

Where tradies work:
A regional analysis of
the labour market
for tradespeople

CENTRE FOR LABOUR
MARKET RESEARCH,
UNIVERSITY OF CANBERRA

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The views and opinions expressed in this document are those of the author/project team
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About the research



Where tradies work: A regional analysis of the labour market for tradespeople

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Before the global financial crisis there was much discussion about skills shortages in Australia. The economy was nearing full employment and skills shortages were perceived as constraining growth.

As the Australian economy recovers from the economic downturn, attention once again turns to avoiding or addressing skills shortages—as illustrated by the current inquiry into the applicability of government employment policies in addressing the skills shortages in regional Australia currently being conducted by the House of Representatives Standing Committee on Employment and Workplace Relations.

It is therefore timely to look at how the labour market has responded to changes in the supply and demand of tradespersons through the varying economic conditions of the past 20 years.

Key messages

- The major factors affecting demand for tradespersons are the business cycle, population movements and structural changes in the Australian economy.
- The analysis showed that the labour market for tradespersons is largely efficient. Migration—both from overseas and internal—and changes in earnings appear to have been important ways of adjusting supply and demand.
- Migration from overseas played an important role in the economic development of urban Western Australia and in the mining boom in remote Western Australia. In terms of regional movement, capital cities continue to attract tradespersons from rural and regional areas.
- There is considerable variation in median earnings within and between different trades and regions. While the relative earnings of the lowest-paid tradespersons have fallen over time, the earnings of the highest-paid have grown. This difference between the lowest- and highest-earning tradespersons is most extreme in remote regions.

Tom Karmel
Managing Director, NCVER

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Executive summary

The economic boom of the late 1990s and early 2000s focused attention on skills shortages in Australia and their role in preventing the economy from reaching its full potential. This report looks at the extent to which the supply of tradespersons has adjusted to changed economic conditions.

While there is much anecdotal evidence on the regional dimension of skill shortages, this has mainly concentrated on flows of labour into the resource-rich states of Western Australia and Queensland. There has been no comprehensive analysis of the regional distribution of skilled labour, such as tradespersons, or the extent of population movement of skilled labour between regions during Australia's recent boom.

This report investigates demand, supply and adjustment in the labour market for tradespersons—individuals working in occupations defined within the Australian and New Zealand Standard Classification of Occupations (ANZSCO) Major Group 4 and within the various sub-groups. Data from the Australian Bureau of Statistics (ABS) Censuses of Population and Housing provide insights into different stages of the business cycle, from the middle of a recession in 1991, to the recovery in 1996, the boom in 2001, to the subsequent severe skills shortages evident in 2006.

A profile of tradespersons shows that in 2006 the majority are male, work in capital cities and are employed in construction, manufacturing and retail trade. An analysis of tradespersons between 1991 and 2006 indicates the cohort is ageing faster than the general population. During this time, the median age for all tradespersons has progressively increased from 33 years in 1991 to 37 years in 2006. The ageing of the population of tradespersons could have implications for their supply, unless there are adjustments to the market, such as increases in skilled migration.

The major factors determining the demand for tradespersons appear to be the business cycle, population movements and structural changes in the Australian economy. The recent prolonged economic boom was marked by significant growth in the construction and mining sectors and the relative decline in manufacturing employment. These changes were mirrored by the changing pattern of demand for tradespersons. Construction experienced noticeable excess demand for tradespersons, and mining actually employed more tradespersons than would have been expected, given their normal skill mix.

With the possible exception of manufacturing and retail trade, technological change has not significantly altered the employment mix vis-à-vis tradespersons. Structural change, arising from changes in relative demand for different goods and services, has been the dominant factor driving changes in relative demand for tradespersons.

When skilled labour is in short supply, one option for firms is to use unqualified labour as a substitute for qualified tradespersons; the research demonstrated a significant rise in the number of unqualified tradespersons in some industries during the economic boom.

Adjustment in the labour market in response to supply and demand takes the form of quantity (employment) and price (wages) movements. This research finds evidence of both forms of adjustment for tradespersons.

Migration of skilled labour from overseas is one form of quantity adjustment and the relocation of tradespersons from overseas has been a significant part of efficient adjustment in the labour market. Migrants played a particularly important role in the economic development of urban Western Australia and also in the mining boom in remote Western Australia.

There was also regional movement in tradespersons. Capital cities continue to be an important source of demand for tradespersons living in rural and regional areas. Given the mobility of skilled labour, both internally and from overseas, there appears to be no apparent need to locate training in regions where a specific demand occurs.

Earnings appear to have played a very important function in adjusting supply and demand for tradespersons over the business cycle and in periods of structural change. This is particularly the case for Western Australia, with its large population growth and booming mining sector.

Rises in wages in specific skills-intensive occupations act as signals for investment in education for the acquisition of these skills. Although median earnings in many trades are not high compared with other occupations, there is considerable variation within and between different trades and regions. The relative earnings of the lowest-paid tradespersons have consistently fallen over time. However, the labour market is increasingly providing better rewards for the best tradespersons. Remote regions are the worst and best places to be for tradespersons, depending on which earnings group they belong to.

A large number of fully qualified tradespersons are lowly paid and this could explain the low percentage of people fully qualified. This suggests that, to justify undertaking trades training, much shorter periods of training would be required to raise the rate of return on a qualification.

The report concludes that there was no overall severe shortage of tradespersons during the economic boom, although there was significant excess demand in some local labour markets and excess supply in some others. The quantity and price adjustments, discussed above, worked in response to changes in supply and demand for tradespersons.

A regional analysis of the labour market for tradespersons

Background

The Australian economy has undergone significant structural change over the past three decades. Successive Labor and Coalition governments have continued the microeconomic reform policies which began in the 1980s, including reducing in the rate of tariffs on imported goods, labour market reform, deregulation of the financial sector, the reform or privatisation of public monopolies, a reduction in the anti-competitive behaviour of firms, and working with the states and territories to enhance competition. Significant change in demand for goods and services, both domestically and overseas, has had important effects on the industry mix of the Australian economy. Firms have become increasingly involved in the global economy, while embracing new technologies and management practices (Lewis et al. 2006).

There have been significant associated changes in labour demand. Full-time jobs, particularly for males, have not kept pace with supply. The growth in part-time work has been an important source of jobs growth. There has been a substitution of females, particularly part-time females, for full-time males. Another major feature of the changing Australian labour market is growth in casual employment. The growth of casual work was an important phenomenon in the 1980s and 1990s, but since 2000 the percentage of the workforce that is casual has reached a plateau of about 27% (Lewis 2008a).

Much of the changing composition of employment can be attributed to changes in the industry mix. In 1975, services accounted for just over 50% of all jobs, but by 2007 the service sector accounted for over 70% of all jobs (ABS 2007). By contrast, manufacturing's share of total employment almost halved over the same period, to about 11% in 2007. There were similar reductions in the relative shares of jobs in the 'industrial' services such as electricity, gas and water. In relation to the change in distribution of jobs by occupation, the picture that emerges, when combined with the industry distribution, is that a 'typical' Australian worker today is a 'white collar' employee in the service sector (Lewis et al. 2006; Keating 2006).

Changes in industry composition and consumer demand have combined with technological change to systematically modify the demand for skills (Kelly & Lewis 2003, 2006). These changes have allowed for, or even driven, a restructuring of occupations within many industries. The demand for labour has significantly changed in relation to part-time employment, gender and skills. Less-skilled workers are more vulnerable, as are younger and older workers. More generic and general skills rather than firm-specific skills are required. There is also evidence of growing wage dispersion (Lewis et al. 2006). The overall outcome, as evidenced by an unprecedented period of 17 years of economic growth, is a more highly skilled workforce and a more efficient economy (Lewis & Kelly 2006).

An examination of the labour market during the years up to the 'global financial crisis' shows that one of the biggest issues facing the Australian economy was perceived *shortages* of labour. This was reflected in the lowest unemployment rate in three decades and record net migration. Although the concept of a 'shortage' has been used rather loosely (Richardson 2007), shortages were reported in both the private and public sectors, ranging from skilled to unskilled labour. Occupations affected included medical practitioners, nurses, schoolteachers, pilots, economists, tradespersons and

engineers, through to agricultural workers and shop assistants (Costello 2005). As an economy nears full employment, bottlenecks in certain parts of the economy are to be expected, as economic growth and structural change are not evenly spread throughout the economy and some industries can adjust more rapidly than others.

One attempt to alleviate this was to increase the intake of migrants and temporary residents. In 2006 the net inflow of new migrants was 134 600, up 23% from 2003. This rose further in 2007 to a net inflow of 177 600—accounting for 56% of Australian population growth—and a net addition of over 200 000 long-stay arrivals over departures per year (ABS 2008). Of the total permanent migration to Australia, more than 45% were skilled settler arrivals.

The economic boom concentrated attention on perceived skill shortages in Australia and their role in both constraining economic growth and fuelling inflation. This report concentrates on the extent to which the supply of tradespersons has adjusted to changed economic conditions. While there is much anecdotal evidence on the regional dimension of skill shortages, this has mainly focused on flows of labour into the resource-rich states of Western Australia and Queensland. There is, however, no comprehensive analysis of the extent of the distribution of skilled labour, such as tradespersons, or the extent of population movement of skilled labour between regions during a prolonged period of significant economic growth.

The Censuses of Population and Housing provide unique data covering different stages of the business cycle, from the middle of a recession in 1991, to the recovery in 1996, the boom in 2001, and subsequent labour shortages in 2006. This report, which uses data from these four periods to examine issues of dispersion of skilled labour, not only offers important factual information on the dimensions of skill shortages, but also provides the basis for more informed policy-making with respect to migration, education and training.

Profile of tradespersons

The focus of this paper is people working as tradespersons, which may well differ from those qualified as tradespersons. In this paper the term ‘tradesperson’ relates to someone working in a trade occupation. The main sources of data are the Censuses of Population and Housing for 1991, 1996, 2001 and 2006.

Here tradespersons are defined as those working in occupations defined within the Australia and New Zealand Standard Classification of Occupations (ANZSCO 2006) Major Group 4 Tradespersons and related workers, and within this the sub-groups:

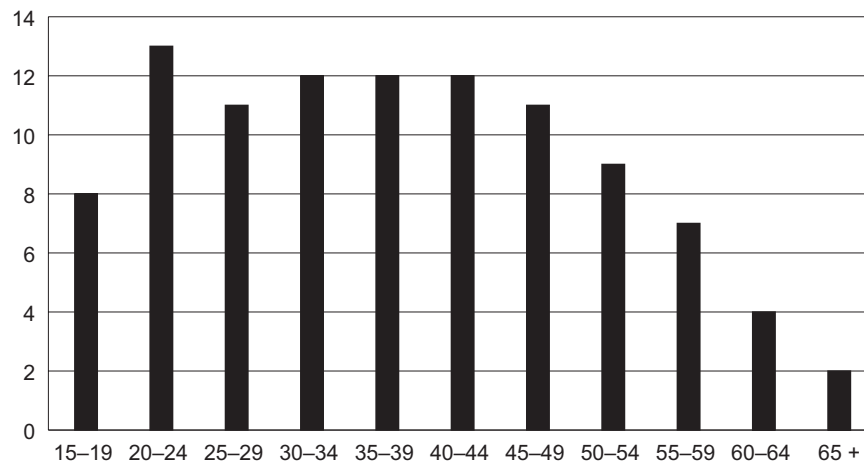
- 41 Mechanical and fabrication engineering tradespersons
- 42 Automotive tradespersons
- 43 Electrical and electronics tradespersons
- 44 Construction tradespersons
- 45 Food tradespersons
- 46 Skilled agricultural and horticultural workers
- 49 Other tradespersons and related workers.

