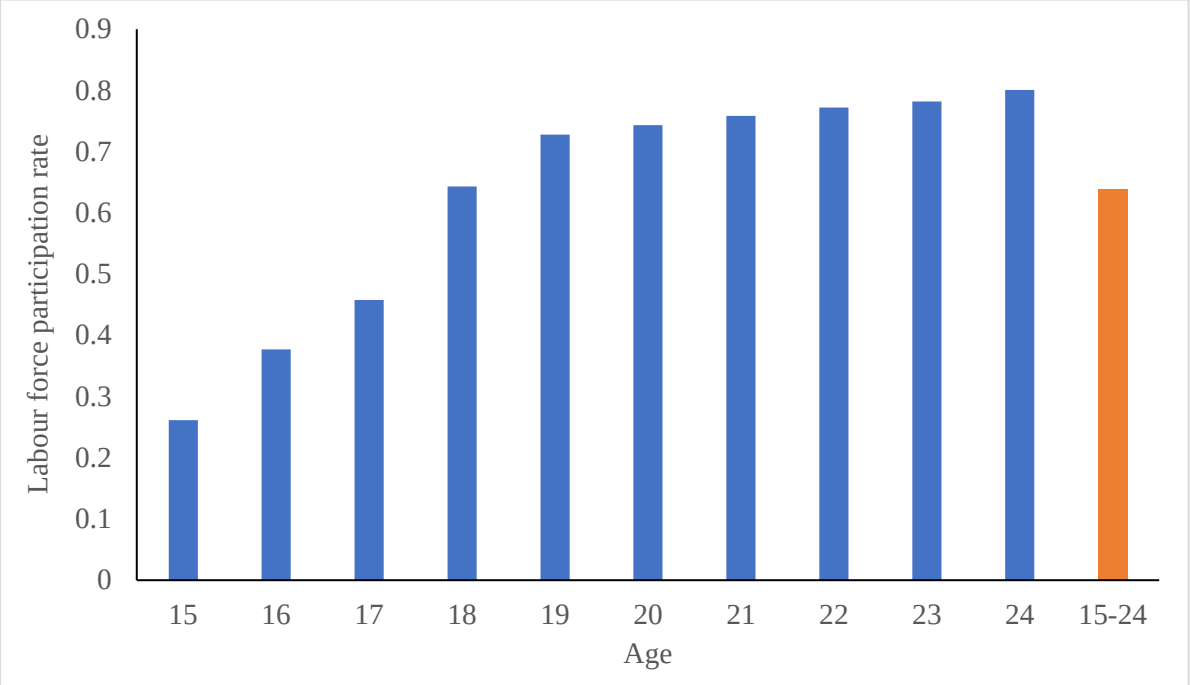
Notes/Sources: https://data.oecd.org/emp/employment-rate-by-age-group.htm#indicator-chart

Appendix Figure 2b: Employment/Population rate, Persons aged 55 to 64 years, Selected countries, 1993 to 2019



