Centre for People, Organisation & Work | RMIT UNIVERSITY

Diversity and Growth in Regional Development

Report for Regional Australia Institute

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February 2020

Table of Contents

Table of Tables

Table of Figures

Key Findings

The primary purpose of this research is to chart and explain the differential labour market and economic performance of key selected Australian regions and to identify policy and research implications of the study.[1] The summary key findings are:

- The regions have been subject to intensive structural change across many dimensions including the age structure of employment, the gender mix of employment, occupation and industry of employment and major job losses across a number of industries.
- The regions experienced starkly different population growth rates over the period 2006 to 2016. The total regional growth rate was 70% of the total Australian growth rate.
- The demographic trend in the regions is one of accelerated aging at faster rate than for Australia as a whole. This is due to a combination of very low growth in the age groups from 0-49 years but much faster growth in the age groups 50 years and above. Even the regions with the fastest overall population growth experienced significant demographic aging.
- The dramatic aging of the population in the regions will arguably offset to some degree the impetus to endogenous economic growth even in those regions having quite rapid population growth. For those regions with very low population growth, rapid aging will reinforce low stimulus to endogenous economic growth. There are however, also counter-veiling trends which may moderate these effects. These include rapidly rising participation rates of older workers and the possibility that the rate of large scale redundancies in manufacturing will decline.
- For the regions as a whole growth in total employment was 12.9% compared to 17.4% for Australia, largely reflecting the difference in population growth rates between the regions and the nation. In 2006 and 2016 the aggregate labour force participation rate in the regions was significantly lower than for Australia as a whole.
- Most measures of labour market dependency (the proportion of the population not working) worsened in the regions.
- There was considerable variation in labour market performance across the regions. Above average employment growth was experienced in Geelong (22.8%) and Central Coast (15.6%), and near average in Toowoomba (12.1%) and Latrobe-Gippsland (11%). Total employment fell in NT Outback (-4.8%) and was nearly static in W&NW Tasmania (1.2%).
- There was a marked feminisation of the labour market due to a significant rise in aggregate female participation rates and a decline in male participation rates. For the regions as a whole the female employment growth rate exceeded male employment growth by more than two to one. In two ‘low growth’ regions (NT Outback and WNW Tasmania) total male employment actually fell in absolute terms.
- In 2016 there was a very large gap between the participation rates of males in the regions (48.2%) and for Australia (52.2%). (A similar gap existed in 2006). Even

[1] There are small differences in some totals due to the ABS applying a confidentialising procedure to small cell sizes.

regions with the fastest employment growth over the period, Toowoomba and Geelong, had a fall in male participation rates.

- Males and females 60 years and over had a marked rise in participation rates.
- Across the regions the number of employed persons aged 50-59 years grew by 20.7%, much faster than the growth in total employment of 13.5%. Even more remarkable was the growth of employment of persons aged 60 years and older whose number in employment increased by 93.7%.
- The flow of new jobs in the regions is heavily skewed to part-time work as the number of full time workers increased by just 9.1% compared to a 23.5% increase in part time employment. Similar trends are evident for Australia. The rapid growth of employment of older persons was greatly facilitated by the availability of part time work. Across the regions as a whole for females 60 years and over part-time employment increased by 144.7% and for males by 84.3%
- There has been a large decline in the number of persons aged 19 years and under in a job. In this age group total male employment fell by 12% and females by 7.1% across the regions. Almost identical trends applied Australia wide. There appears to have been a considerable slump in job openings to young people across the regions and a large rise in the youth unemployment rate. Similar trends occurred Australia wide.
- The number of employed prime aged workers (20-49) increased by only 4.8%; less than the cohort's population. Indeed, in the NT Outback and WNW Tasmania there were substantial declines in the number of prime aged persons employed. The performance of prime age workers in the regions stands in stark contrast to the Australian data, where employment of these workers increased by 13.1%. A major contributor to the low growth of prime age workers in the regions is the huge gender disparity in job creation as prime age female employment increased by 8.4% compared just 1.6% for males. This gender disparity is much larger in the regions compared to Australia as a whole.
- Females were over-represented in occupations and industries such as Health Care and Social Assistance, Education and Training and Accommodation and Food Services, that have experienced especially rapid growth. Conversely, male employment is segmented into jobs and industries that have had marginal growth or declining employment. The exception was Technicians and Trades jobs.
- Net job growth occurs when job creation exceeds job losses. The low growth regions, NT Outback and WNW Tasmania, have a ratio of job loss to gain for both males and females many times higher than for other regions and for Australia as a whole. Across the regions as whole males have a rate of job loss as a share of job gains double that of females in the regions and double that of males for Australia as a whole.
- The loss of male Manufacturing jobs across the regions was equivalent to nearly half of male net job gains over the period. For Australia as a whole for every 10 male jobs created across Australia 3 were lost in manufacturing.
- In the absence of major future job loss in the regions there should be more net job gain and, even possibly in the future, potential labour shortages in the low growth regions in particular.
- Earnings for total full time employed persons in the regions are 8% lower than for Australia as a whole. The study finds evidence supporting the claim that first, the

industry composition of net full time employment growth has not resulted in an increase in the average wage. Second, net full time employment growth is split between industries with above and below average earnings, supporting he claim of job polarisation.

- Over the decade all regions experienced remarkable growth in the proportion of their workforce with a Post School Qualification (PSQ) with the proportion increasing from just over half in 2006 (54.1%) to nearly two thirds in 2016 (64.7%).

Policy and Research Implications

From the results the study identified a number of policy implications and ideas for further research.

Winners and Losers from Structural Change

The regions have been subject to intensive structural change across many dimensions including the age structure of employment; skills and qualification mix of employment; the gender mix of employment; occupation and industry of employment and major job losses across a number of industries. Many in the working population have been remarkably active in helping themselves adjust to these large changes, as indicated by the rate of change in jobs across occupations and industries and their substantial investment in the acquisition of more and higher education and training qualifications.

The result has been easily identifiable ‘winners’ from structural change, with the creation of many high skill, high wage and highly credentialed jobs in business services, health and education and professional, scientific and technical services. Females have also benefitted disproportionately from growth in industries in which they were and are over-represented. Older workers have also grasped the phenomenal growth of job opportunities, especially part-time jobs, with great enthusiasm. (Though, no doubt, a proportion feels impelled to remain in the labour market because of changes to the Age Pension entitlement, rising rents, divorce and loses on superannuation).

The ‘losers’ are those in already depressed regions where low population and employment growth provide diminished opportunities for advancement. Young people have had fewer job openings and therefore higher unemployment rates while prime age males have suffered disproportionately from major redundancies, especially in manufacturing, and employment in low growth industries, with the exception of construction jobs. Their overall labour market participation rate has declined, with much of this attributable to workers simply withdrawing from the jobs market. Some males have also benefited from the growth of female dominated industries, but overall males have not increased their share of these jobs. There have also been many low-income and part-time jobs created, which is consistent with the ‘job polarisation’ hypothesis advanced by researchers and public policy experts including the Australian Treasury. The growth of work that is both low-income and part-time accentuates this polarisation. There is also evidence of significant skill ‘under-utilisation’ where the qualifications workers have exceeded the ‘objective’ requirement so the job.

It can be speculated that for the ‘losers’ there will be resentment and resistance, creating grounds for populism. The data also shows a major gap in economic opportunities between many regions and the rest of Australia, especially the large cities; the so-called, ‘sandstone divide’ on the east coast of Australia. The two regions doing best, the Central Coast and Geelong, are increasingly dormitory regions for the major capital cities, while the high performing Toowoomba is a major inland city that has benefited significantly from the rapid population growth of SE Queensland.

The low labour force participation rate in the regions, although explicable partly by the older demographic, does represent an underutilisation of resources in the regions and the nation.

To address these adverse consequences of structural change and their disproportionate distribution of gains and losses across individuals and regions, it is recommended that policies to encourage the development of new industries in the regions be considered.

Endogenous vs. Exogenous Sources of Demand

The stark differential population growth rates are significant for each region's prospects for growth and development. However, there a number of major caveats to this direct association between population growth and regional economic opportunity. Past demographic trends do not necessarily impose an iron law of destiny on the economic fortunes of regions. This is due to factors such as whether the source of regional effective demand is primarily exogenous or endogenous to the region. To what extent is regional economic activity focussed on meeting demand external to the region be it overseas exports and/or domestic? For regions where these external-demand oriented activities comprise a high share of regional output and employment the principal source of effective demand is exogenous, or determined from outside the region. A good example of this would be the car industry in Geelong, prior to its closure, which 'exported' both overseas and to other regions in Australia. But for other regions where demand is primarily endogenous within the region, economic opportunities are primarily dependent upon population growth, including domestic and overseas migration. Other factors include changes in age specific labour force participation rates and numerous government policy measures and incentives. The latter can be enacted to influence for example, the investment location decisions of industry, residential location decision of workers and retirees and the birth rate.

It would potentially be a useful for public policy makers to quantify the extent to which the industries in each region are subject to exogenous and/or endogenous sources of demand and the extent to which the former are split between export and domestic public and private sector sources. The different sources of demand have significantly different implications for regional development strategies. It would also be pertinent to examine the relative volatility in demand in the different sources. The latter is likely to be important for exogenous demand sources related to mining and tourism.

Job Polarisation

The study finds evidence supporting the claim that first, the industry composition of net employment full time growth has not raised the average full time wage. This is counter to the general presumption of orthodox economics that structural change entails a tendency for high productivity/high wage jobs to displace low productivity/low wage jobs. An implication of this is that net job creation is contributing to stagnant average wages.

Second, net full time employment growth is split between industries with above and below average earnings, supporting the claim of job polarisation. This income job polarisation will be exacerbated by the disproportionate share of net employment growth that is part-time. Many workers seek more hours and this is a major cause of so-called 'under employment'.

These developments have implications for social cohesion and may even be a factor reinforcing inter-generational disadvantage in the regions. Further they may also be a cause of skill under utilisation whereby, at the margin, people are over-qualified for the lower-skill jobs they obtain. This is an inefficient use of social resources on education. These

developments support the earlier recommendation that measures be put in place to promote the development of high productivity, high wage industries in the regions.

Employment Growth and Economic Analysis

The pattern of employment growth bifurcated as it is between high wage, high productivity, highly qualified workers and low wage, low productivity and lesser skilled workers raises important implications for regional policy and economic analysis.

The pattern of employment growth across different industries and occupations suggest there are two distinct mechanisms at play, each having markedly different implications for regional policy. In the first, employment growth and specialisation is driven by the type of fundamental economic forces identified by the classical economists such as Smith and updated in what is termed modern endogenous growth theory. This is a model in which industrial specialisation is driven by the market forces of competition, division of labour, rapid technical change, high productivity and high wage growth. The rapid growth of Professional, Technical and Scientific Services industry reflects these factors such as specialisation due to the rapid growth of knowledge and the profound advantages to firms accessing expertise by contracting out of activities, like engineering design, software development and accounting. In activities such as these there is also a substantial role for government in terms of infrastructure provision, support for R&D, education and direct demand for the output of this industry.

However, much of the employment specialisation and growth occurring across the regions, and Australia, can be explained by drastically different mechanisms. A large share of increased employment specialisation over the last decade may be argued to be driven by a combination of demographic change, increased female labour force participation rates and government funding. This applies especially to the growth of aged care, child care, pre-school education, welfare services, disability services, food and beverage services and some health services. Whilst the past and projected growth of health and social assistance is valued in increasing jobs and meeting the needs of citizens, it is also the case that, in aggregate, this industry has on average a low level of productivity and low wages.[2] In addition, a large share of the increase in employment specialisation, especially for males, is due to large scale job loss in other industries, notably manufacturing. Therefore, this outcome may be better described as decreasing diversity rather than increasing specialisation. The role of government policy in the growth of these industries is also markedly different in that it is focussed on either the direct provision of services, such as public hospitals and schools or contracting out services previously delivered directly by government such as vocational education and training and employment services or indirect support through subsidies to privately owned hospitals, schools, aged care and child care.

[2] The number of highly paid persons in medicine is greatly outweighed by the numbers of relatively low paid in activities like aged care, child care and disability services. In other words, excluding medical workers would greatly lower the calculated level of productivity in this industry. Average hourly total cash earnings for residential care and social assistance is 14% and 23% respectively lower than the average for all industries (ABS 2018).

Government Driven Jobs Growth?

An implication of the above is that many of the industries in which job growth is occurring are directly or indirectly funded by the government. The direct include Public Administration and Safety and large parts of Education and Health and Social Assistance. But aside from the first industry these have also been subject to extensive contracting out, where government remains the principal funder or offers a variety of subsidies to activities in which funding is shared between government and the private user. It is appropriate to quantify the level of direct and indirect dependence on the public sector as a principal source of demand for jobs in regional labour markets. At present the extent of this dependence is opaque. (The traditional use of a public/private sector split of employment is much less useful given the extent of contracting out and subsidies). This research will permit policy makers to craft decisions that are properly informed as to their consequences on regional economies.

A Possible Turnaround for Depressed Regions

Major job loss in manufacturing had ambiguous effects on regional labour markets. On the one hand it caused a significant fall in male participation rates, due to the ‘discouraged worker effect’. On the other, since not all redundant workers left the regional labour market, it constituted an important source of labour supply for expanding industries, especially hospitality and health and social assistance. In the absence of future large scale redundancies, the scope for inter-industry labour transfer will be greatly reduced. Expressed another way, in the absence of major future job loss in the regions there should be more net job gain and, even possibly in the future, potential labour shortages in the low growth regions in particular. This possibility warrants further research.

Wages and Unemployment

The study examined the relationship between unemployment and wage levels and supports the well-established empirical finding of an ‘inverted wage curve’: that lower unemployment is associated with higher wages. The policy implication is that lowering the wage rate may not improve employment.

Extended Summary

Purpose of the Study

The primary purpose of this research is to chart and explain the differential labour market and economic performance of key selected Australian regions and to identify policy and research implications of the study. This research focuses on changes over time, between 2006 and 2016, relying mostly on ABS Census data, but also extensively supplemented with other data and informed by public policy and academic literature. Change over time is critical in revealing the different economic trajectories of regions and some of the drivers of this differential performance. (Below the figures in square brackets refer to chapter sub-headings for easy reference).

Change in Demographic Structure

[2.2] The regions experienced starkly different population growth rates over the period 2006 to 2016. Regions with population growth above the average decadal rate of 12.5% were Geelong (20.6%) Toowoomba (14.5%) and Latrobe Gippsland (13.6%). Regions with the slowest growth were WNW Tasmania (2.7%) and NT Outback (5.4%). Average growth of 12.5% for the region as a whole is significantly slower than for Australia as a whole, whose population increased by 17.9%. The total regional growth rate was 70% of the total Australian growth rate.

Differential population growth rates are significant for each region's prospects for growth and development. A major caveat to this direct association between population growth and regional economic opportunity arises where regional economic activity is focussed on meeting demand external to the region be it overseas exports and/or domestic

Regional Age Composition

Comparing the regions as a whole to Australia, there are markedly divergent differences in the growth rates of certain key age groups. In the regions the number of young (0-19 years) grew by 0.8 percent and prime (20-49 years) by 6.2%. This contrasts with Australia which experienced a comparative surge in the number of young people as these cohorts grew by 9.3% and 14.9% respectively.

The growth rate of older persons (50-59 years) was 2.5 times that of prime age (20-49 years) and the growth rate of retirees (60 and over) was nearly 6.1 faster times than the prime group. The growth rate of these older age groups relative to the young cohort (0-19 years) was many multiples faster again. On average the growth rate of older persons (aged 50-59 years) in the regions was similar to the national average, though again with significant regional variation. Similar trends apply to those 60 years and over.

In sum, the demographic trend in the regions is one of accelerated aging at faster rate than for Australia as a whole. This is due to a combination of very low growth in the age groups from 0-49 years but much faster growth in the age groups 50 years and above. Even the regions with the fastest overall population growth experienced significant demographic aging.

In all regions persons aged 50 years and above accounted for almost all growth, and in some regions the absolute size of the increase in this age group exceeds the total population rise over the period 2006 to 2016. (This is explained by declines in younger aged groups).

The dramatic aging of the population in the regions will arguably offset to some degree the impetus to endogenous economic growth even in those regions having quite rapid population growth. For those regions with very low population growth, rapid aging will reinforce low stimulus to endogenous economic growth.

Four mechanisms are identified where these demographic shifts will, in theory, reduce the economic stimulus in comparison to that provided by population growth skewed to younger age groups.

Change in Labour Force Structure

The interaction of dynamic labour market and demographic trends is examined focussing on 'dependency' and how changes in economic behaviour of the population reinforce or counter-act aging demographic trends.

[3.1] For the regions as a whole growth in total employment was 12.9% compared to 17.4% for Australia. Employment growth in the regions was 74.1% of the rate for Australia as a whole, largely reflecting the difference in population growth rates between the regions and the nation. There is a strong positive association between population growth and employment growth with all regions that experienced below average population growth over the decade also having low employment growth rates with the converse applying for above average population growth rate regions. The dynamics driving slow population and negative or marginal employment growth include first, the fact that a major driver of internal migration of the population is to regions with rapid employment growth. Equally regions with slow population growth can be caught in a vicious cycle of decline, especially where some regions had a fall in the absolute number of young or prime age people. Another factor contributing to this vicious circle is that even modest productivity growth can be sufficient to offset to varying degrees modest population growth resulting in a decline or slow rate of employment growth.

In 2006 and 2016 the aggregate labour force participation rate in the regions was significantly lower than for Australia as a whole. This gap is accounted for by a number of factors such as the regions having a much higher proportion of persons 60 years and older (they have a lower participation rate than younger cohorts); higher unemployment rates in the regions (promoting a higher 'discouraged worker' effect); higher rates of disability and ill-health in the regions and generally lower educational attainment in the regions (labour market participation is positively associated with higher education and training levels).

[3.2] Three different labour market related dependency measures are used. (This measures the proportion of the population not working as a ratio of those employed or in the labour force). The ratio of employment to population, improved slightly over the period from 41.9% in 2006 to 42.1% in 2016. This means there are more workers to support a given population. However, a key factor in the slower growth of the population in the regions relative to the increase in the number of people employed is a much slower rate of growth of young people in the regional population. The number of young people aged below 15 years grew by only 1.8% across the regions over the decade, compared to 10.9% in Australia. Slow growth in

the number of young people is arguably an adverse long-run development for the regions in terms of the adequacy of future labour supply and future trends in the employment to population ratio.

The second economic dependency metric is the ratio of employed persons to population aged 15 years and older. This ratio fell by 1.0%% over the period in the region, so that on this metric dependency increased. This fall is explained by the difference between employment growth across the regions which increased by 12.9% and the population aged 15 years and over which grew by 14.1%. Only two of the six regions, the Central Coast and Geelong, had an improvement in this dependency ratio.

Finally, the labour force participation rate, which is the ratio of employed and unemployed (the labour force) to the population aged 15 years and above fell across the regions by .3%. The labour force increased by 13.8% somewhat slower than the total population of persons aged 15 years or over which increased by 14.1%. A consequence of this dependency measures declining is that the number of people ‘not in the labour force’ (the labour force minus the total population aged 15 years and over) increased at a faster rate (14.5%) than both the total population (12.5%) and the growth in the labour force (13.8%).

In sum, one dependency measure improved, but for the ‘wrong’ reasons and the other two indicated an increase in dependency in the regions as a whole, as did Australia as a whole, with the exception of the Central Coast and Geelong.

There was considerable variation in labour market performance across the regions. Above average employment growth was experienced in Geelong (22.8%) and Central Coast (15.6%), and near average in Toowoomba (12.1%) Latrobe- Gippsland (11%). Conversely, over the decade total employment fell in NT Outback (-4.8%) and was nearly static in W&NW Tasmania (1.2%).

There was a marked feminisation of the labour market due to a significant rise in aggregate female participation rates and a decline in male participation rates. Secondly, males and females 60 years and over had a marked rise in participation rates. Finally, the increase in older male participation rates was incapable of offsetting the decline in younger male age cohorts resulting in a net fall in male participation rate across the regions.

In 2016 there is a very large gap between the participation rates of males in the regions (48.2%) and for Australia (52.2%). (A similar gap existed in 2006). Even regions with the fastest employment growth over the period, Toowoomba and Geelong, had a fall in male participation rates.

The labour market experience of females is, with few exceptions, the opposite of males. The overall female participation rate in all regions increased. Females in all age groups in all regions, with the exception of a few younger cohorts in the NT Outback and Toowoomba, experienced a rise in participation rates. There were especially large rises for females in the two oldest age groups.

The flow of new jobs in the regions is heavily skewed to part-time work as the number of full time workers increased by just 9.1% compared to a 23.5% increase in part time employment. 58%of the total increase in employment in the regions was accounted for by part time employment. Similar trends are evident for Australia.

In all regions the rate of female employment growth exceeded male employment growth by a large margin. For the regions as a whole female employment growth exceeded male employment growth by more than two to one (Table A6). Total female jobs increased by 18.4% and male jobs by 8.6%. In two 'low growth' regions (NT Outback and WNW Tasmania) total male employment actually fell in absolute terms. In NT Outback nearly one in every 10 male jobs disappeared and in WNW Tasmania it was just under one in every twenty male jobs.

There has been a large decline in the number of persons aged 19 years and under in a job. In this age group total male employment fell by 12% and females by 7.1% across the regions. Almost identical trends applied Australia wide. It is unclear what is behind this potentially concerning trend. (An increase in school retention rates was investigated and discounted). There appears to have been a considerable slump in job openings to young people across the regions and a large rise in the youth unemployment rate. Similar trends occurred Australia wide.

The poor labour market performance of young people is a particularly concerning issue in the regions given the overall trend within the regions to lower employment growth and labour force participation rate compared to Australia as a whole. Such conditions may be the basis for inter-generational disadvantage.

The second key age related shift was the labour market behaviour of older persons. Across the regions the number of employed persons aged 50-59 years grew by 20.7%, much faster than the growth in total employment of 13.5%. Even more remarkable was the growth of employment of persons aged 60 years and older whose number in employment increased by 93.7%.

