

SEEK LABOUR MARKET MISMATCH INDICATOR

April 2024

*Analysis of labour market supply and demand
using SEEK job ad and application data.*

Contents

1.	Executive summary	2
2.	Labour market mismatch.....	3
	About the SEEK Labour Market Mismatch Indicator	3
3.	National-level mismatch.....	3
	Excess supply and demand by occupations.....	5
	Opportunities to move.....	8
4.	State and territory mismatch	10
	State-level mismatch in Australia.....	10
5.	State and territory overviews.....	11
	New South Wales.....	11
	Victoria	12
	Queensland	13
	Western Australia	14
	South Australia.....	15
	Tasmania.....	16
	Australian Capital Territory.....	17
	Northern Territory	18
6.	Regional labour market mismatch.....	18
7.	Regional analysis – exemplar regions	22
	Greater Sydney (NSW).....	28
	Toowoomba (QLD)	29
	Bunbury (WA)	32
8.	Appendix A: Constructing the SEEK Labour Market Mismatch Indicator.....	34
	Constructing the mismatch indicator	36
	Definitions and data	37
	Labour demand	38
	Labour supply	38
	Regions	39
	Occupations.....	40
	Smoothing and aggregating.....	40
9.	Appendix B: Translating SEEK data to ANZSCO	41
10.	References	43
	ABOUT SEEK.....	45

1. Executive summary

There is a large and growing gap between the types of jobs employers are trying to fill and the roles jobseekers are applying for. This gap is measured by the SEEK Labour Market Mismatch Indicator (LMMI), using extensive data on job advertisements and applications from Australia's leading employment marketplace. The SEEK LMMI shows that 31.7% of job applications would need to be redirected to other occupations to achieve a balanced labour market — the greatest level of mismatch since the data series started in 2016.

Some occupations, such as Registered Nurses, have substantial excess demand. Registered Nurses are in short supply in every part of Australia. In December 2023, 3.15% of all ads on SEEK in Australia were for Registered Nurses, while the occupation represented only 0.97% of applications. This gap — around 2.2 percentage points — is the largest of any occupation.

While Registered Nurses are in short supply everywhere, some occupations are in short supply in one part of the country but have excess supply in others. For example, the data indicates that Aged and Disabled Carers are in excess supply in Greater Adelaide, but in shortage in Outback South Australia. Similarly, Greater Melbourne has an excess supply of Packers, while Ballarat has excess demand for this occupation. Some shortages and mismatch could be alleviated through increased geographic mobility of workers within Australia.

Mismatch between supply and demand is particularly acute in parts of Tasmania, regional Victoria, and South Australia. Three of the four regions with the highest mismatch are in Tasmania.

Mismatch in the labour market is an important topic. This analysis is a new diagnostic tool that highlights areas — geographic and occupations — that may warrant further investigation by policy makers, consideration by employers and understanding by jobseekers. Where it identifies occupations that have substantial excess demand, a policy response in areas such as education and training policy, and migration policy may be required to address these labour shortages. Policies that reduce barriers to labour mobility within Australia could help alleviate mismatch in some occupations where labour demand is spread unevenly across the country. Employers facing difficult recruiting in particular regions will also benefit from this information, as it may point to alternate regions or adjacent occupations that could help fill shortages. Jobseekers can benefit from understanding which occupations are under-supplied in their region, which can help them make better-informed career decisions.

2. Labour market mismatch

The Australian labour market is a large and complex system for matching people to jobs. On the supply side of the market, there are around 14.9 million people who are either in work or actively seeking work, of whom 14.4 million have a job, some of them multiple jobs. On the demand side, there are 15.5 million filled jobs and a further 418,366 vacant jobs, as at September 2023.¹

The range of skills and experience needed to do each job varies greatly, as do the skills and experience possessed by people looking for work. The difference between jobseekers' skills and experience and employers' requirements is known as 'labour market mismatch', which is a key factor in the functioning of the labour market. A healthy labour market is one in which the level of employment is high, but also one in which people are well-sorted into jobs that make best use of their talents and training.

SEEK, as Australia's number one employment marketplace, has extensive data that can be used to measure the extent of mismatch in the labour market. This data comes from both sides of the market: both labour demand, and labour supply, can be measured at granular levels of detail.

About the SEEK Labour Market Mismatch Indicator

The SEEK Labour Market Mismatch Indicator (LMMI) measures the difference between the occupations that are in most demand from employers, and the occupations to which jobseekers are submitting the most applications. It measures mismatch across occupations within regions.

If labour supply and demand are well-matched within a region, each occupation's share of demand will be equal to its share of supply. We measure demand using job advertisements, and supply using job applications. A well-matched market would feature the same ratio of applications to ads for each occupation. If, on the other hand, there is a mismatch, the ratio of applications to ads will vary across occupations. The SEEK LMMI measures the extent to which regions (or states, or all of Australia) deviates from this ideal. The calculation of the indicator is explained in detail in the appendix.

The SEEK LMMI takes a value from zero to 100%. A value of zero indicates that labour supply and demand within a region are perfectly balanced across occupations. The higher the value, the greater the difference in the pattern between supply and demand. A positive figure demonstrates an excess in supply, whereas a negative percentage highlights an excess in demand.

3. National-level mismatch

The national-level SEEK LMMI is 31.7% as at December 2023. This means that 31.7% of all job applications on SEEK would need to change to different occupations in order to equalise the applications-per-ad ratio across occupations.²

The national-level mismatch indicator is now above pre-COVID levels, as shown in Figure 1. There is a greater difference between the occupations that are in most demand from employers, and the

¹ Australian Bureau of Statistics (2023)

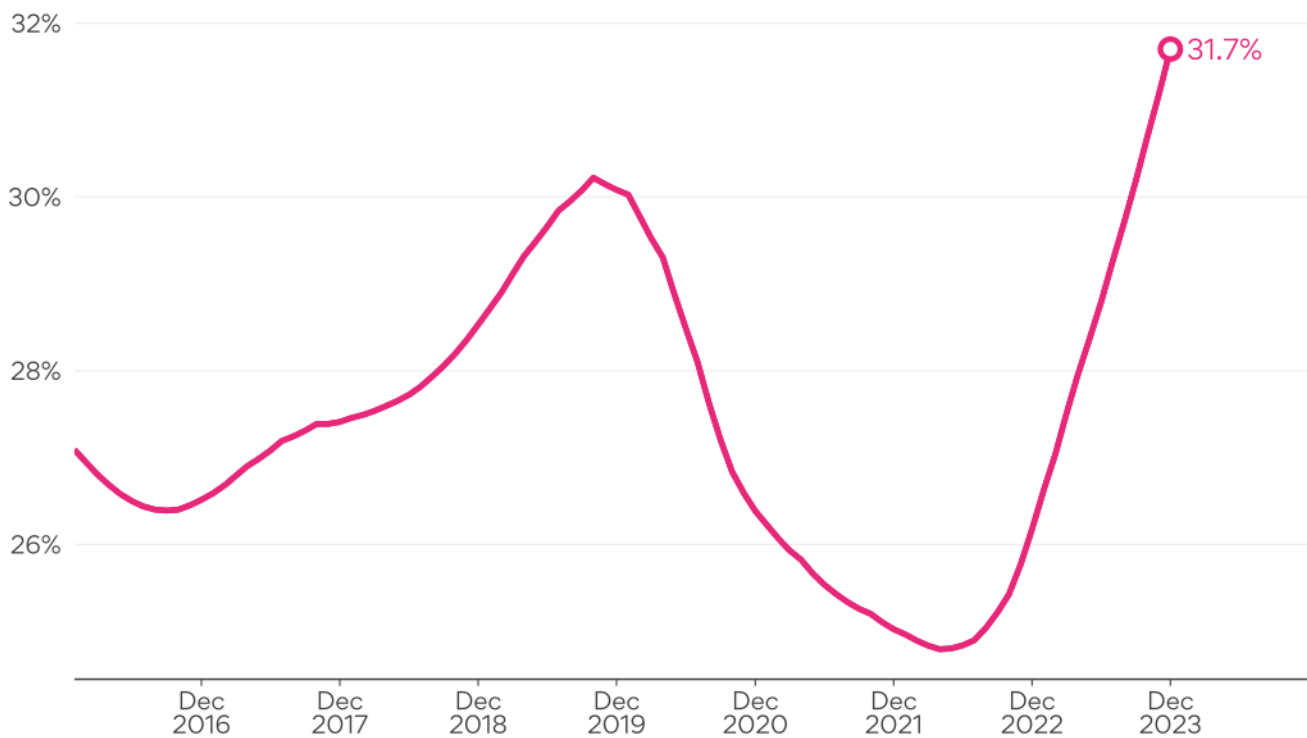
² Note that the national-level and state-level mismatch indicators are weighted averages of the regional mismatch indicators, weighted by the number of job advertisements in each region in each month.

occupations to which jobseekers are applying, than at any point in this data, which begins in January 2016.

Some level of mismatch is inevitable in a large labour market like Australia's. But *rising* mismatch is not inevitable and suggests that the pattern of supply and demand are becoming less similar over time.

Figure 1: Labour market mismatch is now above pre-COVID levels

SEEK Labour Market Mismatch Indicator, Australia



Note: trend estimate.
Source: SEEK.

In general, the SEEK LMMI rises when the labour market is loosening, with less demand relative to supply, and falls when the market is tight.³ The LMMI was at low levels in late 2021 and early 2022, when ad volumes were high, unemployment fell sharply, and the average number of applications per job ad was at low levels. Since then, labour demand has cooled, applications-per-ad has risen, and the mismatch indicator has also risen above where it was in 2019. This indicates that as the market has cooled, not only has the average number of applications-per-ad risen, but the distribution of those applications across different occupations has become less uniform. The cooling market does not affect all occupations and types of jobseeker equally.

³ This is true even though the LMMI does not directly measure labour market tightness; it instead reflects the dispersion of tightness across different occupations.

Excess supply and demand by occupations

There are eight broad occupational groups.⁴ At the national level:

- Three occupational groups (Professionals; Technicians and Trades Workers; and Managers) have persistent excess demand;
- One occupational group – Community and Personal Service Workers – has generally had excess supply, except during the acute phase of the COVID pandemic when it was approximately in balance; and,
- The remaining four occupational groups (Clerical and Administrative Workers; Sales Workers; Labourers; and Machinery Operators and Drivers) have all had excess supply over the whole period since January 2016 when this data series begins.

Note that some individual occupations within these broad groups have experienced periods of strong labour demand, and in some cases excess demand, even if the broad groups overall have remained in excess supply. For example, some occupations within the Community and Personal Service Workers group have experienced strong demand; see the subsequent section for analysis at the detailed occupational level.