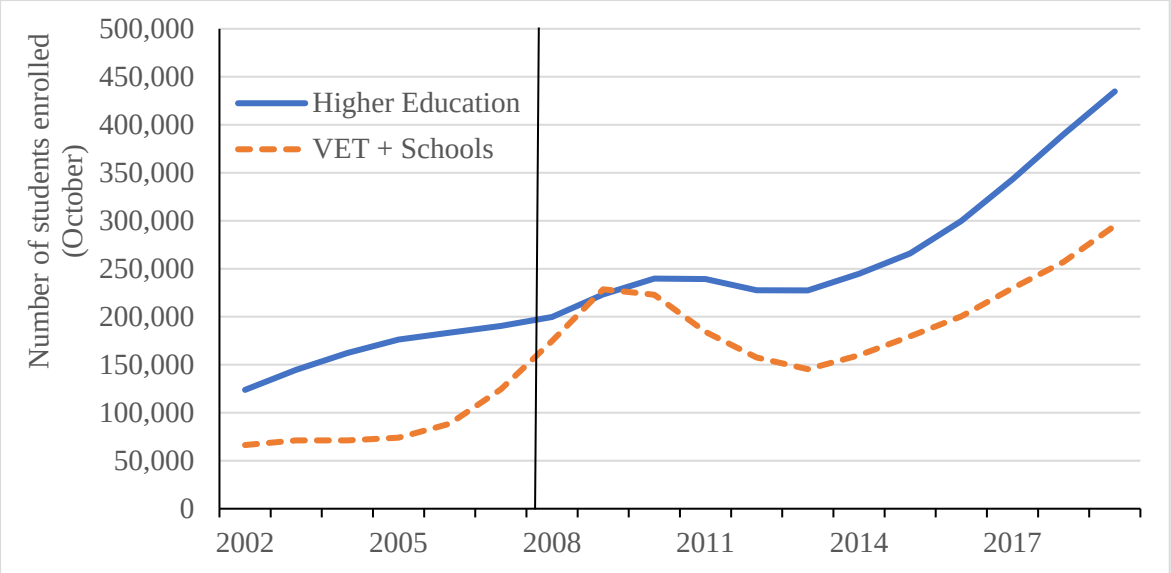
Notes/Sources: https://data.oecd.org/emp/employment-rate-by-age-group.htm#indicator-chart

Appendix Figure 3: Labour force participation rates, Persons aged 15-24 years, By specific age, 2016



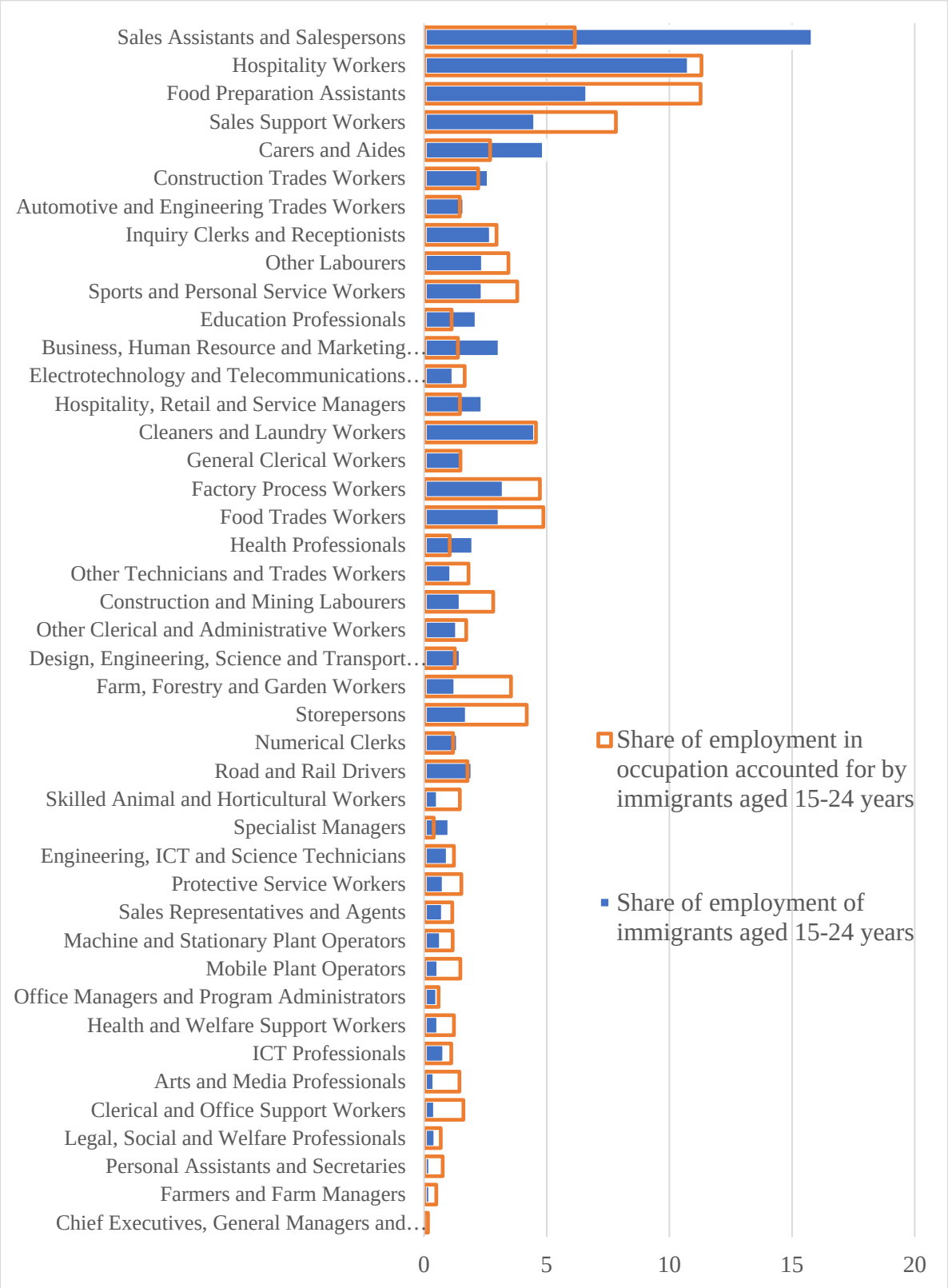
Source: ABS Tablebuilder, 2016 Census.