Of concern to policymakers is that the absolute number of workers aged 15-19 years actually fell by 9.5% and the number of employed prime aged workers (20-49) only increased by 4.8%. Indeed, in the NT Outback and WNW Tasmania there were substantial declines in the number of prime aged persons employed. The performance of prime age workers in the regions stands in stark contrast to the Australian data, where employment of these workers increased by 13.1%. A major contributor to the low growth of prime age workers in the regions is the huge gender disparity in job creation as prime age female employment increased by 8.4% compared just 1.6% for males. This gender disparity is much larger in the regions compared to Australia as a whole.

The rapid growth of employment of older persons was hugely facilitated by the availability of part time work. Across the regions as a whole for females 60 years and over part-time employment increased by 144.7% and for males by 84.3% (Table A7).

It is important to note that the rapid rate of growth of employed persons aged 50-59 and 60 and over is only partially accounted for by the fast growth of the population in these age groups. There was also a large increase in their labour force participation rates.

The causes of rising labour force participation rates of older persons were extensively investigated.

Change in Occupational Structure of Employment

There are significant differences across the regions in the occupational composition of employment.

There are major differences in occupational structure between the regions and Australia. In the regions Managers and Professionals comprise a much lower share of employment than for Australia. Conversely, Community and Personal Service Technicians and Tradespeople and Labourers comprise a higher share. The reasons for these differences were investigated.

Just two broads contributed disproportionately to the growth in total employment over the period in the regions. Professionals and Community and Personal Services contributed 33.1% and 30.1% respectively to the growth in total employment (Table 17). These two occupations accounted collectively for 6.3 of every 10 net jobs created over the period. Similar trends for Professionals applied across Australia but Community and Personal Service Workers across Australia contributed a smaller 22.5% of total employment growth.

Net job growth occurs when job creation exceeds job losses. The low growth regions, NT Outback and WNW Tasmania, have a ratio of job loss to gain for both males and females many times higher than for other regions and for Australia as a whole. Second, across the regions as whole males have a rate of job loss as a share of job gains double that of females in the regions and double that of males for Australia as a whole. In the low growth regions, the rate of male job loss greatly exceeds male job creation. Only the Central Coast, alone of the regions, had a rate of job loss over job creation close to the Australian average.

The net effect of the more rapid growth of female employment in the regions is that females increased their share of total employment over the period from 46.1% to 48.3%.

The data shows considerable evidence of occupational sex segmentation. The key points are that females are significantly over-represented in Professional; Community and Personal Services; Clerical and Administrative and Sales jobs. Over-representation means that the share of female employment in the given occupation exceeds the share of female employment n total employment in each period. Crucially, the first two groups especially have experienced rapid occupational growth accounting for well over 70% of net female job creation across the regions. Further, Sales and Clerical and Administrative jobs also experienced growth over the period. In other words, females have been segmented into jobs that have experienced especially rapid growth and these accounts for the rising overall share of females in total employment.

Conversely, total male employment is over-represented in occupations in which they comprise the great majority of workers, for example, Technicians and Trades, Machine Operators and Drivers and Labourers. The last two broad occupations had marginal or declining employment across the regions and Technicians and Trades grew at around the total average male rate. Thus, the occupational sex segmentation of males in declining or slow growing industries accounts in large part for their declining share of total employment over the period.

For most regions there was considerable growth in the share of part time workers in total employment. Across all regions part time workers increased their share of total employment

from 32.3% in 2006 to 35.2% in 2016. The causes of the rise in part time work over the period are investigated as too are its implications.

Change in Industry Structure of Employment

Of the 19 ANZSIC industries at the 1 digit level, the most aggregated level, female employment across the regions expanded in 15 industry sectors. The pattern of employment growth for Australia was broadly similar to the regions. Just three of the 19 industries accounted for nearly 7 in every 10 female jobs created, Health Care and Social Assistance (41.1%); Education and Training (19.1%) and Accommodation and Food Services (9.3%). The contribution of Education and Training in the regions was close to that for Australia as a whole but, Health Care and Social Assistance grew much faster compared to the nation. The other major contributors were Public Administration and Safety (6.7%) and Professional, Scientific and Technical Services (6.5%)

Male employment fell across the regions in 3 of the 19 industries in Manufacturing (-31.1%), Wholesale Trade (-21.6%) and Retail (-2.5%) (Table A13). With the exception of Retail these declines mostly reflect similar trends across Australia and of the same magnitude.

The principal contributors to net male job growth included Construction (40.7%) were Health Care and Social Assistance (17.2%), Accommodation and Food Services (14.2%), Professional and Technical Services (10.3%) and Education and Training (9.1%).

The main difference between males and females, aside from the fact that female employment grew at more than twice the rate as male employment, is the contribution of Construction to male employment gains. The main difference between the regions and Australia is that former was far more dependent on Construction, accounting for 40.7% of net job growth compared to 25.7% for the latter.

Expressing job loss as a proportion of net job growth across the regions by industry the major contributors to male job loss were Manufacturing (-47.4%); Wholesale (-9.5) and Retail (-2.4%). The loss of male Manufacturing jobs across the regions was equivalent to nearly half of male net job gains over the period across the regions. That is to say, for every 10 male jobs created in the regions over the period 4.7 were lost in Manufacturing. (Around 24,500 male jobs were added across the regions but 11,600 were lost in Manufacturing). For Australia as a whole for every 10 male jobs created across Australia only 3 were lost in manufacturing. (There were close to 700,000 male jobs created over the period but 212,000 manufacturing jobs lost).

The drivers of regional change in industrial structure and policy implications were analysed and include that over the decade of analysis real manufacturing output fell by about 7% due to a resource boom induced massive appreciation of the dollar which made local industry uncompetitive and public policy decisions to cease supporting motor vehicle production.

Major job loss in manufacturing had ambiguous effects on regional labour markets. On the one hand it caused a significant fall in male participation rates, due to the ‘discouraged worker effect’. On the other, since not all redundant workers left the labour market, it constituted an important source of female and male labour supply for expanding industries, especially hospitality and health and social assistance. In the absence of future large scale redundancies, the scope for inter-industry labour transfer will be greatly reduced. Expressed

another way, in the absence of major future job loss in the regions there should be more net job gain and, even possibly in the future, potential labour shortages in the low growth regions in particular.

Rapid growth in the Health Care and Social Assistance industry can be accounted for in large part by the aging of the population, as older people make more demand on the health care system and increasingly move into aged care. The combination of rising per capita income over the long run and medical advances, which expands the scope for medical interventions, also expands the demand for medical services across all age groups. The growth of preschool and child care services, the former being part of the education and Training industry and the latter being part of the Social Assistance industry, is also partly a function of the large rise in female labour force participation rates and employment over the period. The growth of these two industries and the rise in female labour force participation are complementary economic activities.

The 2016 Census results were unlikely to be affected in a significant way by the National Disability Insurance Scheme (NDIS) as it did not commence until June 2016. Over the five years to 2024 the NDIS will require an additional 90,000 full time equivalent workers; a 90 percent increase in the existing disability workforce. Achieving an equivalent proportional increase in the regions' Social Assistance workforce, which has already been subject to a faster rate of growth than for Australia as a whole, will be a challenge.

The growth in the regions of Food and Beverage Services, which includes cafes, restaurants, clubs and catering establishments, reflects increased tourism; rising per capita income and the rise of the two person working household. There is also arguably a link between the growth of Catering services and the Health and Social Assistance industry as the former can be contracted to supply meals to institutions such as hospitals and aged care facilities, both of which have grown significantly over the decade.

Finally, the regions have been subject to very significant changes in the age structure of employment, the gender mix of employment and change in industry of employment. Accordingly, given this intensive structural change it would be anticipated that demand in the regions for Education and Training focussed on training and re-training for adults would be high. Indeed, employment of both males and females in the two main components of Education and Training focused on adult education and re-training, Adult, Community and Other Education and Tertiary Education (which includes university and vocational education), grew substantially faster than for employment as a whole in the regions. (This claim is consistent with the finding in chapter 7 of a significant increase in the workforce possession of post-school qualifications).

In 6 of the 19 industries males represent 70% or more of the workforce. With few exceptions there is little variation across the regions in sex segmentation by industry. Consistent with earlier occupational analysis, sex segmentation by industry disadvantaged males and advantaged females. Males tend to be concentrated in industries subject to decline (Manufacturing and Wholesale) or low growth (Transport, Postal & Warehouse) and very under-represented in industries with high job growth (Health, Social Assistance and Education). Some male dominated industries had high a rate of job growth, such as Mining, but the absolute number of new jobs is small. The key exception is Construction which is both male dominated and a major contributor to net growth over the period.

There is considerable academic and policy debate regarding the effects on economic and/or employment growth of diversification or specialisation in regional industrial structures. Put simply, is a region better off specialising in a few key economic activities or developing multiple industries?

To investigate these issues empirically data from the analysis of employment by industry was used to construct a Hirschman-Herfindahl Index (HHI) for each region and Australia The HHI Index is a standard measure of concentration of various types of economic activity

The purpose of the data is to determine if employment in the different regions is becoming more or less specialised in particular industries and whether there is any association between rising or falling specialisation and employment growth. The key points are that first, female employment is much more concentrated in fewer industries than males. The association between a high and increasing female employment concentration and female job growth is very robust at an aggregate level across all the regions and for Australia as a whole. Indeed, the index data supports the earlier analysis that female employment growth was advantaged by the high degree of sex segmentation in the job market. However, the strength of this association is extremely varied across the regions. Male employment is much less concentrated in particular industries than females, but it too increased its specialisation index over time across the regions and Australia. This more diversified base of male employment did not confer any labour market advantage as they had a much lower rate of employment growth compared to females. The association between increased specialisation and employment growth was even stronger for males than for females.

However, it would be illicit to draw any sweeping conclusions for policy from this analysis. Rather, there seem to be two distinct mechanisms at play, each having markedly different implications for regional policy. In the first, employment growth and specialisation is driven by the type of fundamental economic forces identified by the classical economists such as Smith and updated in what is termed modern endogenous growth theory. This is a model in which industrial specialisation is driven by the market forces of competition, division of labour, rapid technical change, high productivity and high wage growth. The rapid growth of Professional, Technical and Scientific Services industry reflects these factors such as specialisation due to the rapid growth of knowledge and the profound advantages to firms accessing expertise by contracting out of activities, like engineering design, software development and accounting. (But even in these industries there is a substantial role for government in terms of infrastructure provision, support for R&D, education and direct demand for the output of this industry).

However, much of the employment specialisation and growth occurring across the regions, and Australia, can be explained by drastically different mechanisms. A large share of increased employment specialisation over the last decade may be argued to be driven by a combination of demographic change, increased female labour force participation rates and government funding. As argued earlier when looking at the drivers of industrial change this applies especially to the growth of aged care, child care, pre-school education, food and beverage services and some health services. In addition, a large share of the increase in employment specialisation, especially for males, is due to large scale job loss in other industries, notably manufacturing. The role of government policy in the growth of these industries is also markedly different in that it is focussed on either the direct provision of services, such as public hospitals and schools or contracting out services previously

delivered directly by government such as vocational education and training and employment services or indirect support through subsidies to privately owned hospitals, schools, aged care and child care etc. (Cahill and Toner 2018).

Finally, an important implication of the pattern of employment growth by occupation and industry identified in this report is that the labour market is becoming 'polarised' or split between low wage and high wage jobs. This is counter to the general presumption of orthodox economics that structural change entails a primary tendency for high productivity/high wage jobs to displace low productivity/low wage jobs. Against this the Australian Treasury (2017: 33-34) argues the decline of manufacturing and the 'transition towards services could weigh on wage growth. In the past five years, strong employment growth has come from low productivity growth industries. This has implications for the future path of wage growth because in the long run real wage growth is driven by labour productivity growth…Services employment growth has been more concentrated in below-average wage industries. Since 1994-95, almost 3.6 million jobs have been added in the services industries – of these, a little over 1.9 million have been in industries with below-average wages versus a little over 1.6 million in above-average wage industries'. An additional factor in income polarisation is the growth of labour under-utilisation associated with the growth of part-time employment. (A high proportion of part-time workers prefer more hours of work, but the economy is not generating them).

Total Personal Income Full Time Work by Industry and Occupation

The key points are first, earnings for total full time employed persons in the regions are 8% lower than for Australia as a whole. Further, the tendency for lower relative earnings holds for all regions and almost all industries. The gap between earnings in the regions and for Australia as a whole may appear relatively modest in proportional terms but these differences translate into a sizeable absolute pay gap. Over the period there has been no significant increase in wage disparity between the regions and the Australian full time wage.

The study investigated the many reasons why, on average, regional wages are somewhat lower, even in the same industry, than for total Australia. These include firm size, industry compositional effects, educational qualifications of workers, lower living costs in the regions, and intensity of competition for labour.

The data also supports the well-established empirical finding of an 'inverted wage curve': that lower unemployment is associated with higher wages. The policy implication is that lowering the wage rate may not improve employment.

Variation in earnings across industries within regions was investigated. Across regions there is little variation in the extent to the earnings in each industry varies from the mean earnings in each region. Second, there is also a remarkable degree of consistency in the relative pay of industries in relation to average pay in the regions. Finally, across all regions and Australia there is a similar pattern of industries with the highest and lowest relative earnings. These results suggest the presence of some important structural factors affecting relative pay across industries and regions.

The study further investigated the wage polarisation claim by measuring if there is any association between employment growth and above average wages. For example, some industries which made an especially important contribution to employment growth in the

regions have above average pay. For example, Professional, Scientific and Technical Services contributed 9% to net job growth across the regions and had earnings 17% above the average. But the opposite applies to other industries. Health and Social Assistance made an especially large contribution to employment growth but has on average full time wages close to the average. The reason for this, as explained earlier, is that this industry is comprised of many high income earners, such as doctors and medical specialists, but also many more average and low income earners. The latter applies especially to Social Assistance which is comprised of two components at the 2 digit industry level, Residential Care Services and Social Assistance Services. Across the regions as a whole these industries had average full time earnings 19% and 17% below mean full time earnings. On the other hand, some industries which have average pay experienced large job losses including Manufacturing and Wholesale. In contrast some industries such as Finance and Insurance Services have pay well above average but made minor contributions to net employment growth.

The net effect of these interactions was investigated to determine if there is a higher propensity for net job growth to occur in industries with above average pay rates. The share of net employment growth of 21 industries was regressed against the variance of the industry wages from the mean. The linear regression line is very close to horizontal and the R^2 correlation of just 0.003 reveals there is no association between the two variables. Second, industries with especially high wages tend to make a small contribution to net employment growth and that some industries with average wages have had large job losses. Finally, the distribution of the data significantly above and below the x-axis confirms that the Treasury argument regarding growing income polarisation in the Australian job market also applies in the regions.

Some insight into the drivers of commuting was gained by examining the wage difference between full time workers either employed within the region in which they live and those who work outside the region in which they reside, controlling for industry and occupation. The former group is referred to here as Place of Residence (PoR) and the latter as Place of Work (PoW). It was found there is considerable variability in the gain or 'wage premium' to commuting outside the region in which a worker is resident but this is on average small at 2.1% in 2016. This premium does however vary across the regions, industries and occupations and for some there is even a wage penalty to commuting. For many workers a major impetus to commute is simply the availability of work.

Qualifications by and Occupation and Industry

Over the decade all regions experienced remarkable growth in the proportion of their workforce with a PSQ with the proportion increasing from just over half in 2006 (54.1%) to nearly two thirds in 2016 (64.7%). This was caused first by a large increase in the share of employment in industries with an above average *propensity* for workers to have a PSQ. Second, there was a significant rise in the *incidence* of a PSQ across all industries and occupations. All industries and occupations, at the 1 digit classification level of analysis, increased their proportion of workers with a PSQ. However, the gap between the regions and Australia remained. Almost all qualifications experienced a proportional increase, some quite substantial, with the exception of Certificate I-II.

The fastest rate of increase occurred in higher level qualifications as the proportion of employed persons with a bachelor's degree increasing by 30% and post-graduate qualifications 94%. Another notable development is that the rate of growth of persons with PSQ in the regions as a whole increased at a faster rate (20%) than for Australia (16%).

The final point is that the data contributes to our understanding of the wages gap between the regions and Australia. The difference in the aggregate propensity of workers to hold a PSQ across the two geographic regions is a modest 3%. However, the difference is much larger for the incidence of workers with a qualification at a bachelor level or higher with 21.0% of workers in the regions so qualified compared to 30.3% for Australia as a whole. Given the positive association between increments in qualification level and pay, this is a significant contributing factor to the earnings gap.

The reasons for the increase in the propensity for and incidence of qualifications were investigated. These included a large increase of employment in industries with a high propensity for works to have qualifications such as Professional and Community, Personal Services and Technical and Scientific industries and skill-biased technical change in which capital investment and worker knowledge are increasingly complementary. There is also some support for the 'credentialism' hypothesis, where more highly qualified displace less qualified without necessarily a change in the nature of work in the job, with resulting skill 'under-utilisation' in some workplaces. The rise of compulsory occupational licensing is also an important factor.

1 Purpose of the Study

The primary purpose of this research is to chart and explain the differential labour market and economic performance of key selected Australian regions and to identify policy and research implications of the study. This research focuses on changes over time, between 2006 and 2016, relying mostly on ABS Census data, but also extensively supplemented with other data and informed by public policy and academic literature. Change over time is critical in revealing the different economic trajectories of regions and some of the drivers of this differential performance.

1.1 Regions for analysis

The regions for analysis and their corresponding Regional Australia Institute classification are given in Table 1.

Table 1 Selected Regions for Analysis

SA4 NAME	SA4 AREA SQKM	RAI Typology	Key Features
Central Coast	1681	Regional City/ Connected lifestyle area	City region- close proximity to State capital; active RDA; experimenting with S3.
N.T. Outback	326250	Heartland	Remote with university
Toowoomba	2259	Regional City	City region with university
West & North West Tas	22524	Industry and Service Hub	Regional economic governance – Cradle Coast Authority and university
Geelong	4429	Regional City	City-region – close proximity to State capital and university research precinct of international significance
Latrobe-Gippsland	41555	Industry and Service Hub	Rural with university

Source: Australian Statistical Geography Standard (ASGS): Volume 1 - Main Structure and Greater Capital City Statistical Areas, July 2016 Cat. No. 1270.0.55.001

The RAI typologies are:

Regional Cities have populations of over 50,000 persons. They have diverse economies and the chance to use their size and diversity to shape their own future.

Connected Lifestyle Regions do not have city population size, but are close to major metropolitan regions. They will be influenced by their connection with these cities.

Industry and Service Hubs are regional centres with between 15,000 – 50,000 residents, located further from major metropolitan areas. Their performance is linked to industry outcomes, but their population size means they could be resilient to change.

Heartland Regions are smaller regional areas that are not close to other major metropolitan or Regional Cities. Industry trends and local ingenuity will shape their future (Regional Australia Institute 2014).

However, these categories are not mutually exclusive. For example, the Central Coast Statistical Division is categorised as a Regional City by the RAI, due to the population of the region, however it can also be considered a connected lifestyle region due to its close proximity and interactions with Sydney.

1.2 Ensuring Compatibility of Inter-Census Geographic Classifications

Across different Census periods the ABS changes its geographic classification systems and, because this can result in significant boundary changes, it may affect the comparability of Census data for particular localities. From 1984 to 2011 the ABS used the Australian Standard Geographical Classification (ASGC) (ABS 2011). This was replaced in 2011 by the Australian Statistical Geography Standard (ASGS) (ABS 2019). (The 2011 Census was dual coded using both systems). To reconcile the changes in geographic classification systems for the purpose of ensuring comparability of Census time series data ABS concordances between the two geographic classification systems were used (ABS 2012). There is no direct ABS concordance between the 2006 Census and 2016 Census, accordingly, several ABS concordances between the 2006 ASGC Statistical Local Area unit of analysis and the 2011 ASGS Statistical Area 4 were used to ensure compatibility. What the methodology employed for this report did was, in effect, to impose the 2011 (2016) ASGS SA4 boundaries for the selected regions onto the 2006 ASGC Census data to ensure comparability of Census estimates.

It should also be noted that there may be minor variations in Census data row and column totals between tables used in this report. This occurs especially when comparing totals based on either aggregated data using say a 1 digit occupational or industry classification and disaggregated data using a 2 digit classification. The use of 2 digit classifications, especially in smaller regions, results in very small cell size. These can lead to the identification of individual respondents within such localities. To minimise this risk the ABS applies a confidentialising procedure to small cell sizes so that regional totals can differ from other tables constructed using more aggregated data. The effect of this procedure is, in most instances, relatively minor.

2 Change in Demographic Structure

Past demographic trends do not impose an iron law of destiny on the economic fortunes of regions. This is due to factors such as whether the source of regional effective demand is primarily exogenous or endogenous to the region; whether a region specialises in low or high output per worker industries; internal and overseas migration; changes in age specific labour force participation rates and numerous government policy measures and incentives. The latter can be enacted to influence for example, the investment location decisions of industry, residential location decision of workers and retirees and the birth rate (Australian Institute of Family Studies 2008).[3]

[3] Whilst noting the overall importance of technological and macro-economic factors on natural population increase the AIFS argue policies like family payments and parental leave do affect fertility rates.

Nevertheless, whilst demographic trends are subject to varying degrees of change or control from these policy interventions, a given rate of overall population growth and rates of growth in key components of the demographic structure, can impose a floor or ceiling on key aspects of economic activity and performance. The most obvious effect of population levels is in constraining or enabling investments to satisfy regional demand where these investments require a minimum scale of demand to be feasible. An example is that the decision by major grocery retailers to establish a supermarket 'in regional Australia is closely associated with the size of the local population, demand for convenience and levels of disposable income' (Regional Australia institute 2015: 3).[4] Further, different demographic structures generate demand for different industries and services. The most obvious example of this is that a region with a disproportionate share of people aged 0-5 years will likely have a large child care sector.