Individuals qualified as a tradesperson are defined to be those who have a level of skill commensurate with an Australian Qualifications Framework (AQF) certificate III or higher qualification (AQF 2009). The analysis begins with a profile of the national market for tradespersons before turning to regional breakdowns.

Demographics

Approximately 89% of all tradespersons are male. The majority of women tradespersons are employed in either the other tradespersons sub-group (which includes hairdressers) or food sub-group. It is estimated that women account for around 35% of the tradespersons for each sub-group (Lewis 2008b). Women are also represented in the skilled agricultural and horticultural sub-group sector, accounting for 13% of the tradesperson workforce. In the construction, automotive, mechanical, and electrical categories, women represent 1–2% of the tradespersons employed.

Figure 1 Distribution of tradespersons by age, 2006, %



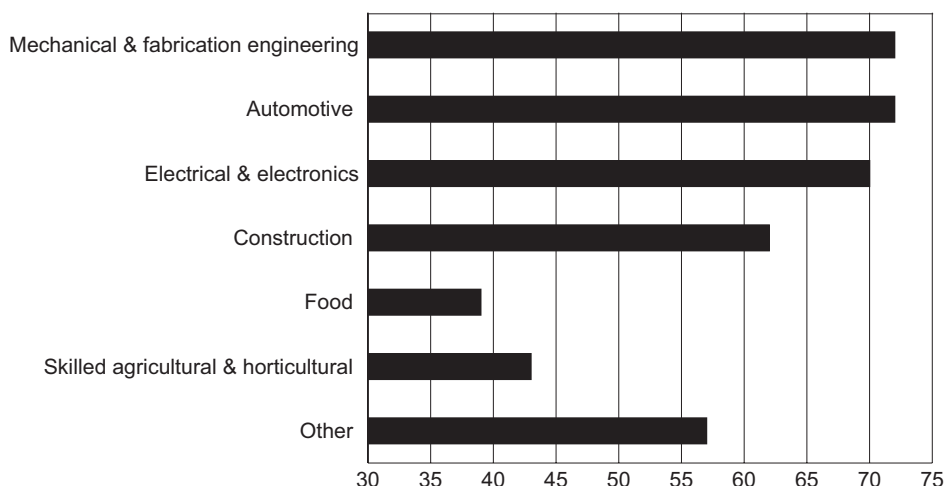
Source: Based on Census of Population and Housing 2006 (unpublished).

The median age of all tradespersons in Australia is 37 years, with 70% of all tradespersons between the ages 20 and 49 years. The age group 20–24 years is the largest group, at just over 13% of the total number of tradespersons. From the age group 45–49 years and on, we see a continuous decline of those age groups represented in the tradespersons workforce.

Qualifications

In 2006 there were 1 102 541 people employed as tradespersons, or 11.5% of the employed population. Of those employed as tradespersons, only 62% were qualified as a tradesperson. The most likely tradespersons to be qualified are the automotive tradespersons and the mechanical and fabrication engineering tradespersons, with over 72% of those employed as tradespersons being qualified. These two sub-groups are closely followed by electrical and electronic tradespersons, of which 70% are qualified. The two lowest percentages of those persons working and not qualified are food tradespersons, with fewer than 39% qualified, and skilled agriculture and horticultural workers, of whom only 43% are qualified.

Figure 2 Percentage of tradespersons' workforce qualified, 2006

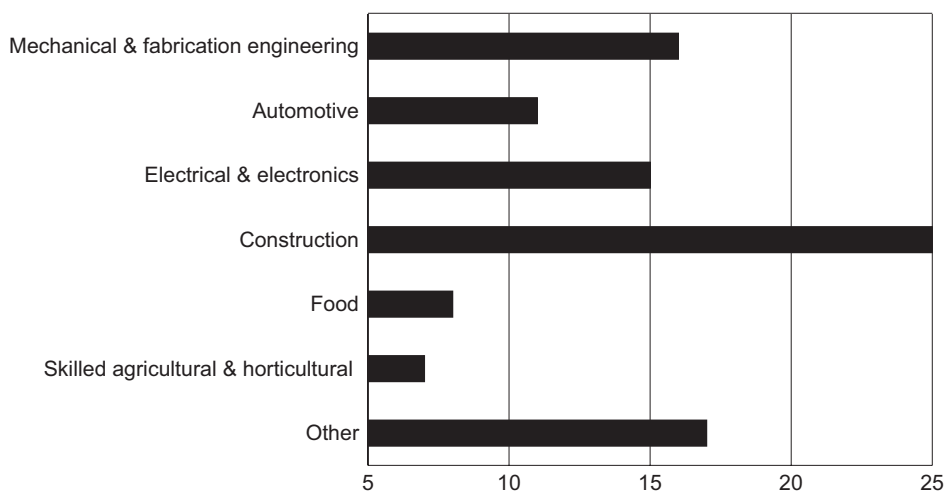


Source: Based on Census of Population and Housing 2006 (unpublished).

Occupation

Figure 3 shows the distribution of the different sub-groups of tradespersons. The largest sub-group is construction, which constitutes 25% of total tradespersons, followed by other tradespersons and related workers, which includes hairdressers, printing tradespersons and textile tradespersons, accounting for 17.3%. The other two main groups are mechanical and fabrication engineering and electrical and electronics, accounting for 16% and 15%, respectively. The automotive sub-group accounts for 11% of all tradespersons in Australia, while the food sub-group accounts for only 8%. The smallest occupational sub-group of tradespersons is skilled agricultural and horticultural workers, which accounts for only 7% of all tradespersons.

Figure 3 Distribution of tradespersons by sub-group, %



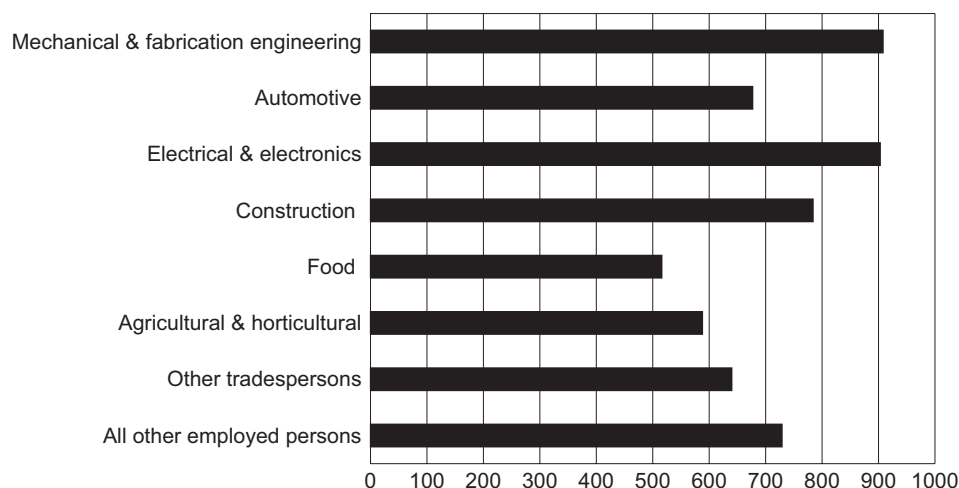
Source: Based on Census of Population and Housing 2006 (unpublished).

Earnings

In 2006, the two best-paid tradesperson sub-groups were mechanical and fabrication engineering and electrical and electronics, which were paid a weekly median income of \$908 and \$903, respectively. The only other tradespersons sub-group to be paid more than the weekly median income for all employed persons (\$728) was construction tradespersons, who earned a median income of \$784 weekly. All other sub-groups of tradespersons earned less than the median income

for all workers: automotive \$677; other tradespersons \$640; agricultural and horticultural workers \$588; and lastly, food tradespersons, earning \$516 weekly—\$213 less than the national median wage in 2006. For many people, being a tradesperson is not necessarily a very lucrative occupation.

Figure 4 Weekly median income by occupation, 2006, \$



Source: Based on Census of Population and Housing 2006 (unpublished).

Industry

Only a few industries are large employers of tradespersons. In 2006, the most significant employer of tradespersons was the construction industry, employing 330 000 tradespersons or nearly 30% of all tradespersons. The manufacturing industry is the second largest employer of tradespersons, employing 242 384 tradespersons or 22% of the total. The retail industry employs just under 14% of the total number of tradespersons, and personal and other services industries employ around 7%.

Table 1 Distribution of tradespersons by industry of employment, 2006

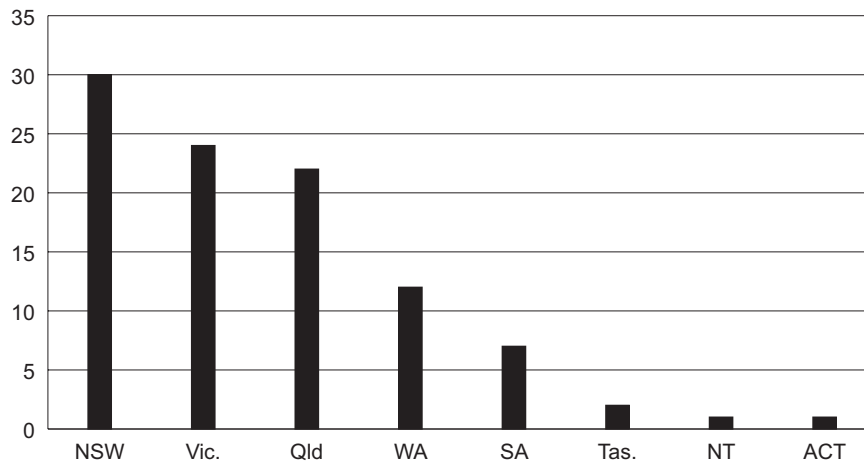
	Number	Per cent
Finance and insurance	1 667	0.2
Education	10 215	0.9
Not stated	10 616	1.0
Communication services	13 608	1.2
Agriculture, forestry and fishing	15 245	1.4
Electricity, gas and water supply	17 751	1.6
Non-classifiable economic units	18 235	1.7
Health and community services	18 472	1.7
Cultural and recreational services	19 446	1.8
Transport and storage	19 625	1.8
Mining	22 384	2.0
Government administration and defence	30 592	2.8
Accommodation, cafes and restaurants	33 468	3.0
Property and business services	33 815	3.1
Wholesale trade	38 521	3.5
Personal and other services	74 298	6.7
Retail trade	152 188	13.8
Manufacturing	242 384	22.0
Construction	330 000	29.9
Total employed persons	1 102 530	100.0

Source: Census of Population and Housing 2006 (unpublished).

Location

Most tradespersons work on the eastern seaboard, with 76% located in New South Wales, Victoria and Queensland. New South Wales has the largest share of tradespersons, with more than 30%. The remaining states and territories combined only account for just over 12% of all employed tradespersons.