Appendix Figure 4: Total enrolments of international students attending education institutions in Australia, 2002 to 2019 (year to October)



Source: Australian Department of Education (2019), International Student Data; accessed from: https://internationaleducation.gov.au/research/International-Student-Data/Pages/InternationalStudentData2019.aspx

Appendix Figure 5: Distribution of employment by occupation, Persons aged 15 to 24 years, Immigrants, 2016



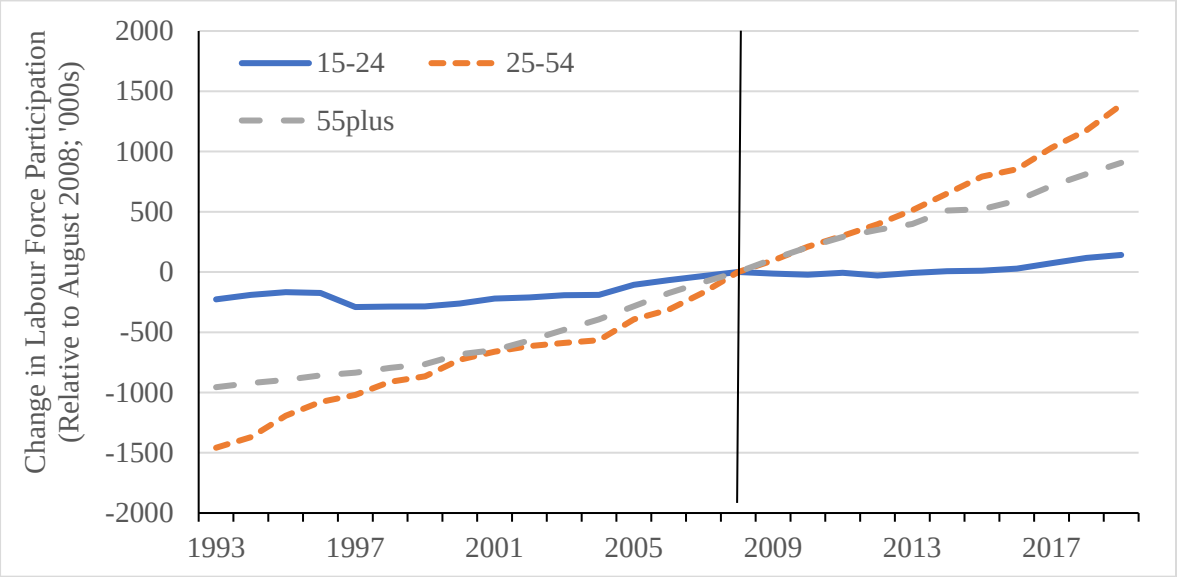
Source: ABS Australian Census, 2016, Tablebuilder.