There are three notable issues in the Census demographic data of relevance to the issue of relative regional economic performance identified here. These are shifts in gender composition, overall population growth rates and changes in the age composition of the region's population.

2.1 Gender Composition of the Population

The gender composition of the population both in the selected regions and nation-wide remained remarkably stable between 2006 and 2016, reflecting a small but, significant, higher proportion of females in the population (Tables A1, A2). Regions offering high amenity to retirees (Connected Lifestyle regions) had the highest proportion of females. In 2016 in these regions females outnumber males by 1.8% in absolute terms, which is 2.4 times above the national average. The over-representation of females is due to the effects firstly, of a disproportionate share of older residents and secondly, much higher death rate of males compared to females at almost all ages (Australian Institute of Health and Welfare 2018).[5]

2.2 Regional Population Growth

The regions experienced starkly different population growth rates over the period 2006 to 2016. A number of different growth rate measures are provided (Table 2). Regions with population growth above the average decadal rate of 12.5% were Geelong (20.6%) Toowoomba (14.5%) and Latrobe Gippsland (13.6%). Regions with the slowest growth were WNW Tasmania (2.7%) and NT Outback (5.4%). With an average growth of 12.5% for the region as a whole this is significantly slower than for Australia as a whole, whose population increased by 17.9%. The total regional growth rate was thus 70% of the total Australian growth rate.

Unsurprisingly, these decadal growth rates translate into stark differences in annual compound rates of growth. To put these different exponential growth rates into perspective

[4] 'Convenience' is defined by RAI as high labour force participation and high participation of women in the labour force. These translate respectively into demand for supermarket goods and potential supply of labour for the supermarket.
[5] Death rates for males exceed females for all ages by a significant margin until the age of 85 and above (AIHW 2018).

each region's compound rate was used to calculate how many years it would take for the region's population to double, assuming of course these rates do not change. Australia will take 42 years to double its population. This compares to 37 years for Geelong and 259 years for WNW Tasmania.

Table 2 Population Growth Rates Regions and Australia. 2006-2016

	Central Coast	NT Outback	Too'mba	W & NW Tas	Geelong	Latrobe - Gipps.	Total Regions	Australia
Percent Change 2006-2016	10.0%	5.4%	14.5%	2.7%	20.6%	13.6%	12.5%	17.9%
Compound annual growth rate	0.96%	0.53%	1.36%	0.27%	1.89%	1.28%	1.19%	1.66%
Years for population to double*	73	133	51	259	37	55	59	42

* Based on the compound growth rate

These differential population growth rates are significant for each region's prospects for growth and development since, in general, the scope for an improvement in economic opportunities, employment growth and, arguably job variety and quality, is heavily dependent on population growth. The demographic trends above strongly suggest a marked and growing divergence in the future economic prospects of these regions.

A major caveat to this direct association between population growth and regional economic opportunity arises where regional economic activity is focussed on meeting demand external to the region be it overseas exports and/or domestic. For regions where these external-demand oriented activities comprise a high share of regional output and employment the principal source of effective demand in such is exogenous, or determined from outside the region. But for other regions where demand is primarily endogenous within the region economic opportunities are primarily dependent upon population growth.[6] In regions with

[6] It hardly needs stating that population growth is not the only determinant of either growth in total output and/or growth in output per worker (productivity growth) at a regional or national level. It has been known quantitiveltvely for over half a centry that growth in the volume of inputs to production , labour and capital, account for only around half of the growth of total output. Productvity, or growth of outut per worker, explains the residual and, crucially, accounts for most of the growth of real incomes. Modern 'endogenous growth theory' identifies the sources of productvity growth in investment in skills, competition, innovation embodies in new, more effceint vintages of capital equipment an software, and so-called knowledge spillovers between firms, institutions and workers (Roberts and Setterfield 2010). Whereas orthodox economic theory regards most of these elements as exogenous to the economic system, modern endogenous approaches regard them as determined by agents within the system and, critically, as being subject to change by intelligent state action. For example, public investment in skills, improving access to knowledge and knowledge diffusion between firms can raise ouput per worker. Nevertheless, to the extent that these elements are first, sensitive to the scale of production within a given region and, second, demand is primarily determined within the region, the size of the regional population 'feeds-back' into these elements. At the core of modern endogenous growth theory is the idea of a virtuous circle between these elements or how growth is circular and cumulative (Toner 1999). By the same logic regions in which these elements are substantially absent may suffer low or stagnant growth or even suffer from a vicious cycle of decline. The present study examines, to a limited extent, the some of these elements in the selected regions.

very low population growth rates and an industrial structure focussed on low wage, low productivity activities, economic prospects are restricted.

It is beyond the scope of this paper to quantify the extent to which the industries in each region are subject to exogenous and/or endogenous sources of demand and the extent to which the former are split between export and domestic public and private sector sources. It would potentially be a useful exercise for public policy makers to undertake this research since the different sources of demand have significantly different implications for regional development strategies. It would also be pertinent to examine the relative volatility in demand in the different sources. The latter is likely to be important for exogenous demand sources related to mining and tourism.

2.3 Regional Age Composition

A major potential caveat to these observations on the relation between endogenous regional growth and population growth is shifts in the age composition of the population over time. This a topic to which we now turn.

Table A3 shows percentage change 2006-2016 in the number of persons in each ten-year age group in each region. To make the trends easier to identify the age groups are aggregated in Tables 3-5. The key points are first, the remarkable diversity in population growth rates across the regions also applies to growth rates in the different age cohorts. For example, four of the six regions had a negative growth rate of young people (0-19 years), that is, in absolute terms there were fewer young people in the regions in 2016 than in 2006. The largest falls were in NT Outback (-7.4%) and WNW Tasmania (-9.7%). Presumably part of the reason for this is the movement of young people away from regions offering few employment and study opportunities. In contrast, in Geelong the number of young people (0-19 years) grew by 12.3%. WNW Tasmania was also the only region to experience a reduction in the number of prime age population (20-49 years), which fell by 8.5%.

Secondly, comparing the regions as a whole to Australia, there are markedly divergent differences in growth rate in certain key age groups. In the regions the number of young (0-19 years) grew by 0.8 percent and prime (20-49 years) by 6.2%. This contrasts with Australia which experienced a comparative surge in the number of young people as these cohorts grew by 9.3% and 14.9% respectively.

On average the growth rate of older persons (aged 50-59 years) in the regions was similar to the national average, though again with significant regional variation. Similar trends apply to those 60 years and over.

Table 3 Population X Age Group. Percentage Change. 2006-2016

	Age Group	Central Coast	NT Outb'k	Too'mba	W&NW Tas	Geelong	Lat–Gipps.	Total Regions	Australia
Young	0-19	-1.0%	-7.4%	4.2%	-9.7%	12.3%	-1.3%	0.8%	9.3%
Prime	20-49	4.6%	3.7%	9.7%	-8.5%	16.1%	4.0%	6.2%	14.9%
Older Worker	50-59	17.7%	21.5%	17.4%	10.1%	17.7%	11.5%	15.6%	16.8%
Retiree	≥60	27.2%	58.6%	40.0%	33.3%	41.5%	47.1%	37.9%	38.1%
Total		10.0%	5.4%	14.5%	2.7%	20.6%	13.6%	12.5%	17.9%

The implications of these demographic shifts are evident in Tables 5-6 which show how the share of each age group in the total population changed, sometimes dramatically, over the decade. At the start of the period, in 2006 in all regions the share of the young (0-19 years) was larger than for Australia as a whole, but by 2016, in most regions this had nearly reversed. Conversely, the combined effect of a much faster rate of growth in the share of retirees in the regions and negative or much slower growth in the numbers of young and prime age workers resulted in a bigger proportional increase of retires (≥60 years) in the regions compared to Australia as a whole. By 2016 across the regions persons aged 60 years comprised more than one quarter of the entire population compared to just over one-fifth for Australia.

In sum, the demographic trend in the regions is one of accelerated aging at faster rate than for Australia as a whole. This is due to a combination of very low growth in the age groups from 0-49 years but much faster growth in the age groups 50 years and above. Even the regions with the fastest overall population growth experienced significant demographic aging.

Table 4: Age Group Share of Total Population X Region 2006

	Age Group	Central Coast	NT Outb'k	Too'mba	W&NW Tas	Geelong	Lat–Gipps.	Total Regions	Australia
Young	0-19	27.2%	35.9%	29.8%	27.2%	26.5%	26.8%	28.0%	26.7%
Prime	20-49	36.8%	46.8%	39.9%	37.5%	39.3%	35.7%	38.3%	42.3%
Older	50-59	12.5%	10.3%	12.1%	13.9%	13.2%	14.5%	13.0%	12.8%
Retiree	≥60	23.5%	7.0%	18.2%	21.5%	20.9%	23.0%	20.7%	18.1%
Total		100%	100%	100%	100%	100%	100%	100%	100%

Table 5: Age Group Share of Total Population X Region 2016

	Age Group	Central Coast	NT Outb'k	Too'mba	W&NW Tas	Geelong	Lat–Gipps.	Total Regions	Australia
Young	0-19	24.5%	31.5%	27.1%	23.9%	24.7%	23.3%	25.1%	24.7%
Prime	20-49	35.0%	46.0%	38.2%	33.4%	37.8%	32.6%	36.2%	41.3%
Older	50-59	13.4%	11.9%	12.4%	14.9%	12.9%	14.3%	13.4%	12.7%
Retiree	≥60	27.1%	10.6%	22.3%	27.9%	24.6%	29.8%	25.4%	21.3%
Total		100%	100%	100%	100%	100%	100%	100%	100%

In separate research the ABS (2018) projected these trends to continue for some decades into the future. Based on the medium growth scenario used by the ABS by 2066 the age distribution of the Australian population will be substantially more skewed to persons aged 60 and over (Table 6).

Table 6: Demographic Projections to 2066

Young	Prime	Older	Retiree	Total
24%	38%	11%	27%	100%

Source ABS (2018)

Another perspective on this is provided by examining the share of net population growth in the regions accounted for by both older and retiree age groups (Table 7). In all regions, again, persons aged 50 years and above accounted for almost all growth, and in some regions the absolute size of the increase in this age group exceeds the total population rise over the period 2006 to 2016. (The latter is explained by declines in younger aged groups, as noted above).

Table 7: Contribution to Net Population Growth of Persons Aged 50 and Over. Percent 2006-2016

Central Coast	NT Outb'k	Too'mba	W&NW Tas	Geelong	Lat–Gipps.	Total Regions	Australia
86.0%	117.5%	64.8%	313.0%	53.6%	92.1%	79.1%	50.8%

There is not space to analyse in detail the implications of this quite substantial shift in the age composition of the regions, but it is arguable the dramatic aging of the population in the regions will arguably offset to some degree the impetus to endogenous economic growth even in those regions having quite rapid population growth. For those regions with very low population growth, rapid aging will reinforce low stimulus to endogenous economic growth.

Four mechanisms are identified where these demographic shifts will, in theory, reduce the economic stimulus in comparison to that provided by population growth skewed to younger age groups. Firstly, a large reduction in the proportion of young (0-19 years) and prime age (20-49), and in some regions an absolute decline in their number, will lower both potential labour supply and employment growth. Second, it will raise dependency rates. (This is taken up shortly). These issues have been the subject of extensive research at a national level (Parliamentary Budget Office 2019). Third, the level of effective demand will arguably be reduced in regions where an increasing share of the population are in retirement and, consequently, have significantly reduced income and consumption, due to their withdrawal from the workforce. Some insight into the effect of retirement on income levels is given in Table 8, which provides actuarial estimates of the average income from the Aged Pension and superannuation for three different groups based on their pre-retirement income. It basically shows how much of this pre-retirement income is 'replaced' by the Aged Pension and superannuation. For low income earners the combined effect of the Aged Pension and superannuation is that their retirement income is marginally lower than their working income, but for those whose pre-retirement earnings were at or well above average earnings their incomes in retirement are basically halved.

Table 8: Net Pension Replacement Rates by Percent of Average Income. 2017.*

For those earning this percent of the national average income	Net Mandatory Public and Private Income Retirement Replacement Rate
50%	89%
100%	56%
150%	48%

Institute of Actuaries Australia et al (2017*). *Note other income sources such as rent, shares held outside of superannuation and inheritances are excluded.

Finally, not only does a large increase in the proportion of older persons affect the level and growth of effective demand in a region it also arguably affects the regional industrial structure of employment and output. As the share of older persons in the population increases the composition of demand changes to cater more to the needs of the older population.[7] These effects will be complex but to take one example, over the last two decades the fastest rate of employment growth nationally has been in the industry Health and Social Assistance. The latter comprises mostly aged care, home help, child care, disability services and welfare counselling amongst others. This trend will continue driven in large part by the aging population. 'The impacts on health and aged care spending will increase…as baby boomers move into their 70s and 80s. Demand for health services typically starts to increase when individuals are in their 70s, and demand for aged care services when they are in their 80s' (Parliamentary Budget Office 2019: iv). Propensity to enter age and residential care is related to age but counter-acting this are higher education and income levels.[8]

Whilst the past and projected growth of health and social assistance is valued since it provides many jobs and meets the needs of citizens, it is also the case that, in aggregate, this industry has on average a low level of productivity and low wages.[9] The level of productivity (as measured by gross value added per hour worked) in the industry was around

[7] A focus of debates on aging is on government finances but it is important to avoid hyperbole as to the scale of the effects and to identify aging as just one influence on government taxation and expenditure. The Parliamentary Budget Office (2019: iv) for example argues that 'the influence of ageing should be considered in the context of the overall budget position. Ageing is estimated to detract around $20 billion in real terms from revenue in 2028–29, but population and income growth are expected to increase revenue by around $187 billion (resulting in a net increase in 2028–29 in the order of $166 billion). Similarly, while ageing is projected to add around $16 billion in real terms to Commonwealth spending in 2028–29, broader factors such as population growth and indexation of payments are expected to increase spending by around $104 billion (resulting in a total increase in 2028–29 in the order of $119 billion)'. Against this however, is that at a regional level the rate of adverse change in population and labour market trends can be much faster than at a state or national level. For several regions studied here, this is indeed the case.

[8] For a discussion of the demographic and other factors associated with permanent entry to aged care see Australian Institute of Health and Welfare (2017) and Borotkanics et al (2017)

[9] The number of highly paid persons in medicine is greatly outweighed by the numbers of relatively low paid in activities like aged care, child care and disability services. In other words, excluding medical workers would greatly lower the calculated level of productivity in this industry. Average hourly total cash earnings for residential care and social assistance is 14% and 23% respectively lower than the average for all industries (ABS 2018).

one-third lower than for the average across all industries (Green, Toner and Agarwal 2013). (These issues are taken up in chapter 6).

Finally, although these effects of demographic change will arguably lower the growth ceiling in the regions, it is important to note there are all so potential counter-veiling trends. For example, equilibrium reasoning of the type favoured by orthodox economists, would suggest that the effect of lower labour supply may be to increase real wages in the regions which will boost effective demand in the regions. (Based on the principle that increased scarcity of a commodity raises its price). Secondly, offsetting the potential decline in labour supply, in whole or in part, has been a sustained rise in the labour force participation rates of older workers and other workers. Some of these issues are examined in the next chapter.

3 Change in Labour Force Structure

This chapter examines the interaction of dynamic labour market and demographic trends over the last decade across the various regions. A focus of this chapter is to investigate the issue of 'dependency'. The previous chapter charted demographic trends that appear to significantly increase economic dependency, especially an increase in the proportion of older persons in the regional and national populations. This chapter investigates how changes in economic behaviour of the population reinforce or counter-act these demographic trends. Dependency is here defined as a segment of a population which is 'economically dependent in the sense that a part of its consumption is financed through transfers from other persons. The dependent population consists most notably of children and retired elderly persons' (Loichinger et al 2017). Interactions of the key labour market variables are quite complex. In addition, different metrics of 'dependency' provide differing and, sometimes, conflicting trends. This adds further complexity to the task of policy makers. Despite these conflicting trends it is the case that, if properly understood and used, each metric provides important insights into highlighting particular labour market issues.[10]

Change in the key labour market aggregates is given in Table 9.

3.1 Regional Trends

For the regions as a whole growth in total employment was 12.9% compared to 17.4% for Australia. Employment growth in the regions was 74.1% of the rate for Australia as a whole, largely reflecting the difference in population growth rates between the regions and the nation. There is a strong positive association between population growth and employment growth with all regions that experienced below average population growth over the decade also having low employment growth rates with the converse applying for above average population growth rate regions.

The dynamics driving slow population and negative or marginal employment growth include first, the fact that a major driver of internal migration of the population is to regions with rapid employment growth. As noted earlier, there is a virtuous cycle at play here. Equally regions with slow population growth can be caught in a vicious cycle of decline, as some regions had a fall in the absolute number of young or prime age people. Another factor contributing to this vicious circle is that even modest productivity growth can be sufficient to offset to varying degrees modest population growth resulting in a decline or slow rate of employment growth. [11] Even in slow growing regions productivity growth occurs due to the introduction of new technologies, learning by doing within the firm and new and improved ways of working

[10] A comprehensive analysis of dependency measures found that 'the choice of which dependency ratio to use in a specific policy context is determined by the nature of the question to be answered. The comparison of… various dependency ratios across countries gives insights into which strategies might be effective in mitigating the expected increase in economic dependency due to demographic change' (Loichinger et al 2017).

[11] There is positive relationship between the rate of output growth and productivity growth is known as Verdoorn's Law (Toner 1999). For example a slow rate of output growth by a firm lowers the replacement rate of its capital equipment. As newer generations of capital equipment tend to embody improved technologies, this is one factor linking slow output growth and slow productivity growth. Low growth also typically reduces the capacity and incentive to innovate.

copied from other firms. As a rough rule of thumb, at an economy-wide Australian level, for unemployment not to increase real output has to increase by 3% p.a. due to annual population growth of 1.5% p.a. and productivity growth of 1.5%.[12]

Table 9 Change in Key Labour Market Aggregates. Persons 2006-2016 Percent

	Central Coast	NT Outb'k	Too'mba	W&NW Tas	Geelong	Lat–Gipps.	Total Regions	Aust.
Employed, FT	14.3%	5.8%	8.4%	-6.3%	16.0%	4.2%	9.1%	13.7%
Employed, PT	22.8%	-27.1%	22.4%	19.4%	38.2%	24.4%	23.3%	30.0%
Total Employed	15.6%	-4.8%	12.1%	1.2%	22.8%	11.0%	12.9%	17.4%
U/E FT work	-3.6%	129.0%	89.8%	-7.9%	5.0%	14.4%	18.0%	44.1%
U/E PT work	33.7%	73.3%	65.6%	10.1%	55.7%	41.6%	43.3%	75.9%
Total U/E	9.3%	113.4%	79.1%	-2.3%	23.4%	23.2%	26.8%	56.3%
Pop. Aged ≥ 15years	13.4%	8.5%	14.5%	4.2%	21.0%	14.1%	14.1%	19.4%
Emp. to Pop. Ratio Aged ≥ 15 years	2.0%	-12.2%	-2.1%	-2.8%	1.4%	-2.7%	-1.0%	-1.7%
Emp. to Pop. Ratio	5.1%	-9.6%	-2.1%	-1.5%	1.8%	-2.3%	0.4%	-0.4%
U/E Rate Δ	-5.1%	109.5%	55.6%	-3.2%	0.5%	10.3%	11.4%	30.9%
Total Labour Force	15.2%	1.9%	15.1%	1.0%	22.8%	11.7%	13.8%	19.4%
Not in the labour force	10.8%	20.1%	13.4%	8.8%	18.2%	17.4%	14.5%	19.5%
Not applicable*	-0.7%	-7.6%	6.4%	-10.7%	14.0%	0.9%	1.8%	10.9%
Lab. Force Part. Rate	1.6%	-6.1%	0.6%	-3.1%	1.5%	-2.0%	-0.3%	-0.0%
Total Pop.	10.0%	5.3%	14.5%	2.7%	20.6%	13.6%	12.5%	17.9%

*Persons aged below 15 years

It is also important to note that in both periods the aggregate labour force participation rate in the regions was significantly lower than for Australia as a whole (Tables A4-A5). In 2016 for example, the participation rate in the regions for males was 48.2% and 42.6% for females. For Australia the figures were 52.2% and 45.9% respectively. This gap is accounted for by a number of factors such as the regions having a much higher proportion of persons 60 years and older (they have a lower participation rate than younger cohorts); higher unemployment rates in the regions (promoting a higher 'discouraged worker' effect); higher rates of disability and ill-health in the regions and generally lower educational attainment in the regions (labour market participation is positively associated with higher education and training levels). (Age specific participation rates are discussed in section 3.4).

3.2 Labour Market Dependency Metrics

Three different labour market related dependency measures are analysed below. Total regional employment growth of 12.9% was somewhat faster than total population growth in

[12] This is consistent with one version of Okun's Law, named after the US economist Arthur Okun (Gordon 2010).

the regions at 12.5%. Accordingly, the first dependency measure, the ratio of employment to population, improved slightly over the period from 41.9% in 2006 to 42.1% in 2016. An increase in the employment to population ratio is generally viewed as a 'good thing', as it means, all other things being equal, there are more workers to support a given population. Another way of viewing this is that in 2006 in the regions there were 41.9 workers for every 100 members of the population and this increased by 2016 to 42.1 workers per 100 population. Over the period the ratio increased by 0.4%. In contrast this ratio declined in Australia by .4%, due to the fact that the population increased at a slightly faster rate than total employment.

However, the reasons for the improvement in the regional employment to population ratio reveal it may be less of a 'good thing' than at first appearance. A key factor in the slower growth of the population in the regions relative to the increase in the number of people employed is, as we saw earlier, is a much slower rate of growth of young people in the regional population. Table 9 indicates that the number of young people aged below 15 years grew by only 1.8% across the regions over the decade, compared to 10.9% in Australia. (This is given in the table as the Not Applicable group since the ABS, by definition, excludes them from the labour force count). Slow growth in the absolute number of young people aged below 15 years in the regions offset to some extent the acceleration in the number of older persons. Slow growth in the number of young people assisted a slight improvement in the employment to population ratio, but it is arguably an adverse long-run development for the regions in terms of the adequacy of future labour supply and future trends in the employment to population ratio.