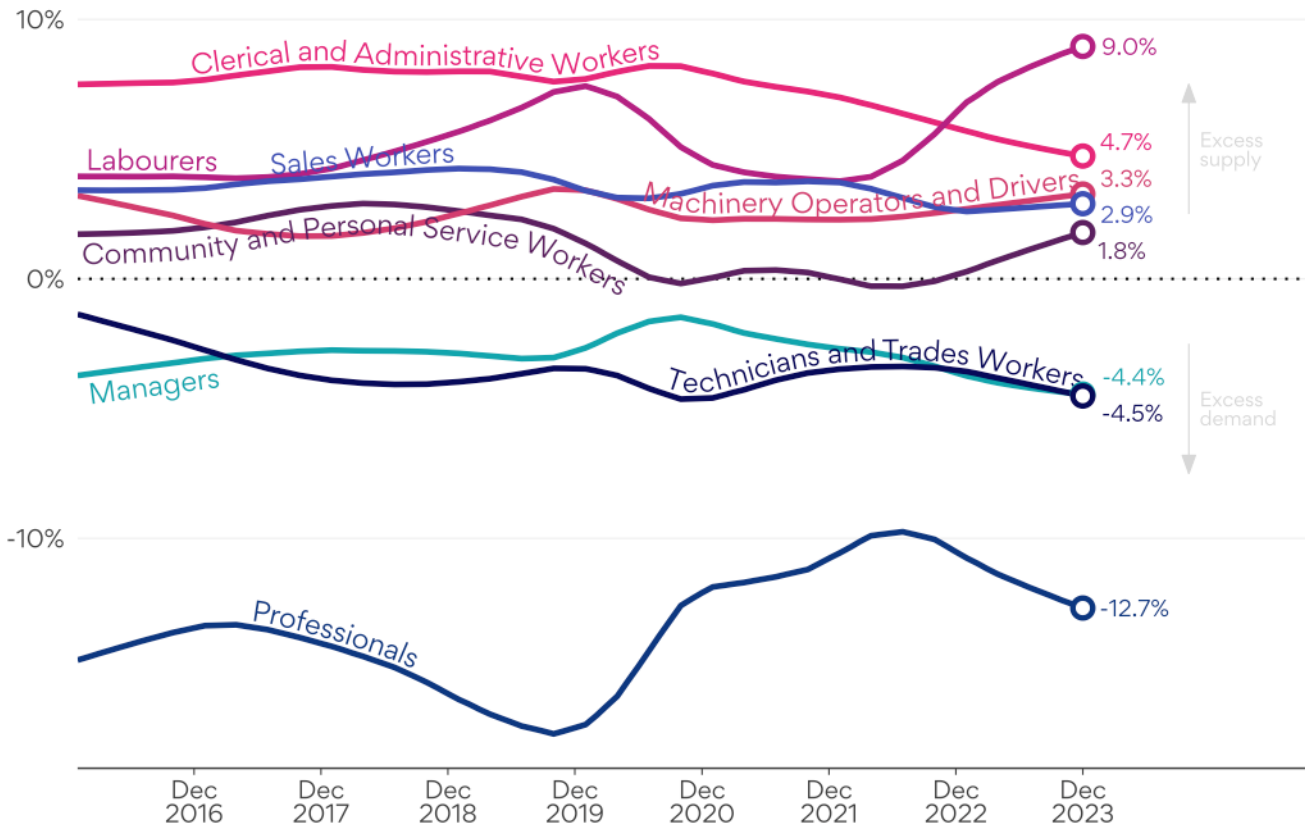
In general, occupational groups that require higher levels of education and training are more likely to be in excess demand. Occupational groups that are growing as a share of total employment, like Professionals and Managers, are also more likely to be in shortage.

Figure 2 shows the excess supply (or for those below zero, excess demand) for each broad occupational group. In 2023, there was a sharp rise in excess supply for Labourers, rising from 6.4% in December 2022 to 9.0% in December 2023. Over the same period, there was a more modest rise in the excess supply of Community and Personal Service workers, while the excess demand for Professionals grew.

⁴ Our excess supply and mismatch analysis is at the detailed (four-digit) ANZSCO level, but this can be aggregated up to the broad, one-digit ANZSCO level.

Figure 2: Labourers have the largest excess supply

Excess supply by broad occupational group



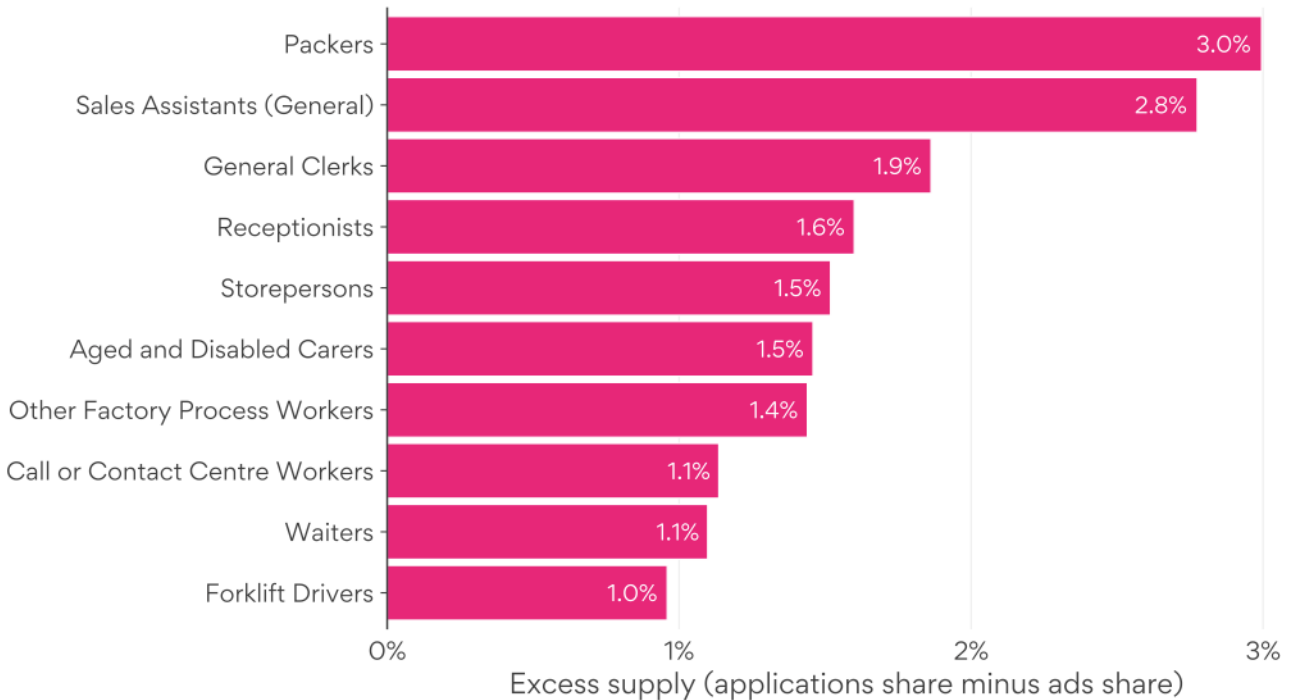
Note: trend estimate.
Source: SEEK.

Figure 2 (above) shows the excess supply/demand by broad occupational group; the charts below examine this for each of the 361 detailed occupations included in the analysis.

Figure 3 shows the ten granular occupations with the largest excess supply as at December 2023. The occupations with the largest excess supply are Packers; Sales Assistants (General); and General Clerks. Of the broad occupational groups, Labourers have the biggest over-supply (see above); this is reflected in the fact that Packers, which are a subset of Labourers, top the over-supply list for detailed occupations. But eight of the 10 most over-supplied occupations are not part of the Labourers group.

Figure 3: Occupations with the largest excess supply at the national level

Difference between share of total applications and share of total ads, national level, as at December 2023



Note: trend estimate.
Source: SEEK.

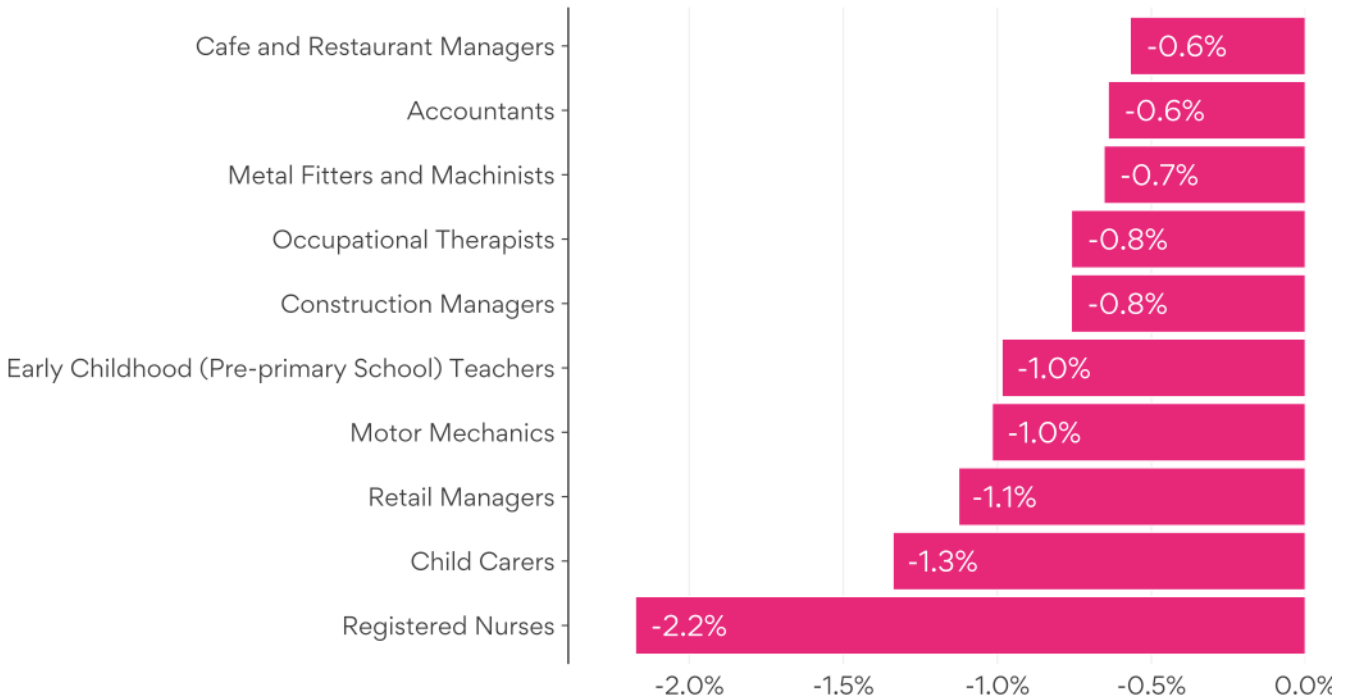
The occupations with the biggest excess supply across Australia (Figure 3) are generally ones that do not require extensive post-school occupations. The occupations with the biggest excess supply are generally those that are easier to enter, and where the supply of workers is less constrained by the availability of training places. These occupations are also more likely to be affected by cyclical factors, such as a rise in overall unemployment, which can lead to large swings in the demand for and/or supply of workers in these industries. There are more ‘potential applicants’ for roles that require lower levels of educational attainment, compared to more specialised roles that require extensive training.

Aged and Disabled Carers are in the list of occupations with the greatest excess supply. This may be surprising, as many employers of people in this occupation have reported difficulty finding workers. But the market for Aged and Disabled Carers has turned around dramatically since the very tight labour market of mid-2022. Since that time, labour demand (the number of job ads) for this occupation has cooled a little, while the total number of applications has risen sharply; as a result, the average number of applications-per-ad is substantially higher than in 2022, and also above pre-COVID levels. Widespread perceptions that there is a shortage of Aged and Disabled Carers may partly reflect a lagged understanding of the supply-demand balance for this occupation.

Most occupations with the largest excess demand require some form of post-school education. Occupations from the ‘Professionals’ group dominate the list of the most under-supplied occupations, as shown in Figure 4. The most under-supplied occupations — i.e. those with the biggest excess demand — are Registered Nurses, Child Carers and Retail Managers. Registered Nurses are by far the most under-supplied occupation, with an excess demand of -2.2%. This is a consistent theme in our regional-level analysis — many regions, particularly those outside the capital cities, have a dramatic under-supply of Registered Nurses.

Figure 4: Occupations with the largest excess demand at the national level

Difference between share of total applications and share of total ads, national level, as at December 2023



Note: trend estimate.
Source: SEEK.

Opportunities to move

The demand for workers in each occupation is not evenly distributed across the country. In some regions, there is a significant excess supply of workers in certain occupations, while in others, there is a significant excess demand. This can create opportunities for workers to move to regions where their skills are in high demand, and for employers in regions with insufficient supply to attract workers from elsewhere. In some cases, it may make sense for employers to consider remote workers for these roles where it's feasible.

SEEK's data allows us to identify the occupations with the largest differences in excess supply between regions, as shown in the table below. This doesn't include occupations like Registered Nurses that are in excess demand in every region of the country, nor occupations like Housekeepers and Commercial Cleaners that are in excess supply everywhere. The table below shows only occupations that are in excess supply in some regions and in excess demand in others.