Appendix Table1: Sources of changes in number of labour force participants aged 15 to 24 years who are immigrants, 2006 to 2016, Australia

	15-19 years	20-24 years
Total change in LFP	21,825	61,782
Change in LFP by FT students	22,915	36,536
Change in LFP by non-students		22,249
Change in LFP by non-students in Australia for less than 2 years		6,681

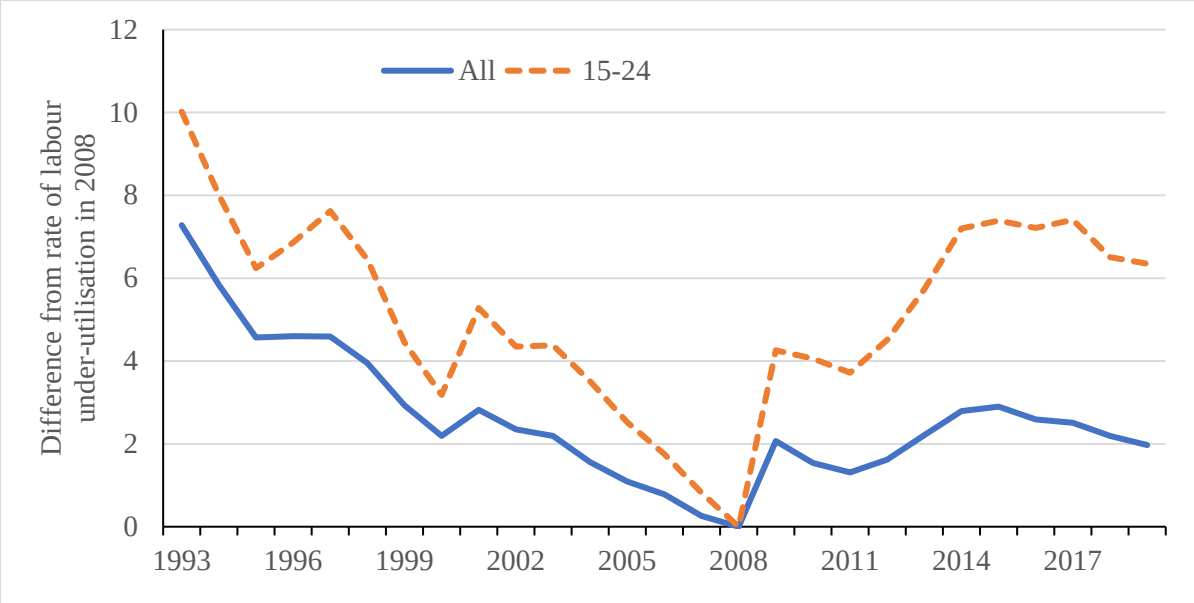
Source: ABS Census Tablebuilder.

Appendix Figure 6a: Change in Labour Force Participation, By age, relative to August 2008, 1993 to 2019 (August)



Source: ABS, Labour Force Australia, Detailed – Electronic Delivery, catalogue no. 6291.0.55.003, Table 01.

Appendix Figure 6b: Volume-based rate of labour underutilisation, All persons aged 15 and above and persons aged 15-24 years, Australia, 1993 to 2019



Note: Calculated as (Hours of work sought by unemployed persons + Hours of work sought by underemployed)/(Actual hours worked + Hours of work sought by unemployed persons + Hours of work sought by underemployed) over calendar year. Hours of work sought by unemployed persons = Number of unemployed seeking FT work*Average actual hours worked by person employed FT + Number of unemployed seeking PT work*Average actual hours worked by person employed PT. Hours of work sought by underemployed = Number of underemployed*Average extra hours of work sought by underemployed person.
Source: Actual hours worked by age: ABS, Labour Force Australia – Detailed, EM1a; Number of unemployed seeking FT and PT work by age: ABS, Labour Force Australia – Detailed, Table 01; Number of underemployed persons by age: ABS, Labour Force Australia, Table 22; Average extra hours sought by underemployed persons by age: Taken as average over August 2014 to November 2019 from ABS, Labour Force Australia – Detailed, Table 23b.