On the other hand, this does reveal an important mechanism, noted in the literature, which is moderating to some extent the taxation and government budgetary implications of a rapid rise in the share of older persons in the population (Productivity Commission 2005). A decline in the share of young people reduces the budgetary effects of aging since the young also incur disproportionately heavy public support, especially through education and health expenditures. But as noted by the Commission this effect only 'partially offsets' growth in the proportion of older persons in the population.

The second economic dependency metric is the ratio of employed persons to population aged 15 years and older. The population aged 15 years and over is defined by the ABS to be the population from which the labour force is derived and is as used as a divisor for various labour market measures. A fall in the ratio of employed to the population aged 15 years and over implies there are fewer working people to support this age cohort. This ratio fell by 1.0%% over the period in the region, so that on this metric dependency increased. This fall is explained by the difference between employment growth across the regions which increased by 12.9% and the population aged 15 years and over which grew by 14.1%. (As we saw in chapter 2 the growth rate of older persons (50-59 years) was 2.5 times that of prime age (20-49 years) and the growth rate of retirees (60 and over) was nearly 6.1 faster times than the prime group. The growth rate of these older age groups relative to the young cohort (0-19 years) was many multiples faster again. Only two of the six regions, the Central Coast and Geelong, had an improvement in this dependency ratio, as their rate of employment growth exceeded the growth of population aged 15 and above. The NT Outback had a large increase in dependency due to modest population growth and a large fall in person employed.

Finally, we examine the labour force participation rate, which is the ratio of employed and unemployed (the labour force) to the population aged 15 years and above. It measures what proportion of the 'potential labour supply' (all persons aged 15 years and older) are actually in a job or actively looking for a job. As a dependency measure it quantifies what proportion of the population aged 15 and above are actually or potentially in a position to support those aged 15 or over not in the labour force.

The labour force participation rate fell across the regions by .3% because the labour force increased by 13.8%somewhat slower than the total population of persons aged 15 years or over which increased by 14.1%. Accordingly, the number of people 'not in the labour force' (the labour force minus the total population aged 15 years and over) increased at a faster rate (14.5%) than both the total population (12.5%) and the growth in the labour force (13.8%). This also explains why the ratio of persons employed to the number of persons aged 15 years and above fell by 1.0%.

It is also important to note that in the regions, whilst the labour force increased by 13.8%, employment increased by a slower 12.5% so that, arithmetically, the difference can only have been accounted for by a large rise in the number of unemployed, whose number did indeed, increase by 26.8% over the period. The regional unemployment rate increased from 6.3% to 7.0%. The Australian rate increased much faster from 5.2% to 6.9%. The gap in the unemployment rate between the regions and Australia narrowed substantially over the period.

The labour force participation rate, like other measures of dependency, is thus subject to numerous interpretations and qualifications.

3.3 Variation in Labour Market Performance Across the Regions

There was considerable variation in labour market performance across the regions. Above average employment growth was experienced in Geelong (22.8%) and Central Coast (15.6%), and near average in Toowoomba (12.1%) and Latrobe- Gippsland (11%).

Conversely, over the decade total employment fell in NT Outback (-4.8%) and was nearly static in W&NW Tasmania (1.2%). Despite the robust employment growth in Toowoomba the unemployment rate increased by 55.6% over the period as the rate of labour force growth, at 15.1%, exceeded employment growth rate by a wide margin. The unemployment rate in NT Outback more than doubled but for very different reasons to Toowoomba, as the labour force increased only marginally, but the number of people employed declined by 4.8%.

On key dependency measures, the employment to population ratio and the employment to population aged 15 and above ratio, all regions with the exception of the Central Coast and Geelong experienced a large deterioration, as did Australia as a whole.

3.4 Labour Force Participation by Age and Gender

The key trends identified in this section include firstly, a marked feminisation of the labour market due to a significant rise in aggregate female participation rates and a decline in male participation rates. Secondly, males and females 60 years and over had a marked rise in participation rates. Finally, the increase in older male participation rates was incapable of

offsetting the decline in younger male age cohorts resulting in a net fall in male participation rate.

Across the region as a whole the most notable movement was a large rise in the participation rate amongst males aged 60 and over which increased in absolute terms from 20.6% to 25.1% (Tables A4-A5). This contrasts with most other male age groups which experienced a decline in participation rates. Disturbingly, the largest decline was for prime aged males (20-49 years) whose participation rate fell from 83.1% to 80.2%. There was also a 1% decline in the male participation rate of people aged under 19 years. All regions experienced a decline in the participation rate of both cohorts, as did Australia as a whole. An important reason for this, to be taken up in the next section, is that across all regions the number of young males employed fell by 12%. Similar trends apply for Australia as a whole.

However, considerable growth in the labour force participation rate of males 60 years and over was insufficient to counter-act decline in young and prime age groups resulting in the overall fall in absolute terms of male participation rate of 1.1% across the regions. In 2016 there is a very large gap between the participation rates of males in the regions (48.2%) and for Australia (52.2%). (A similar gap existed in 2006). It is the deterioration in the male participation rate that accounts for all of the deterioration in the two dependency ratios, total regional labour force participation rate and employment to population ratio aged 15 years and above. Similar trends occurred across Australia as a whole.

Even regions which experienced solid employment growth over the period, Toowoomba and Geelong, had a fall in male participation rates.

The labour market experience of females is, with few exceptions, the opposite of males. The overall female participation rate in all regions increased. Females in all age groups in all regions, with the exception of a few younger cohorts in the NT Outback and Toowoomba, experienced a rise in participation rates. There were especially large rises for females in the two oldest age groups.

3.5 Full time and Part time Employment by Age and Gender

Total employment in the regions increased by 12.9%. However, the flow of new jobs in the regions is heavily skewed to part-time work as the number of full time workers increased by just 9.1% compared to a 23.5% increase in part time employment (Table A7). 58% of the total increase in employment in the regions was accounted for by part time employment. Six in every 10 jobs created were part time. In 2016 37.5% of all jobs in the region were part-time compared to 34.7% in 2006. [13] Similar trends are evident for Australia.

In all regions the rate of female employment growth exceeded male employment growth by a large margin. For the regions as a whole female employment growth exceeded male employment growth by more than two to one (Table A6). Total female jobs increased by 18.4% and male jobs by 8.6%. In two ‘low growth’ regions (NT Outback and WNW Tasmania) total male employment actually fell in absolute terms. In NT Outback nearly one

[13] Some of these estimates were calculated excluding the ‘employed away from work’ category as no hours worked data is collected.

in every 10 male jobs disappeared and in WNW Tasmania it was just under one in every twenty male jobs.

As expected, the rate of both male and female employment growth was much faster for Australia as a whole given it had a higher rate of total employment growth, at 17.4%, over the period, compared to the regions. However, the difference in growth rates between male and female employment was less for Australia as a whole. Whereas, the rate of growth of female employment was over two times faster than male employment in the regions, for Australia female employment growth was 1.5 times male employment growth. (In subsequent chapters we will examine in what occupations and industries these differential growth rates occurred).

Despite the much faster growth of both female employment and part-time employment across the regions there was only a small increase in the share of part-time work amongst all working females, but a dramatic proportional increase for males (Table 10). The relatively small overall effect on females is due to the fact that a high proportion of females were already engaged in part time work in 2006.

Table 10: Part-Time Employment as a Share of Total Employment X Gender.

	2006	2016
Female	52.9%	54.2%
Male	19.1%	28.4%

Moving onto the age variable, it was noted earlier there had been a large decline in the number of persons aged 19 years and under in a job, and this applied especially to males. In this age group total male employment fell by 12% and females by 7.1% across the regions. Almost identical trends applied Australia wide. It is unclear what is behind this potentially concerning trend. One potential cause was investigated.

There has been a substantial increase in school retention rates over the period and this may have caused this cohort to withdraw from the labour force and therefore reduce its level and rate of employment. There has been an increase in school retention to Year 12 as 'nationally in 2016, the apparent retention rate from year 10 to year 12 was 82.9 %, an increase from 75.6%in 2007' (Productivity Commission 2018a: 4.13). However, the observed fall in labour force participation rates for this age group (Tables A4-A5) is a small fraction of the large reduction in employment over the period. Thus, the increase in school retention is not associated with a large withdrawal of the age cohort from seeking work, rather there appears to have been a considerable slump in job openings to young people across the regions and Australia wide.

The net effect of a small fall in the participation rate of young people but a large fall in employment has been to increase the youth unemployment rate from around 13% in 2006 to 17% in 2016 in Australia (Reserve Bank 2018a). The Reserve Bank investigated these issues recently and concluded the large rise in youth unemployment reflects the more general trend to 'spare capacity in the Australian labour market…[and] the unemployment rate for younger workers has a largely contemporaneous relationship with the overall unemployment rate but tends to move twice as much. The heightened sensitivity of younger workers to demand conditions may reflect a 'last in, first out' practice. Employers are also generally more reluctant to hire or even retain younger workers during periods of cyclical

weakness because they tend to have less experience and lower skills. Furthermore, younger workers tend to be disproportionately concentrated in industries where the nature of work is quite cyclical' (Reserve Bank 2018a).

Census data confirms the substantial rise in unemployment rates for females and males over the period across the regions as a whole (Table 11).

Table 11: Unemployment rate of persons ≤19 years. Total Regions. 2006 and 2016

	Female	Male	Total Persons
2006	14.2%	14.9%	14.6%
2016	17.0%	20.0%	18.5%

The poor labour market performance of young people is a particularly concerning issue in the regions given the overall trend within the regions to lower employment growth and labour force participation rate compared to Australia as a whole. Such conditions may be the basis for inter-generational disadvantage. The 2018 report found that the regions as a whole are relatively disadvantaged based for example on their scores on the ABS Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD) compared to the scores for Australia as a whole.

The second key age related shift was the labour market behaviour of older persons (Table A6). Across the regions the number of employed persons aged 50-59 years, classified here as older workers, grew by 20.7%, much faster than the growth in total employment of 13.5%. Even more remarkable was the growth of employment of persons aged 60 years and older whose number in employment increased by 93.7%.

As noted above of concern to policymakers is that the absolute number of young workers actually fell by 9.5% and the number of employed prime aged workers (20-49) only increased by 4.8%. Indeed, in the NT Outback and WNW Tasmania there were substantial declines in the number of prime aged persons employed. The performance of prime age workers in the regions stands in stark contrast to the Australian data, where employment of these workers increased by 13.1%. A major contributor to the low growth of prime age workers in the regions is the huge gender disparity in job creation as prime age female employment increased by 8.4% compared just 1.6% for males. This gender disparity is much larger in the regions compared to Australia as a whole.

The rapid growth of employment of older persons was hugely facilitated by the availability of part time work. Across the regions as a whole for females 60 years and over part-time employment increased by 144.7% and for males by 84.3% (Table A7).

It is important to note that the rapid rate of growth of employed persons aged 50-59 (20.7%) and 60 and over (93.7%) is only partially accounted for by the fast growth of the population in these age groups (Table 3). The population of the former increased by 15.6% and the latter by 37.9% cent over the period. Thus, the rate of growth of working persons aged 50-59 was one-third faster than the age group's rate of population growth. Employment of persons aged 60 and above was nearly three times that of the corresponding population.

As with the younger age cohorts the growth rate of working females aged 50-59 and 60 and above far exceeded the growth rate of males of a similar age. In the former female employment increased by30.8% compared to 12.2% for males and in the former the proportions were 134.6% and 70.8%. This difference in gender growth rates in part reflects the fact that in 2006 females comprised a much smaller proportion of older workers and there was greater scope for a rapid proportional rise in their employment. This trend reflects the rapid rise in the labour force participation rates of these female age groups identified earlier.

Despite the impressive rate of growth of employment of older workers, it is essential to keep some perspective on the significance of their quantitative contribution to total employment. In 2006 workers aged 60 and above comprised 6.9% of total employment in the region. By 20016 this had increased to 11.9% (Table 12). A reasonable inference from this data is that a much faster rate of growth of employment of older persons will be required to fully offset the decline in employment of young people and very low job growth of prime age males. The poor labour market performance of these two groups contributed substantially to the increased dependency rates identified earlier.

Table 12: Share of Total Employment Comprised of Persons ≥ 60 X Gender. All Regions. Percent

	F	M	T
2006	5.4%	8.2%	6.9%
2016	10.7%	13.0%	11.9%

3.6 Causes of Rising Labour Force Participation Rates of Older Persons

Increased labour market participation of older persons and, especially older females, has occurred at a regional, national and indeed, international level across high income nations. Accordingly, explaining these labour market trends has been the subject of intense academic and public policy investigation. The following is based on research by the Reserve Bank of Australia (2017a), National Centre for Vocational Education Research (Griffin and Beddie 2010), Parliamentary Budget Office (2019), Productivity Commission (2005) and academic research institutions specialising in demographics (Burtless 2013).

These factors include:

- a rising share of older persons in the population and labour force represents, in part, a return on previous generations' investment in improved health systems and medical research. Put simply, not only are older people living longer, they are living better in the sense that the age at which they are compelled to withdraw from the workforce due to age related health incapacity is increasing
- greater labour market flexibility especially the rise of part time employment has created opportunities for those who seek a job but not a full time job, to find openings in the economy. This is supported by data reported earlier, that the largest proportional increases in part time employment have occurred amongst older workers
- the current and future generation of older workers is better educated than the previous generation of older workers. Not only are years of education positively

correlated with increased labour force participation rates across all age groups, including the old, but because of more education the relative returns to older people in the workforce now are higher than the relative returns to older workers in the workforce in previous generations. That is to say there is more economic incentive for the current generation of older workers to continue working compared to that offered to earlier generations

- it is also probable that the standard of living in retirement expected by the current generation of older workers is considerably higher than in previous generations. (These higher expectations no doubt reflect the higher real incomes enjoyed by current workers of all ages compared to previous generations).[14]
- an increasing proportion of older people do not own their home (due in part to rising divorce rates and a housing price 'bubble' linked to financial deregulation) and are reliant on the private rental market in which price increases are driven by housing price increases. This requires older renters to continue working
- structural change in the composition of industries has led to growth of services and information processing broadly conceived, and so favoured a type of work suited to older persons. Put simply, on average work is less physically demanding than in previous generations
- given continuing expansion in output and employment demographic change has created more opportunities for older persons. Put simply, more jobs are being created but a growth in the relative size of older persons means more of these jobs will be filled by this cohort
- increases in the age of entitlement to government pensions and benefits will have increased labour force participation rates of older people
- wealth losses caused by the GFC from 2008 onwards forced retired people or those transitioning to retirement to continue working. (Australia is unusual in having effectively privatised its superannuation system and having a system so dependent on the stock market to deliver private pension incomes).
- The long run trend to rising female labour force participation rates persists at older ages. Table 13 shows the interaction of a large rise in female participation rates, declining long run male rates and how the former has more than compensated for the decline in the latter so that total participation rates have increased.

[14] In support of this proposition is that the ASFA 'comfortable' retirement income for a couple ($61,061) is 168% higher than the age pension for couples in 2019 ($36,300) (https://www.superguide.com.au/accessing-superannuation/age-pension-rates and https://www.superannuation.asn.au/resources/retirement-standard). The ASFA retirement standards are not based on surveys of actual expenditure, though reference is made to a variety of authoritative surveys by the ABS to assist in constructing an appropriate 'basket' of goods and for prices. The ASFA standard represents an 'aspirational' standard but, importantly, these expenditure levels do closely match the desired retirement income levels of people in pre-retirement ages derived from the Household Income and Labour Dynamics Australia (HILDA) surveys (ASFA 2018: 5)

Table 13: Long-run Change in Labour Force Participation Rates X Gender

	F	M	P
Feb 1978	50.6%	88.1%	69.5%
Feb 2019	74.0%	83.3%	78.6%

(ABS 2019: Table 1)

4 Change in Occupational Structure of Employment

The previous sections used various economic and labour market aggregates to identify key trends in the regions and compare and contrast them with nation-wide trends. This section provides a more fine-grained analysis of these aggregate changes by examining shifts in the occupational structure of the regions and nation.

4.1 Differences Across Regions in Occupational Structure

Tables (14-15) show employment in each broad occupation group as a share of total employment in each region. The key points are that there are significant differences across the regions in the occupational composition of employment.

Table 14: Occupation Share of Total Employment. Percent. Persons. 2006

	Central Coast	NT Outback	Toow.	W&NW Tas	Geelong	Latrobe -Gipp.	Total Regions	Aust.
Managers	11.2%	10.6%	11.0%	13.5%	11.6%	16.3%	12.5%	13.2%
Professionals	16.8%	17.1%	17.2%	12.7%	18.4%	14.5%	16.3%	19.8%
Techs. & Trades	16.0%	13.0%	15.8%	16.2%	16.7%	16.8%	16.1%	14.4%
Community. & Personal Service	10.4%	13.8%	9.1%	9.5%	9.6%	9.1%	9.9%	8.8%
Clerical & Admin.	15.1%	11.5%	14.1%	11.4%	13.0%	11.5%	13.1%	15.0%
Sales	11.7%	6.1%	10.7%	9.7%	10.8%	9.9%	10.4%	9.8%
Machine Ops. & Drivers	6.3%	5.5%	6.5%	9.9%	7.1%	7.2%	7.0%	6.6%
Labourers	11.0%	17.7%	14.1%	15.7%	11.1%	13.2%	12.8%	10.5%
Inad. Described	0.8%	3.3%	0.7%	0.7%	0.9%	0.8%	1.0%	1.0%
Not stated	0.7%	1.2%	0.7%	0.8%	0.8%	0.9%	0.8%	0.8%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 15: Occupation Share of Total Employment. Percent. Persons. 2016

	Central Coast	NT Outback	Toow.	W&NW Tas	Geelong	Latrobe - Gipp.	Total Regions	Aust.
Managers	11.2%	11.9%	10.9%	12.3%	11.6%	14.4%	12.1%	13.0%
Professionals	18.6%	22.1%	19.6%	13.7%	21.1%	15.3%	18.4%	22.2%
Techs. & Trades	15.5%	12.1%	15.1%	15.0%	15.1%	16.4%	15.3%	13.5%
Community. & Personal Service	12.4%	17.1%	11.4%	12.0%	12.6%	11.6%	12.4%	10.8%
Clerical & Admin.	13.7%	11.9%	13.7%	11.2%	12.1%	11.4%	12.5%	13.6%
Sales	10.6%	5.8%	9.5%	10.1%	10.2%	9.6%	9.8%	9.4%
Machine Ops. & Drivers	6.0%	5.1%	6.5%	8.6%	5.8%	6.9%	6.4%	6.3%
Labourers	10.4%	10.5%	12.1%	15.1%	10.0%	12.7%	11.4%	9.5%
Inad. Described	1.0%	1.8%	0.7%	1.2%	1.0%	0.9%	1.0%	1.0%
Not stated	0.7%	1.6%	0.6%	0.7%	0.7%	0.9%	0.8%	0.7%
Total	100%	100%	100%	100%	100%	100%	100%	100%

The NT Outback and WNW Tasmania again stand out as having the most different occupational structure from the regional average and from Australia. For example, they have a much higher share of Labourers but the highest and lowest share of Professionals respectively across the regions.

The major differences in occupational structure between the regions and Australia are that in the regions Managers and Professionals comprise a much lower share of employment than for Australia. Conversely, Community and Personal Service Technicians and Tradespeople and Labourers comprise a higher share.

Accounting for some of these differences in the share of occupations between the regions and Australia is relatively straightforward. The higher share of Technicians and Tradespeople is partly a function of some regions, such as the Central Coast and Geelong and Latrobe Gippsland, experiencing more rapid population growth with consequent demand for workers to build housing. Further these regions serve as dormitory suburbs for these occupations to work in the city and surrounding suburbs. Also, some regions such as WNW Tasmania and the NT Outback have mining industries which intensively use these occupations as well as Machine Operators and Drivers. The higher share of Community & Personal Service workers is partly explained by the older demographic structure of the regions, with consequent demand for aged and disability care. There is also a tendency for disabled people to have a higher representation in regional centres outside the cities (Centre for Disability Research and Policy, 2018). Tourism is also a large employer in the regions with workers in this activity allocated to the Community & Personal Services, which captures the hospitality industry. The lower share of Professionals is due in part to the concentration of these occupations in large population centres, which create enough demand to justify people specialising in skilled services, such as legal, accounting, finance and medicine. There is also an important element of internal economies of agglomeration with skilled specialised services in that there are major advantages to specialised services providers locating in close proximity to one another.

4.2 Shifts in Occupational Share

There is relative stability in the occupational structure of each region over the decade. This arises because the flow of change in occupational employment is only a small fraction of the stock of employment in each region. In addition, a decade of structural change, even substantial change, is insufficient to elicit large proportional shifts in these aggregates. Thus, the largest increases in occupational share were for Professionals which increased its share of total employment in the regions by 2.1%. Across Australia professionals increased its share of total employment by 2.4%. Community and Personal Service workers increased by 2.5% on the regions and 2.0% for Australia.[15] All other occupations declined in their share, most by modest amounts, with only Labourers declining by more than 1% in the regions to fall by 1.4% and 1% for Australia.