For example, there is an excess supply of Sales Assistants in Launceston and North East Tasmania, while Outback Western Australia has a shortage of people applying for these roles. Similarly, there's a surplus of Packers in Greater Melbourne, while Ballarat has a slight shortage of supply for these roles. While it may not be feasible in some cases to move across the country for work, the variation in excess supply across regions highlights the potential for workers to move to regions where their skills are in high demand. If regulations dampen this labour mobility, such as through onerous occupational licensing arrangements across jurisdictions, non-compete clauses in employment

contracts, or stamp duty on residential property, policymakers should consider whether the costs of these policies are justified by the benefits, as discussed by a range of researchers.⁵

Occupations with the largest difference in excess supply between regions

• Occupation	• Region with biggest excess supply	• Region with biggest excess demand
• Drillers, Miners and Shot Firers	• South Australia - Outback (SA)	• Capital Region (NSW)
• Sales Assistants (General)	• Launceston and North East (TAS)	• Western Australia - Outback (WA)
• Food and Drink Factory Workers	• Barossa - Yorke - Mid North (SA)	• Western Australia - Outback (WA)
• Crop Farm Workers	• Barossa - Yorke - Mid North (SA)	• Northern Territory - Outback (NT)
• Aged and Disabled Carers	• Greater Adelaide (SA)	• South Australia - Outback (SA)
• General Clerks	• Coffs Harbour - Grafton (NSW)	• South East (TAS)
• Packers	• Greater Melbourne (VIC)	• Ballarat (VIC)
• Building and Plumbing Labourers	• Capital Region (NSW)	• Western Australia - Wheat Belt (WA)
• Plastics and Rubber Production Machine Operators	• Hume (VIC)	• South East (TAS)
• Other Mobile Plant Operators	• Western Australia - Outback (WA)	• Hume (VIC)

⁵ For example, the Productivity Commission found that stamp duty and occupational licensing can inhibit labour mobility ([Productivity Commission 2014](#)). The Employment White Paper ([The Treasury 2023, 189](#)) states that the Commonwealth Government is “improving cross-jurisdictional worker mobility through digitalisation of occupational licensing and improved worker screening in the care and support sector.” See recent discussion of stamp duty in Garvin et al. ([2024](#)) and Buckley ([2023](#)). Andrews and Hansell ([2021](#)) discuss the effect of declining labour mobility and reallocation in Australia on productivity growth.

4.State and territory mismatch

The mismatch in supply and demand for workers varies greatly across different regions. This section examines the labour market mismatch within individual regions in Australia, beginning with the state-level view.⁶

Each capital city is treated as its own labour market region. This is because the labour market in each capital city is relatively self-contained, with most workers living and working in the same city. Outside the capital cities, each ABS 'Statistical Area 4' (SA4) is treated as its own labour market region. The choice of regions is discussed further in [Appendix A](#).

State-level mismatch in Australia

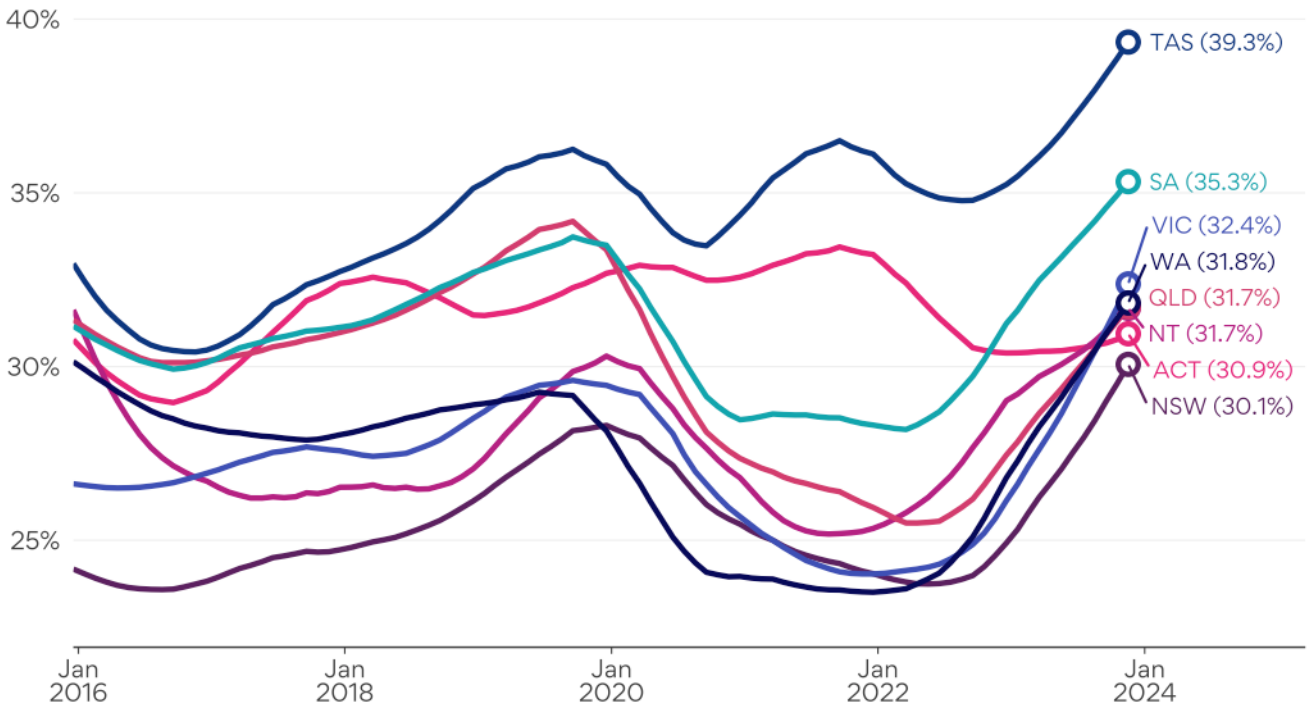
Most Australian states have a similar level of labour market mismatch, with the SEEK LMMI ranging from 30.1% in NSW to 32.4% in Victoria. South Australia and Tasmania have greater mismatch, with Tasmania's consistently higher than all other states and territories over the entire period since 2016, when this data series begins (see Figure 5).

Tasmania's SEEK LMMI is at 39.3%, meaning that nearly 40% of applications would need to be redirected to different occupations in order to bring supply and demand into balance.

⁶ Note that each state's SEEK LMMI is an average of the values for the regions within the state, weighted by the number of job advertisements per region.

Figure 5: Tasmania has the highest labour market mismatch

SEEK Labour Market Mismatch Indicator by state



Note: trend estimate.
Source: SEEK.

5. State and territory overviews

This section provides an overview of labour market mismatch at a state and territory level.

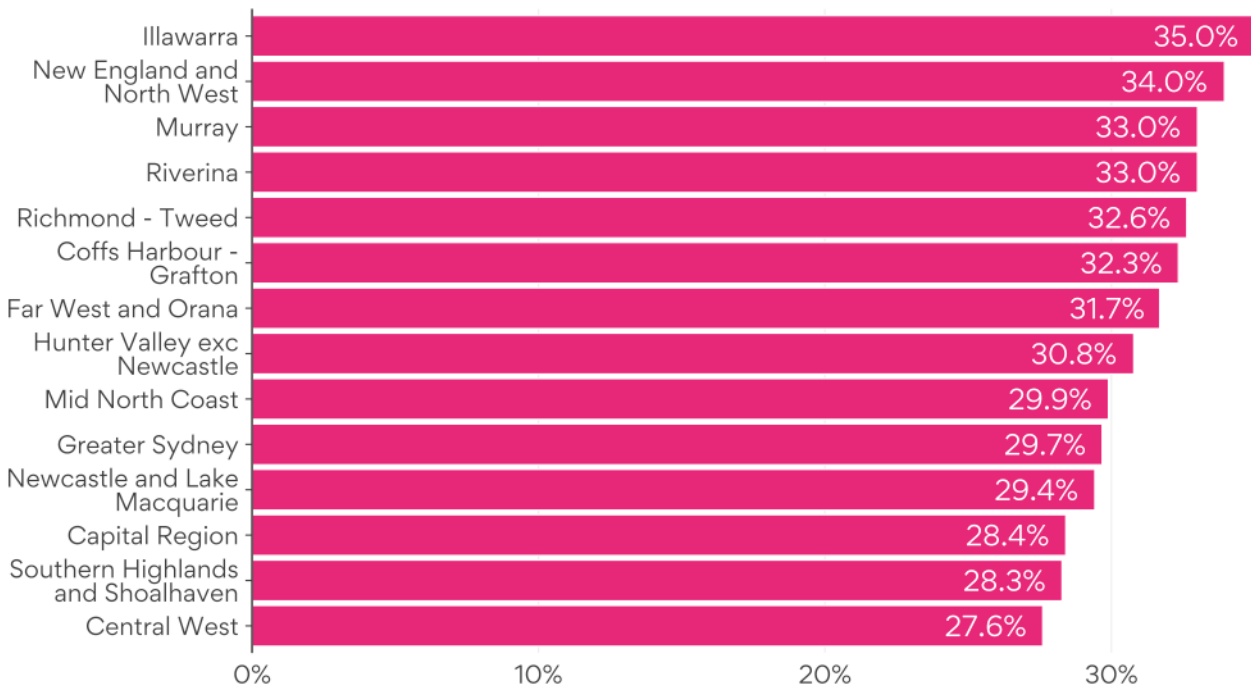
New South Wales

New South Wales has the lowest mismatch between labour supply and demand of any state. The mismatch indicator for New South Wales is 30.1%. This means that 30.1% of job applications in New South Wales would need to be redirected to other occupations in order to equalise the ratio of applications-per-ad across all occupations in New South Wales.

Within New South Wales, the SEEK LMMI ranges from 27.6% in the Central West region of the state, up to 35.0% in Illawarra.

Labour market mismatch in New South Wales

Mismatch indicator as at December 2023



Note: 12 month rolling average.
Source: SEEK.

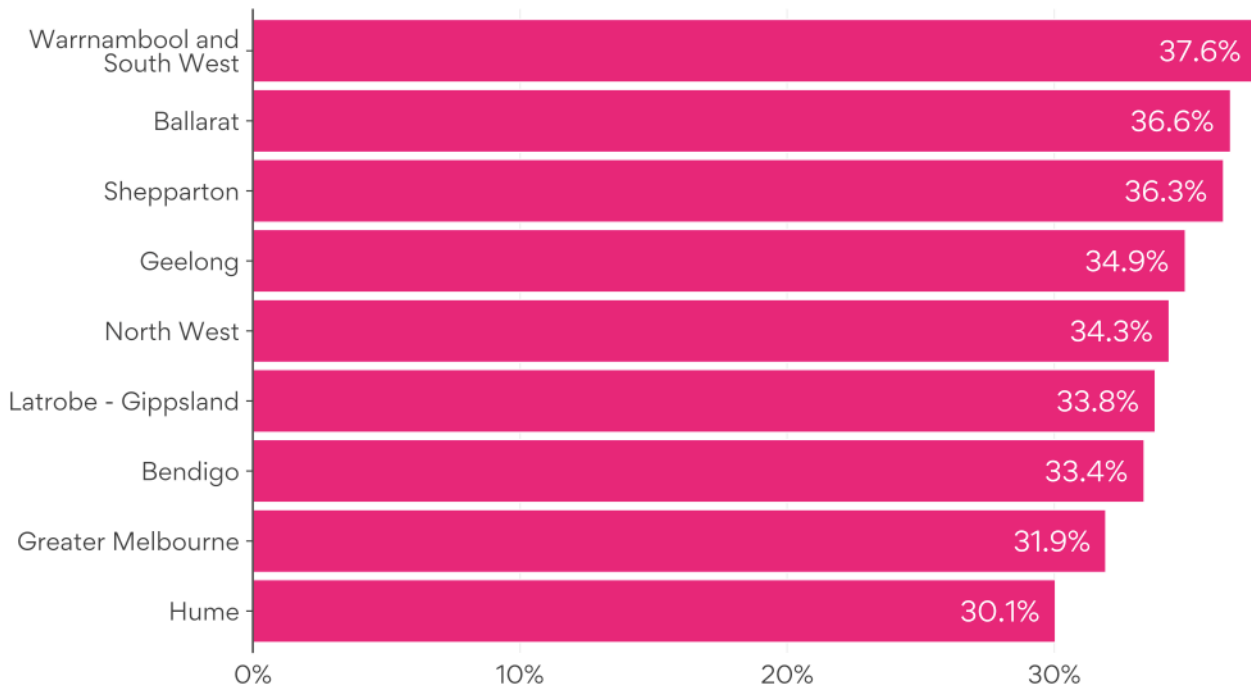
Victoria

In Victoria, the Greater Melbourne region has the second-lowest mismatch between labour supply and demand, behind Hume. In Melbourne, the mismatch indicator is 31.9%. This means that 31.9% of job applications in Melbourne would need to be redirected to other occupations in order to equalise the ratio of applications-per-ad across all occupations in Melbourne.

This compares to a high of 37.6% in Warrnambool and South West and 36.6% in Ballarat. Labour market mismatch is highest in rural and regional Victoria.