Figure 5 Distribution of tradespersons by state, 2006, %



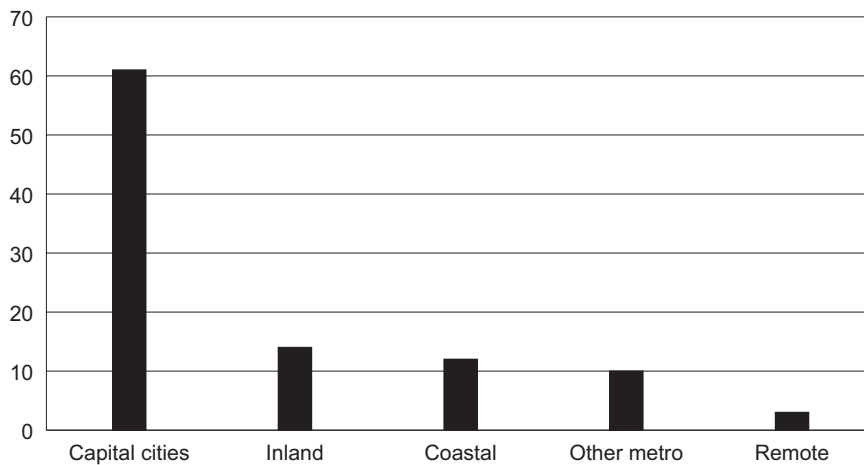
Source: Based on Census of Population and Housing 2006 (unpublished).

Although there are a number of methods of regional classification used in the literature, here the method employed is that developed by the Australian Bureau of Agricultural and Resource Economics (ABARE 2001) and discussed in Garnett and Lewis (2007).

- ✧ *Capital cities*: eight capital cities
- ✧ *Other metropolitan*: other than in capital cities that contain whole or part of an urban centre with population of 100 000 or more
- ✧ *Coastal*: within 80 km of the coastline
- ✧ *Remote*: coded by road distance between populations and from the nearest urban centre, according to the Accessibility/Remoteness Index for Australia (ARIA)
- ✧ *Inland*: all remaining.

Over 61% of tradespersons are located in capital cities. Another 36% of tradespersons are spread fairly evenly over the inland, coastal and other metropolitan regions. Remote regions account for only 2.5% of the total number of tradespersons.

Figure 6 Distribution of tradespersons by region, 2006, %



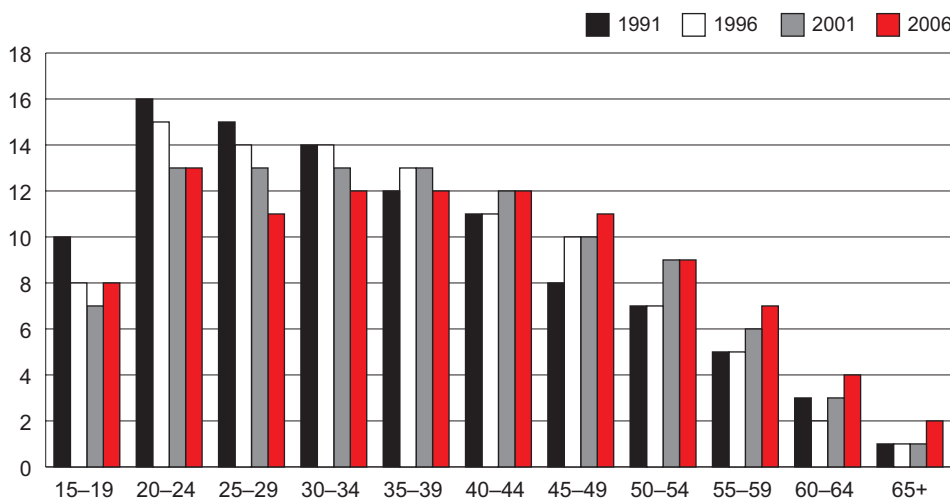
Source: Based on Census of Population and Housing 2006 (unpublished).

Major changes in tradespersons employment

Demographics

The changing distribution by age over time (figure 7) is interesting because it indicates an ageing tradesperson workforce in Australia between 1991 and 2006. During this time the median age for all tradespersons has progressively increased from 33 years in 1991 to 37 years in 2006. Of particular interest are the mechanical, automotive, electrical and electronics, agricultural and horticultural, and other tradespersons subgroups, whose median age has risen faster than that of all occupations. For example, within the electrical and electronics sub-group the median age increased from 32 years in 1991 to 37 years in 2006, while the median age of all other occupations increased from 37 years 1991 to 40 years. This suggests that, not only is the tradespersons workforce ageing, but it is ageing at a faster rate than the rest of the workforce. It is also interesting to note that, while the majority of trade occupations have seen a significant increase in their median age, construction tradespersons have not, with a constant 36-year median age maintained from 1996 to 2006.

Figure 7 Distribution of tradespersons by age, 1991–2006, %



Source: Based on Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

Supporting evidence of an ageing tradespersons workforce emerges when looking at the age distribution over time. The steady decline of tradespersons aged between 19 years and 34 years is

quite noticeable, as is the significant increase in the percentage of tradespersons aged 40 years and over. In particular, while the age groups 20–24 years and 25–29 years are down 3%, the age group 45–49 is up 3% over the period 1991–2006. There has, however, been a small increase in the proportion of younger tradespersons, 15–24 years old, between 2001 and 2006. This is evidence in support of the success of apprenticeship and trainee training in attracting students, thereby bringing more young people into the trades. For instance, between 2001 and 2006 the number in apprenticeships or trainee trades rose from just under 130 000 to almost 184 000. Growth was particularly strong for construction trades, from about 29 000 in 2001 to almost 50 000 in 2006 (NCVER 2008).

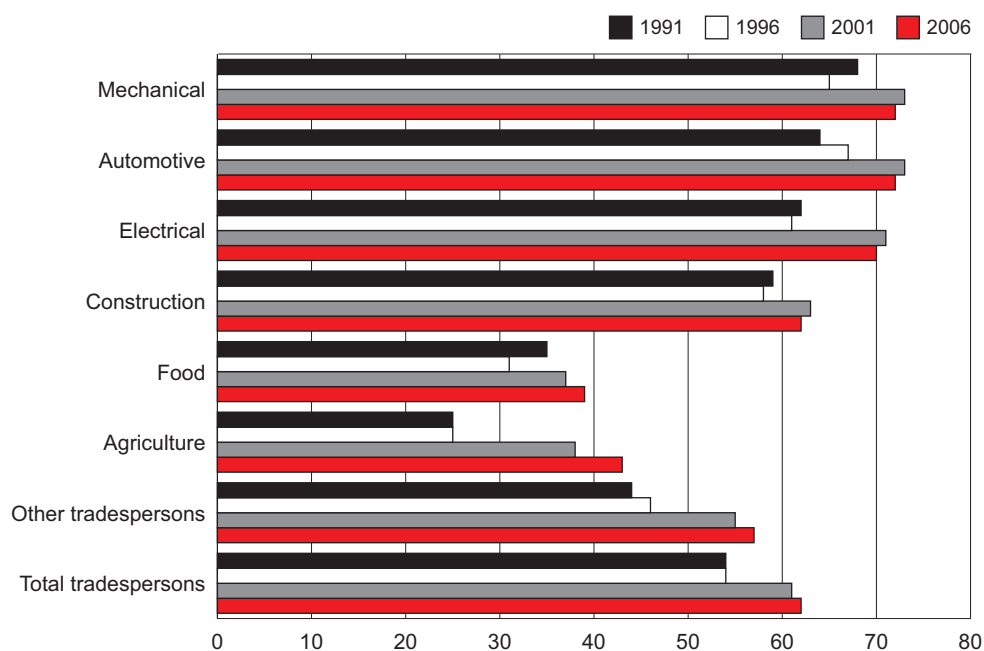
The implications of these data are that the supply of tradespersons will decline significantly in the near future, with implications for the ability of the economy to match supply and demand for manual skilled labour, unless there is a significant increase in skilled migration. However, as Karmel and Ong (2007) point out, although the ageing of the population will significantly impact on the potential trades labour force, shortages will be significantly more severe if trades lose their attractiveness relative to other occupations. This issue is considered further in the section on earnings.

Qualifications

Between 1991 and 2006 there was a significant 8% increase in the percentage of people employed as qualified tradespersons, although it is important to note that most of the increase in the percentage was between 1996 and 2001. This increase takes place in all the individual trade occupations as well. The most significant skilling of trade occupations has come from agriculture and horticultural, electrical and electronics, mechanical and other tradespersons, who have all increased the number qualified faster than total tradespersons or the average during the 1996 to 2001 period.

Training uptake stagnated in the mechanical and electrical and electronics sub-groups between 2001 and 2006, but improved by 5 and 3% respectively in the agricultural and other tradespersons sub-groups.

Figure 8 Tradespersons' workforce qualified, %



Source: Based on Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

These trends are consistent with growing credentialism and government regulation in relation to registration. However, the small fall in the percentage qualified among the mechanical, automotive, electrical and electronics and construction trades between 2001 and 2006 is consistent with previous research, which suggests that, as skilled labour becomes in short supply, firms tend to substitute unqualified labour for qualified tradespersons (see, for instance, Webster et al. 2001).

Occupation

The number of tradespersons employed grew by 15% in a steady growth pattern between 1991 and 2006, although there were variations between sectors. Employment of tradespersons increased between 2001 and 2006, where the number of tradespersons employed grew by 83 674. This represented a rise of over 8%—but was less than the growth of 13% in the Australian workforce as a whole. Thus tradespersons have fallen as a proportion of the workforce. Not all industries have been affected in the same way.

Table 2 Distribution of tradespersons by sub-group, over time

	1991		1996		2001		2006	
	No.	%	No.	%	No.	%	No.	%
Tradespersons nfd	14 205	1	14 942	1	13 369	1	14 979	1
Mechanical	179 768	19	178 285	18	169 201	17	179 878	16
Automotive	116 547	12	120 723	12	115 599	11	116 368	11
Electrical	138 055	14	136 208	14	141 616	14	162 227	15
Construction	197 126	21	210 163	21	233 142	23	275 735	25
Food tradespersons	102 474	11	83 226	8	85 037	8	90 334	8
Skilled agricultural	44 428	5	64 085	6	70 195	7	72 222	7
Other tradespersons	133 693	14	189 333	19	190 708	19	190 798	17
Total tradespersons	958 480	100	996 965	100	1 018 867	100	1 102 541	100

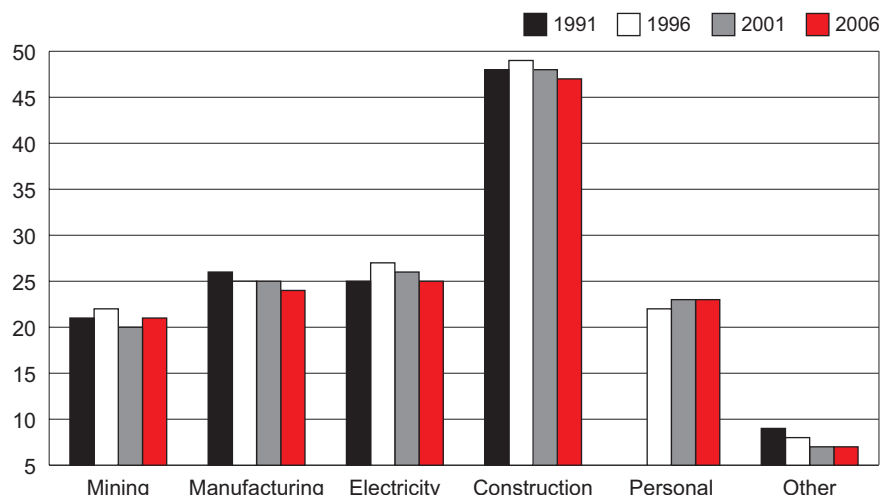
Source: Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

The trade sub-group experiencing the biggest percentage growth was construction, which has the largest percentage of its workforce who are tradespersons; between 1991 and 2006 it rose by 4% to 25% of all tradespersons. A decline in the number of mechanical, automotive and food tradespersons between 1991 and 2001 is evident, as is the increase by 2006. Food tradespersons suffered a significant loss in employment in the period 1991–96, losing 19 248 jobs, but gained between 1996 and 2006 to maintain their relative share of 8% of the total tradesperson workforce. Tradespersons in the mechanical sub-group, representing 16% of the trade workforce in 2006, suffered a significant drop in numbers between 1991 and 2001, but growth from 2001 to 2006 saw numbers restored to a level almost identical to 1991. The exceptions were the electrical and electronic and construction trades, where employment has grown significantly, concomitant with the growth in the construction sector of the economy.