Table 16: Change in Employed Persons X Occupation 2006-2016. Percent.*

	Central Coast	NT Outback	Toow.	W&NW Tas	Geelong	Latrobe - Gipp.	Total Regions	Aust.
Managers	16.3%	13.9%	11.1%	-6.4%	23.3%	-0.6%	9.9%	15.6%
Professionals	27.9%	31.2%	28.3%	10.9%	41.4%	18.2%	28.5%	31.3%
Techs. & Trades	11.7%	-5.3%	7.9%	-4.5%	11.8%	9.4%	8.2%	10.6%
Community. & Personal Service	38.4%	25.3%	41.8%	30.4%	61.4%	43.0%	42.7%	44.3%
Clerical & Admin.	4.7%	5.0%	10.0%	0.9%	14.7%	11.1%	8.6%	6.1%
Sales	5.1%	-3.1%	-0.3%	7.8%	15.9%	8.5%	7.5%	11.7%
Machine Ops. & Drivers	10.6%	-4.9%	12.7%	-10.6%	-0.3%	7.2%	3.9%	10.8%
Labourers	8.9%	-39.6%	-3.3%	-1.1%	11.3%	7.6%	1.7%	6.2%
Inad. Described	42.7%	-45.8%	5.6%	82.3%	26.1%	20.6%	14.1%	21.3%
Not stated	8.2%	38.2%	-9.5%	-11.5%	6.7%	9.9%	7.4%	1.7%
Total	15.7%	1.6%	12.9%	2.8%	23.3%	11.9%	14.0%	17.4%

* Note, as explained in section 1 because the ABS applies a confidentialising procedure to small cell sizes regional totals can differ from other tables constructed using more aggregated data.

A very different perspective is provided when considering proportional change in employment levels by occupation over the period. Table 16 reveals that there are very large differences in growth rates of the broad occupational groups and in the rate of growth of the same occupational group across the regions. For the regions as a whole just two broad occupational groups, Professionals (28.5%) and Community and Personal Services (42.7%), increased employment at much a faster rate than the average growth in total employment of 14.0%. The number of Labourers increased by just 1.7%. As will be shown later the

[15] 'Community and Personal Service Workers assist Health Professionals in the provision of patient care,
provide information and support on a range of social welfare matters, and provide other services in the areas of aged care and childcare, education support, hospitality, defence, policing and emergency services, security, travel and tourism, fitness, sports and personal services ' (ABS 2016: 472).

remarkable growth of Community and Personal Services jobs was especially important to female job growth.

There were also large differences in growth rates over the period across the regions. The two low growth regions, NT Outback and WNW Tasmania, all experienced significant declines in the number of people employed in middle skill (Technicians and Tradespeople) and low skill (Machine Operators and Drivers and Labourers) occupations. These are also male dominated occupations and their decline in total employment account for the bulk of the fall in male employment in these regions over the period. (Examined below).

The same two occupations which experienced the largest percentage change also contributed disproportionately to the growth in total employment over the period in the regions. Professionals and Community and Personal Services contributed 33.1% and 30.1% respectively to the growth in total employment (Table 17). These two occupations accounted collectively for 6.3 of every 10 net jobs created over the period. Similar trends for Professionals applied across Australia but Community and Personal Service Workers across Australia contributed a smaller 22.5% of total employment growth.

The large anomalous-looking percentage changes in the two low growth regions especially, the large negative percentage change in Technicians and Tradespeople, Machine Operators and labourers and large positive growth in Professionals are due to the fact that these regions experienced a fall or marginal total employment growth over the period but also comparatively large absolute changes in employment in the given occupations. (Put simply, a small denominator and a much larger numerator will produce a large percentage change).

Table 17: Contribution to Total Employment Growth 2006-2016. Persons. Percent.

	Central Coast	NT Outback	Toow.	W&NW Tas	Geelong	Latrobe - Gipp.	Total Regions	Aust.
Managers	11.6%	90.9%	9.5%	-31.3%	11.6%	-0.9%	8.9%	11.9%
Professionals	29.8%	326.7%	37.9%	50.3%	32.6%	22.1%	33.1%	35.8%
Techs. & Trades	11.9%	-42.5%	9.6%	-26.3%	8.4%	13.3%	9.5%	8.7%
Community. & Personal Service	25.3%	214.4%	29.6%	104.4%	25.3%	32.7%	30.1%	22.5%
Clerical & Admin.	4.5%	35.2%	11.0%	3.7%	8.2%	10.7%	8.0%	5.3%
Sales	3.8%	-11.5%	-0.2%	27.3%	7.4%	7.0%	5.6%	6.6%
Machine Ops. & Drivers	4.2%	-16.6%	6.4%	-38.0%	-0.1%	4.4%	1.9%	4.1%
Labourers	6.2%	-430.8%	-3.6%	-6.1%	5.4%	8.4%	1.5%	3.7%
Inad. Described	2.2%	-93.9%	0.3%	19.5%	1.0%	1.4%	1.0%	1.2%
Not stated	0.4%	28.1%	-0.5%	-3.4%	0.2%	0.7%	0.4%	0.1%
Total	100%	100%	100%	100%	100%	100%	100%	100%

4.3 Occupational Change in Skill Level

The ABS assigns a skill level to each broad occupation group based on factors such as typical educational requirement to enter the job, work experience and amount of on the job training. The most skilled jobs are classified as level 1 and the least skilled jobs as level 5. Applying these skill levels to the share of broad occupations as at 2016 within the regions and comparing them to Australia as a whole it is evident that the regions are over-represented in lower skill occupations (Table 18).

Table 18: Skill Level of Broad Occupations in Regions Relative to Australia. 2016

	Skill Level	Occupation share in regions above (+) or below (-) Australian share 2016*
Managers	1,2	(-)
Professionals	1	(-) (-)
Techs. & Trades	2,3	(+) (+)
Community. & Personal Service	2,3,4,5	(+) (+)
Clerical & Admin.	2,3,4,5	(-) (-)
Sales	2,3,4,5	(+)
Machine Ops. & Drivers	4	(+)
Labourers	4,5	(+) (+)

* A double sign indicates the variation is more than 1 per cent.

4.4 A More Detailed Look at Occupational Change and Gender

It was noted earlier that females had a much faster rate of employment growth over the period and we now turn examine how this has affected the occupational structure of female employment over the period (Tables 19-20). The principal changes across the regions were a rise in the proportion of females employed in Professional and Community and Personal Service occupations. (The principal occupations accounting for this rise will be examined shortly). The major occupations experiencing a fall in the share of total female employment were Clerical and Administrative and Sales. The changes in the regions reflected national trends.

Table 19: Female Employment X Occupation. Percent of Total Female Employment. 2006*

	Central Coast	NT Outback	Toow'	W&NW Tas	Geelong	Lat-Gipps	Total Regions	Aust.
Managers	8.2%	8.9%	8.0%	10.2%	8.2%	12.4%	9.3%	9.9%
Professionals	19.7%	22.4%	20.4%	16.4%	22.0%	19.1%	20.0%	22.8%
Techs. & Trades	4.7%	3.5%	5.2%	5.0%	5.4%	5.1%	4.9%	4.6%
Comm & Pers. Serv.	15.1%	18.7%	14.2%	15.8%	14.7%	14.7%	15.1%	13.2%
Clerical & Admin.	25.3%	20.6%	24.3%	20.4%	22.0%	20.7%	22.7%	25.0%
Sales	15.9%	9.2%	14.5%	14.4%	15.2%	14.7%	14.7%	13.2%
Machine Ops. & Drivers	1.6%	0.6%	0.8%	1.7%	1.7%	1.0%	1.3%	1.5%
Labourers	8.2%	12.2%	11.5%	14.8%	9.2%	10.7%	10.3%	8.3%
Total	100%	100%	100%	100%	100%	100%	100%	100%

*Excludes inadequately described and not stated categories.

Table 20: Female Employment X Occupation. Percent of Total Female Employment. 2016*

	Central Coast	NT Outback	Toow'	W&NW Tas	Geelong	Lat-Gipps	Total Regions	Aust.
Managers	8.6%	10.1%	8.2%	8.7%	8.5%	10.8%	9.1%	10.1%
Professionals	22.6%	27.6%	24.1%	17.5%	25.5%	20.4%	22.9%	25.9%
Techs. & Trades	4.8%	3.8%	4.8%	5.1%	5.2%	5.3%	5.0%	4.5%
Comm & Pers. Serv.	18.1%	20.4%	17.1%	19.4%	18.4%	18.4%	18.4%	15.9%
Clerical & Admin.	22.3%	19.3%	22.8%	18.4%	19.4%	19.5%	20.5%	21.7%
Sales	14.0%	7.6%	11.9%	14.5%	13.3%	13.3%	13.1%	12.1%
Machine Ops. & Drivers	1.3%	1.1%	0.9%	1.3%	1.3%	1.0%	1.2%	1.3%
Labourers	6.8%	7.2%	9.3%	13.5%	7.0%	9.9%	8.4%	7.0%
Total	100%	100%	100%	100%	100%	100%	100%	100%

*Excludes inadequately described and not stated categories.

Across all regions there was comparatively much less change in the share of male employment across the broad occupational groups (Tables 21-22). There were relatively modest increases in the share of males employed in Professional jobs and Community and Personal Services. However, as will be demonstrated below this apparent stability in the composition of male employment masks quite dramatic shifts in male employment growth especially within the 'low growth' regions.

Table 21: Male Employment X Occupation. Percent of Total Male Employment. 2006*

	Central Coast	NT Outback	Toow'	W&NW Tas	Geelong	Lat-Gipps	Total Regions	Aust.
Managers	13.8%	12.1%	13.6%	16.2%	14.5%	19.5%	15.3%	16.1%
Professionals	14.3%	12.6%	14.5%	9.6%	15.3%	10.6%	13.2%	17.3%
Techs. & Trades	26.0%	21.0%	25.0%	25.3%	26.2%	26.6%	25.7%	22.7%
Comm & Pers. Serv.	6.2%	9.8%	4.7%	4.3%	5.2%	4.3%	5.4%	5.1%
Clerical & Admin.	6.1%	4.0%	5.2%	4.1%	5.3%	3.7%	4.9%	6.5%
Sales	8.0%	3.4%	7.4%	5.8%	7.1%	5.8%	6.7%	7.0%
Machine Ops. & Drivers	10.4%	9.6%	11.5%	16.6%	11.8%	12.4%	11.8%	11.0%
Labourers	13.5%	22.4%	16.4%	16.4%	12.7%	15.3%	15.0%	12.3%
Total	100%	100%	100%	100%	100%	100%	100%	100%

*Excludes inadequately described and not stated categories.

Table 22: Male Employment X Occupation. Percent of Total Male Employment. 2016

	Central Coast	NT Outback	Toow'	W&NW Tas	Geelong	Lat-Gipps	Total Regions	Aust.
Managers	13.6%	13.6%	13.3%	15.7%	14.5%	17.8%	14.9%	15.6%
Professionals	14.8%	16.9%	15.3%	10.1%	16.9%	10.6%	14.2%	18.9%
Techs. & Trades	25.5%	19.9%	24.7%	24.3%	24.4%	26.7%	25.0%	21.8%
Comm & Pers. Serv.	7.1%	13.9%	6.2%	5.1%	7.0%	5.3%	6.8%	6.2%
Clerical & Admin.	5.6%	5.0%	5.3%	4.5%	5.2%	3.9%	5.0%	6.2%
Sales	7.4%	4.0%	7.2%	6.1%	7.2%	6.1%	6.8%	6.9%
Machine Ops. & Drivers	10.4%	8.9%	11.8%	15.4%	10.0%	12.3%	11.2%	10.7%
Labourers	13.7%	13.6%	14.7%	16.6%	12.8%	15.3%	14.2%	11.7%
Total	100%	100%	100%	100%	100%	100%	100%	100%

A more disaggregated examination of the change in occupational structure, using 2 digit occupational classifications, reveals large rates of growth and decline at an individual occupation level across the regions (Table A8-9). These large shifts tend to be masked when more aggregated data is employed. For example, of the 54 individual occupations at an ANZSCO 2 digit level 31 had growth of more than 20%, the average female rate of employment growth over the decade. The largest proportional declines were for Personal Assistants & Secretaries (-34%) within the Clerical and Administrative broad group.

For the regions females in the Professions enjoyed particularly large employment growth in teaching (22%), nursing/allied medical (40%), engineering and design (59%) and legal and social welfare occupations (76%). (The latter includes jobs like lawyer and social workers). In the Community and Personal Services broad occupation group rapid growth occurred in Carers and Aides (47%), Health and Welfare Support Workers (47%). These occupations work for example, carers working in aged, disabled and child care as well as nursing and dental assistants and education aides. Rapid growth in this broad occupation group also occurred in hospitality (34%), and Protective Service Workers occupation (54%). (The latter would encompass the very rapid growth of private security and public spending on immigration, police and internal and external intelligence services).

In terms of the contribution of the broad occupational groups to net female employment growth over the decade Professional and Community and Personal Services contributed 37.6% and 34.9% respectively to total female employment growth across the regions. Just one occupation, Carers and Aides, part of the larger Community and Personal Services group, accounted for 19% of net female job growth in the regions. Hospitality contributed 5.4%. Education Professional contributed 8.1% and Health Professional 14.1%. Table 23 provides a list of occupations contributing 4% or more to net female job growth.

Table 23: Occupations contributing ≥4 Percent to Net Regional Female Employment Growth 2006-2016

Sports and Personal Service Workers	4.1%
Inquiry Clerks and Receptionists	4.8%
Health and Welfare Support Workers	4.9%
Office Managers and Program Administrators	5.3%
Hospitality Workers	5.4%
Business, Human Resource and Marketing Professionals	5.4%
Legal, Social and Welfare Professionals	5.4%
Specialist Managers	6.3%
Education Professionals	8.0%
Health Professionals	14.1%
Carers and Aides	18.9%

For males, of the 54 individual occupations at an ANZSCO 2 digit level, 31 had growth of more than 9.3% the male average rate of employment growth across all regions. The largest proportional declines were for Factory Process Workers (-16.3%), Farmers and Farm Managers (-14.2%), Machine and Stationary Plant Operators (-11.3%), Sales Representatives and Agents (-10.4%), and Automotive and Engineering Trades Workers (-7.5%). Similar trends applied nationally. The fall in farmers and farm managers no doubt reflects the effect of drought and the long term trend to farm consolidation.

Remarkable rates of male employment growth occurred in the regions for Carers and Aides (84.5%); Food Preparation Assistants (56.3%); Hospitality Workers (45.2%); Health Professionals 40.7%; ICT Professionals (25.0%); Legal, Social and Welfare Professionals (24.9%) and Health and Welfare Support Workers (24%). In Geelong the number of male Carers and Aides increased by 150%.

In terms of the contribution of the broad occupational groups to net male employment growth over the decade Professional and Community and Personal Services contributed 25.0% and 21.6% respectively to total male employment growth across the regions. Managers contributed 17.4% and Tradespeople and Technicians 10.5%. Despite male employment growing at roughly half the rate of female employment growth it is much more evenly spread across the major occupation groups.

In terms of the contribution of individual occupations to total job growth, Specialist Managers accounted for 14.5% of male job growth (probably related to large growth in education, welfare services); Construction Trades (9.9%); sales assistants (8.2%). The largest negative contribution to growth, that is, job losses as a proportion of net job gain, were Automotive

and Engineering Trades Workers (-5.9%); Factory Process Workers (-5.6%) and Farmers and Farm Managers (-5.1%).

Table 24: Occupations Contributing ≥4 Percent to Net Regional Male Employment Growth 2006-2016

Business, Human Resource and Marketing Professionals	4.0%
Skilled Animal and Horticultural Workers	4.1%
Protective Service Workers	4.1%
Design, Engineering, Science and Transport Professionals	4.5%
Construction and Mining Labourers	5.1%
Engineering, ICT and Science Technicians	5.1%
Food Preparation Assistants	6.1%
Road and Rail Drivers	6.3%
Health Professionals	7.6%
Carers and Aides	7.8%
Sales Assistants and Salespersons	8.2%
Construction Trades Workers	9.9%
Specialist Managers	14.5%

4.5 Net Job Growth by Gender and Region

Net job growth occurs when job creation exceeds job losses. Table 25 shows job creation and job loss across the regions for males and females. The key points are that it is starkly evident the low growth regions, NT Outback and WNW Tasmania, have a ratio of job loss to gain for both males and females many times higher than for other regions and for Australia as a whole. Males in these two regions have a ratio of job loss greater than job gain. Second, across the regions as whole males have a rate of job loss as a share of job gains three times that of females in the regions and significantly higher that of males for Australia as a whole.

The net effect of the more rapid growth of female employment in the regions is that females increased their share of total employment over the period from 46.1% to 48.3%.

Table 25: Job Growth and Loss X Region. 2006-2016

	Central Coast	NT Outback	Toow	W& NW Tas	Geelong	Lat.-Gipps	Total Regions	Aust.
Female +	13140	2342	6072	2741	15346	9318	47493	979538
Female -	-2157	-1201	-1063	-580	-1012	-869	-5415	-96530
Female job loss as % of gains	-16%	-51%	-18%	-21%	-7%	-9%	-11%	-10%
Male +	11385	1698	5646	1920	14515	6789	38962	974740
Male -	-3355	-2364	-2629	-2497	-4528	-2120	-14503	-278061
Male job loss as % of gains	-29%	-139%	-47%	-130%	-31%	-31%	-37%	-29%

4.6 Sex Segmentation by Occupation

It is evident from tables (19-22) that there are marked differences in the distribution of employment of males and females across different broad occupational groups. Expressed more formally the data shows considerable evidence of occupational sex segmentation. Over many decades research has revealed that occupational sex segmentation within Australia is high by many international comparisons (Workplace Gender Equality Agency 2019).

To determine both the extent of this segmentation and whether it has changed over the period tables were constructed showing female employment as a proportion of total employment in each major occupational group (Appendix A10-A11). The key points are that females are significantly over-represented in Professional; Community and Personal Services; Clerical and Administrative and Sales jobs. Over-representation means that the share of female employment in the given occupation exceeds the share of female employment n total employment in each period. Crucially, the first two groups especially have experienced rapid occupational growth accounting for well over 70% of net female job creation across the regions. Further, Sales and Clerical and Administrative jobs also experienced growth over the period. In other words, females have been segmented into jobs that have experienced especially rapid growth and these accounts for the rising overall share of females in total employment.

Conversely, total male employment is over-represented in occupations in which they comprise the great majority of workers. For example, in 2016 in the regions males comprise 85% of Technicians and Trades, 91% of Machine Operators and Drivers and 64% Labourers. The last two broad occupations had marginal or declining employment across the regions and Technicians and Trades grew at around the total average male rate. Thus, the occupational sex segmentation of males in declining or slow growing industries accounts in large part for their declining share of total employment over the period.

4.7 Full Time and Part Time Work. An Occupational Perspective

An investigation was made into the distribution of employment by part-time and full-time status (Table 26). ‘For Census purposes, a person is considered to be working full-time if they worked 35 hours or more in all jobs during the week prior to Census Night’ (ABS 2016: 192). Part-time is defined as those working less than 35 hours.[16]

[16] Note, Census employment data includes an ‘Away From Work’ category which does not record hours worked. The percentages above would therefore be different if this was excluded. The effect is however, small.

Table 26: Part-Time Workers as a Share of Total Employment X Occupation. Persons. Percent

	Central Coast		NT Outback		Toowoomba		W&NW Tas	
1 Digit ANZSCO	2006	2016	2006	2016	2006	2016	2006	2016
Managers	13.2%	14.6%	5.7%	8.3%	12.5%	13.8%	16.5%	18.1%
Profess.	29.7%	31.4%	21.1%	18.6%	27.2%	29.0%	28.2%	33.6%
Techs. & Trades	17.2%	19.5%	9.0%	12.9%	14.2%	16.2%	14.9%	19.7%
Comm & Pers. Serv.	51.1%	53.0%	34.8%	29.6%	49.9%	54.9%	55.2%	60.5%
Clerical & Admin.	39.0%	40.8%	23.6%	20.8%	34.3%	35.3%	39.6%	42.3%
Sales	54.7%	56.9%	44.7%	41.2%	51.4%	55.4%	54.6%	61.0%
Machine Ops. & Drivers	19.9%	22.6%	11.5%	18.9%	14.3%	16.0%	15.1%	19.1%
Labourer	44.0%	47.4%	55.6%	31.5%	39.3%	44.8%	41.1%	46.9%
Total	33.2%	35.3%	27.3%	21.4%	29.9%	32.7%	31.4%	37.1%
	Geelong		Latrobe –Gipps.		Total Regions		Australia	
	2006	2016	2006	2016	2006	2016	2006	2016
Managers	14.8%	16.8%	16.5%	19.4%	14.3%	16.2%	12.7%	14.1%
Profess.	30.0%	34.3%	32.9%	36.9%	29.3%	32.1%	25.4%	27.4%
Techs. & Trades	15.5%	19.5%	16.2%	19.9%	15.5%	18.9%	15.7%	19.1%
Comm & Pers. Serv.	54.2%	57.2%	57.6%	58.6%	51.8%	54.1%	50.5%	54.6%
Clerical & Admin.	40.7%	42.8%	43.3%	46.0%	38.7%	40.5%	34.3%	35.9%
Sales	56.9%	60.4%	56.8%	59.4%	54.8%	57.9%	51.6%	55.6%
Machine Ops. & Drivers	15.6%	21.2%	15.8%	18.3%	16.2%	19.9%	15.8%	20.4%
Labourer	47.7%	51.8%	45.4%	49.9%	45.1%	47.6%	42.4%	48.3%
Total	33.2%	37.4%	33.4%	37.4%	32.3%	35.2%	29.5%	32.7%

The key points are that first, for most regions there was considerable growth in the share of part time workers in total employment. Across all regions part time workers increased their share of total employment from 32.3% in 2006 to 35.2% in 2016. The exception was NT Outback which experienced a decline in the share of part time work. (On many measures examined in this report this region is ‘idiosyncratic’ reflecting its small population base so that even modest changes in absolute numbers have large proportional effects). Second, all major occupational groups experienced an increase in part time work. Similar increases occurred in Australia but the regions retained over the period their somewhat higher share of part time work compared to Australia as a whole.