Labour market mismatch in Victoria

Mismatch indicator as at December 2023



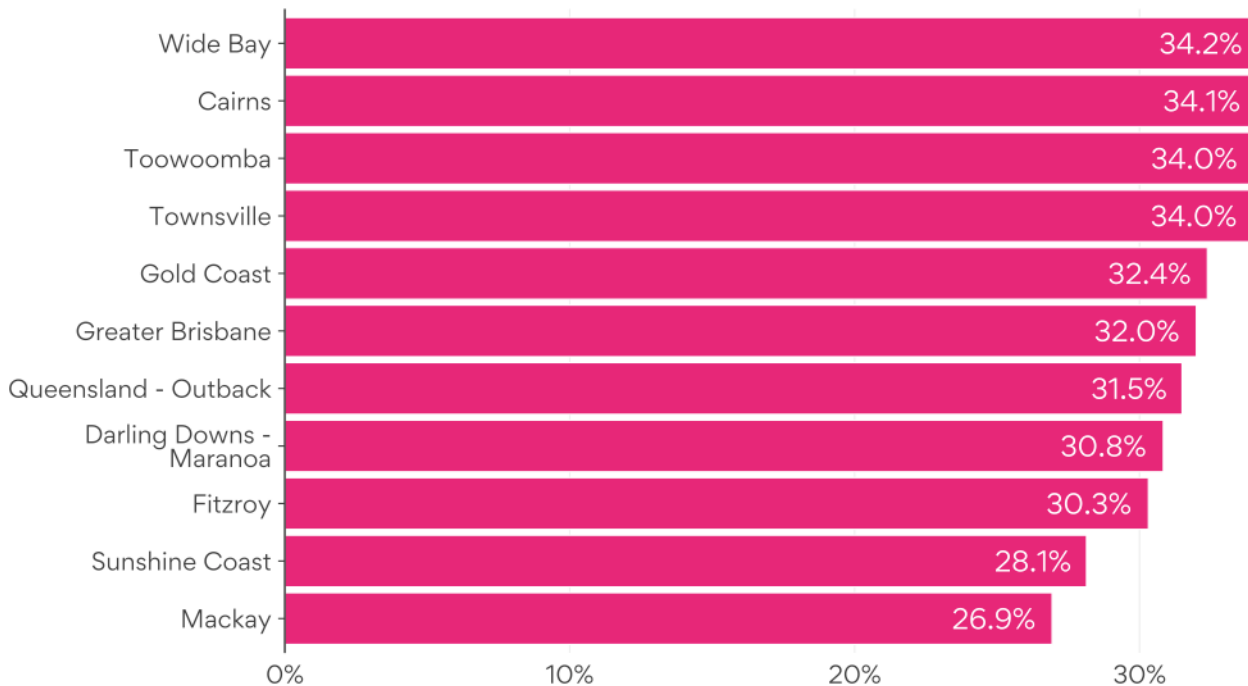
Note: 12 month rolling average.
Source: SEEK.

Queensland

Queensland's overall level of labour market mismatch is middling — lower than Tasmania and South Australia, higher than New South Wales, but around a similar level as Western Australia, Victoria, and the territories. Queensland has substantial variation in the SEEK LMMI across the regions of the state, ranging from 26.9% in Mackay to 34.2% in Wide Bay. Brisbane is in the middle of the pack, with a mismatch indicator of 32.0%.

Labour market mismatch in Queensland

Mismatch indicator as at December 2023



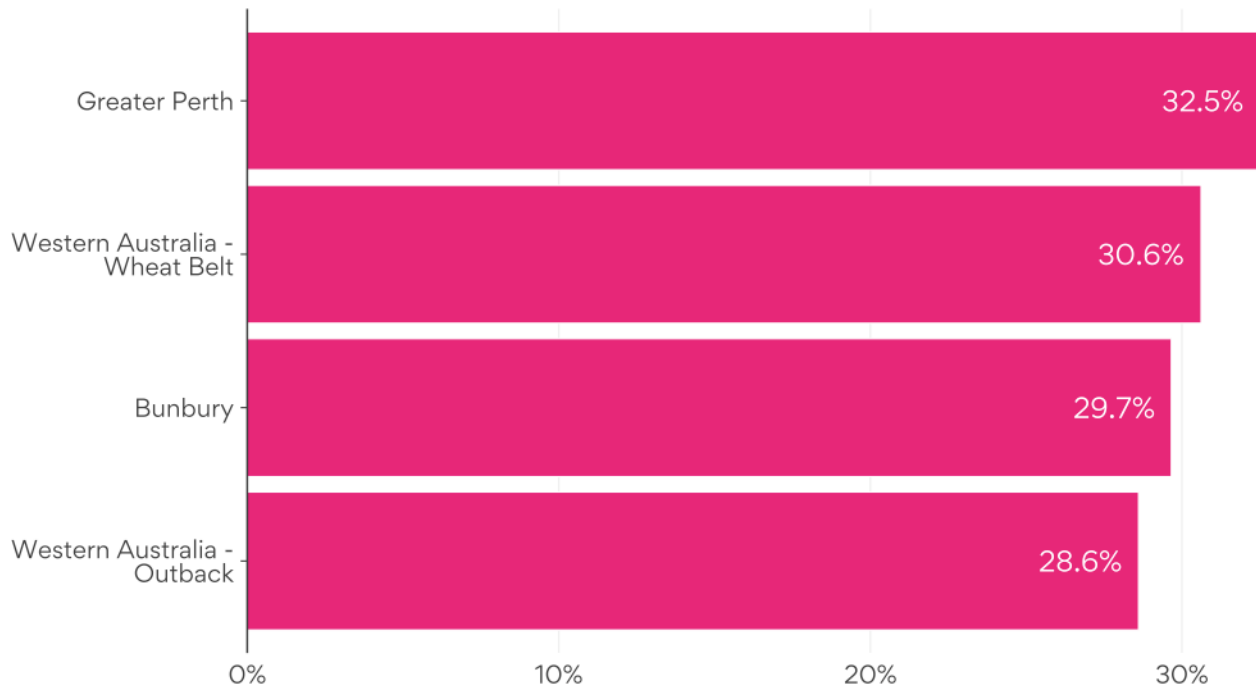
Note: 12 month rolling average.
Source: SEEK.

Western Australia

Greater Perth has the highest level of labour market mismatch of any region in Western Australia, at 32.5%. Although this is higher than Western Australia's regions, it is broadly comparable to the levels of mismatch in other cities, such as Greater Brisbane (32.0%) and Greater Melbourne (31.9%). Given the prevalence of fly-in, fly-out work in Western Australia, it should be noted that the SEEK LMMI is based on the location of the job, not the location of the applicant, so supply and demand for roles in the north of the state is counted in the 'Western Australia - Outback' region.

Labour market mismatch in Western Australia

Mismatch indicator as at December 2023



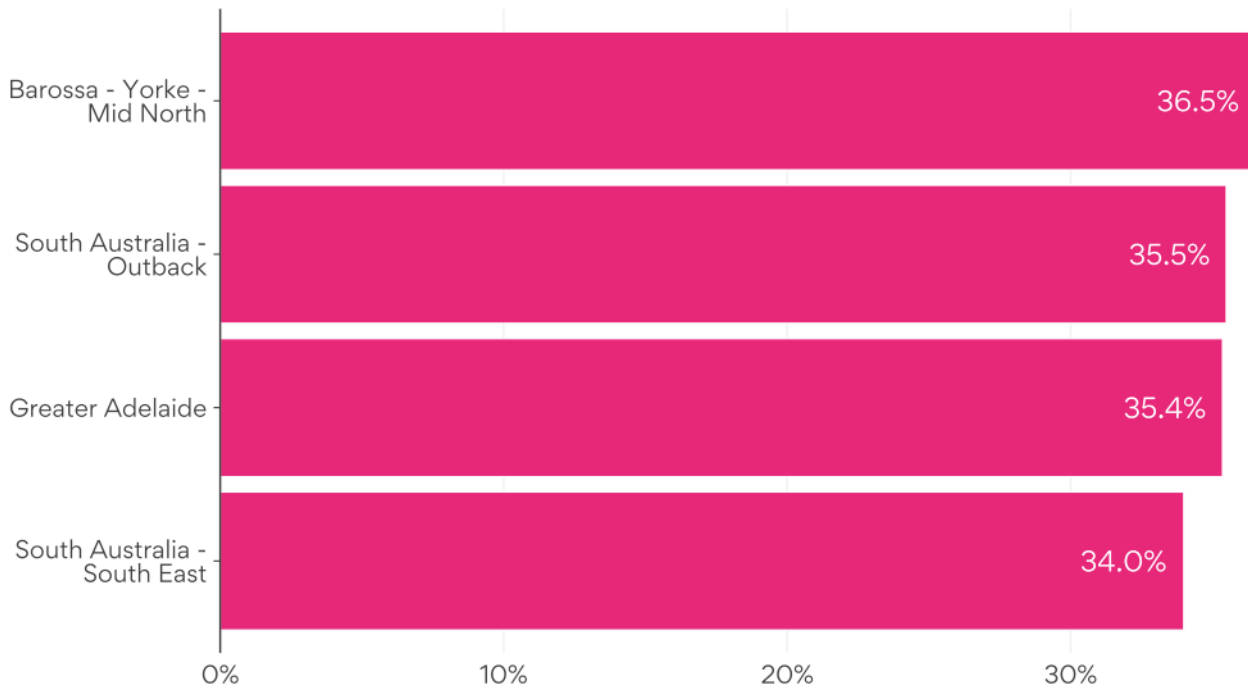
Note: 12 month rolling average.
Source: SEEK.

South Australia

South Australia has the second highest level of labour market mismatch in the country, behind Tasmania. Greater Adelaide's level of mismatch at 35.4%— although not the worst in the state — is worse than other cities such as Perth (32.5%), Brisbane (32.0%), and Melbourne (31.9%). The Barossa - York - Mid North region has the highest level of mismatch in the state, at 36.5%.

Labour market mismatch in South Australia

Mismatch indicator as at December 2023



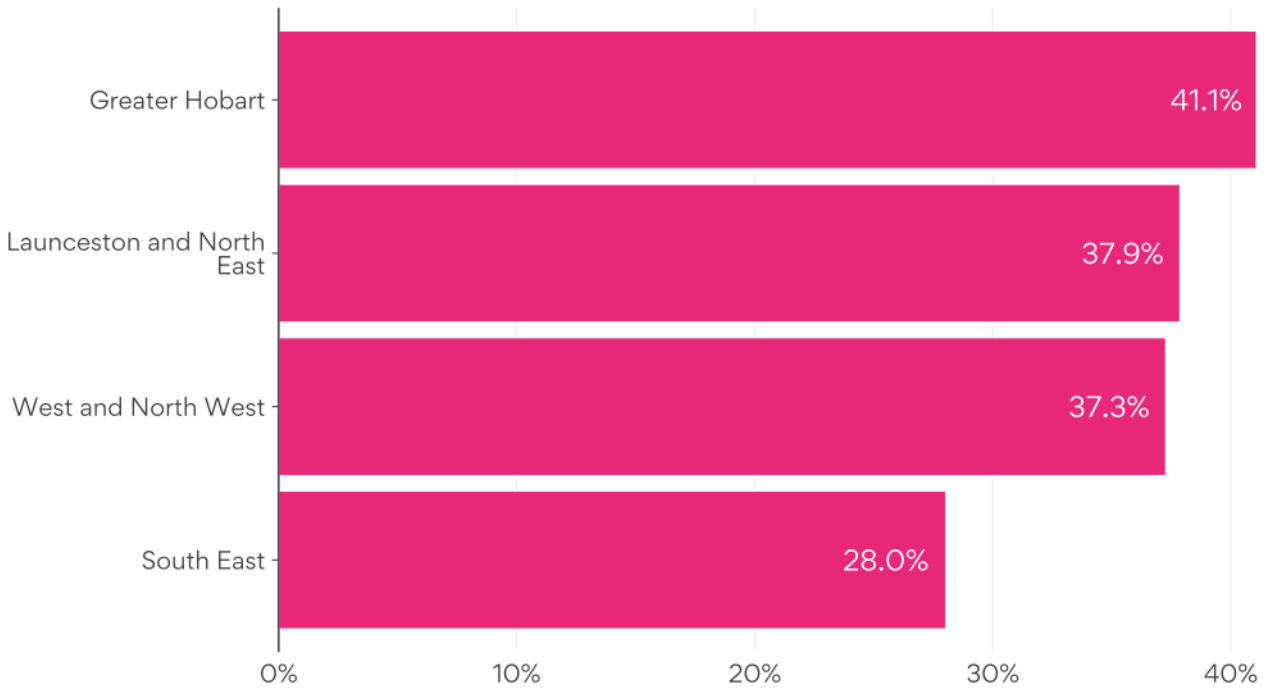
Note: 12 month rolling average.
Source: SEEK.