Industry

The percentage of workers within an industry employed as tradespersons has seen little dramatic change in the last 15 years, although a small downward trend is discernible. In 1996, 49% of persons employed in the construction industry were tradespersons, falling to just below 47% in 2006, by far the highest concentration of tradespersons of any industry. Tradespersons account for approximately one-quarter of employees in the manufacturing and electricity, gas and water supply industries, with less than 2% variation over the 15 years.

Figure 9 Tradespersons as a percentage of the workforce by industry



Source: Based on Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

Personal and other services is the fourth largest industry of employment for tradespersons, and the percentage of those employed who are tradespersons has remained fairly constant at 22–23%. In the mining industry tradespersons accounted for 21% of the workforce in 2006; however, it is important to note that the mining and electricity industries account for a relatively small proportion of the Australian workforce—2% and 1.6%, respectively. For all other industries, the concentration of tradespersons is only 7% and declining. Of these other industries, retail is the largest employer of tradespersons, but the percentage of tradespersons is relatively low and, therefore, not displayed here. The percentage varied significantly over time, from 14.4% in 1996 to 11.7% in 2006.

Further, changes in the skills mix within industries are generally attributable to technological change (Kelly & Lewis 2006). Therefore the above data suggest that, with the exception of retailing, technological change has had little impact on the skills mix, at least in terms of tradespersons relative to other workers, in industries which are the main employers of tradespersons. Thus skills development will depend largely on growth in total employment in particular industries. This is not to say that the skills required within trade occupations will not also need development as a result of technological change.

Figure 10 Percentage of all tradespersons employed by industry, %



Source: Based on Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

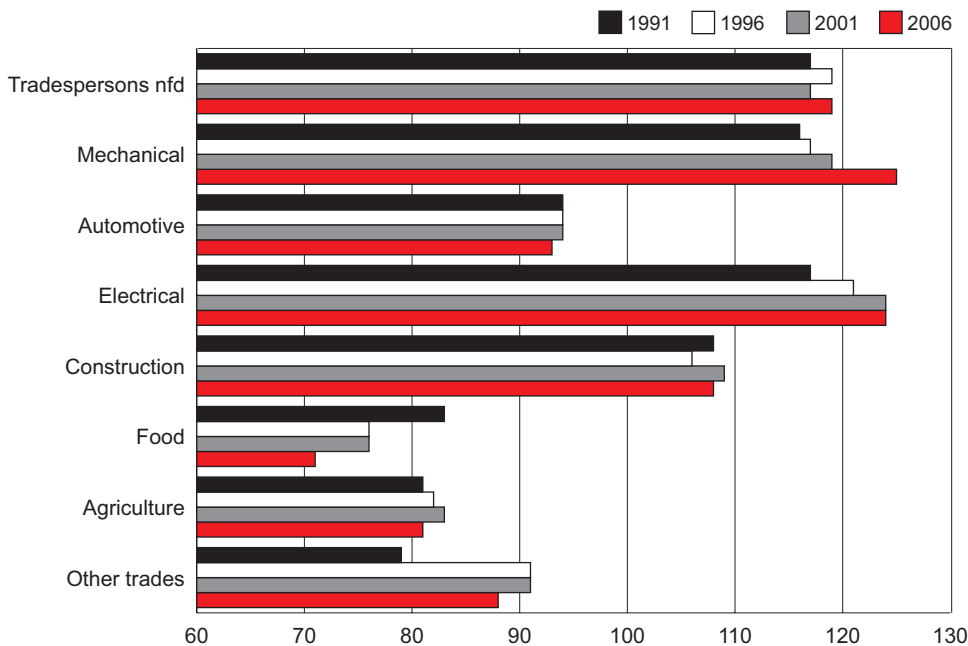
On the other hand, the percentage of all tradespersons employed in particular industries has seen significant changes over the last decade and a half as a result of structural change in the economy, with the industry mix changing in response to both domestic and overseas demand (see Kelly & Lewis 2006). The largest shift has been away from all other industries towards the construction industry, moving from employing 21% of tradespersons in 1991 to 30% in 2006. Another shift has been the decline occurring in the manufacturing industry, from 25% in 1991 to a little under 22% in 2006. The retail industry held steady at approximately 14% and after a significant decline from 10% in the personal and other services industry occurring in 1991, the percentage of all tradespersons employed by this industry held steady at around 7%.

The above data suggest that the changes in skills mix in the economy are largely related to shifts in employment between industries, that is, structural change, and this has significantly reduced the average demand for ‘motor skills’ in the economy (Kelly & Lewis 2006).

Earnings

Even with the economic boom, a number of trade occupations have seen little dramatic change in their relative earnings between 1991 and 2006. This applied to tradespersons in the agriculture, construction, automotive and tradespersons nfd sub-groups.

Figure 11 Median earnings relative to all employed, %



Source: Based on Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

Other trade occupations, for instance, mechanical, electrical and other trades, have all seen significant improvement in their relative earnings over time. While the growth in earnings of 7% took place between 1991 and 2001 for electrical tradespersons, mechanical tradespersons saw steady improvement in their relative earnings over the period 1991–2006, with the bulk of the improvement taking place between 2001 and 2006. Food tradespersons were not only paid well below the median earnings of all employed, their relative earnings have also slipped substantially, to just 71% of the median in 2006, down 12% since 1991.

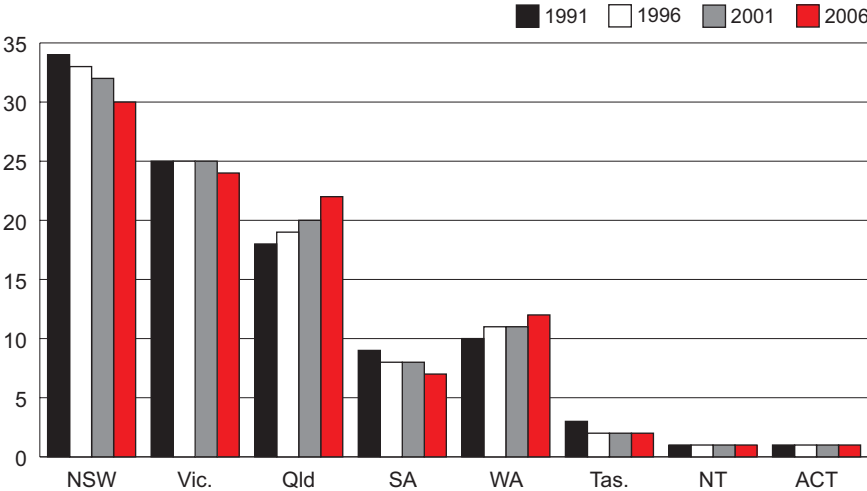
With respect to trades training, the data suggest the attractiveness of courses for the food sector is very low and has been deteriorating over time. Trade training has become more profitable for mechanical and electrical and electronics trades. Perhaps surprisingly, given the increased demand for construction tradespersons, the attractiveness, from an earnings perspective, has not changed

significantly over time, suggesting an increase in supply, or substitution of less-qualified labour by employers taking pressure off wages to rise.

While the above data relate only to median earnings, the distribution of earnings is also an important factor in labour market adjustment, as will be seen later.

Location

Figure 12 Tradespersons by state, %

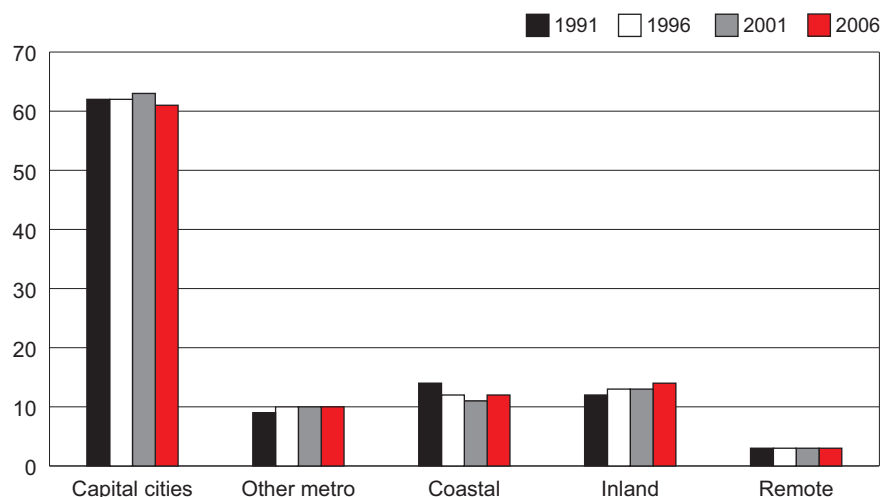


Source: Based on Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

Figure 12 shows the distribution of tradespersons by the states and territories over time. Significant shifts have occurred over the period 1991–2006. The percentages of tradespersons in New South Wales and South Australia have fallen, while in Queensland and Western Australia the percentages have risen. In 1991 New South Wales had 34% of all tradespersons, declining 4% to 30% in 2006, while South Australia’s share of tradespersons fell 2% to 7% in 2006. Meanwhile, Queensland has increased its share of tradespersons from 18% in 1991 to 22% in 2006 and, similarly, Western Australia has accounted for a greater number of tradespersons, up 2% over the period to 12% in 2006.

These results suggest that there has been significant regional movement of tradespersons in Australia. Whether this is due to general population movements in response to greater economic opportunities and lifestyle or due to structural change, such as declining manufacturing, which has particular effects on demand for tradespersons, will be analysed later in the report.

Figure 13 Tradespersons by region, %



Source: Based on Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

Figure 13 shows tradespersons distributed by region over time. The most notable feature is that the largest percentage of tradespersons are employed in capital cities—over 60%. Over the period 1991–2006 little has changed in regard to the distribution of tradespersons by region. The largest of these small changes has been in coastal regions, down 2% to 12% in 2006. There has been a shift in tradespersons flowing into inland regions, up 2% over the same period to 14% in 2006, consistent with the changes in regional employment construction and retail (see table 3).

Adjustment in the tradespersons' labour market

In order to examine the extent to which structural change has affected employment of tradespersons, it is necessary to examine changes in employment of all workers by state, industry and region. These changes have been examined in detail above and are summarised in table 3.