The main reasons for this rise in the share of part time workers include first, the increased share of females in the workforce. Not only do females have a higher propensity than males to work part time but they also increased their share of total employment. Both genders increased share of part time work. In 2006 across the regions 52.9% of females worked part-time and this increased to 54.2% by 2016. The corresponding male figures are 19.0% and 22.1%. Second, the increased share of older workers contributed as these workers have a much higher preference for part time work compared to other age groups (Reserve Bank of Australia 2017b). Third, certain industries experienced particularly rapid growth and these offer disproportionately part time employment. For example, the occupational group Community and Personal Service contributed substantially to employment growth across all regions and has a share of part time workers well above that of most other industries. Fourth, the pursuit of greater labour market flexibility over the last four decades, of which part time work is an expression, has permitted employers to more closely match labour utilisation to peak production output in pursuit of greater efficiency. Finally, related to the last

point, some element of the rise of part time employment would also be caused by increased use of ‘non-standard’ forms of employment such as employees being classified as contractors and casual work. For example, contractors can more easily be allocated ‘zero hour’ contracts than employees. (Non-standard work is not captured in Census data, as other ABS surveys must be used for estimates of ‘forms of employment’).

There are many implications of the rise of part time employment but just three are examined here. Especially for regions experiencing declining or slow population growth ‘the rise in part-time employment over the past few decades has contributed to an increase in labour market participation’ (Reserve Bank of Australia 2017b: 23). This is particularly the case for older age groups to whom part-time work seems especially conducive. Second, on the other hand, the rise of part time work ‘also means there are more part-time workers who are willing and able to work additional hours’ (Reserve Bank of Australia 2017b: 23). The large rise in part time employment is causally associated with the rise in the ‘labour under-utilisation rate’, which is measured by the proportion of employed persons seeking more hours of work but unable to attain them. In simple terms labour under-utilisation means the economy is unable to supply enough hours of work to satisfy the demand for additional work. Labour under-utilisation means in affected workers are unable to attain the income they seek. Third, another effect of the rise of part-time work is to spread available job hours across more people and this can potentially lower relative wage inequality within regions. Finally, on the other hand, gif some regions have a high proportion of part-time work compared to regions with a high proportion of full-time, this may cause inter-regional income disparities.

5 Change in Industry Structure of Employment

Just as there is considerable variation in the growth rates of different occupations similar trends also apply to the analysis of employment by industry over the period.

5.1 Change in Industry Employment by Gender

Across the regions females experienced substantial growth in employment across most industries. Of the 19 ANZSIC industries at the 1 digit level, the most aggregated level, female employment across the regions expanded in 15 industry sectors (Table A12). The declining sectors for females were Wholesale (-26.5%), Manufacturing (-22.3%) and Retail (-4.2%). The pattern of employment growth for Australia was broadly similar to the regions.

Some industries across the regions experienced phenomenal rates of growth in female employment, for example, Mining (129.6%) and Electricity, Gas, Water and Waste (91.1%). These high growth rates largely reflect the relatively small female employment base in these industries at the beginning of the period.

A different but equally startling picture emerges when we consider the more important issue of which industries contributed the most to total female employment growth. Just three of the 19 industries accounted for nearly 7 in every 10 female jobs created, Health Care and Social Assistance (41.1%); Education and Training (19.1%) and Accommodation and Food Services (9.3%). The contribution of Education and Training in the regions was close to that for Australia as a whole but, Health Care and Social Assistance grew much faster compared to the nation. The other major contributors were Public Administration and Safety (6.7%) and Professional, Scientific and Technical Services (6.5%)

Expressing job loss as a proportion of net job growth across the regions by industry the major contributors to female job loss were Manufacturing (-5.8%), Retail (-3.4%) and Wholesale

(-3.1%). Manufacturing declined across all regions and Australia. The decline of Wholesale occurred across all regions and Australia. Wholesale entails transactions occurring 'mainly business-to-business…characterised by high value and/or high-volume dealings' (Skills IQ 2019: 6). The decline in employment is attributed to a combination of automation (reducing for example jobs for packers) and the entry of on-line giants such as Amazon, fulfilling domestic orders from overseas distribution sources. Retail fell significantly across all regions, excluding Geelong, but rose slightly in Australia. This probably reflects the more depressed economic conditions in the regions, in addition to similar technological and competitive factors affecting Wholesale.

A more disaggregated level of analysis, the 2 digit ANZSIC level, of which there are more than 100 discrete industries, reveals that for Health Care and Social Assistance most 2 digit sectors contributed more than 10% to total female employment growth. These are Hospitals (10.9%); Medical and Other Health Care Services (10.7%); Residential Care Services (10.5%) and Social Assistance Services (9.9%). (The principal component of Social assistance is child care). Nearly all job growth within Education and Training was accounted by Preschool and School Education, contributing 15.5%. Female employment in Preschool and School Education accounted for around 50% of female employment growth in NT outback; 24% in Toowoomba and 20% in WNW Tasmania. The growth of Accommodation and Food Services was explained almost totally by the Food and Beverage Services component.

Male employment fell across the regions in 3 of the 19 industries in Manufacturing (-31.1%), Wholesale Trade (-21.6%) and Retail (-2.5%) (Table A13). With the exception of Retail these declines mostly reflect similar trends across Australia and of the same magnitude.

Industries with the largest growth rates across the regions include Mining (52.5%), Arts and Recreation (41.6%), Health Care and Social Assistance (38.5%), Accommodation and Food Services (30%) Construction (28.7%) and Professional and Technical Services (25.1%).

The principal contributors to net male job growth included Construction (40.7%) were Health Care and Social Assistance (17.2%), Accommodation and Food Services (14.2%), Professional and Technical Services (10.3%) and Education and Training (9.1%).

Similar trends apply to males as applied to females in relation to the 2 digit sub-industries mainly accounting for growth. For example, all sectors within Health Care and Social Assistance experienced growth and Food and beverage Services accounted for almost all the growth in the Accommodation and Food Services industry. The main difference between males and females, aside from the fact that female employment grew at more than twice the rate as male employment, is the contribution of Construction to male employment gains. However, there are quite important regional variations, as in the two low growth regions, construction employment either fell substantially or had no growth. The main difference between the regions and Australia is that former was far more dependent on Construction, accounting for 40.7% of net job growth compared to 25.7% for the latter.

It is also worth observing that in the two low growth regions direct public sector employment of males in the Public Administration and Safety industry declined by 30.5% and16.0% in the NT Outback and WNW Tasmania respectively. Other regions experienced considerable job growth in this industry; Geelong for example rose by 34%, but across the regions as whole employment in this industry was unchanged. It increased by 11.4% in Australia. In the two low growth regions these public sector job losses made a major contribution to their overall poor labour market performance. (Female employment in this industry across the regions rose by 20.3%, close to the female average for all industries. Why there should be such marked gender differences within this industry in the regions and between males in this industry and for Australia as a whole are interesting questions).

Expressing job loss as a proportion of net job growth across the regions by industry the major contributors to male job loss were Manufacturing (-47.4%); Wholesale (-9.5) and Retail (-2.4%). The loss of male Manufacturing jobs across the regions was equivalent to nearly half of male net job gains over the period across the regions. That is to say, for every 10 male jobs created in the regions over the period 4.7 were lost in Manufacturing. (Around 24,500 male net jobs were added across the regions but 11,600 were lost in Manufacturing). For Australia as a whole for every 10 male jobs created across Australia only 3 were lost in manufacturing. (There were close to 700,000 male jobs created over the period but 212,000 manufacturing jobs lost).

5.2 Drivers of Regional Change in Industrial Structure and Policy Implications

Manufacturing jobs experienced widespread decline across all regions and most sub-industries but in specific regions such as Geelong they were focussed on particular industries allied to car making. Manufacturing employment has been in decline for several decades in Australia and across the developed world associated with the well-known forces of de-industrialisation. It is important to remember however, that the level of real manufacturing output has increased significantly over the long-run, evidence of the industry's significant scope for productivity growth and technical change (ABS 2018). Over the decade of analysis real manufacturing output fell by about 7% due to a resource boom induced massive appreciation of the dollar which made local industry uncompetitive and public policy decisions to cease supporting motor vehicle production.

Major job loss in manufacturing had ambiguous effects on regional labour markets. On the one hand it caused a significant fall in male participation rates, due to the 'discouraged worker effect'. On the other, since not all redundant workers left the labour market, it constituted an important source of female and male labour supply for expanding industries, especially hospitality and health and social assistance.[17] Many of the entry-level jobs in these industries require only modest training and formal qualifications. For low growth regions in particular with low or declining population redundant manufacturing workers were an important labour source, but in such regions, assuming the absence of future large scale redundancies, the scope for inter-industry labour transfer will be greatly reduced. Expressed another way, in the absence of major future job loss in the regions there should be more net

[17] The Nous Group (2013) literature review of large scale redundancies is a useful summary of the key issues. Generally, higher skilled workers fair much better post-redundancy than low skilled workers, a high proportion of whom enter early retirement. This is consistent with the data presented in the present study.

job gain and, even possibly in the future, potential labour shortages in the low growth regions in particular.

Rapid growth in the Health Care and Social Assistance industry can be accounted for in large part by the aging of the population, as older people make more demand on the health care system and increasingly move into aged care. The combination of rising per capita income over the long run and medical advances, which expands the scope for medical interventions, also expands the demand for medical services across all age groups. The growth of preschool and child care services, the former being part of the education and Training industry and the latter being part of the Social Assistance industry, is also partly a function of the large rise in female labour force participation rates and employment over the period. The growth of these two industries and the rise in female labour force participation are complementary economic activities.

It is important to note that the 2016 Census results were unlikely to be affected in a significant way by the National Disability Insurance Scheme (NDIS) as it did not commence until June 2016, though pilot programs had been conducted since 2013. For the NDIS 'the scale of job creation is expected to exceed previous major national projects' including the national broad band network and snowy river scheme combined (Department of Social Service 2019). Over the five years to 2024 the NDIS will require an additional 90,000 full time equivalent workers; a 90 percent increase in the existing disability workforce. Achieving an equivalent proportional increase in the regions' Social Assistance workforce, which has already been subject to a faster rate of growth than for Australia as a whole, will be a challenge.

The growth in the regions of Food and Beverage Services, which includes cafes, restaurants, clubs and catering establishments, reflects increased tourism; rising per capita income and the rise of the two person working household. There is also arguably a link between the growth of Catering services and the Health and Social Assistance industry as the former can be contracted to supply meals to institutions such as hospitals and aged care facilities, both of which have grown significantly over the decade.

Finally, it would be anticipated that because the regions were subject to very significant changes in the age structure of employment, the gender mix of employment and change in industry of employment demand in the regions for Education and Training focussed on adults would be high. It would be expected that high structural change will increase the demand for training and re-training in the regions. The employment of both males and females in the two main components of Education and Training focused on adult education and re-training, Adult, Community and Other Education and Tertiary Education (which includes university and vocational education), grew substantially faster than for employment as a whole in the regions. (This claim is consistent with the finding in chapter 7 of a significant increase in the workforce possession of post-school qualifications).

5.3 Sex Segmentation by Industry

As shown previously for occupations, employment by industry is quite segmented by gender. Table 27 shows the proportion of males in total employment in each industry as at 2016. Certain industries such as Electricity, Gas, Water and Waste and Mining are overwhelmingly male dominated.

Table 27: Male Share of Total Employment by Industry. Percent. 2016

	Central Coast	NT Out'	Toow.	W& NW Tas.	Geelong	Lat.-Gipps.	Total Regions	Aust.
Accom.& Food	42%	48%	42%	32%	42%	39%	41%	45%
Admin.& Supp.	48%	47%	45%	42%	47%	46%	46%	47%
Agric, For & Fish	63%	67%	65%	71%	69%	67%	67%	69%
Arts & Rec.	54%	47%	48%	50%	55%	46%	51%	52%
Construction	89%	83%	86%	90%	90%	90%	89%	87%
Educ. & Training	28%	29%	29%	25%	32%	25%	28%	29%
E.G.W.&W.	86%	86%	85%	84%	73%	87%	84%	76%
Fin. & Insurance	47%	27%	40%	31%	44%	33%	42%	48%
Health Care & Social Assist.	21%	30%	22%	19%	19%	16%	20%	21%
Inform. Media & Telec.	66%	63%	65%	49%	58%	55%	61%	60%
Manufacturing	73%	76%	75%	73%	77%	77%	75%	72%
Mining	90%	86%	88%	92%	90%	92%	90%	84%
Other Services	53%	61%	56%	55%	52%	55%	54%	54%
Profess., Scient. & Tech.	53%	51%	48%	46%	55%	49%	52%	55%
Public Admin & Safety	57%	56%	59%	46%	50%	46%	53%	53%
Rental, Hiring & R. E	45%	44%	47%	41%	46%	42%	45%	49%
Retail Trade	41%	47%	43%	38%	41%	40%	41%	43%
Transport, Postal & Warehouse	80%	75%	81%	77%	82%	78%	79%	77%
Wholesale Trade	65%	68%	75%	75%	71%	72%	70%	66%
Total	52%	52%	52%	52%	51%	52%	52%	52%

In 6 of the 19 industries males represent 70% or more of the workforce. With few exceptions there is little variation across the regions in sex segmentation by industry.

Again, consistent with earlier occupational analysis, sex segmentation by industry disadvantaged males and advantaged females. Males tend to be concentrated in industries subject to decline (Manufacturing and Wholesale) or low growth (Transport, Postal & Warehouse) and very under-represented in industries with high job growth (Health, Social Assistance and Education). Some male dominated industries had high a rate of job growth, such as Mining, but the absolute number of new jobs is small. The key exception is Construction which is both male dominated and a major contributor to net growth over the period.

On the other hand, Table 28 reveals that over the decade there has been a tendency for sex segmentation to decline marginally, though, not in all industries. This has occurred notably in industries with very high existing rates of segmentation such as Electricity, Gas, Water and Waste and Mining. Of the 19 industries 12 experienced a reduction in the share of males in total employment. Across the regions males reduced their share of total employment by 2.2%, with the largest proportional change in the two low growth regions.

Table 28: Change in Male Share of Total Employment in Each Industry. 2006-2016 Percent. 2016

	Central Coast	NT Out'	Toow.	W& NW Tas.	Geelong	Lat.-Gipps.	Total Regions	Aust.
Accom.& Food	-2.3%	3.2%	6.8%	0.7%	2.2%	2.8%	1.6%	2.4%
Admin.& Supp.	-1.3%	-1.0%	-0.9%	-2.6%	-1.4%	-11.5%	-3.3%	-0.5%
Agric, For & Fish	1.3%	-0.6%	-0.0%	-0.2%	2.1%	-0.3%	-0.0%	-0.0%
Arts & Rec.	1.3%	-6.3%	-0.8%	-9.3%	3.4%	-2.7%	-0.3%	0.3%
Construction	1.2%	-4.1%	-0.2%	-0.3%	2.3%	-0.0%	0.7%	0.6%
Educ. & Training	-2.8%	1.4%	-2.1%	-3.7%	-0.9%	-3.2%	-1.9%	-1.8%
E.G.W.&W.	-2.2%	-5.6%	-4.7%	-12.4%	-10.4%	-3.5%	-5.3%	-2.0%
Fin. & Insurance	4.1%	-1.9%	-0.7%	2.1%	-0.7%	0.4%	2.0%	3.0%
Health Care & Social Assist.	-0.2%	-6.5%	0.4%	-0.3%	1.4%	0.3%	-0.2%	0.1%
Inform. Media & Telec.	2.8%	0.2%	3.1%	-2.0%	-3.5%	-0.0%	0.3%	0.7%
Manufacturing	-1.4%	-0.6%	6.3%	3.6%	1.1%	2.2%	0.9%	2.7%
Mining	0.8%	-9.1%	-3.0%	-2.9%	-3.0%	-2.6%	-2.2%	-1.9%
Other Services	-3.5%	3.9%	-0.7%	-2.5%	-2.2%	-4.1%	-2.2%	-2.6%
Profess., Scient. & Tech	0.2%	-7.0%	-0.9%	-4.2%	-0.7%	-1.6%	-1.1%	0.4%
Pub. Admin & Safe	-5.0%	-3.2%	-6.6%	-4.6%	-2.1%	-4.5%	-4.6%	-2.8%
Rental, Hiring & R.E.	-2.4%	6.8%	-2.0%	-2.5%	-3.6%	-5.1%	-2.7%	-0.6%
Retail Trade	0.4%	3.4%	0.6%	-2.1%	0.7%	0.6%	0.4%	0.2%
Transport, Postal & Warehousing	-2.0%	-2.3%	-1.7%	0.2%	-0.6%	-2.1%	-1.3%	-0.3%
Wholesale Trade	1.6%	-4.0%	0.9%	1.2%	2.9%	-0.3%	1.4%	0.4%
Total	-1.5%	-3.0%	-1.9%	-3.3%	-2.5%	-2.2%	-2.2%	-1.5%

5.4 Regional Concentration or Diversification in Employment by Industry

There is considerable academic and policy debate regarding the effects on economic and/or employment growth of diversification or specialisation in regional industrial structures. Put simply, is a region better off specialising in a few key economic activities or developing multiple industries? Research is inconclusive, on the one hand there are claims that industrial 'diversity helps employment growth' (Glaeser et al 1991: 1150). On the other, in the US for example 'the bulk of national income growth between 1994 and 2000 was driven by large gains in just five of the country's 3141 counties; these counties feature iconic clusters of tradable activity in information technology and financial services'(Kemeney and Storper 2014: 2).

The argument for regional specialisation largely rests on the idea, taken over from international trade theory, that nations (regions) which specialise in the production of goods and services reflecting their national (regional) comparative advantage accrue the 'gains from trade'. A key additional idea is that of the 'export multiplier'. Whereas industries reliant primarily on domestic demand are limited by the size of the regional market, the tradable sector has potentially much faster growth rate since its market can include all other regions within the nation and, indeed, the world. Empirically as well there is strong support for the proposition that industries have very different growth rates and that a region, through good fortune or planning, specialised in high growth activities will experience rapid per-capita

income growth. Differences in industry growth rates arise from the fact that industries differ in their scope for technical advance and productivity growth, scope for knowledge 'spillovers' between firms and the income elasticity of demand for their output (Toner 1999).

The argument for diversification rests on different propositions. First, an argument taken over from investment portfolio planning, is that holding a variety of economic assets spreads risk arising from business cycles and uncertainty regarding future prospects of particular industries, -'economic diversity can mitigate the impact of downturns in any single industry'(Center for Regional Economic Competitiveness 2017). Second, is the simple empirical fact that in particular locations the combination of population growth and rising per capita income causes diversification of the industrial structure. In a phenomena recognised by Adam Smith around 250 years ago growth of demand within a particular locality increases specialisation or 'the division of labour'. That is, an increase in demand or 'size of the market', or makes it economic for businesses to specialise in the production of particular goods and services. Smith used the term division of labour to refer to the splitting up of occupations and tasks and application of more specialised equipment both within a firm and across firms and industries. Around 150 years after Smith it was further recognised that the direction of causality also flows from the division of labour to determine the size of the market. Increased specialisation gives rise to productivity gains, or real per capital increases in output and income per worker, and this productivity growth causes increases in the size of the market. In a famous aphorism, 'the division of labour is determined by the size of the market, but the size of the market is determined by the division of labour' (Young 1928).

The implication of this analysis is that industrial specialisation and diversification are mutually reinforcing and complementary economic activities. Thus, specialisation begets diversification and diversification begets specialisation (Hidalgo and Hausman 2009). This bi-directional causality and conceptual ambiguity about the measurement of specialisation are the most important reasons that research and policy have led to contradictory outcomes and advice (Kemeney and Storper 2014: 2).

5.4.1 Hirschman-Herfindahl Index

To investigate these issues empirically data from the analysis of employment by industry was used to construct a Hirschman-Herfindahl Index (HHI) for each region and Australia (Table 29).

The HHI Index is a standard measure of concentration of various types of economic activity.[18] The Index is bounded so that 1 represents total employment concentrated in just one industry and equality in employment, or each industry having an equal share of total employment, is indicated by a value approaching 0.[19] The data used to construct the Index was at the 2 digit ANZSIC level and comprised 115 discrete industries.

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[18] HHI Index is $\sum_{i=1}^{N} s2_i$ where N= total number of industries, *i* = a given industry and s = industry share of total employment in the *ith* industry.

[19] With 115 industries equi-proportional employment is represented by a minimum value of 0.0087. This value is much smaller than any index number in the tables and is consistent with the data showing employment is not evenly distributed across industries.

Table 29: Hirschman-Herfindahl Index of Female and Male Employment. 2006 and 2016.

	Females							
	Central Coast	NT Out'	Toow.	W&N W Tas.	Geelong	Lat.-Gipps.	Total Regions	Aust.
2006 HHI Index	0.0436	0.0726	0.0461	0.0457	0.0462	0.0481	0.0444	0.0377
2016 l HHI Index	0.0464	0.0609	0.0508	0.0482	0.0489	0.0477	0.0468	0.0415
Region as Ratio of Aust. 2006	1.155	1.925	1.222	1.212	1.225	1.274	1.176	1
Region as Ratio of Aust. 2016	1.119	1.467	1.225	1.161	1.179	1.149	1.128	1
% Δ in HHI Index	6.5%	-16.2%	10.2%	5.3%	5.9%	-0.8%	5.5%	10.0%
% Δ Female Emp	19.5%	8.3%	6.4%	11.3%	27.1%	19.0%	17.8%	21.1%
	Males							
2006 HHI Index	0.0298	0.0576	0.0293	0.0298	0.0304	0.0356	0.0277	0.0249
2016 HHI Index	0.0345	0.0360	0.0298	0.0326	0.0326	0.0356	0.0302	0.0274
Region as Ratio of Aust. 2006	1.198	2.317	1.180	1.199	1.222	1.432	1.114	1
Region as Ratio of Aust. 2016	1.261	1.314	1.089	1.191	1.192	1.302	1.105	1
% Δ in HHI Index	15.8%	-37.6%	1.5%	9.3%	7.4%	0.1%	9.2%	10.1%
% Δ Male Emp	12.5%	-4.0%	9.7%	-2.5%	18.4%	8.8%	10.1%	14.2%

The purpose of the data is to determine if employment in the different regions is becoming more or less specialised in particular industries and whether there is any association between rising or falling specialisation and employment growth. The way to read the tables is that a higher figure and an increase over time for a region indicates respectively higher and increased industry concentration of employment. The converse also applies. Because the labour market performance of males and females was so dissimilar over the period it was pertinent to construct indices based on gender. (The strength of the results justifies this decision).