Tasmania

Tasmania has the highest level of supply-demand mismatch of any Australian state or territory. Within Australia, Greater Hobart fares the worst, with a SEEK LMMI of 41.1%. This is higher than the level of mismatch in other cities such as Adelaide (35.4%), Perth (32.5%), Brisbane (32.0%), and Melbourne (31.9%).

Labour market mismatch in Tasmania

Mismatch indicator as at December 2023



Note: 12 month rolling average.
Source: SEEK.

Australian Capital Territory

The Australian Capital Territory has one of the lowest levels of mismatch of any state or territory, with a SEEK LMMI of 30.9%. This is lower than the level of mismatch in other cities such as Adelaide (35.4%), Perth (32.5%), Brisbane (32.0%), and Melbourne (31.9%).

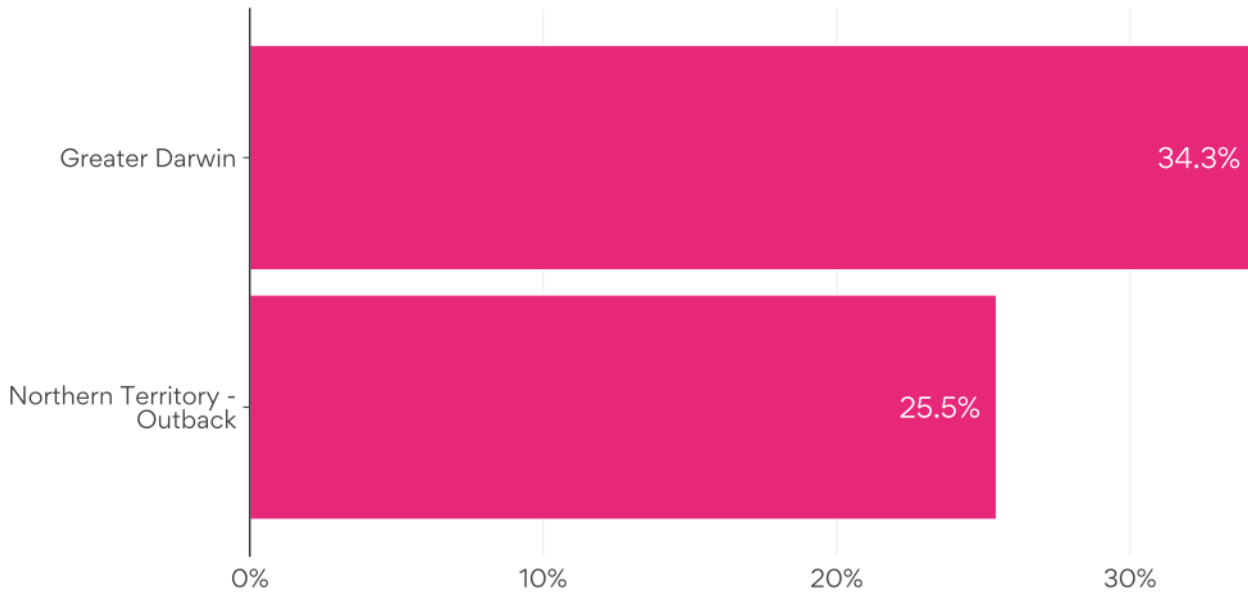
The Territory's SEEK LMMI tends to be less volatile than that of other states or territories. From mid-2022 to late-2023, the Australian Capital Territory's SEEK LMMI held roughly steady, while those of other states and territories rose quite sharply.

Northern Territory

The Northern Territory's level of mismatch is broadly comparable to that of other states and territories. Darwin's mismatch is higher than the rest of the Territory's, but is within the typical range for other Australian cities.

Labour market mismatch in Northern Territory

Mismatch indicator as at December 2023



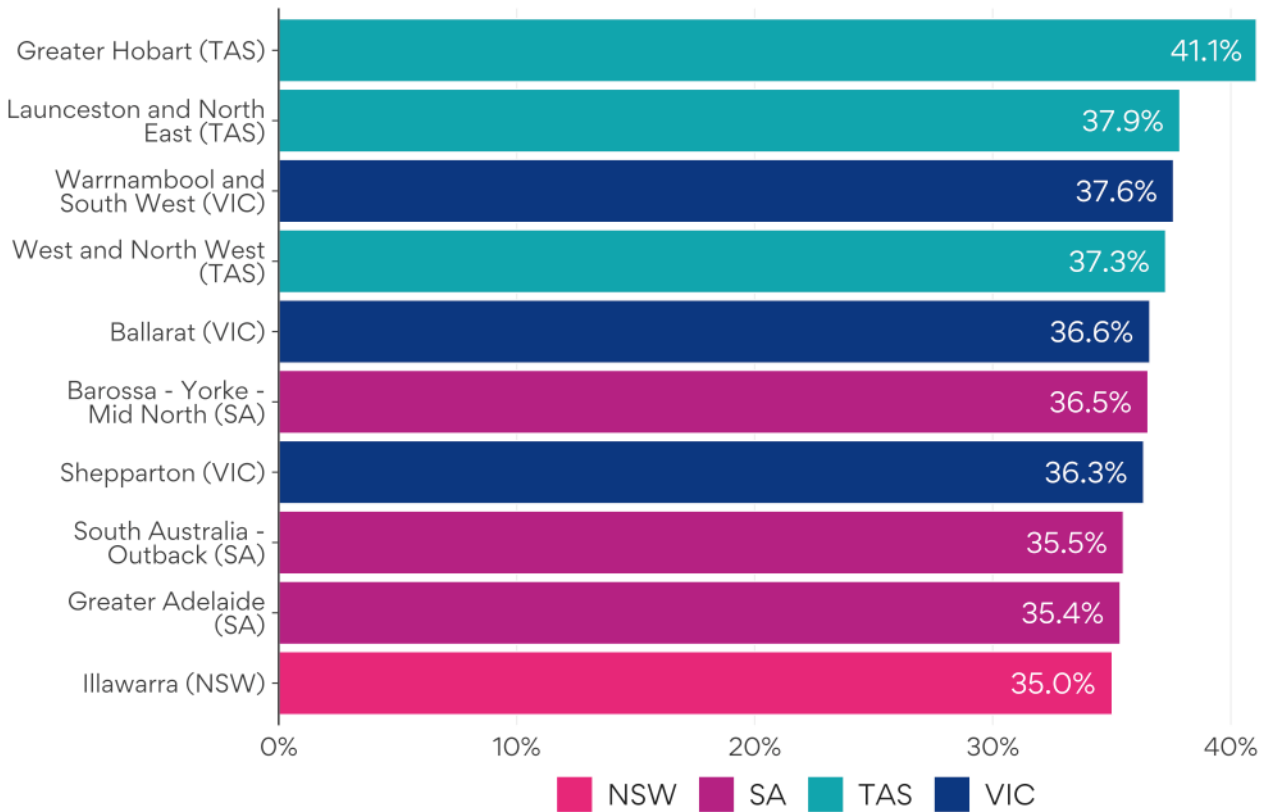
Note: 12 month rolling average.
Source: SEEK.

6. Regional labour market mismatch

Three of the four regions with the highest mismatch are in Tasmania. Hobart has the largest labour market mismatch of any region in Australia, as shown in Figure 6. Although in general, rural and regional areas tend to have higher levels of labour market mismatch, this is not universally the case, with both Hobart and Greater Adelaide ranking in the top 10 regions with the largest mismatch.

Figure 6: Rural areas and smaller cities feature heavily among the regions with the highest mismatch

Top 10 Australian regions by labour market mismatch as at December 2023



The SEEK LMMI at regional level runs from the highest level of 41.1%, down to 25.5% in the Outback – Northern Territory. Queensland and New South Wales dominate the list of regions with the lowest mismatch, as shown in Figure 7. Notably, the regions with the lowest mismatch also features a number of small cities and regional centres — both the top and bottom of the mismatch rankings are dominated by regional areas. The size of a labour market region does not appear to be a strong predictor of its level of labour market mismatch.