Table 3 Percentage change in all persons employed by industry, state and region, 1996–2006

	Manufacturing	Mining	Construction	Retail trade
NSW	-4.4	-6.9	25.7	17.9
Vic.	-3.5	9.6	41.5	23.2
Qld	23.5	31.4	46.9	29.7
SA	1.9	48.1	43.6	24.0
WA	18.2	34.3	42.7	24.0
Tas.	-2.4	-13.9	22.0	19.3
NT	30.3	-48.6	9.1	13.6
ACT	7.2	-13.7	30.5	12.3
-----	-----	-----	-----	-----
Capital cities	2.8	47.9	36.4	23.1
Other metro	-1.4	0.4	32.8	18.9
Coastal	-2.4	48.5	41.9	21.6
Inland	14.8	9.4	46.6	26.4
Remote	19.9	-10.2	12.4	6.6
-----	-----	-----	-----	-----
Australia	3.4	20.9	37.2	22.6

Source: Census of Population and Housing 1996, 2006 (unpublished).

From the last row—Australia—it can be seen that, during the latest sustained period of economic growth in Australia between 1996 and 2006, the mining, construction and retail industries delivered a

dramatic increase in the number of all persons employed in those industries, increasing by 21%, 37% and 23%, respectively. Manufacturing, on the other hand, saw only a slight increase of 3%.

Of the growth in employment in the mining industry, Queensland, Western Australia, Northern Territory and South Australia produced the lion's share of the new mining jobs and increased their percentage of all the mining jobs nationally. Of all the states that lost a percentage share in mining jobs nationally, New South Wales was the most significant, falling by 6.1%.

Regionally the shift in mining jobs has been away from remote, inland and other metropolitan areas towards capital cities and coastal regions. In fact, capital cities increased their share of mining jobs by 8.5% and coastal regions by 4% over the period. Mining employment for capital cities and coastal regions grew by 47.9% and 48.5%, respectively. This is an interesting finding and deserves future research. Among the issues which need to be examined is the extent to which the pattern of jobs in the industry has changed with this regional shift and the implications for skills development.

Similarly, employment growth in the retail sector has been considerable at 22.6% over the period 1996–2006. There has been little dramatic change in either the regional distribution or the states and territories' distribution in retail employment over the period, although there has been a decline in importance, relative to retailing in other states, in New South Wales, the Australian Capital Territory and the Northern Territory. The most notable change in regional employment has been lower growth in other metropolitan and, particularly, remote areas, compared with inland regions and capital cities. Retail employment in inland regions and capital cities rose by 26.4% and 23.1% respectively between 1996 and 2006—above the national average of 22.6%.

The most notable growth in employment was in the number of construction jobs nationally, which was up 37.2% during the period 1996–2006. The construction industry has the greatest percentage of tradespersons of any industry, just below 47% in 2006. Hence nearly half of the growth in construction jobs over the period 1996–2006 has been in the employment of tradespersons. This has drastically increased the demand for qualified tradespersons over the same period.

Although demand for construction workers has increased significantly generally, regionally there have been some notable shifts in the distribution of construction employment, with lower increases in capital cities, other metropolitan and, in particular, remote areas. Meanwhile, inland and coastal regions have increased their share of the national total. For the states and territories, the most interesting shift has been a reduction in New South Wales's share and increasing shares for Queensland and Victoria.

The manufacturing industry, on the other hand, indicates strong evidence of structural change taking place over the period 1996–2006. While the Australian economy as a whole was in a boom and had significant growth in aggregate demand, Australian manufacturing industry only incurred employment growth of 3.4% nationally. New South Wales, Victoria and Tasmania all experienced declines in their shares of the national total of manufacturing employment, while Queensland, the Northern Territory and Western Australia increased their share.

It was pointed out earlier in this report that the percentage of tradespersons in total employment in the main industries that employ tradespersons has changed little over time.

This suggests that technological change has not significantly altered the employment mix in relation to tradespersons. The evidence on industries, states and regions indicates that structural change has been the dominant factor determining the demand for tradespersons, arising from changes in relative demand for different goods and services over the business cycle.

For instance, most demand for labour in industries employing tradespersons is in the capital cities, so population movements towards Brisbane and Perth (ABS 2007) can partly explain the relative growth of tradespersons in these cities and the corresponding decline in cities such as Sydney. In addition, the economic boom and resultant structural change in demand have enhanced growth rates for some industries that employ relatively high numbers of tradespersons, such as mining and

construction. Other industries which also employ large percentages of tradespersons, such as manufacturing, have been in relative decline. However, in manufacturing there has been increased employment in Queensland and Western Australia.

Excess demand and supply

Since the percentages of tradespersons employed in the personal and other services, mining, manufacturing, electricity, gas and water; and construction industries have remained reasonably constant over time, we can assume that these proportions are consistent in the long term. By making this assumption, we can then determine the demand for tradespersons within each industry, by assuming a constant input–output technology for demand for tradespersons. Multiplying the growth in jobs from 2001 to 2006 by the percentage of tradespersons employed in each industry provides an estimate of the expected demand for tradespersons in 2006. Table 4 shows the expected growth in employment (demand) and the actual growth (supply) of tradespersons in each industry. Comparing the expected (demand) and actual (supply) employment growth provides a measure of excess demand or supply.

Table 4 Expected and actual growth of tradespersons, 2001–06

	Change in all jobs 2001–06	Tradespersons expected	Jobs actual	Difference
Mining	31 386	6 629	7 298	-669
Manufacturing	-12 053	-3 025	-11 429	8 404
Electricity etc.	10 116	2 591	2 184	407
Construction	146 357	70 130	60 750	9 380
Personal & other	23 285	5 402	4 560	842

Source: Census of Population and Housing 1996, 2006 (unpublished).

The most significant shortage of tradespersons is estimated to have been in the construction industry. This industry had strong consistent growth during the boom in the economy and it seems it had some difficulty attracting sufficient tradespersons to the industry. The shortage of tradespersons in this industry is estimated to have been 9380 in 2006, or almost 3% of the total employment of construction tradespersons. This is expected to have represented a relatively modest deskilling of the industry, as skilled labour was partly substituted by unskilled labour.

The electricity, gas and water industry and the personal services and other industries also suffered relatively minor shortages, about 2% and 1%, respectively, of tradespersons.

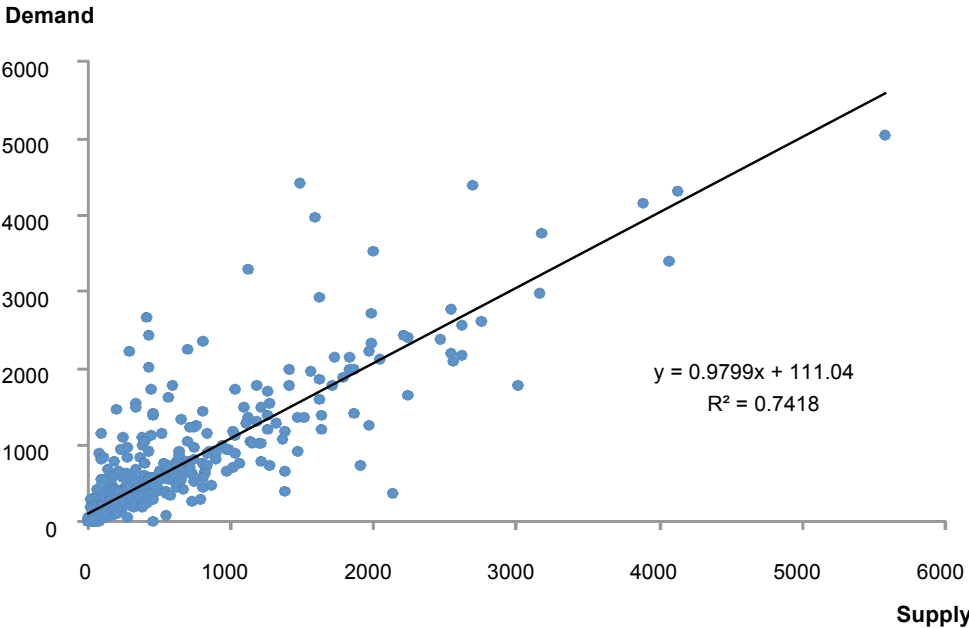
The mining industry, on the other hand, was able to attract more than the number of tradespersons it might be expected to attract on the basis of normal skills mix, about 3% of the tradesperson workforce in mining. It is doubtful whether the technology of mining would have changed over the period up to 2006 such that it would require a greater percentage of skilled workers. The growth in employment of tradespersons therefore implies some tradespersons might have been taking advantage of opportunities available in less-skilled jobs.

Manufacturing, given its decline in total employment, would have been expected to reduce its employment of tradespersons by about 3000, but it actually reduced its employment by over 11 000, or 4.5% of tradespersons employed in manufacturing. This may have been due to significant technological change, reducing the demand for tradespersons in manufacturing or the inability of manufacturing employers to recruit or retain tradespersons, particularly given growing demand in other industries. In either case there was significant deskilling of the manufacturing workforce.

Another way of examining the extent of excess demand and supply is to examine a lower level of aggregation. The statistical local area (SLA) is a spatial unit used by the ABS to collect and analyse statistics from other sources, as well as those collected from the censuses. In non-census years, the SLA is the smallest unit defined in the Standard Geographical Classification (ASGC) Section of

State Structure. There are over 1300 SLAs and they cover the whole of Australia without gaps or overlaps. These data can be aggregated to any level, including region, state or Australia as a whole and can be cross-tabulated by variable, state and region. They also allow statistical cross-section modelling, which will be the subject of a forthcoming NCVER paper. People can be enumerated by the SLAs in which they live or where they work. Since the question of relevance here is employment adjustment, the SLA where people work is used as the unit of observation. There are over 800 SLAs defined as places of work compared with the much greater number defined where people live. Demand and supply of tradespersons are calculated in the same way as above.

Figure 14 Demand and supply of tradespersons, 2006



The scatter plot of supply and demand shown in figure 14 suggests that, overall, the supply and demand of tradespersons were in balance. A coefficient on the fitted trend line of about unity suggests on average a unit change in demand is associated with a unit change in supply. However, there are notable local labour markets where there was observable excess demand for tradespersons and (fewer) local labour markets where there was excess supply. Together with the evidence from table 4, this suggests that, although the demand and supply of tradespersons were in balance overall, there were significant regional and some industry imbalances. This will be the subject of further work for NCVER.

Earnings adjustment

In a well-functioning labour market, movement of labour should reflect changes in industry demand, and prices (wages) play an important part in this adjustment. In addition, we would expect to see a degree of compensating differential, that is, a wage premium for unpleasant or hard work, or for living in areas with poor amenities, or for workers in particular industries. Increased wage dispersion is the signal, in the short run, for workers to move between firms, industries and regions. In the long run wage dispersion acts as a signal for individuals and providers to invest in training in order to pursue those jobs with higher earnings. This increased supply of trained workers will eventually reduce earnings dispersion, but nevertheless it is the initial earnings dispersion which triggers long-run efficient labour market outcomes. Table 5 shows the median incomes for full-time employed tradespersons, relative to median earnings of all full-time employed by industry, region and states.

Table 5 Full-time earnings of tradespersons as a percentage of the median income of all workers by region, 1996 and 2006

1996	Mechanical	Automotive	Electrical	Construction	Food	Agricultural
Capital city	117	97	120	109	77	83
Other metro	123	95	125	106	74	79
Coastal	114	89	117	97	73	76
Inland	109	88	118	95	78	83
Remote	172	101	150	114	76	90
Australia	117	94	121	106	76	82
2006						
Capital cities	124	96	124	112	71	83
Other metro	131	94	125	109	70	81
Coastal	126	86	120	99	68	73
Inland	111	84	119	95	72	81
Remote	191	105	167	115	76	80
Australia	125	93	124	108	71	81

Source: Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

The table shows that there has been a significant payoff for tradespersons who are located in remote regions, probably because of the need for firms to pay compensating differentials. Not only are the median incomes for tradespersons highest in remote Australia, but also tradespersons in remote regions experienced the greatest growth in median income. The most notable earnings differential is for mechanical tradespersons who in 2006 earned 191% of the national median income, up 19% from 1996, and 67% higher than the median income of mechanical tradespersons located in capital cities.