The key points are that first, female employment is much more concentrated in fewer industries than males. In 2016 the index number for females across all regions at 0.0468 was over 50% larger than the figure of 0.0302 for males. This data is consistent with the earlier analysis which showed just three industries accounted for over 70% of the increase in female jobs. Female employment is also more concentrated than for Australia as a whole, though this gap narrowed over the period. Second, female employment concentration increased by 5% over the period. Third, the degree of female employment concentration across the regions is very similar, with the exception of the NT Outback, which was over 60% higher than for the regions as a whole. Finally, the association between a high and increasing female employment concentration and female job growth is very robust at an aggregate level across all the regions and for Australia as a whole. Indeed, the index data supports the earlier analysis that female employment growth was advantaged by the high degree of sex segmentation in the job market. However, the strength of this association is

extremely varied across the regions. In some regions such as the Central Coast the rate of employment growth increased by around 3 times the proportional increase in the concentration index. But in both the NT Outback and Latrobe-Gippsland the index fell but female employment increased significantly.

Male employment is much less concentrated in particular industries than females, but it too increased its specialisation index over time across the regions and Australia. This more diversified base of male employment did not confer any labour market advantage as they had a much lower rate of employment growth compared to females. The association between increased specialisation and employment growth was even stronger for males than for females.[20]

However, it would be illicit to draw any sweeping conclusions for policy from this analysis, of the type that ''increased regional specialisation is always and everywhere associated with strong employment growth''. Rather there seem to be two distinct mechanisms at play, each having markedly different implications for regional policy. In the first, employment growth and specialisation is driven by the type of fundamental economic forces identified by the classical economists such as Smith and updated in what is termed modern endogenous growth theory. As described above this is a model in which industrial specialisation is driven by the market forces of competition, division of labour, rapid technical change, high productivity and high wage growth. The rapid growth of Professional, Technical and Scientific Services industry reflects these factors such as specialisation due to the rapid growth of knowledge and the profound advantages to firms accessing expertise by contracting out of activities, like engineering design, software development and accounting. (But even in these industries there is a substantial role for government in terms of infrastructure provision, support for R&D, education and direct demand for the output of this industry).

However, much of the employment specialisation and growth occurring across the regions, and Australia, can be explained by drastically different mechanisms. A large share of increased employment specialisation over the last decade may be argued to be driven by a combination of demographic change, increased female labour force participation rates and government funding. As argued earlier when looking at the drivers of industrial change this applies especially to the growth of aged care, child care, pre-school education, food and beverage services and some health services. In addition, a large share of the increase in employment specialisation, especially for males, is due to large scale job loss in other industries, notably manufacturing. The role of government policy in the growth of these industries is also markedly different in that it is focussed on either the direct provision of services, such as public hospitals and schools or contracting out services previously delivered directly by government such as vocational education and training and employment services or indirect support through subsidies to privately owned hospitals, schools, aged care and child care etc. (Cahill and Toner 2018).

Finally, an important implication of the pattern of employment growth by occupation and industry identified in this report is that the labour market is becoming ‘polarised’ or split

[20] There was only one region where the sign for specialisation was the opposite to that of employment growth for males, whereas for females there were two regions in which this occurred. (The correlation coefficient between increased specialisation and employment growth for females was .33 and .64 for males).

between low wage and high wage jobs. This is counter to the general presumption of orthodox economics that structural change entails a generalised tendency for high productivity/high wage jobs to displace low productivity/low wage jobs. Against this the Australian Treasury (2017: 33-34) argues the decline of manufacturing and the 'transition towards services could weigh on wage growth. In the past five years, strong employment growth has come from low productivity growth industries. This has implications for the future path of wage growth because in the long run real wage growth is driven by labour productivity growth…Services employment growth has been more concentrated in below-average wage industries. Since 1994-95, almost 3.6 million jobs have been added in the services industries – of these, a little over 1.9 million have been in industries with below-average wages versus a little over 1.6 million in above-average wage industries'. This reflects a global trend affecting 'many advanced countries, including Australia, [that] have seen significant 'job polarisation' – the simultaneous growth of high-education, high-wage and low-education, low-wage jobs at the expense of middle-education, middle-wage jobs. Job polarisation would affect the distribution of wage growth for various groups in society' (Australian Treasury 2017: 33-34). As argued above an additional factor in income polarisation is the growth of labour under-utilisation associated with the growth of part-time employment. The issue of structural change and worker earnings in the regions is examined in the next chapter.

6 Total Personal Income Full Time Work by Industry and Occupation

The ABS conducts multiple surveys on income derived from paid work and other sources. However, this data is not available at the disaggregated regional level used in this study. The Census does not directly collect wage and earnings income from employed persons. However, census data can be used to construct proxy data using the variable Total Weekly Individual Income cross classified with full-time employed persons. This provides an approximate measure of wages for employed persons resident within the region across industries and occupations.[21]

There are multiple approaches to analysing this data and the distribution of wages across the key variables. Two are used here and each provides important insights into regional labour markets.

6.1 Variation in income across regions for the same industry

Table A14 shows the average full time wage for a given industry in each region as a percent of the same industry for Australia. Its purpose is to identify the extent of variation in income across regions for the same industry. The key points are first, earnings for total full time employed persons in the regions are 8% lower than for Australia as a whole. Further, the tendency for lower relative earnings holds for all regions and almost all industries. The gap between earnings in the regions and for Australia as a whole may appear relatively modest in proportional terms but these differences translate into a sizeable absolute pay gap. For example, full time persons in WNW Tasmania earn on average $12,700 p.a. less than the average Australian full time worker. There is, in general, no significant increase in wage disparity between the regions and the Australian full time wage.[22]

There are many reasons why, on average, regional wages are somewhat lower than for total Australia. An important factor is that the latter is strongly influenced by capital city wages and

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[21] The census variable used was INCP and measures 'the total income that the person usually receives each week' (ABS 2016). This income can include non-wage income in addition to wages. Further, the ABS collects data on negative income for this variable, for example, where people make a loss from employment. This is excluded from the data presented above. The full-time employment variable was used since it provides an approximate control for hours worked. The wages data is collected in bands of income and so the mid-point of each band was used. The Census records the number of employed persons whose weekly earnings fall within the bands. Because the highest income band in the Census is '$2000 or more' this puts a cap on the highest income earners so the data will tend to under-estimate wage disparity. Finally, whilst full-time work, defined by the ABS as 38 hours or more per week, was used to control for hours worked, it does so only approximately. Despite this the ranking of industries and occupations in terms of income is broadly consistent with other ABS earnings data.

[22] For example the total regional full time wage in 2006 was 7% lower than the Australian average compared to 8% in 2016. 2016 data is shown for brevity since the 2006 data shows similar distribution of results to the 2016 data.

‘wage income…tends to be higher in the capital cities than elsewhere. In part, this is explained by the types of jobs available in larger cities. For example, the capital cities are home to over 80% of all IT, business, HR and marketing professionals, while only around 65% of people live in these cities. On average, these business-service roles attract higher wages than many other occupations’ (Reserve Bank 2018: 14). Many other higher paying industries also have a propensity to be concentrated in capital cities including finance, legal and medicine.

Some of the factors explaining why average earnings are lower in the regions compared to Australia also account for the finding that, with few exceptions, earnings in the regions are lower than for Australia in the same industry. The size of the firm in many industries is related to the size of the population they serve. Thus, we expect on average the size of the firm to increase the larger the population base it serves. There is a well-established positive relationship between firm size and wages, controlling for industry. This ‘large firm wage premium’ is substantial and due primarily due to the fact that larger firms have higher labour productivity, which translates into higher wages. This, in turn is due to factors such as higher capital/labour ratio, higher innovation expenditures, greater capacity to exploit economies of scale and a capacity to attract higher quality labour through higher wages. ‘Large firms demand a higher quality of labour defined by such observable characteristics as education, job tenure, and a higher fraction of full-time workers’ (Oi and Idson1999). Also, typically the head offices of multi-plant firms are located in capital cities or major metropolitan areas. Head offices, including those of major multi-nationals in Australia, even though classified to the same industry as their regional plants, employ higher skilled labour engaged in management, design and marketing.

Aside from productivity, firm size and industry composition effects the regions also tend to have lower living costs, notably housing and commuting to work. To the extent that living costs enter into wage setting arrangements this will be reflected in relatively lower wages in the regions. There also tends to be less competition between firms for labour in the regions, as evidenced by generally higher unemployment rates and lower wages in the regions compared to metropolitan labour markets. [23] It will be shown that differences in the

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[23] The data for the regions is broadly consistent with the ‘inverted wage curve’ model developed by Blanchflower and Oswald (1995) which used comprehensive multi-national data to empirically show a strong inverse relationship between the unemployment rate and real wages. As unemployment declines real wages go up and regions with high unemployment have with lower real wages. This may seem intuitively obvious and fits with even casual observation, but it is the reverse of the orthodox economic model which suggests that as the price of labour- the real wage- goes up unemployment should increase and the converse applies. ‘Unemployment in the neoclassical model of the labour market results when the wage exceeds the market-clearing level. The numbers of individuals who wish to supply their labour then exceeds the number whom firms wish to employ. The higher the wage, the higher the rate of unemployment. In a framework of the textbook kind, where unemployment is the gap between a supply curve of labour and a demand curve for labour, wages and unemployment are positively associated. This is the reverse of the empirically estimated [inverted wage] curve’ (Blanchflower and Oswald 1995: 159).

A prediction of the neoclassical model is that firms will be attracted to set up in low wage regions. Obviously, this does occur, but equally obviously, not enough to equalise the unemployment or wage rate across the regions. The wage curve findings are important as they challenge the idea that to reduce unemployment wages should be cut. Blanchflower and Oswald argue the wage curve findings support models of wage setting mechanisms different from the orthodox model where the equilibrium wage is set by the productivity of labour and supply of labour. In alternative models of income

attainment of post school qualifications between the regions and Australia arguably account in part for the observed wage gap.

Finally, whilst the inverse relation between wage levels and unemployment rates generally holds there are some exceptions, but with marked exceptions. For example, WNW Tasmania has a high unemployment rate and very low labour force participation rate, all indicative of depressed labour market conditions. As expected, it also has the lowest average wage. Against this the NT Outback has the smallest wage gap of any region but also the highest unemployment rate of any region. Factors explaining the perverse result in the NT Outback include remoteness, requiring higher wages to attract suitable applicants, and a mismatch between the skill levels of the resident workers and unemployed and those demanded by employers. These results points to the complexity of wage setting influences at a regional level.

6.2 Variation in income across industries within regions

Whereas Table A14 used the full time wage in each industry at an Australian level as a comparator Table A15 uses the total full-time wage in each region and compares each industry with this. The purpose of this is to provide a base for assessing wage disparity across industries within each region. The key points are first, a remarkably consistent variation of pay in each industry from the mean full time wage in each region. In other words, across regions there is little variation in the extent to the pay in each industry varies from the mean pay in each region. A measure of this variation in the same industry across regions is given by the average deviation which varies by only around 2-3% for most industries. For example, wages in the industry Accommodation and Food is 72% of the mean in the Central Coast and 69% in Geelong. This industry has an average deviation of just 1.3%. Some industries such as Information, Media and Telecommunications have more variation across regions from their regional average wage with an average deviation of 8.3%. Second, there is also a remarkable degree of consistency in the relative pay of industries in relation to average pay in the regions. The average deviation of earnings across all industries from the mean full time earnings is around 16%. These results suggest the presence of some important structural factors affecting relative pay across industries and regions. Finally, across all regions and Australia there is a similar pattern of which industries have the highest and lowest relative earnings. Across all regions (and Australia) the industries with the lowest full time pay as a proportion of the average full time pay include Accommodation and Food (71%), Other Services (77%), Retail (79%) and Agriculture, Forestry and Fishing (79%).[24] In all regions the highest paid jobs are in Mining (151%); Electricity, Gas, Water and Waste

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distribution workers and employers 'bargain' over the allocation of income. In regions of high unemployment workers accept low wages because bargaining power is shifted to capital as workers are concerned that job loss may mean an extended period of unemployment. The second mechanism is the 'efficiency wage model' where employers pay higher wages to raise worker productivity through a combination of higher work intensity and attracting higher quality labour. One Australian study used the wage curve to examine regional growth prospects and found that a policy of lowering regional wages to increase employment would lower demand and constrain employment growth. This policy would be self-defeating due to 'the presence of a positive feedback with declining regions suffering both wage and employment cuts that would threaten their long term capacity to achieve high employment levels' (Denniss and Watts 1999).

[24] Other Services covers a diverse range of activities including automotive, appliance and clothing repair; religious services, dry-cleaning and funeral services.

(135%), Finance and Insurance (122%); Professional, Scientific and Technical Services (117%); Public Administration and Safety (117%), Information, Media and Telecommunications (114%) and Education and Training (113%). All other industries, such as Wholesale, Construction, Manufacturing and Health and Social Assistance are close to the average.

Consistent with the argument earlier there is considerable diversity across industries in terms of both their contribution to net employment growth over the period and their average pay rates. Some industries which made an especially important contribution to employment growth in the regions have above average pay. For example, Professional, Scientific and Technical Services contributed 9% to net job growth across the regions and had earnings 17% above the average. But the opposite applies to other industries. Health and Social Assistance made an especially large contribution to employment growth but has on average full time wages close to the average. The reason for this, as explained earlier, is that this industry is comprised of many high income earners, such as doctors and medical specialists, but also many more average and low income earners. The latter applies especially to Social Assistance which is comprised of two components at the 2 digit industry level, Residential Care Services and Social Assistance Services. Across the regions as a whole these industries had average full time earnings 19% and 17% below mean full time earnings. On the other hand, some industries which have average pay experienced large job losses including Manufacturing and Wholesale. In contrast some industries such as Finance and Insurance Services have pay well above average but made minor contributions to net employment growth.

The net effect of these interactions was investigated to determine if there is a higher propensity for net job growth to occur in industries with above average pay rates. Figure 1 is a scatter diagram for 21 industries in which the share of net employment growth over the decade in each industry is on the x-axis and, the average wage in each industry as a ratio of the average full time wage across the regions as a whole in 2016 is on the y-axis.

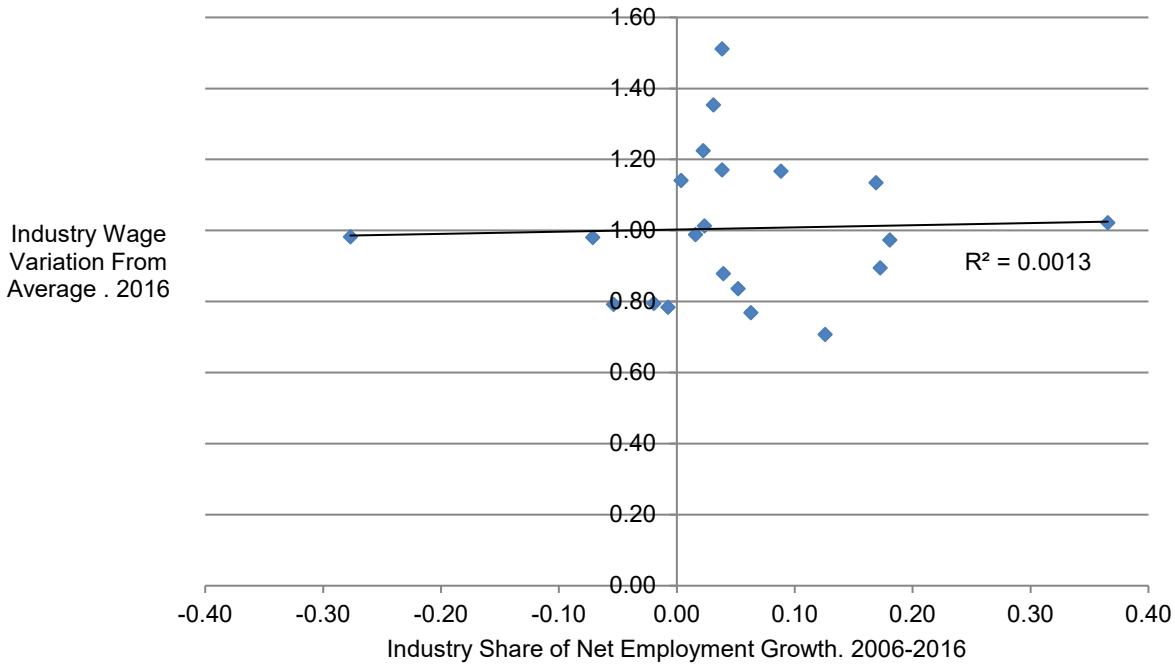

Figure 1: Relationship Between Job Growth and Wages

The key points are that first, the data is in general, evenly distributed above and below the x-axis indicating there is equal growth in high wages jobs and low wage jobs. These opposing results effectively cancel each other out in a statistical sense. This is indicated more formally by the regression line and the R^2 correlation of just 0.003, which is very close to horizontal, revealing there is no association between the two variables. Second, the data also confirms visually the argument above that industries with especially high wages tend to make a small contribution to net employment growth and that some industries with average wages have had large job losses. (Manufacturing is located to the extreme left of the vertical axis). Finally, the distribution of the data significantly above and below the x-axis confirms the Treasury argument regarding growing income polarisation in the Australian job market also applies in the regions.

6.3 Earnings by Place of Work and Place of Residence

The issue of commuting to work has again gained recent prominence with research showing that at least in the major metropolitan centres the time taken in the journey to work has increased substantially over the last decade (ABC 2019). This issue is not investigated here but some insight into the drivers of commuting is gained by examining the wage difference between full time workers either employed within the region in which they live and those who work outside the region in which they reside, controlling for industry and occupation. The former group is referred to here as Place of Residence (PoR) and the latter as Place of Work (PoW).

Table 30 shows the wage gain/loss between PoW and POR expressed as a percentage of the PoR wage for 2006 and 2016. It shows little difference between the two periods in the ratio of PoW to PoR wages. Second, there is some gain or ‘wage premium’ to commuting

outside the region in which a worker is resident but this is small at 2.1% in 2016. This premium does however vary across the regions. It is highest in the Central Coast and Geelong. This is unsurprising since it was shown earlier that the average full time wage is higher in the major metropolitan centres compared to the regions and these two regions are relatively close to these centres.

Table 30: Percent Difference in Full Time Earnings Place of Work and Residence

	Central Coast	NT Outback	Toow.	W&NW Tas	Geelong	Lat-Gipps	Total Regions
2006	5.5%	-5.1%	1.1%	-0.6%	2.4%	0.6%	1.8%
2016	5.7%	-3.5%	1.3%	-0.3%	3.5%	0.1%	2.1%

Table 31: Employment Difference Between Place of Work and Place of Residence. Selected Regions. 2016

Central Coast	NT Outback	Toow.	W&NW Tas	Geelong	Lat-Gipps	Total Regions
-24.8%	10.5%	-3.4%	-4.3%	-14.0%	-9.3%	-12.3%

In addition, these two regions have the largest share of workers employed outside the region in which they are resident (Table 31). The NT Outback once again is anomalous since it shows a premium to PoR workers.

However, this is consistent with the earlier finding that employers in this region have to pay a premium to attract workers across a range of industries and occupations, and more workers work in the NT Outback region than are resident there.

There is considerable variation across industries in terms of the gains from commuting. For example, the industries with the highest premia to commuting include Information Media and Telecommunications (15.2%); Financial and Insurance Services (8.4%) and Professional, Scientific and Technical Services (5.9%). This is probably indicative of the fact that these industries tend to be over-represented in capital cities and larger regional population centres. Interestingly, Mining, which is the highest paid industry, has a very low premium to commuting. The reasons for what appears at first impression to be a counter-intuitive result are complex and probably reflect the fact that the location of mines are driven fundamentally by geology and not, like almost all other industries by population. Further, at least for the regions examined here the result implies that Fi-Fo type work, which is associated with large wage premia, is not the predominant labour source for mining activity. For other industries such as Administrative and Support Services, Retail, Health Care and Social Assistance and Manufacturing the premia to commuting are either low or even negative. Many workers simply have to accept jobs that are inconveniently located and even provide a lower wage than local work provides.

A somewhat different picture emerges when examining wage premia through the occupational lens. Figure 2 reveals first that all occupations receive a premium for commuting but this is much more compressed than on an industry basis as the maximum wage increase is around 5%.

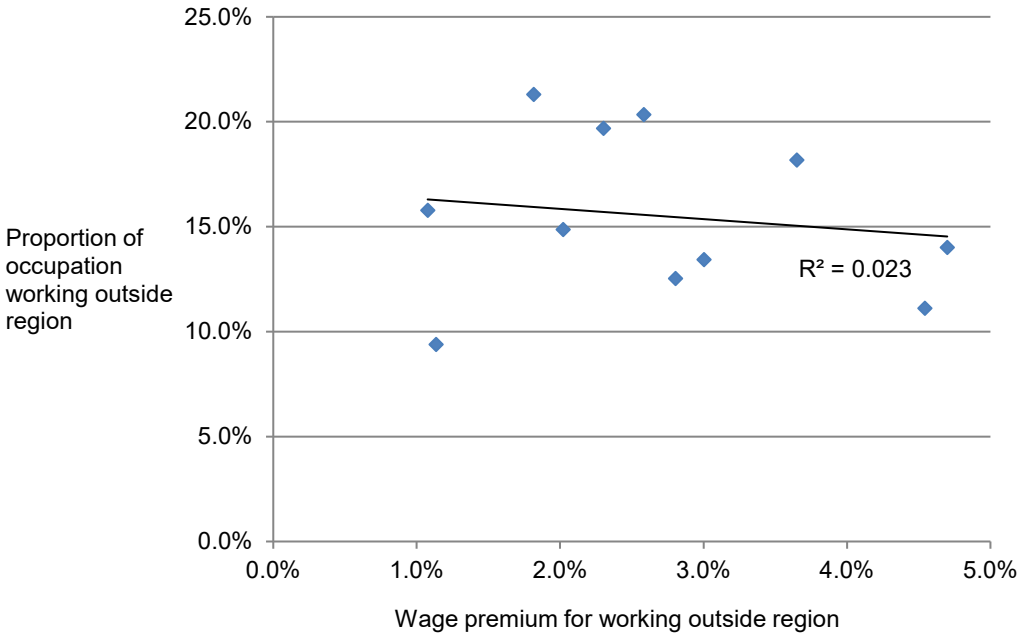

Figure 2: Wage Premia for Occupation Commuting Outside Region and Proportion of Occupation Commuting Outside Region. 2016

The reason for this is that occupations are not equally spread across all industries so that some occupations receiving the highest return for commuting are concentrated in certain industries. Further, the occupations examined here are quite aggregated, at the 1 digit ANZSCO level, and as we saw earlier there is considerable variation in earnings within these broad occupational categories. The other key finding, consistent with the industry data is that the major driver of commuting, at least in the regions examined here, is the availability of work. This is indicated by the negative slope on the regression line as occupations which have the highest propensity to commute receive a lower wage premium to commuting than occupations receiving a higher wage premium

7 Qualifications by and Occupation and Industry

7.1 Distribution of Qualifications Across Regions

The 2006 and 2016 Census asked respondents if they had a post-school qualification (PSQ) and to state the level of their highest PSQ.[25] Table 32 provides the regional distribution of qualifications in 2006 and 2016.