Appendix Table 2: Highest level of education attainment, Australian-born population, By selected age groups, 1996 to 2016

	1996			2016		
	20-24	25-54	55-69	20-24	25-54	55-69
Post-graduate	0.7	4.3	2.5	1.5	7.7	7.4
Bachelor's degree	11.0	11.1	4.4	13.9	20.1	12.6
Diploma	6.5	8.3	6.4	6.2	11.6	10.7
Certificate	15.4	19.1	14.9	24.9	28.5	23.0
No post-school	66.4	57.1	71.8	53.5	32.1	46.3

Notes/Sources: Census of Population and Housing.

Appendix Table 3a: Video game players, By age, Per cent of population, 2009 to 2019

	2009	2011	2013	2015	2017	2019
1-4 years			43	39	36	25
5-14 years	95	92	91	91	90	81
15-24 years	84	88	85	84	82	83
25-34 years	77	78	78	85	75	75
35-44 years				76	69	63
45-54 years				60	54	52
55-64 years				51	49	37

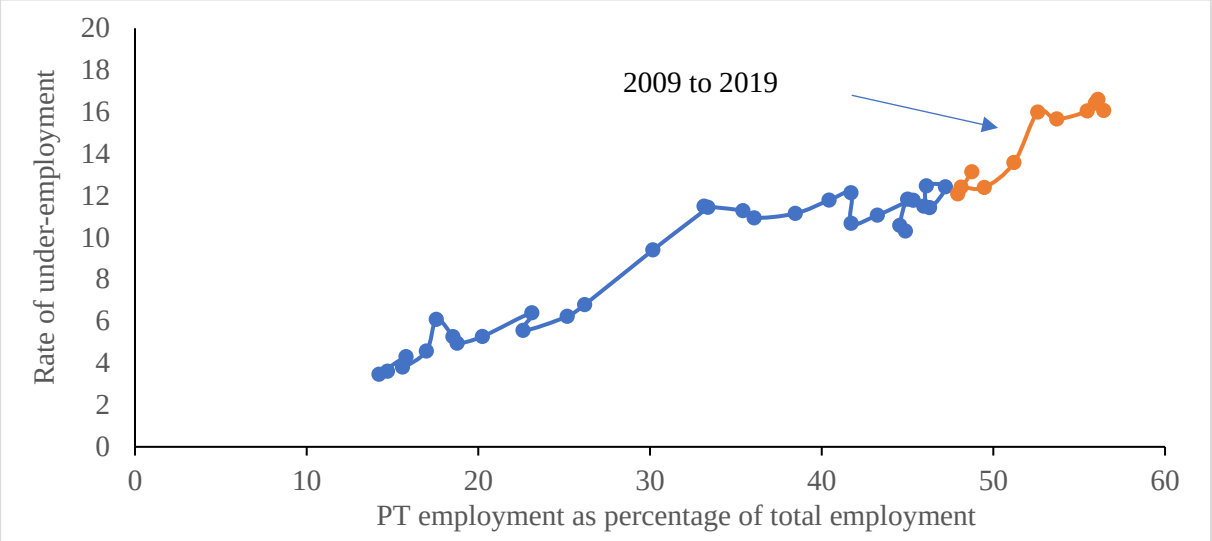
Source: Interactive Games and Entertainment Association, Digital Australia reports, 2010, 2012, 2014, 2016, 2018 and 2020. Accessed at: https://igea.net/category/research-2/igea-research-reports/

Appendix Table 3b: Video game time played, By age and gender, Average minutes per day, 2013 to 2019

	2013	2015	2017	2019
Males				
5-14 years		112	110	80
15-24 years	145	144	155	130
25-34 years	108	100	118	100
35-44 years		90	92	80
45-54 years		68	76	80
Females				
5-14 years		70	64	60
15-24 years	96	84	84	81
25-34 years	48	83	84	82
35-44 years		70	76	74
45-54 years		60	80	62