Figure 7: Many regional areas have a low level of labour market mismatch

Bottom 10 Australian regions by labour market mismatch as at December 2023

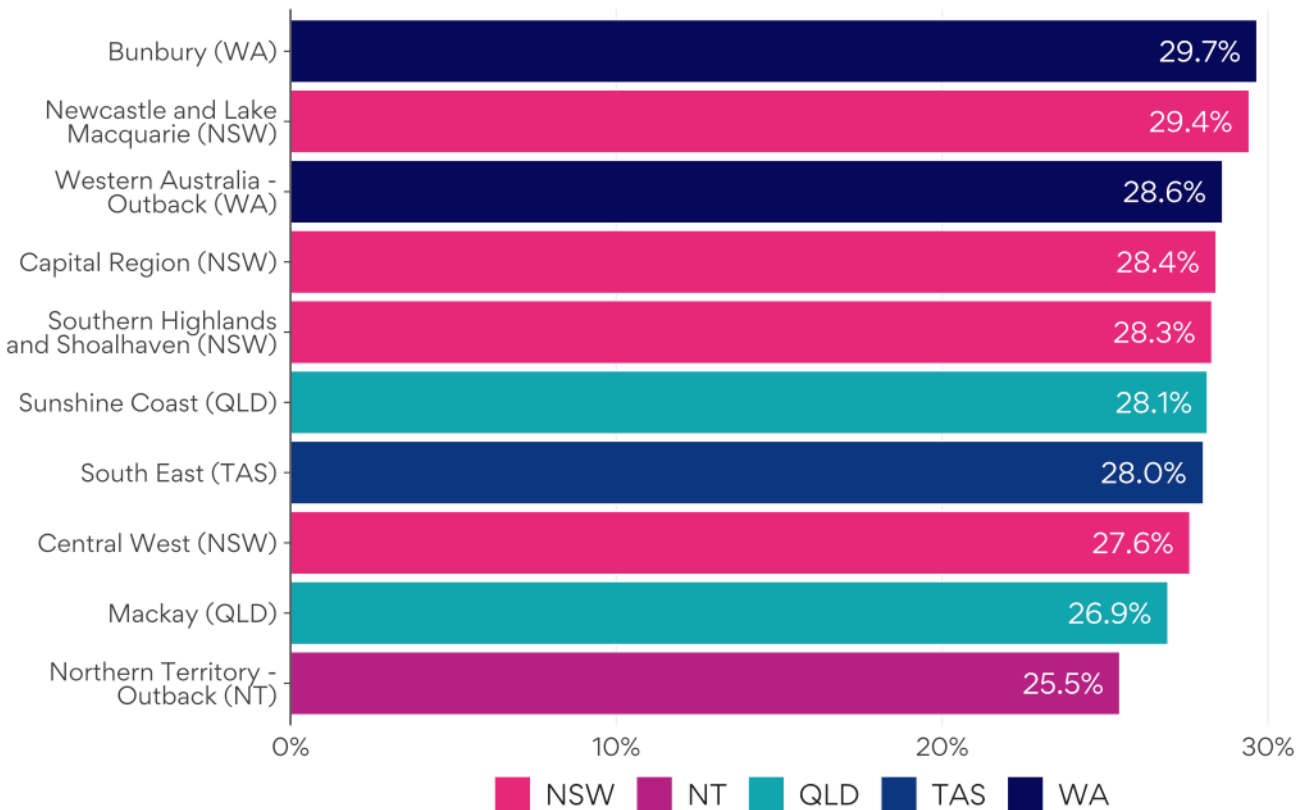


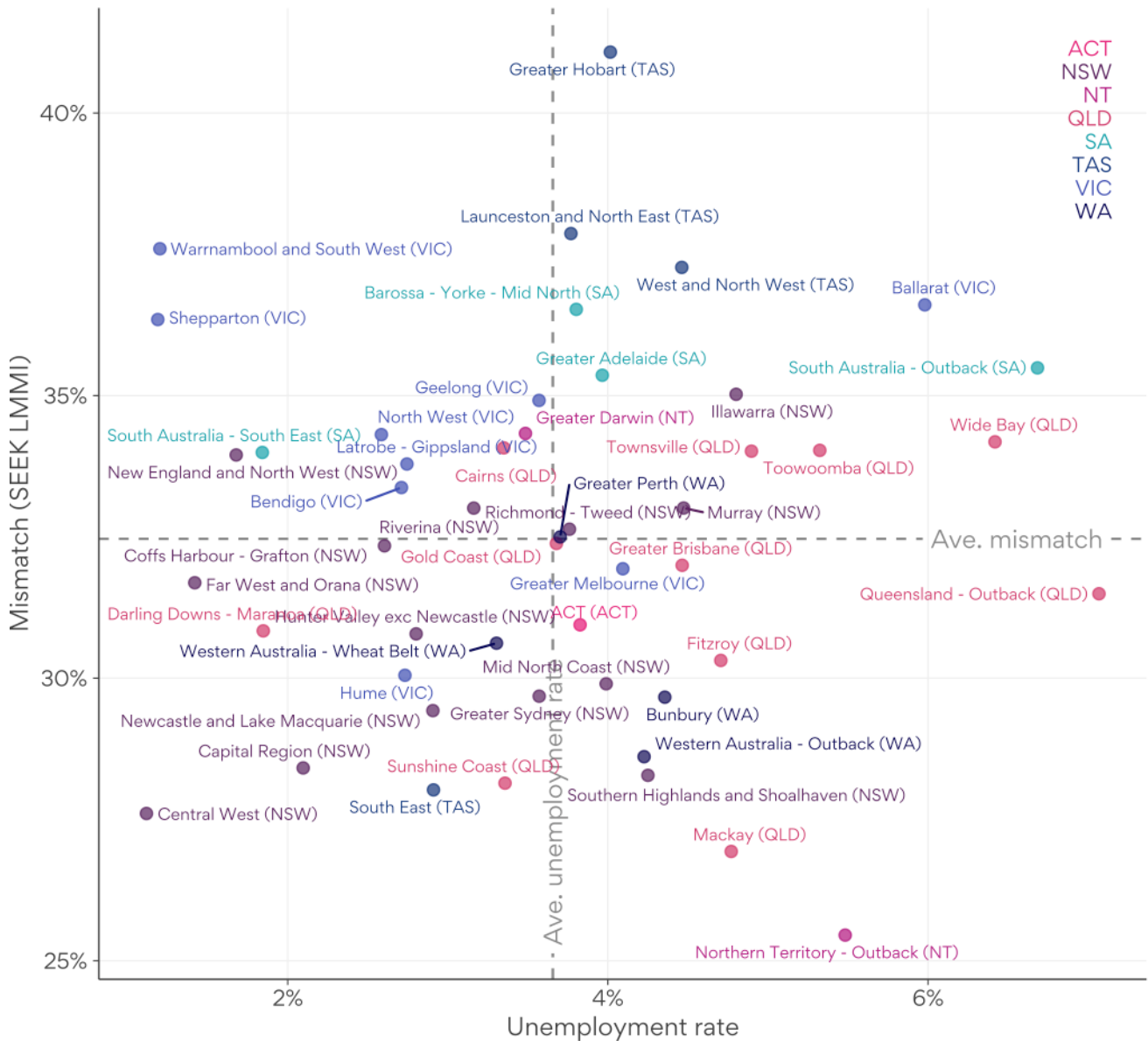
Figure 8 shows that regions with high levels of labour market mismatch do not necessarily have high levels of unemployment.⁷ For example, Greater Hobart has the highest level of mismatch in Australia, but its unemployment rate is only slightly above the national average. Conversely, the Outback Northern Territory has the lowest level of mismatch in Australia, but its unemployment rate is well above the national average.

Regions are divided among four quadrants: those with high unemployment and high mismatch, like Ballarat; those with low unemployment and high mismatch, like Shepparton; those with low unemployment and low mismatch, such as the Capital Region of New South Wales; and those with high unemployment but low mismatch, such as Mackay in Queensland.

⁷ Unemployment rates at SA4 level — or even at state level — can be volatile. For this reason, SEEK seasonally adjusts them and uses the ‘trend’ estimate from the seasonal adjustment process. The noise (sampling error) of the underlying data still means that undue emphasis should not be placed on minor differences in unemployment rates over time or between regions.

Figure 8: Regions with high mismatch don't necessarily have high unemployment

Unemployment rate vs SEEK Labour Market Mismatch Indicator as at December 2023



Note: unemployment rates are seasonally adjusted by SEEK; smoothed ('trend') estimates are used. Source: SEEK and ABS Labour Force Detailed.

The two dimensions in Figure 8 correspond to labour demand (the unemployment rate, horizontal axis, with high unemployment indicating low demand) and the degree of alignment or mismatch between labour supply and demand (SEEK LMMI, vertical axis). Regions in the top right quadrant fare poorly on both, with high unemployment suggestive of insufficient overall demand for workers, but high mismatch indicating that the demand that is present is not well aligned with the supply of workers.

Regions in the bottom left quadrant fare well on both measures — unemployment is low, suggesting sufficient overall labour demand; mismatch is also low, which suggests that the demand that is present is well aligned with the supply of workers.

The top-left and bottom-right quadrants are more ambiguous. Regions in the top-left quadrant have low unemployment and high mismatch, which suggests that there is sufficient overall demand for

workers, but that the demand that is present is not well aligned with the supply of workers. Those in the bottom-right have insufficient demand for workers — as indicated by their above-average unemployment rates — but a relatively low level of mismatch between supply and demand.

7. Regional analysis – exemplar regions

This section provides insights into four regions; Ballarat (VIC), Greater Sydney (NSW), Toowoomba (QLD) and Bunbury (WA).

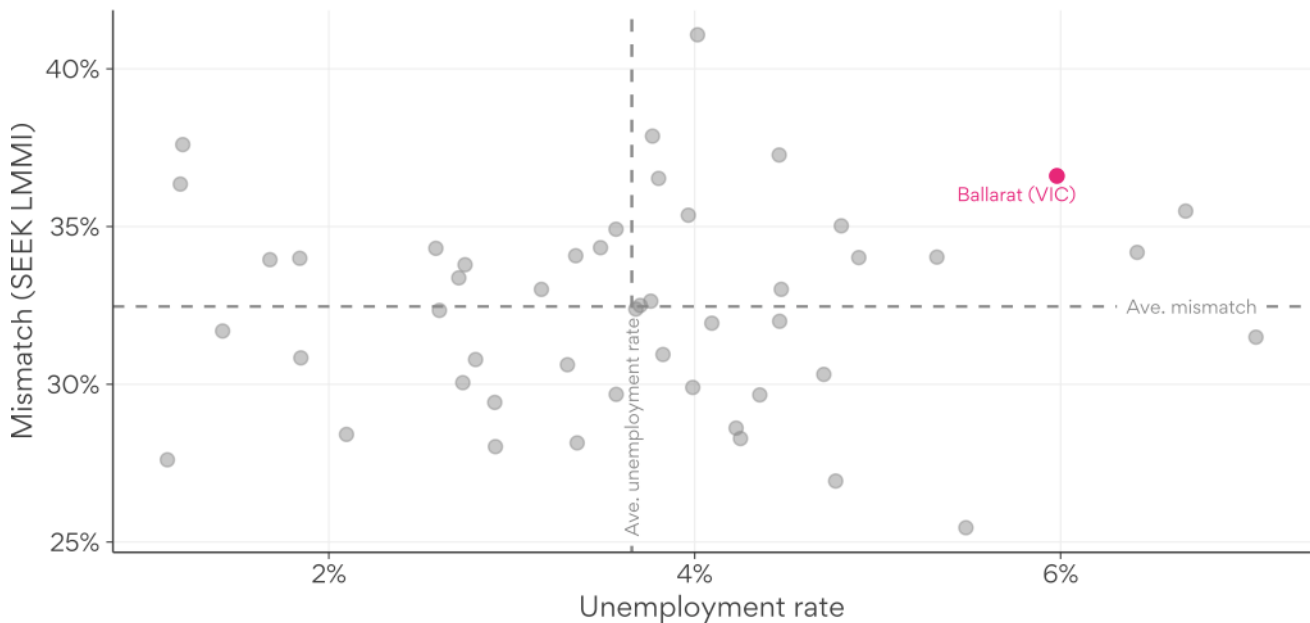
Ballarat is provided with detailed commentary and the charts for Greater Sydney (NSW), Toowoomba (QLD) and Bunbury (WA) are also provided, without the commentary.

Ballarat (VIC)

Ballarat has relatively high unemployment and high mismatch between supply and demand, as shown in Figure 9. Not all regions that have mismatch have high unemployment, and vice versa; Ballarat is an example of a region that has both. A scatter plot like Figure 9 is included for each region, to help understand how the region compares to others across Australia.

Figure 9: Ballarat has relatively high unemployment and high mismatch

Unemployment rate vs LMMI, Dec '23



The unemployment rate does not fully capture all the different dimensions of a labour market. The participation rate provides additional information — if unemployment and participation are both high, this is a different situation to Ballarat’s, where unemployment is high but participation is low. Only slightly more than half of people aged 15 and above in Ballarat are employed; this compares to nearly two-thirds in Victoria as a whole, and nationwide. Figure 10 shows Ballarat’s key stats — the

unemployment and participation rates, along with the unemployment to population rate. Each of the grey dots is another region of Australia.⁸

Figure 10: Ballarat has high unemployment and low participation

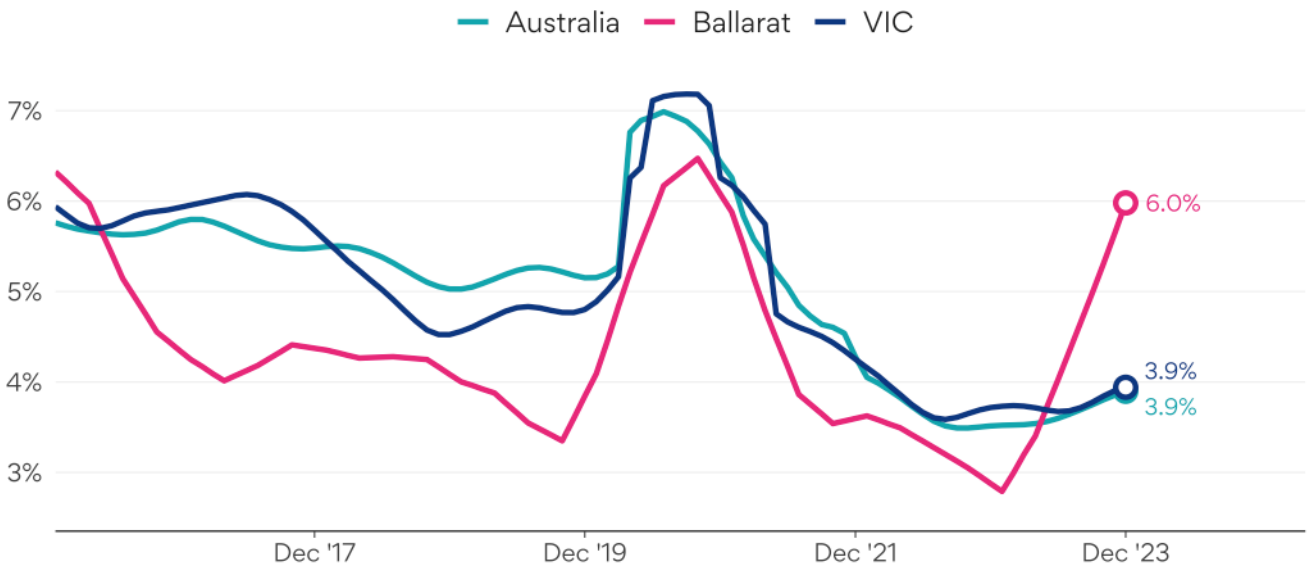


Ballarat has not always had higher unemployment than the national and statewide figures. In fact, for several years before 2023, Ballarat’s unemployment rate was lower than the national average. But even during that time, participation was relatively low, suggesting the labour market was not as strong as the unemployment rate alone might suggest. Figure 11 shows the unemployment rate for Ballarat, Victoria, and Australia.

⁸ Note that the labour force statistics for SA4 regions can be volatile. For this region, SEEK seasonally adjusts the data and uses the smoother ‘trend’ estimates. Some unavoidable volatility due to sampling error remains.