Electrical tradespersons in remote regions earned 167% of the national median in 2006, up 17% of the national median in 1996, and were paid an extra 43% of the national median compared with electrical and electronics tradespersons located in capital cities.

Construction, automotive and food tradespersons all received significantly higher wages in remote regions. Even though food tradespersons earn well below the national median, they still did much better in remote regions. In virtually all regions, their relative earnings fell between 2001 and 2006, as did relative earnings of agricultural tradespersons. Tradespersons in inland areas from the mechanical, automotive, construction and electrical and electronic sub-groups have lower earnings than in any other region in Australia.

Table 6 Full-time earnings as a percentage of the national median income by state

1996	Mechanical	Automotive	Electrical	Construction	Food	Agricultural
NSW	119	96	122	106	75	84
Vic.	115	92	120	103	77	79
Qld	115	94	120	106	76	81
SA	111	92	115	100	77	82
WA	131	99	123	111	77	86
Tas.	111	91	117	100	78	79
NT	138	107	132	120	90	88
ACT	115	98	123	113	75	88
Australia	117	94	121	106	76	82
<hr/>						
2006						
NSW	122	92	122	103	68	83
Vic.	118	91	123	105	70	79
Qld	127	93	126	114	72	80
SA	115	91	118	102	72	79
WA	152	103	133	120	75	83
Tas.	110	84	118	94	73	74
NT	151	111	137	130	88	81
ACT	121	96	128	117	71	87
Australia	125	93	124	108	71	81

Source: Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

There are substantially greater incomes for most trade occupations in Western Australia and the Northern Territory than elsewhere in Australia, and these differences increased between 1996 and 2006. For the automotive, electrical and electronic, construction and food tradespersons, the highest-paying state or territory was the Northern Territory. Western Australia was the highest-paid location for mechanical tradespersons and the second highest paid location for automotive, electrical, and construction tradespersons. Both Western Australia and the Northern Territory recorded the most significant increases in the median incomes of mechanical tradespersons over the period 1996–2006. Tasmania, however, has the lowest earnings of tradespersons of any state or territory. It has the lowest median incomes for trade occupations and the relative position has deteriorated in almost all sectors. In Queensland, where growth in employment has been high, the earnings differential between tradespersons and others is not as pronounced as in Western Australia, but construction and mechanical tradespersons experienced high growth in earnings between 2001 and 2006.

Another way of examining tradespersons earnings is how they rate relative to other workers in the region in which they live (table 7).

Table 7 Full-time tradespersons' earnings as a percentage of all other workers

	1991	1996	2001	2006
Sydney	99	97	96	93
Rest of NSW	108	107	106	106
Melbourne	97	98	99	98
Rest of Vic.	105	107	106	107
Brisbane	102	102	102	104
Rest of Qld	111	110	111	116
Adelaide	99	100	101	101
Rest of SA	110	108	107	108
Perth	101	105	107	110
Rest of WA	115	120	123	126
Hobart	97	100	98	97
Rest of Tas.	105	108	107	108
Darwin	95	102	105	106
Rest of NT	105	119	120	122
Canberra	88	84	85	78
Australia	101	102	102	102

Source: Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

The difference between the major urban centres of Australia and the regions appears to have a significant impact on the relative earnings of tradespersons. In the major urban centres, where the service sector accounts for a larger proportion of the jobs, tradespersons earn less, relative to all other workers in the same location. Alternatively, outside urban areas, tradespersons' relative earnings are for the most part significantly better than all other workers. For example, when comparing tradespersons' relative earnings in Sydney with the rest of New South Wales, tradespersons' relative position is less than the earnings of all other workers in Sydney and this position slides over time to just 93% of all other workers in 2006. For the rest of New South Wales, tradespersons' relative earnings are consistently better over time than all other employed persons, by 6% in 2006. A fairly similar story can be said for Melbourne and rest of Victoria, Adelaide and the rest of South Australia, Hobart and the rest of Tasmania, except that the relative position of tradespersons in these capital cities does not decrease over time, and in Adelaide, tradespersons' relative position increases to better the earnings of all other workers.

For the other capital cities and their associated rest of states, the story is somewhat different. While the relative earnings of tradespersons are much improved when compared with all other workers, there is still a clear discernable difference between the major urban centres and the rest of state. For example, in Brisbane the relative earnings of tradespersons is better than all other workers in Brisbane, an improvement of 4% in 2006. However, tradespersons in the rest of Queensland enjoy improved relative earnings of 16% over other workers in 2006. The same story is observed and is even more pronounced for Perth and the rest of Western Australia. While Perth tradespersons recorded wages 10% greater than all other workers in 2006, the corresponding wage premium of tradespersons working in the rest of Western Australia was 26% in 2006. The story is similar for Darwin and the Northern Territory. Nowhere are tradespersons worse off relative to all other workers than in Canberra. This position became even worse as the relative median earnings of tradespersons declined considerably between 2001 and 2006, down 7% to just 78% in 2006 of the median earnings of all other workers. This is largely due to the median earnings of non-tradespersons in Canberra being higher than the rest of Australia and increasing between 2001 and 2006.

In summary, earnings appear to have played a very important function in adjusting supply and demand for tradespersons over the business cycle and in a period of structural change. This is particularly the case for Western Australia with its large population growth and its booming mining sector.

Income dispersion

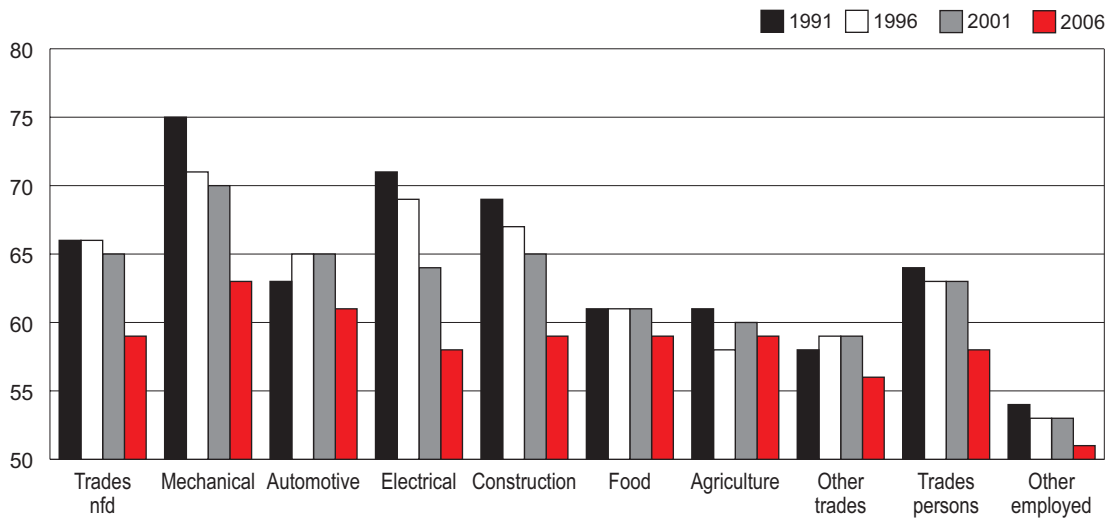
Another feature of a well-functioning labour market, particularly with respect to flexibility, is growing wage dispersion as the rewards to initiative and skills become more pronounced. In a market economy, for efficient human capital formation it is necessary for returns to skill formation to reflect changes in demand for skills. Rises in wages for occupations and individuals which are intensive in skills in demand act as signals to invest in education to attain these skills. Similarly, relative wages should decline for occupations and individuals with skills that are in relative decline. It is not clear what the implications for formal training would be in the case where earnings dispersion widens within occupations since the skills set for persons within an occupation would be similar and differences reflect ability (or good fortune) rather than returns to education and training. Nevertheless, differences in earnings will measure differences in skills, broadly defined.

The pattern of wages can be distorted, however, in a period of general excess demand for labour. For instance, Daly and Lewis (2009) found that the widening of the income differential between university graduates and those who had only completed Year 12, observed between 1986 and 2001, was reversed in 2006. This suggests that the full employment, or even excess demand for labour that characterised the economy in 2006 (Lewis 2008b), significantly reduced the skill differential for university graduates evident in periods of high unemployment. Whether this same phenomenon is observable for trades occupations is of interest.

There are several ways in which earnings dispersion can be measured. Here two simple but well-known measures are applied to earnings of employed tradespersons and all other employed workers, namely, the ratio of the lowest 20% (20th percentile) to the median (50th percentile) and the ratio of the highest 20% (80th percentile) to the median (ABS 2009).

Nationally, from 1991 to 2006, there have been observable downward trends in the 20th percentile relative to median weekly earnings for all tradespersons and for many of the individual trade occupations. This downward trend is very small for the years 1991–2001: it only fell by 1.2% from 63.9% in 1991 to 62.7% in 2001. However, between 2001 and 2006, the 20th percentile's share of the median weekly earnings dropped by 5% from 62.7% in 2001 to 57.7% in 2006. The falls between 2001 and 2006 are consistent through all trade occupations and all other employed persons. The largest falls were for the trade occupations of mechanical, electrical and building, by 6.2%, 6.3% and 5.9% respectively over the period 2001–06. The relative loss suffered by the 20th percentile is not due to reduced weekly earnings, since the 20th percentile weekly earnings for all tradespersons increased by \$46 from \$382 to \$428 between 2001 and 2006. The relative loss occurred due to the median weekly earnings for all tradespersons rising much faster over the same period by \$133 from \$608 in 2001 to \$741 in 2006.

Figure 15 Trade occupations ratio of 20th percentile to median weekly earnings, 1991–2006

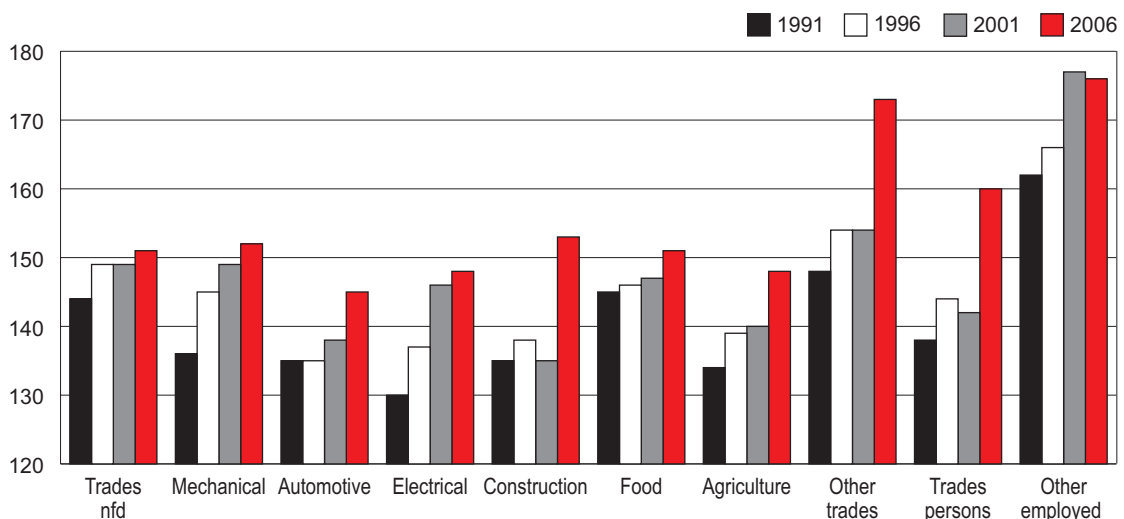


Source: Based on Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

The above data suggest that the lowest-paid tradespersons' relative earnings have consistently fallen over time.