Source: Interactive Games and Entertainment Association, Digital Australia reports, 2010, 2012, 2014, 2016, 2018 and 2020. Accessed at: https://igea.net/category/research-2/igea-research-reports/

Appendix Figure 7: Rate of under-employment and share of part-time employment in total employment, Persons aged 15-24 years, 1978 to 2019 (August)



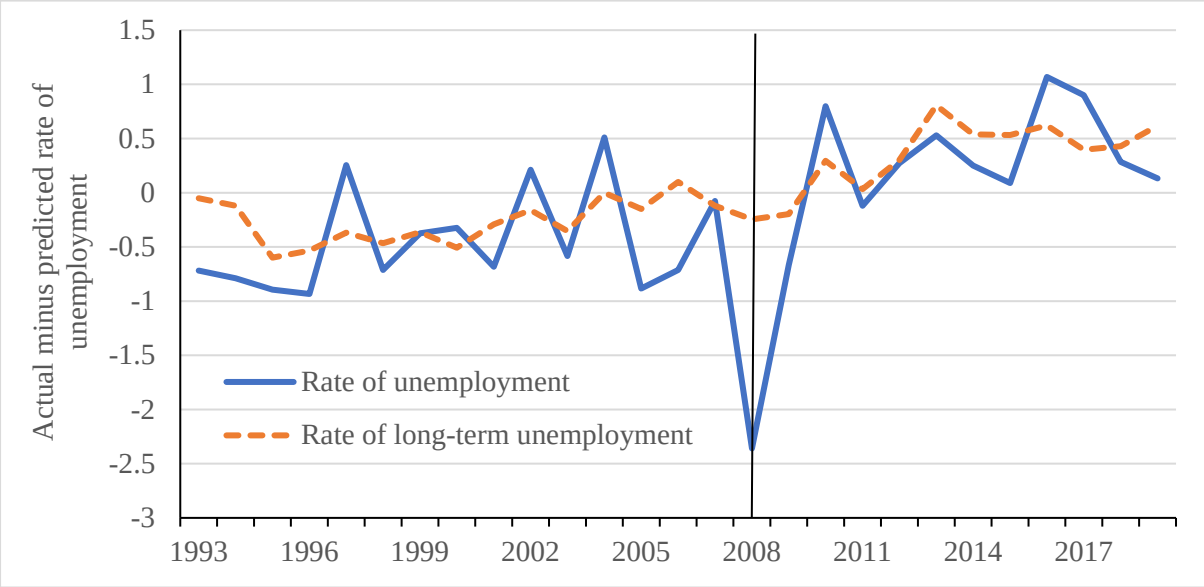
Sources: ABS, Labour Force, Australia, Detailed – Electronic Delivery, catalogue no. 6291.0.55.001, Table 01; ABS, Labour Force, Australia, catalogue 6202.0, Table 22.

Appendix Table 4: Relation between rate of underemployment and share of part-time employment in total employment, Persons aged 15-24 years, Australia, 1978 to 2019 (August)

	Rate of underemployment
Part-time share	0.257***
	(0.014)
Post-GFC	-12.90***
	(4.66)
Part-time share*Post-GFC	0.258***
	(0.089)
Constant	0.487
	(0.492)
Observations	42
Adjusted R-squared	0.941

Sources/notes: i] Share of PT employment – ABS, Labour Force Australia – Detailed, Electronic Delivery, catalogue no.6291.0.55.001, Table 1; ii] Rate of underemployment – ABS, Labour Force Australia, catalogue no.6202.0, Table 22. *** = significant at 1% level.

Appendix Figure 8: Variation in the rates of unemployment and long-term unemployment not explained by pre-2008 trend and cyclical factors, Labour force aged 15-24 years, 1993 to 2019 (August)



Sources: i] Rate of unemployment: ABS, Labour Force, Australia, Detailed – Electronic Delivery, catalogue no. 6291.0.55.001, Table 01; ii] Rate of long-term unemployment: 1978-90: ABS, Labour Force Australia, catalogue no. 6203.0; 1991-2019: ABS, Labour Force Australia, Detailed – Electronic Delivery, UM3.