In 2006 there was considerable variation across the regions in the share of their respective workforce with a PSQ. Both the NT Outback (48.2%) and WNW Tasmania (48.7%) are substantially below the total regional share (54.1%). All regions are below the total Australian figure but only marginally so for the Central Coast and Geelong. Over the decade all regions experienced remarkable growth in the proportion of their workforce with a PSQ with the

[25] The results given here closely match those in other ABS surveys such as *Education and Work, Australia*, May 2018 (Cat No. 6227.0). The estimates in this publication are somewhat higher since the scope is total persons aged 15-64 not employed persons as in the Census data.

proportion increasing from just over half in 2006 (54.1%) to nearly two thirds in 2016 (64.7%). This was caused first by a large increase in the share of employment in industries, notably Professional and Community and Personal Services, with an above average *propensity* for workers to have a PSQ. Second, there was a significant rise in the *incidence* of a PSQ across all industries and occupations. All industries and occupations, at the 1 digit classification level of analysis, increased their proportion of workers with a PSQ. However, the gap between the regions and Australia remained.

Table 32: Proportion of Employed Persons with a Post School Qualification 2006 and 2016

2006	Post Grad	Grad. Dip./Cert	Bachelor	Adv. Dip./Dip.	Cert. Total	Cert. nfd	Cert. III & IV	Cert. I & II	Post-School Qual*	No Post School Qual
C C	1.9%	1.4%	10.8%	9.2%	27.9%	2.5%	23.6%	1.7%	57.3%	42.7%
NT Out	2.0%	1.7%	11.0%	6.3%	22.3%	1.0%	19.6%	1.7%	48.2%	51.8%
Toowoo.	2.5%	1.5%	13.0%	7.4%	22.8%	1.5%	19.8%	1.6%	51.2%	48.8%
WNW Tas	0.8%	0.8%	8.6%	6.1%	27.3%	1.7%	24.0%	1.5%	48.7%	51.3%
Geelong	2.2%	2.1%	14.4%	9.1%	24.1%	1.6%	21.2%	1.3%	57.0%	43.0%
Lat-Gipps	1.2%	1.8%	10.1%	7.2%	27.5%	1.3%	24.8%	1.4%	53.2%	46.8%
Regions	1.8%	1.6%	11.5%	8.0%	25.9%	1.7%	22.6%	1.5%	54.1%	45.9%
Australia	3.7%	2.1%	16.2%	9.0%	21.5%	2.0%	18.2%	1.4%	57.9%	42.1%
2016										
C C	3.4%	1.8%	14.4%	11.8%	30.5%	2.6%	26.4%	1.5%	64.9%	35.1%
NT Out	4.4%	3.0%	15.6%	9.9%	26.6%	2.4%	21.8%	2.4%	64.3%	35.7%
Toowoo.	4.5%	2.4%	16.5%	10.1%	28.4%	2.0%	24.9%	1.5%	64.4%	35.6%
WNW Tas	1.8%	1.6%	10.4%	8.9%	33.1%	2.6%	28.4%	2.1%	59.1%	40.9%
Geelong	4.6%	3.4%	18.9%	12.0%	26.2%	1.8%	23.3%	1.1%	67.8%	32.2%
Lat- Gipps	2.4%	2.7%	12.3%	10.6%	31.9%	2.1%	28.3%	1.5%	63.4%	36.6%
Regions	3.5%	2.5%	15.0%	11.0%	29.5%	2.2%	25.8%	1.5%	64.7%	35.3%
Australia	6.8%	2.8%	20.7%	11.0%	23.3%	2.1%	20.0%	1.2%	67.3%	32.7%

*Also includes Inadequately Described and Not Stated.

It was shown earlier that in the regions employment of Professionals and Community and Personal Service Workers increased by 26.4 percent and 40.3 percent respectively. By 2016 over 90% and 60% respectively of workers in these occupations had a PSQ. (Some of the causes of the rising propensity and incidence of PSQ and its significance is taken up in section 7.4).

In 2006 and 2016 across all regions the most common PSQ is a Certificate III and IV, reflecting in part the earlier finding that the regions have a higher share of both Tradespeople and Technician and Community and Personal Service occupations compared to Australia.

Similarly, the higher propensity for workers to hold bachelor and higher qualifications in Australia compared to the regions reflects the higher proportion of Professional occupations in the former workforce compared to the latter.

Almost all qualifications experienced a proportional increase, some quite substantial, with the exception of Certificate I-II. To more easily assess the relative performance of regions and qualifications Table 33 provides the percentage change over the decade in the proportion of employed persons with a PSQ.

Table 33: Percentage Change in the Proportion of Employed Persons with a PSQ. 2006-2016

2006	Post Grad	Grad. Dip./Cert	Bachelor	Adv. Dip./Dip.	Cert. Total	Cert. nfd	Cert. III & IV	Cert.I & II	Post-School Qual*	No Post School Qual
C C	79%	29%	33%	28%	9%	4%	12%	-12%	13%	-18%
NT Out	120%	76%	42%	57%	19%	140%	11%	41%	33%	-31%
Toowoo.	80%	60%	27%	36%	25%	33%	26%	-6%	26%	-27%
WNW Tas	125%	100%	21%	46%	21%	53%	18%	40%	21%	-20%
Geelong	109%	62%	31%	32%	9%	13%	10%	-15%	19%	-25%
Lat-Gipps	100%	50%	22%	47%	16%	62%	14%	7%	19%	-22%
Regions	94%	56%	30%	38%	14%	29%	14%	0%	20%	-23%
Australia	84%	33%	28%	22%	8%	5%	10%	-14%	16%	-22%

*Also includes Inadequately Described and Not Stated.

The fastest rate of increase occurred in higher level qualifications as the proportion of employed persons with a bachelor degree increasing by 30% and post-graduate qualifications 94%. Another notable development is that the rate of growth of persons with PSQ in the regions as a whole increased at a faster rate (20%) than for Australia (16%).

Once again, the NT Outback and WNW Tasmania are outliers at least in terms of the remarkably high rate of growth in the acquisition of the lowest level qualifications Certificate I and II and unidentified Certificate level qualifications. One possible explanation for this is the practice of ‘dodgy’ private Registered Training Organisations to ‘target poor areas’ and offer cash and other inducements to students to sign up (Deloitte 2016). An alternative and more positive interpretation of the results is that disadvantaged groups in the labour market have accelerated the acquisition of post-school qualifications in an attempt to offset their relative disadvantage in school education.

Nevertheless, in 2016 WNW Tasmania maintained its relatively disadvantaged position with respect to the proportion of its workforce with PSQ at 59.1%. In contrast the NT Outback substantially lifted its relative ranking to 64.3% to be very close to the regional average.

The final point to be made from this data is that it contributes to our understanding of the wages gap between the regions and Australia. Earlier it was shown that across all full time workers in 2016 there was an 8% gap in earnings between the regions and Australia. A number of empirical reasons were produced to explain this earnings difference but an additional factor is the higher propensity of workers in Australia to have a PSQ and for this to be at a higher level. The difference in the propensity of workers to hold a PSQ across the two geographic regions is a modest 3%. However, the difference is much larger for proportion of workers with a qualification at a bachelor level or higher with 21.0% of workers in the regions so qualified compared to 30.3% for Australia as a whole. Given the positive association between increments in qualification level and pay, this is a significant contributing factor to the earnings gap.

7.2 Qualifications: An Occupational Perspective

Taking the regions as a whole all occupations and almost all PSQ experienced an increase over the period (Table 34). The exception was Certificate I and II.

Particularly large increases in the proportion of the workforce with a PSQ occurred in the Manager, Community and Personal Service, Clerical and Administrative and Labourer occupations, which all had an increase of more than 10% in absolute terms in the share of their respective workforce with a PSQ. Occupations which, at the beginning of the period, already had a high share of PSQ, notably Professionals and Tradespeople and Technicians, had a more modest rate of increase in the acquisition of PSQ.

Table 34: Proportion of Employed Persons X Occupation with a Post School Qualification. Total Regions. 2006 and 2016

2006	Post Grad	Grad. Dip./Cert	Bach.	Adv. Dip./Dip.	Cert. Total	Cert. nfd	Cert. III & IV	Cert.I & II	Post-School Qual*	No Post School Qual	Total
Managers	2.9%	1.8%	11.9%	10.2%	24.4%	1.8%	21.5%	1.1%	55.9%	44.1%	100%
Profess.	7.9%	7.4%	45.9%	15.2%	8.6%	0.9%	7.3%	0.4%	89.0%	11.0%	100%
T&Trades	0.1%	0.1%	2.3%	5.0%	60.1%	0.9%	58.6%	0.7%	71.0%	29.0%	100%
Comm & Pers. Serv.	0.3%	0.8%	6.4%	12.9%	29.2%	3.3%	23.3%	2.6%	56.9%	43.1%	100%
Clerical & Admin.	0.4%	0.5%	6.9%	9.5%	20.8%	3.5%	14.5%	2.8%	43.7%	56.3%	100%
Sales	0.1%	0.2%	3.1%	4.4%	16.3%	2.0%	11.8%	2.6%	29.4%	70.6%	100%
M.O.D.**	0.0%	0.0%	0.9%	1.7%	24.9%	1.1%	22.8%	1.0%	33.7%	66.3%	100%
Labourer	0.0%	0.0%	1.5%	2.0%	18.0%	1.2%	15.1%	1.7%	27.8%	72.2%	100%
Inadeq. Described	1.0%	0.5%	5.8%	7.7%	21.9%	0.9%	20.3%	0.7%	46.9%	53.1%	100%
Not stated	0.3%	0.2%	2.5%	1.9%	13.8%	0.3%	13.2%	0.3%	42.0%	58.0%	100%
Total	1.8%	1.6%	11.5%	8.0%	25.9%	1.7%	22.6%	1.5%	54.1%	45.9%	100%
2016											
Managers	5.2%	2.8%	16.3%	14.5%	26.1%	2.0%	23.0%	1.1%	67.8%	32.2%	100%
Profess.	12.6%	8.7%	48.0%	12.6%	7.9%	0.9%	6.5%	0.5%	91.9%	8.1%	100%
T &Trades	0.5%	0.4%	3.6%	7.4%	63.7%	1.2%	61.8%	0.8%	77.8%	22.2%	100%
Comm & Pers. Serv.	1.2%	2.0%	9.4%	19.5%	34.2%	4.2%	27.8%	2.2%	69.6%	30.4%	100%
Clerical & Admin.	1.6%	1.5%	10.5%	14.5%	26.7%	3.5%	20.9%	2.4%	57.7%	42.3%	100%
Sales	0.6%	0.4%	5.4%	7.2%	21.4%	2.6%	16.2%	2.6%	38.1%	61.9%	100%
MOD*	0.3%	0.1%	2.0%	4.2%	32.9%	2.3%	29.2%	1.4%	43.2%	56.8%	100%
Labourer	0.5%	0.2%	3.5%	4.2%	26.0%	2.2%	21.6%	2.2%	38.5%	61.5%	100%
Inadeq. Described	2.8%	1.5%	10.9%	10.3%	29.6%	2.4%	25.4%	1.8%	62.1%	37.9%	100%
Not stated	0.7%	0.2%	4.8%	4.9%	17.2%	1.2%	15.1%	0.9%	51.2%	48.8%	100%
Total	3.5%	2.5%	15.0%	11.0%	29.5%	2.2%	25.8%	1.5%	64.7%	35.3%	100%

*Machinery operators and drivers

7.3 Qualifications an Industry Perspective

As with occupations all industries increased the share of workers with a PSQ (Tables A16-17). Only 4 industries out of the 21 ANZSIC categories had less than 50% of workers with a PSQ in 2016.These were Accommodation, Agriculture, Retail and Wholesale.

The industries with the highest proportion of workers with a PSQ were Education. & Training (85.5%); Health Care & Social Assistance (81.4%) and Professional, Scientific &

Technical Services (78.6%). All of these had a significant proportional increase and contributed disproportionately to total employment growth over the period.

7.4 Over-Qualification, Credentialism and Skill Utilisation

The very substantial rise in both the proportion of employed persons with a qualification and the proportion of higher level qualifications in the regions and Australia does raise the question as to what extent is this associated with an increase in productivity of workers and an increase in the actual skill and knowledge requirements of occupations? These issues have been the subject of extensive research over the last two decades. Toner (2011) provides a comprehensive analysis of the debates and issues.

In summary there are two competing schools of thought. In part the different approaches to explaining this important change reflect methodological problems in statistically isolating the effects of qualifications on earnings. Some of these complications include the extent to which 'inputs' of additional education *per se* account for differences in earnings or to what extent differences in earnings and the rate at which individuals acquire qualifications reflect innate and/or learned differences in attributes such as intelligence, diligence and problem solving. These attributes may themselves provide a necessary and sufficient explanation for earnings differences across individuals. Further, occupational classifications used by national statistical agencies are infrequently updated and these may be subject to significant shifts in their task, knowledge and skill job content required by employers. In other words, the job title and the presumed job status and 'skill level' remains unchanged in official statistics but over time the occupation may have been subject to up-skilling or down- skilling. This can affect the demand for formally qualified workers but such changes would not be evident to researchers when making inferences from changes in the distribution of qualifications across occupations over time. An example of this would be when employers respond to an increased supply of say university graduates applying for low skill jobs by shifting more skilled tasks onto such employees. Against this it may also be the case that a significant increase in the supply of formally qualified job applicants simply results in credentialism, where applicants with higher qualifications displace less qualified workers, with no a change in the actual demand for skills and knowledge in the job. [26]

The first approach is associated with the notion of Skills Biased Technical Change (SBTC) and essentially argues for technological determinism in that it is inherent in innovation, especially arising from the ICT revolution, to demand higher skilled workers. This applies not just to the development of these technological breakthroughs, which, after all employs only a small fraction of the entire workforce, but more importantly to the application of this technology across all or almost all workplaces and industries. SBTC can also be thought of as a variant of orthodox Human Capital Theory in that additional increments of investment in Human capital, as measured for example, by a rise in the proportion of workers with formal PSQ and the level of this PSQ causes these workers to be more productive and receive higher earnings. The 'twist' of SBTC is to argue that current technical change and higher worker skills and qualifications are essentially complementary inputs into production. Regressions of technical change as proxied by investment in ICT and investment by workers in higher qualifications show a positive association, but with also high error terms, indicating

[26] Another important dimension is the match between the job and the employee's 'field of study' of their qualification. For example, then engineers or scientists are employed in social science related policy jobs that require a degree but not a STEM qualification.

there is considerable variation across qualification levels, fields of study, industry and occupation.

The second approach is much more eclectic drawing on telling empirical exceptions to the orthodox predictions and high theory. It notes for example, that the rising propensity and incidence of PSQ is linked in part to the significant growth of mandated occupational licensing for jobs. For example, possession of certain minimum qualifications is now compulsory for many jobs in aged care, child care, disability, welfare support, security guarding and certain pedagogical qualifications for teachers of vocational education and training. The reasons for the 'explosion' of occupational licensing are complex but include the widespread adoption by many organisations of Quality Assurance systems which are predicated on 'documenting' inputs and outputs to production, including worker skills. A related set of demands for formal documentation of 'competence' occurred with the expansion of OH&S systems.

Another good example of the tenuous link between qualifications, earnings and SBTC is the phenomenal rise in global CEO salaries. More generally, to what extent is the rise of say high salaries for employees of the global FANGs (Facebook, Amazon, Netflix and Google) and parts of the finance industry a function of SBTC or the monopoly pricing power of the respective firms? Aside from notions of market power and social norms determining relative earnings of occupations and industries this alternative approach also uses notions of credentialism and skill utilisation of workers.

The scale of credentialism and 'skill-under utilisation' in Australia is, apparently, significant. A major study conducted by the National Institute of Labour Studies (2013: 11) for the Australian Workforce and Productivity Agency concluded:

… there are several indications that skills are currently being underutilised in the Australian labour market. One indicator is that 'some 30% of Australian tertiary education graduates work in jobs classified at a lower skill level than their qualification' (Skills Australia 2009, p. 10). Another indicator is that 'a substantial proportion of employers—over 40% in recent years—report that their workforces have in general more skills than the organisation requires' (Skills Australia 2009, p. 10). These two figures suggest that, in aggregate, the skills supplied by Australian workers are not being fully utilised by employers. This raises the possibility of wastage arising from overprovision of certain skills, with consequent losses of income (for affected workers) and of productivity (for the national economy).

Further evidence is provided by Census data but, by itself, this data cannot control for many of the methodological complications outlined above. Nevertheless, it does provide some support for concerns regarding credentialism and, in all probability, skill under-utilisation. Table 35 shows the distribution of PSQ for a selection of 2 digit ANZSCO occupations which the ABS classified as low skilled. The ABS skill classification of occupations was used earlier to contrast trends in the skill level arising from change in employment by occupation between Australia and the regions as a whole.

Table 35: Post School Qualifications of Lower Skill Occupations. Total Regions. 2006 and 2016

2006	P-G	Grad. Dip./Cert	Bach.	Adv. Dip /Dip.	Cert. nfd	Cert. III & IV	Cert.I &II	PSQ*	No PSQ	Total	Skill Level
Carers & Aides	0.2%	0.6%	4.4%	10.9%	4.7%	27.1%	2.7%	59.0%	41.0%	100%	4
Hospitality	0.0%	0.0%	3.2%	5.0%	2.0%	12.0%	3.4%	30.8%	69.2%	100%	4-5
Clerical & Office Support	0.3%	0.4%	4.6%	6.0%	1.6%	15.2%	1.7%	34.5%	65.5%	100%	5
General Clerical	0.1%	0.4%	5.9%	8.6%	3.8%	13.2%	3.1%	41.4%	58.6%	100%	4
Store-persons	0.0%	0.0%	1.3%	2.6%	1.6%	17.2%	1.1%	28.7%	71.3%	100%	4
Cleaners & Laundry	0.0%	0.0%	1.2%	2.2%	1.5%	10.9%	1.6%	24.8%	75.2%	100%	5
2016											
Carers & Aides	1.0%	2.6%	6.9%	16.9%	5.9%	37.4%	2.2%	76.6%	23.4%	100%	4
Hospitality	0.7%	0.2%	5.6%	6.5%	1.9%	15.5%	2.9%	35.9%	64.1%	100%	4-5
Clerical & Office Support	1.5%	1.0%	7.8%	8.3%	2.4%	20.4%	2.4%	46.5%	53.5%	100%	5
General Clerical	1.3%	1.3%	9.0%	13.7%	3.7%	20.9%	2.5%	55.5%	44.5%	100%	4
Store-persons	0.4%	0.2%	3.1%	5.1%	2.1%	22.1%	1.7%	37.8%	62.2%	100%	4
Cleaners & Laundry	0.7%	0.2%	4.1%	4.9%	2.7%	16.1%	2.3%	35.8%	64.2%	100%	5

*Also includes Inadequately Described and Not Stated

Occupations at Skill Level 4 require a Certificate II or III or at least one year of relevant experience. Skill Level 5 requires a Certificate I or completing compulsory secondary education.

Consistent with the earlier analysis even these low skill occupations have experienced both a significant rise in the proportion of the workforce with a PSQ and a shift towards higher level qualifications. For example, Clerical & Office Support occupations increased the proportion with a PSQ from around one-third in 2006 to nearly half in 2016. The proportion of the same occupation with a qualification at or above a Certificate III/IV in 2006 was 28.1% but, ten years later this increased to 41.4% by 2016, a rise of 47%. Clerical & Office Support is defined by the ABS as a Level 5 occupation requiring a Certificate 1 qualification. Similar trends apply to the other occupations listed.

On the other hand, there is also some support for the proposition of under-qualification, though to a lesser extent than over-qualification. For example, Table 34 revealed that in 2016 nearly one in every ten Professionals and over one in every five Tradespeople and Technicians had no PSQ. Offsetting this is that the ABS does allow on the job experience to substitute for qualifications, though it is interesting to note that both broad occupations groups had a substantial rise in the share of the workforce with a PSQ so it is arguable this is of declining significance as a mode of entry into the occupation.

A major review of the causes and effects of over and under qualification found that, at least for the individual, the consequences of over-qualification on earnings and job quality are worse than under-qualification.

Across the board, over-qualified workers are found to earn less than their equally-qualified and well-matched counterparts but more than appropriately-qualified workers doing the same job. Under-qualified workers are found to earn more than their equally-qualified and well-matched counterparts but less than appropriately-qualified workers doing the same job. Over-qualified workers are also found to be less satisfied about their job and more likely to leave their work than well-matched workers with the same qualifications. (Quintini 2011: 4).

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