At the same time as the 20th percentile has fallen relative to the median, the 80th percentile of all tradespersons relative to the median has exhibited an upward trend, as the percentage share of the median has typically increased. This occurred most notably between 2001 and 2006, when it jumped by 17.7% from 142% of the median to 159.8%. Of the trade occupations, the most significant change between 2001 and 2006 was observed in construction, other trades and agriculture, which increased by 18.1%, 18.3% and 8.6%, respectively. However, some sectors recorded notable changes earlier than this. For electrical and electronic tradespersons and for non-trade occupations, the 80th percentile relative to the median increased significantly between 1996 and 2001 by 9.8% and 11.3% respectively and then observed little change between 2001 and 2006.

Figure 16 Trade occupations ratio of 80th percentile to median weekly earnings, 1991–2006



Source: Based on Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

Clearly, the dispersion of earnings among trade occupations has been increasing over time and at a greater rate than for non-trade occupations. Thus, the highest-earning tradespersons have been improving their position and the lowest-earning tradespersons have been becoming worse off,

relative to the median. This implies that the labour market is increasingly providing better rewards for the best tradespersons.

Regionally, with the exception of remote regions there is little difference between the regions with regard to the 20th percentiles, relative to median weekly earnings for all tradespersons, but between 2001 and 2006 the relative position of the lowest earners deteriorated noticeably for all regions. In remote regions the lowest quintile is not only significantly less than other regions relative to the particular region's median weekly income, but it has experienced the sharpest decline between 2001 and 2006. In 2006 in all the regions of Australia except remote regions, the 20th percentiles relative to median weekly income converged towards 58%. For remote regions, however, the ratio dropped sharply between 2001 and 2006 by 7%, to just 50% of the median. Thus, while it was found earlier that, on average (as measured by the median), earnings of tradespersons are highest in remote Australia, the disparity between the lowest earners and the median is greatest and increased over the economic boom.

Table 8 Total tradespersons percentiles share of the median income by region

	Per cent 20/50				Per cent 80/50			
	1991	1996	2001	2006	1991	1996	2001	2006
Capital cities	66	64	64	58	137	142	149	157
Other metropolitan	64	63	63	58	139	142	150	157
Coastal	62	61	60	57	137	145	152	167
Inland	62	62	62	59	139	145	153	163
Remote	57	58	57	50	165	185	185	186
Australia	64	63	63	58	138	144	142	160

Source: Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

With the exception of remote regions, the ratio of the 80th percentile to median income has grown over time, with the greatest increase occurring between 2001 and 2006. Although remote regions have the highest median income and the highest 80th percentile relative to median weekly income (26.5% more than the national average in 2006), there was no significant rise between 2001 and 2006.

For all of the states and territories the 20th percentile relative to median earnings has exhibited a general downward shift over the 15-year period, with a pronounced fall between 2001 and 2006. While the 20th percentile relative to the median in most states was reasonably consistent (between 58% and 60% in 2006), Western Australia was notably less at 55% in 2006—down significantly from 2001. The 80th percentile relative to the median has increased over time in every state and territory, was highest in Western Australia in 2006, and was lowest in the Northern Territory.

Table 9 Total tradespersons percentiles share of the median income by state and territory

	Per cent 20/50				Per cent 80/50			
	1991	1996	2001	2006	1991	1996	2001	2006
NSW	64	63	62	58	139	143	152	159
Vic.	64	63	62	58	137	143	153	159
Qld	64	64	64	58	137	142	151	159
SA	64	64	64	60	134	140	146	154
WA	64	62	61	55	143	153	157	166
Tas.	62	62	61	59	135	142	143	153
NT	63	66	66	59	139	144	139	147
ACT	65	62	61	58	135	140	145	153
Australia	64	63	63	58	138	144	142	160

Source: Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

The data indicate that dispersion in earnings of tradespersons is not great between regions, states and territories, with the exception of remote Australia. However, dispersion has increased with regard to both the lowest and the highest earners. Remote regions are the worst and best places to be for tradespersons, depending on which earnings group they belong to. Also, the disparity between the lowest and highest earners increased between 2001 and 2006, due mostly to the deteriorating relative position of the lowest earners.

In summary, there has been considerable widening of the earnings distribution between the best- and worst-paid tradespersons. This suggests that there is considerable price (wage) adjustment in the labour market, which is not evident in considering aggregate measures such as medians.

The role of migration

Internal and external migration has typically played an important part in labour market adjustment in Australia (Garnett & Lewis 2007; Hugo 2006). Earlier, it was observed that in 2006 the net inflow of new migrants to Australia was 134 600, up 23% from 2003. In order to gauge the importance of tradespersons from overseas, a simple exercise is carried out here. In the 2001 and 2006 censuses, questions were asked about the usual place of residence in the census year and five years earlier. Table 10 shows the percentage of tradespersons and other employees in different states and regions who were overseas five years previously.

Table 10 Workers in Australia who were overseas five years previously as a percentage of all workers

	Tradespersons		All other employed		Total employed	
	2001	2006	2001	2006	2001	2006
Capital cities	3.4	4.2	4.8	5.9	4.7	5.7
Other metropolitan	2.3	3.0	3.2	3.6	3.1	3.5
Coastal	1.0	1.8	1.4	2.0	1.3	2.0
Inland	0.8	1.4	1.1	1.7	1.1	1.6
Remote	2.3	3.4	2.3	3.2	2.3	3.2

NSW	3.1	3.0	4.8	5.1	4.6	4.9
Vic.	2.2	2.9	3.5	4.7	3.3	4.5
Qld	2.8	3.9	3.6	4.7	3.5	4.6
SA	1.6	2.8	1.9	3.0	1.8	3.0
WA	3.6	5.3	4.3	5.6	4.2	5.6
Tas.	0.6	1.0	1.3	1.9	1.2	1.8
NT	2.7	3.0	3.5	4.2	3.3	4.0
ACT	1.6	2.4	3.9	4.7	3.7	4.5

Australia	2.7	3.4	3.9	4.7	3.7	4.6

Source: Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

There has been a small but significant increase in the percentage of all employed persons in Australia who arrived recently from overseas. This increase in recently arrived workers is true for every state, territory and region of Australia, for the period 2001–06. Recently arrived workers have the highest representation in capital cities, other metropolitan and remote regions, where they accounted for 5.7%, 3.5% and 3.2%, respectively, in 2006. However, they only accounted for 1.6% for inland regions and 2% for coastal regions, respectively, in 2006. Some of the states and territories also have a significantly higher representation. The most significant of these are Western Australia, New South Wales and Queensland, where overseas workers constitute 5.6%, 4.9% and 4.6% respectively of all employed persons in these states in 2006—all above the national average. Thus, migrants are mostly drawn to the large cities and the high-growth states of Western Australia and Queensland.

Recently arrived workers make up a higher percentage of all other employed persons in the Australian workforce than they do of tradespersons. The most significant percentages are found in Western Australia and New South Wales, recorded at 5.6% and 5.1%, respectively. In terms of regions, the most notable figure is in the capital cities, where in 2006, 5.9% of all other employed persons were recently arrived workers.

Recently arrived tradespersons are of greatest importance in Western Australia and Queensland, accounting for 5.3% and 3.9% of employed tradespersons respectively in 2006, above the national average of 3.4%. Recently arrived tradespersons are observed as a higher percentage of the total number of workers in capital cities than in remote regions, accounting for 4.2% and 3.4%, respectively.

All other regions were below the national average in 2006. In summary, migrants have made a somewhat smaller contribution to the tradespersons' labour market than they have for the workforce as a whole. They have been of greatest importance in the high-growth state of Western Australia but also in the relatively low-growth state of New South Wales. Although they have made their most important contribution in the major cities, they have also been important in providing labour to the remote regions of Australia.

The percentage of all employed tradespersons who were recently from overseas grew over the 2001–06 period in all states except New South Wales and grew most significantly in Western Australia, South Australia and Queensland, with growth estimated at 1.7%, 1.2% and 1.1%, respectively. Regionally, similar growth was also observed in all regions, but most notable in remote areas, with an increase in the ratio of recently arrived tradespersons of just over 1% over the period. Likewise, there was consistent growth in the percentage of recently arrived workers in the category of all other employed for both states and territories and the regions of Australia over the 2001–06 period. The most notable growth occurred in Western Australia, South Australia, Victoria and Queensland, in which increases of 1.3%, 1.1%, 1.2% and 1.1% respectively were observed. While all regions recorded a similar increase, only in capital cities and remote regions were the growth rates larger than the national average at 1.1% and 0.9%, respectively.

Table 11 Recently arrived tradespersons as a percentage of all tradespersons by type, region and state, 2001 and 2006

	Mechanical		Automotive		Electrical		Construction		Food	
	2001	2006	2001	2006	2001	2006	2001	2006	2001	2006
Capital cities	3.6	4.9	2.6	3.1	3.4	4.2	3.6	3.6	5.2	7.8
Other metro	1.7	2.5	2.3	2.8	1.9	3.0	2.1	3.2	2.9	4.2
Coastal	1.1	2.1	0.7	1.3	0.9	1.8	0.9	1.6	1.3	2.4
Inland	0.9	1.8	0.4	0.8	0.6	1.4	0.5	1.2	1.1	2.6
Remote	2.4	4.6	1.6	3.5	2.5	3.1	1.5	2.4	1.7	3.6
Australia	2.6	3.7	2.0	2.5	2.6	3.4	2.8	3.0	3.6	5.7
NSW	2.4	2.7	2.0	1.9	3.0	2.8	3.7	2.8	4.4	6.2
Vic.	2.3	3.4	1.6	2.0	1.9	2.6	2.1	2.3	3.5	6.5
Qld	2.8	4.0	2.6	3.4	2.8	4.4	2.5	3.7	3.4	5.2
SA	2.0	3.1	1.2	2.2	1.8	3.8	1.7	2.4	1.8	3.8
WA	4.1	6.8	2.7	4.3	3.9	5.5	3.3	5.2	4.5	6.6
Tas.	0.5	0.8	0.5	0.5	0.7	1.5	0.4	1.0	1.0	1.3
NT	2.7	4.1	2.1	3.2	3.2	3.3	2.0	3.7	3.4	3.6
ACT	1.5	2.1	2.0	2.3	1.4	2.3	1.7	1.6	2.5	4.9

Source: Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

There was significant variation in the percentage of recently arrived workers represented in each tradesperson sub-group for 2001–06 (table 11).

Capital cities had significantly higher percentages of recently arrived workers compared with the national average for trade occupations. The proportion of recently arrived workers in the mechanical tradespersons sub-group increased 1.3 percentage points to 4.9% in 2006; the proportion of electrical and electronics tradespersons increased 0.8 percentage points to 4.2% in 2006; and the proportion of food tradespersons increased 2.6 percentage points to 7.8% in 2006. Remote regions had a significantly higher percentage of recently arrived workers in the trade occupations. However, only mechanical tradespersons observed an increase over the period from 2.4% in 2001, which was actually below the national average at that time, to 4.6% in 2006, significantly above the national average for 2006. Of the states and territories, Western Australia had consistently higher percentages of recently arrived workers in the different trade sub-groups and all of them recorded an increase in the percentage of recently arrived workers during the period 2001–06.