Figure 11: Ballarat’s unemployment rate rose sharply in 2023

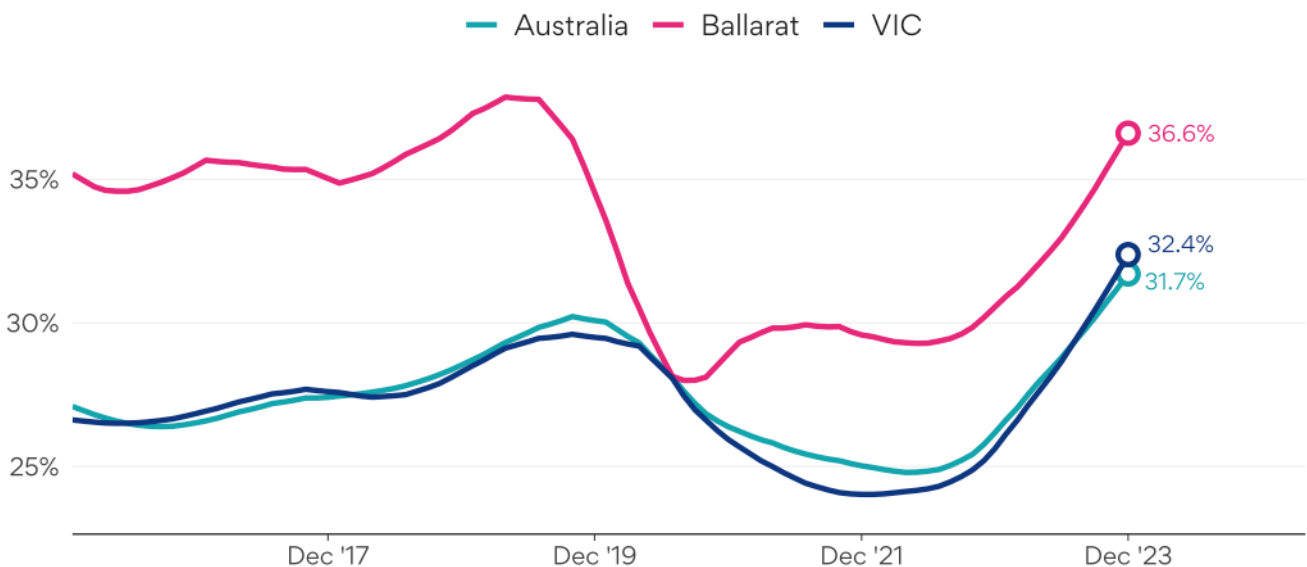
Unemployment rate



Although Ballarat’s unemployment rate has been below the national average before 2023, Ballarat has consistently featured a higher-than-average level of labour market mismatch. Figure 12 shows the SEEK LMMI for Ballarat, Victoria, and Australia.

Figure 12: Ballarat has consistently had a higher-than-average level of labour market mismatch

SEEK Labour Market Mismatch indicator



By definition, supply and demand contribute equally to mismatch at each point in time — an ‘excess supply’ in one occupation must be offset by ‘excess demand’ in another.⁹ However, although supply

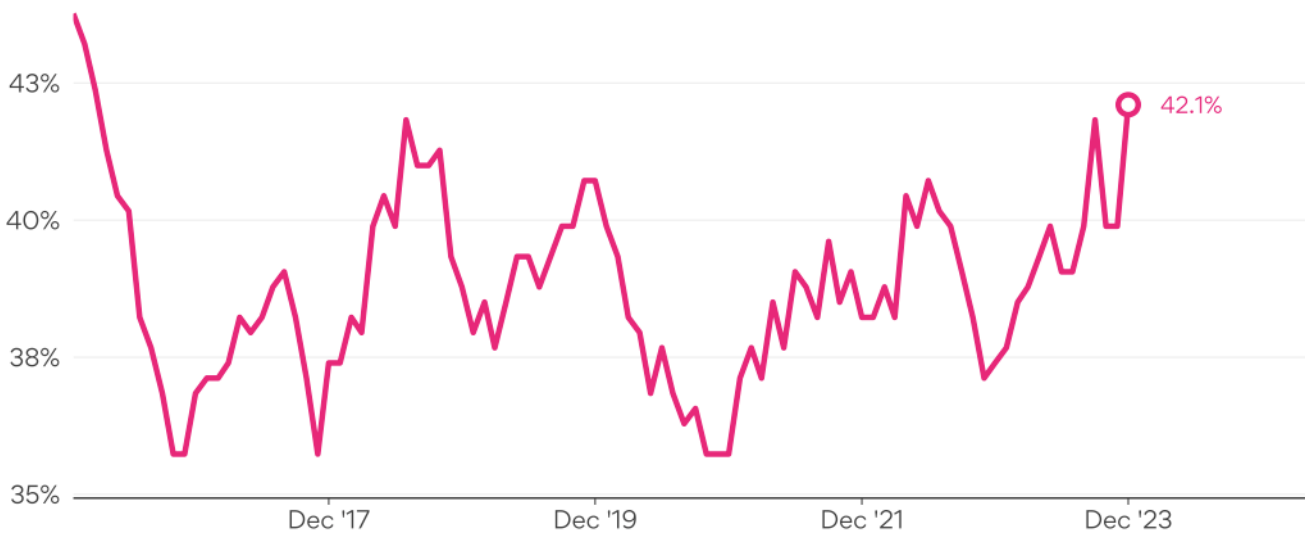
⁹ See [Appendix A](#) for more on the construction of the SEEK LMMI.

and demand contribute equally to the SEEK LMMI, the proportion of occupations that have excess supply varies over time and across regions.

Figure 13 shows the proportion of occupations in Ballarat that have excess supply: around 42% of occupations in Ballarat as at December 2023. If the proportion of occupations with excess supply was very low, this would indicate that the excess is concentrated in a small number of occupations, whereas many occupations feature excess demand; if the proportion with excess supply was very high, this would conversely indicate broad-based excess supply and concentrated excess demand. In Ballarat's case, the proportion of occupations with excess supply is relatively high, close to half of all occupations, indicating that the mismatch is relatively broad-based.

Figure 13: Nearly half of occupations in Ballarat have excess supply

Percentage of occupations in Ballarat in excess supply



Finally, for each region we examine which occupations have excess supply or demand. Figure 14 shows the top 20 occupations with excess supply in Ballarat. Sales Assistants have the greatest over-supply in Ballarat, followed by Aged and Disabled Carers and then Receptionists.

Figure 14: Sales Assistants have the greatest over-supply in Ballarat

Top 20 occupations with excess supply in Ballarat as at December 2023

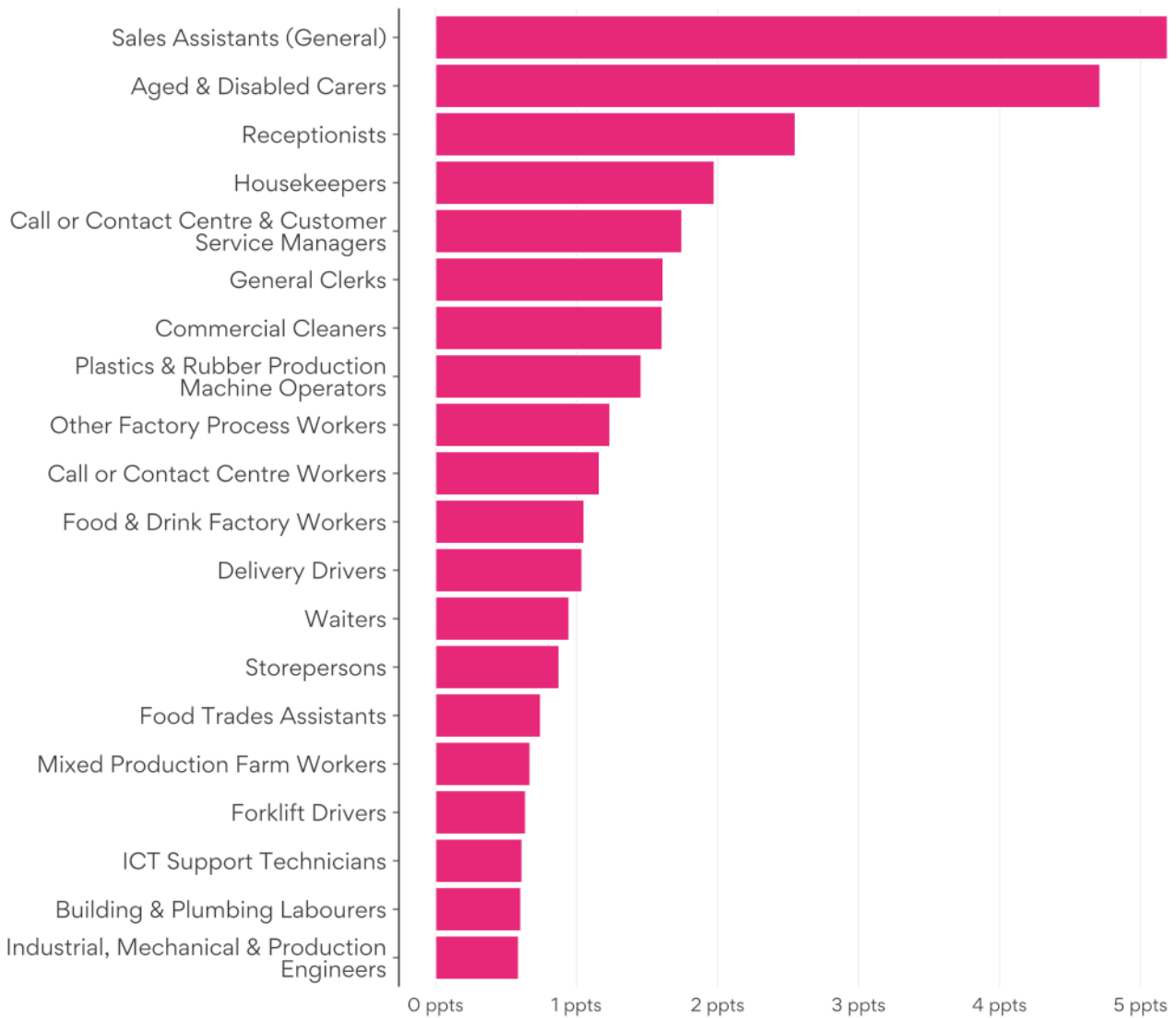


Figure 15 shows the other end of the spectrum, those occupations with the largest under-supply of workers in Ballarat – in other words, excess demand. Registered Nurses top the list, followed by Child Carers and Early Childhood Teachers. Many of the occupations in shortest supply in Ballarat are in the caring professions, but are occupations that require a degree or other high-level formal qualification. The over-supply of Aged and Disabled Carers and the under-supply in some other caring professions is common to other regions, and suggests that there are people who are willing to work in caring professions, but who do not have the qualifications to do so.

Figure 15: Registered Nurses have the biggest excess demand in Ballarat

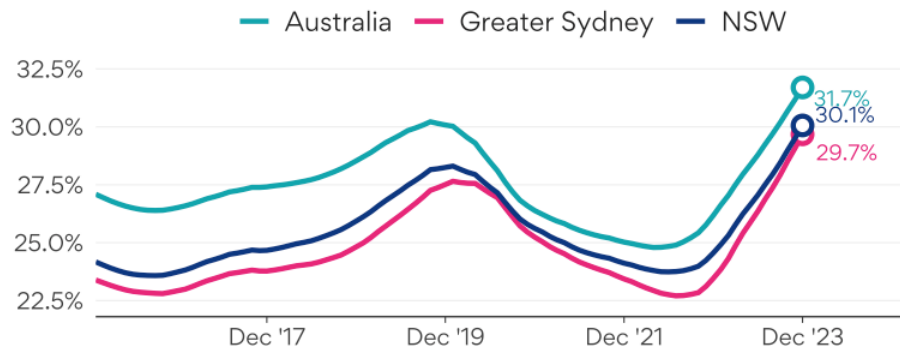
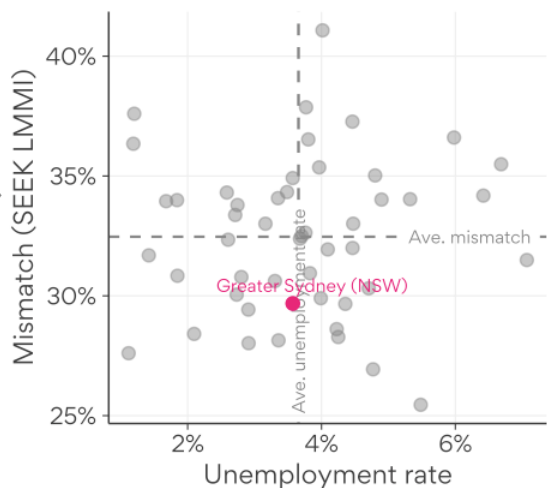
Top 20 occupations with excess demand in Ballarat as at December 2023