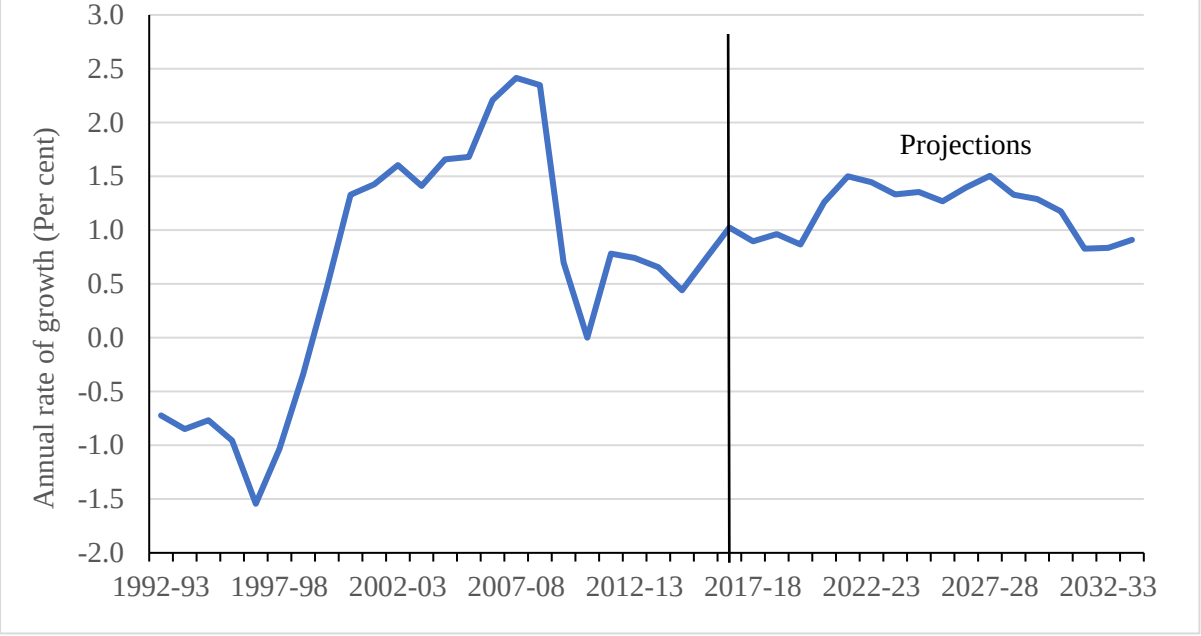
Notes: Each series constructed as follow: 1] Estimate regression model using annual data for 1978 to 2008 with series for 15-24 years group as dependent variable and for 25-54 years as explanatory variable; 2] Use estimates from regression model to generate predicted series; 3] Series displayed in figure equals actual series minus predicted series.

Appendix Table 5: Actions taken by Fair Work Ombudsman, 2009-10 to 2018-19

	Infringement notice issued	Compliance undertakings	Enforceable undertakings	Civil litigation commenced
2009-10			4	53
2010-11			11	55
2011-12	18	51	8	51
2012-13	124	74	12	50
2013-14	116	65	15	37
2014-15	348	118	42	50
2015-16	573	186	43	50
2016-17	665	192	40	55
2017-18	615	220	7	35
2018-19	563	274	17	23

Source: Fair Work Ombudsman Annual Reports, 2009-10 to 2018-19; accessed at: https://www.fairwork.gov.au/about-us/access-accountability-and-reporting/annual-reports

Appendix Figure 9: Annual rate of growth in population aged 15 to 24 years, Australia, 1992-93 to 2033-34



Sources: i] Historical: ABS, Australian Demographic Statistics, catalogue no.3101.0, Table 59; ii] Projections: ABS, Population Projections Australia, 2017 (Base) – 2066, catalogue no.3222.0, Tables A9, B9 and C9 – Projected rates of population growth calculated as an average of series A, B and C.