Western Australia appears to have higher-than-average percentages of its workforce recently arriving from overseas and has received particular attention because of anecdotal evidence focused on its particular importance for the mining boom.

In Western Australia, the proportion of recently arrived workers in the tradespersons and related workers sub-group increased by 1.9% to 6% in 2006; mechanical tradespersons observed a remarkable increase over the period, up 2.7% to 6.8% in 2006. Although the percentage of recently arrived workers was low in 2001 for automotive tradespersons, the percentage increased significantly to 4.3% in 2006; the proportion of recently arrived workers in the electrical and electronic sub-group rose 1.6% to 5.5% in 2006; the percentage of overseas tradespersons in construction was unremarkable in 2001, but observed a significant increase over the period of 1.9% to 5.2% in 2006; and lastly the proportion of tradespersons in the food sub-group rose dramatically—up 2.1% over the period to 6.6% in 2006.

A more detailed examination of the dispersion of recently arrived workers in the state reveals further important patterns (table 12).

Table 12 Recently arrived workers from overseas as a percentage of the total, Western Australia

	Perth		Coastal		Inland		Remote		Australia	
	2001	2006	2001	2006	2001	2006	2001	2006	2001	2006
Related workers nfd	4.6	6.3	1.6	3.0	0.0	3.9	5.3	5.8	3.0	3.9
Mechanical	5.0	7.6	2.0	4.8	1.1	3.1	3.3	6.5	2.6	3.7
Automotive	3.2	4.7	1.0	3.0	0.4	1.4	2.0	4.9	2.0	2.5
Electrical	4.5	6.3	1.6	2.4	1.8	2.6	3.2	4.5	2.6	3.4
Construction	3.9	5.8	1.5	3.3	0.4	1.6	1.5	4.2	2.8	3.0
Food	5.4	6.3	2.7	6.7	2.5	8.3	2.6	7.7	3.6	5.7
Agricultural	2.7	3.7	1.9	3.0	3.1	1.8	2.9	2.7	1.8	2.2
Other tradespersons	4.0	5.0	1.2	2.6	1.5	1.5	4.1	4.7	2.9	3.3
Total trades	4.2	5.9	1.7	3.6	1.5	2.8	3.0	5.2	2.7	3.4
All other employed	5.0	6.4	2.0	3.0	1.6	2.1	3.2	4.4	3.9	4.7

Source: Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

Significantly larger proportions of migrant workers have chosen to locate themselves either in Perth or remote regions, and in some instances the growth over the period 2001–06 has been quite dramatic. For example, mechanical tradespersons recorded a 2.6% increase in recently arrived workers to 7.6% in 2006. Similarly, recently arrived workers in remote regions went from 3.3% to 6.5% of the workforce over the period. The percentage of recently arrived workers in the automotive sub-group in Perth went from 3.2% in 2001 to 4.7% in 2006 and in remote regions was up nearly 3%. For electrical tradespersons in Perth the increase was 1.8% over the period to 6.3%

in 2006. Likewise, the proportion of recently arrived workers in remote regions also increased to 4.5%, up 1.3% over the period.

The construction trade workforce also saw a quite dramatic increase in the percentage of recently arrived workers, increasing in 2006 by 1.9% to 5.8% in Perth and by 2.7% to 4.2% in remote regions of Western Australia.

The food trade workforce experienced the most remarkable increase in the percentage of recently arrived workers of any of the trades, observed across all regions of Western Australia. In inland Western Australia, the proportion of recently arrived food workers increased from 2.5% in 2001 to 8.3% in 2006, up 5.8%. Similarly, the proportion of recently arrived food workers in remote Western Australia increased to 7.7% in 2006, up 5.1% over the period. The proportion of recently arrived food workers in coastal Western Australia rose 4% to 6.7% in 2006, and Perth, while not quite so dramatic, still increased its percentage of the food trade workforce recently arrived from overseas by 0.9% to 6.3% in 2006.

In summary, migrants played a very important role in facilitating the economic development of urban Western Australia and in the mining boom in remote Western Australia.

Internal mobility

There is anecdotal, but largely unsubstantiated evidence of internal mobility of tradespersons. This could range from commuting between regions on a regular basis to the more extreme fly-in and fly-out patterns often associated with remote mining regions. This issue is examined in table 13. It should be read as follows: the cells are the percentage of those who work in a region by their place of residence. As examples, of all the people who work in capital cities, 95.5% live in capital cities and of those who work in coastal regions 3.1% live in inland regions.

Table 13 Place of work by place of usual residence, percentage of the total tradespersons' workforce, 2006

Place of residence	Place of work				
	Capital cities	Other metropolitan	Coastal	Inland	Remote
Capital cities	95.5	4.0	3.3	2.7	7.9
Other metropolitan	1.5	88.9	3.0	1.5	1.6
Coastal	1.2	5.5	89.9	3.3	3.9
Inland	1.5	1.1	3.1	91.8	3.2
Remote	0.3	0.5	0.7	0.7	83.5

Source: Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

Table 13 reveals that there is little dramatic inter-regional travelling for tradespersons between where they live and where they work. The most notable is for tradespersons who work in remote regions, where 7.9% live in capital cities and 3.9% live in coastal regions in 2006. Other metropolitan regions also have significant inflows of tradespersons; an estimated 5.5% of their tradespersons workforce lives in coastal regions and as many as 4% are from capital cities.

Tradespersons who work in capital cities mainly live in capital cities, with fewer than 2% of workers living in each of other metropolitan, coastal and inland areas and just 0.3% living in remote areas.

While tradespersons living in other regions only represent a small percentage of all the tradespersons working in capital cities, they represent a much larger percentage of the tradespersons' workforce from their place of residence. For example, there are 7804 tradespersons living in other metropolitan areas and working in capital cities; this represents 6.7% of the other metropolitan tradespersons' workforce as opposed to just 1.5% of the capital cities tradespersons'

workforce. Therefore, capital cities provide an important source of demand for tradespersons living outside capital cities.

The equivalent table for the states and territories (not shown here) has one interesting feature: 13.7% of tradespersons working in the Australian Capital Territory are from New South Wales, some 1858 tradespersons. There is also a significant number of other employed persons from New South Wales working in the Australian Capital Territory, some 19 579 workers, or 11.3% of all the other employed persons workforce.

In the special case of Western Australia, where mining activity is centred in remote areas (although most employment in the mining industry is in Perth), there have been a significant number of tradespersons travelling from Perth to remote Western Australia for work (table 14).

In 2001 the percentage of Western Australian tradespersons working in remote regions who lived in capital cities was 9.5% or 1149 tradespersons. In 2006 this increased to 11.2% or 1494 tradespersons. Tradespersons working in remote Western Australia and living elsewhere in Australia other than Western Australia accounted for only 3.1% in 2001 and had dropped by 2006 to just 2.1%. In 2001, 1163 or 18.6% of the tradespersons working in inland regions lived in capital cities.

Table 14 Place of work by place of usual residence, percentage of the total tradespersons workforce, Western Australia

Place of residence	Place of work							
	Perth		Coastal		Inland		Remote	
	2001	2006	2001	2006	2001	2006	2001	2006
Perth	96.6	96.1	6.1	7.1	18.6	5.2	9.5	11.2
Coastal	1.3	1.5	86.6	85.8	10.9	12.6	2.0	2.1
Inland	0.5	0.6	5.5	5.1	66.8	78.7	1.5	1.4
Remote	1.0	1.0	1.4	1.5	3.3	3.0	83.9	83.1
Elsewhere	0.6	0.8	0.4	0.5	0.5	0.5	3.1	2.1

Source: Census of Population and Housing 1991, 1996, 2001, 2006 (unpublished).

This decreased substantially to just 275 tradespersons working in inland Western Australia and living in Perth in 2006. This substantially increased the percentage of tradespersons who work and live in inland Western Australia, as there was a significant decrease in the number of tradespersons working in inland Western Australia between 2001 and 2006, a reduction of some 961 trade jobs.

Many tradespersons travel from coastal regions of Western Australia to work in inland regions, accounting for an estimated 667 tradespersons or 12.6% of the inland tradespersons' workforce in 2006. This is a smaller number of tradespersons from coastal regions with jobs in inland Western Australia than in 2001, but represents a higher proportion of the workforce because of the decline in the size of the tradespersons' workforce in that region. Coastal regions also had a significant percentage of their locally employed tradespersons living in Perth and inland Western Australia, 7.1% and 5.1%, respectively.

Conclusion

The major factors determining the demand for tradespersons appear to be the business cycle, population movements and structural change in the Australian economy. The recent prolonged economic boom was marked by significant growth in construction and mining and the relative decline in manufacturing employment, which was mirrored by the changing pattern of demand for tradespersons. Construction experienced noticeable excess demand for tradespersons, but mining actually employed more tradespersons than would have been expected, given their normal skill mix.

Overall, there has been little change in the relative mix of the workforce in the industries that employ most tradespersons, implying that technological change has not had a major impact on the demand for tradespersons in most sectors, with the exception of manufacturing. Given the decline in manufacturing employment, some fall in employment of tradespersons would have been expected, but the actual fall was much greater than expected. However, the cause is difficult to determine: whether in this particular sector of the economy there was significant technological change which allowed employers to shed tradespersons or whether employers were unable to retain or recruit tradesperson in a tight labour market is unknown.

From a structural perspective, there has been a relative decline in manufacturing and an increase in the services and construction sectors in Australia. This has obvious implications for the demand for tradespersons, apprenticeship training and migration. Training issues relate to long-term growth and technological/structural change in the economy. There are no signs that these trends will not continue and they have implications for training. This report has identified structural change as a major determinant of demand for tradespersons. In addition, there appears to have been significant technological change in manufacturing, resulting in reduced demand for tradespersons. For some tradespersons their earnings do not yield returns to justify investment in long periods of trade training—food tradespersons and agricultural tradespersons. A large number of fully qualified tradespersons in these trades are lowly paid and this could explain the low percentage of people fully qualified. The growing number of unqualified tradespersons during a time of economic demand also raises questions about the role of training in upskilling the workforce.

Generally, the labour market for tradespersons seems to be fairly efficient, with no severe shortage in any of the states or larger regions. There was, however, noticeably higher wages and significantly higher growth in wages in remote regions, particularly in Western Australia and the Northern Territory, which employers may consider represents a shortage, as it may indicate that employers have to pay more to get the labour they require. However, from an economic perspective, rises in wages in a period of high demand is evidence of economic efficiency. Wages have played an important role in bringing supply and demand into balance.

Given the mobility of skilled labour, both internally and from overseas, there is no apparent need to locate training regionally according to demand. The movement of tradespersons from overseas seems to be an important part of efficient adjustment in the labour market. This has clear implications for migration policy.

Adjustment of the total quantity of labour is difficult in occupations requiring significant formal and on-the-job training. However, firms can, and do, use a variety of adjustment mechanisms to maintain output during skill shortages. Where the changes in demand differ between cities, regions and industries, however, adjustment of tradespersons should take place in an efficient market, and

this report has shown that, during the recent boom, significant adjustment did take place. Price adjustment is also an important feature of efficient labour markets, and the earnings data presented in this report emphasise the crucial role earnings played in facilitating quantity adjustment in the market for tradespersons.

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