Greater Sydney (NSW)

Unemployment rate vs LMMI, Dec '23

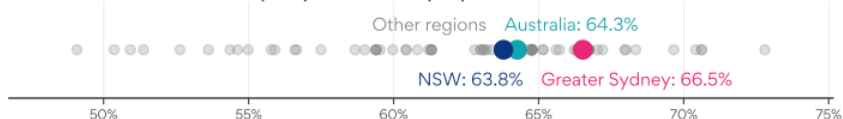
SEEK Labour Market Mismatch indicator



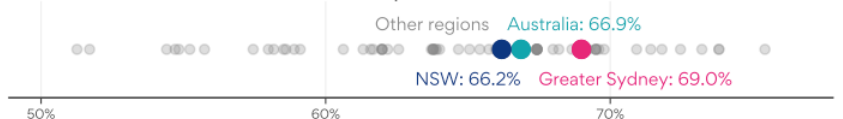
Percentage of occupations in Greater Sydney in excess supply



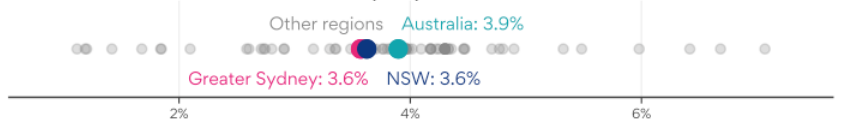
Employment-to-population ratio



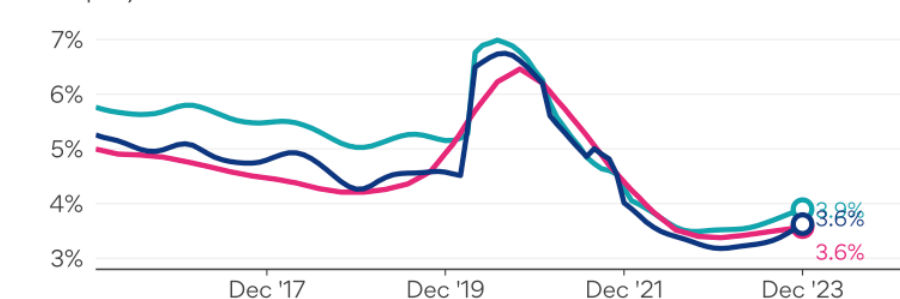
Participation rate



Unemployment rate



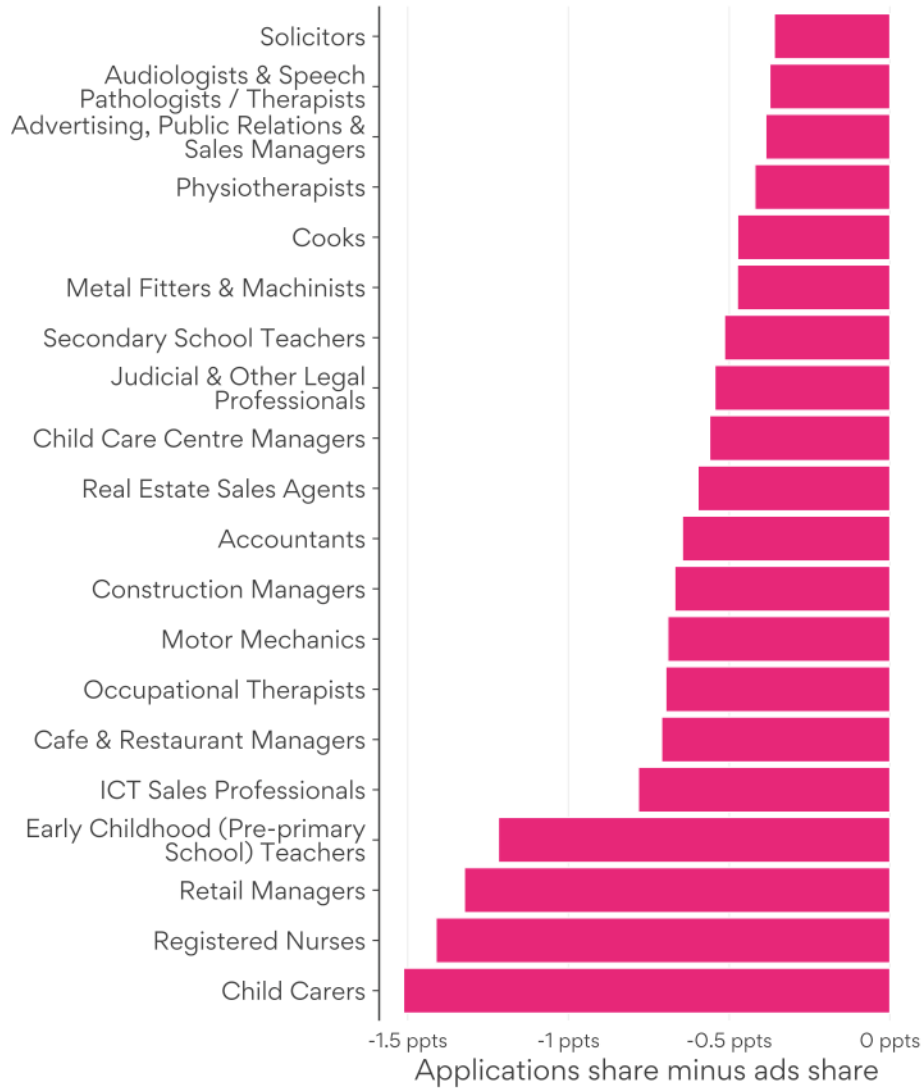
Unemployment rate



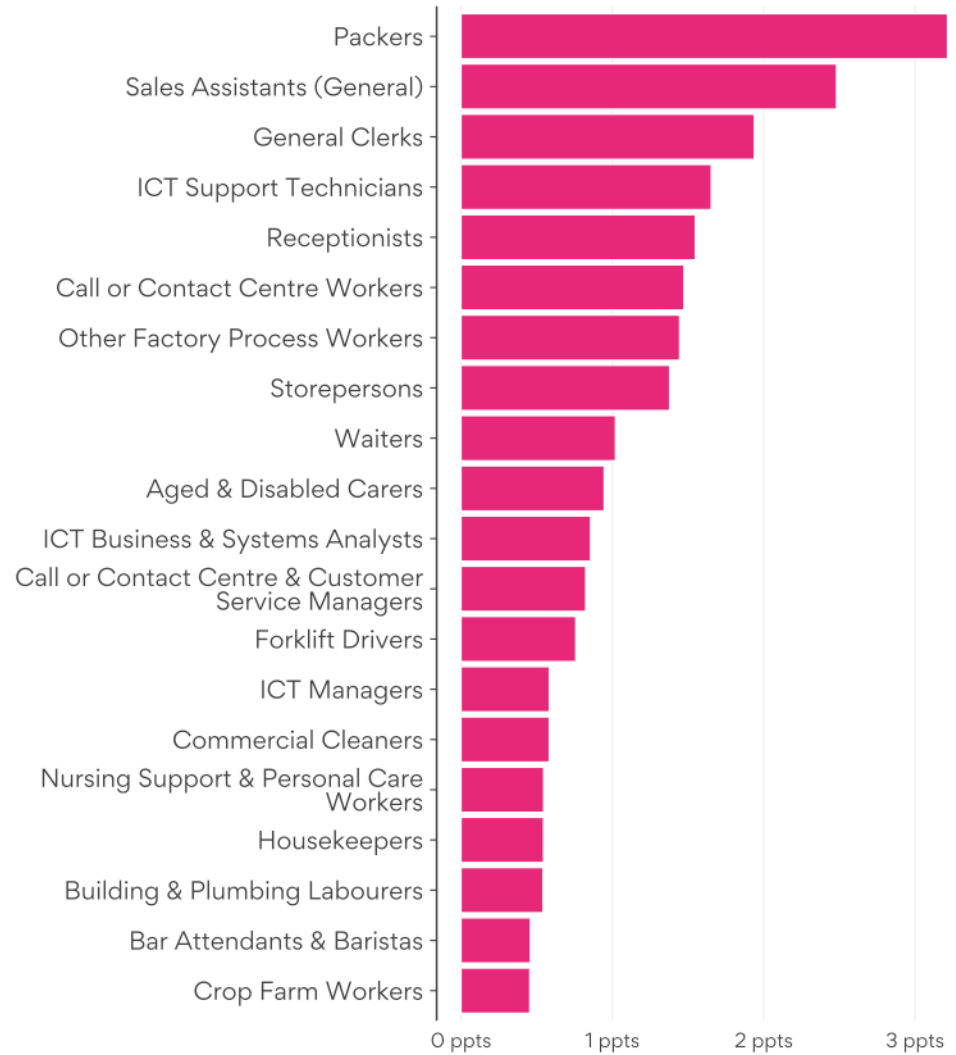
Note: unemployment rates are seasonally adjusted by SEEK; smoothed ('trend') estimates are used.
Source: SEEK and ABS Labour Force Detailed.

Greater Sydney (NSW)

Top 20 occupations with excess demand as at December 2023



Top 20 occupations with excess supply as at December 2023



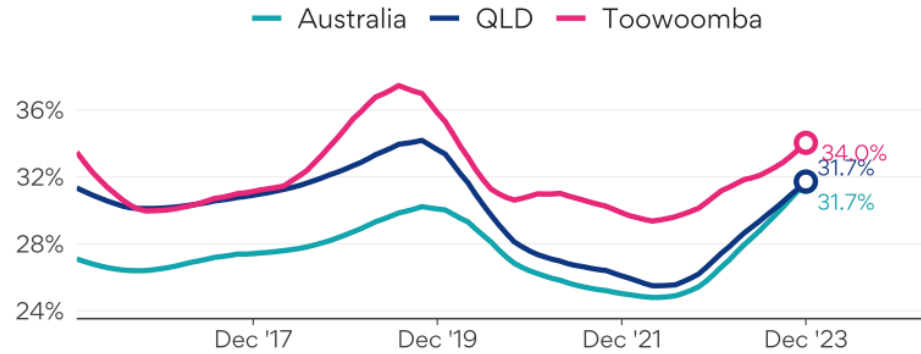
Source: SEEK.

Toowoomba (QLD)

Toowoomba (QLD)

Unemployment rate vs LMMI, Dec '23

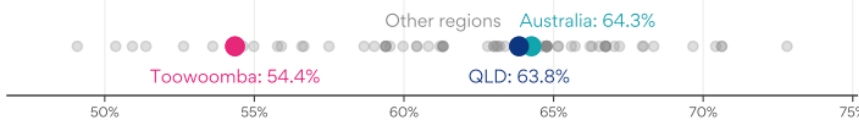
SEEK Labour Market Mismatch indicator



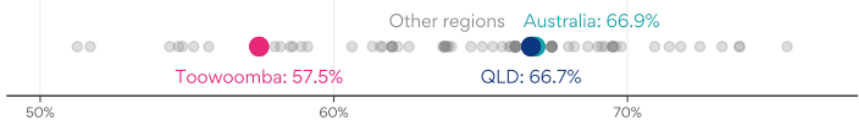
Percentage of occupations in Toowoomba in excess supply



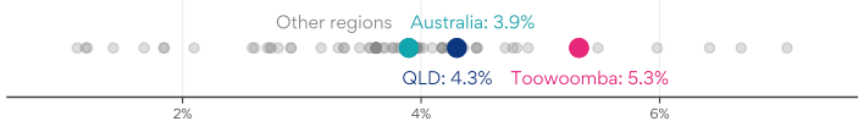
Employment-to-population ratio



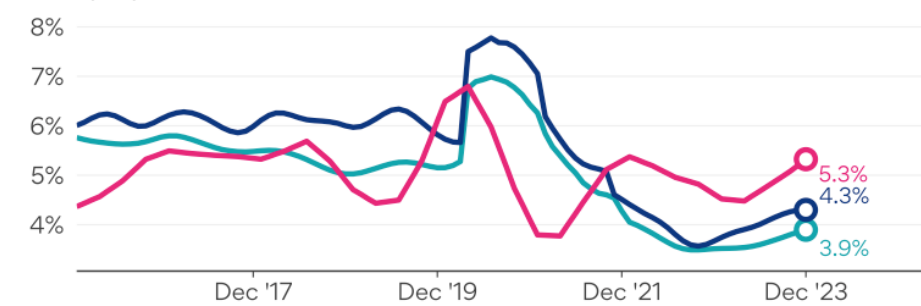
Participation rate



Unemployment rate



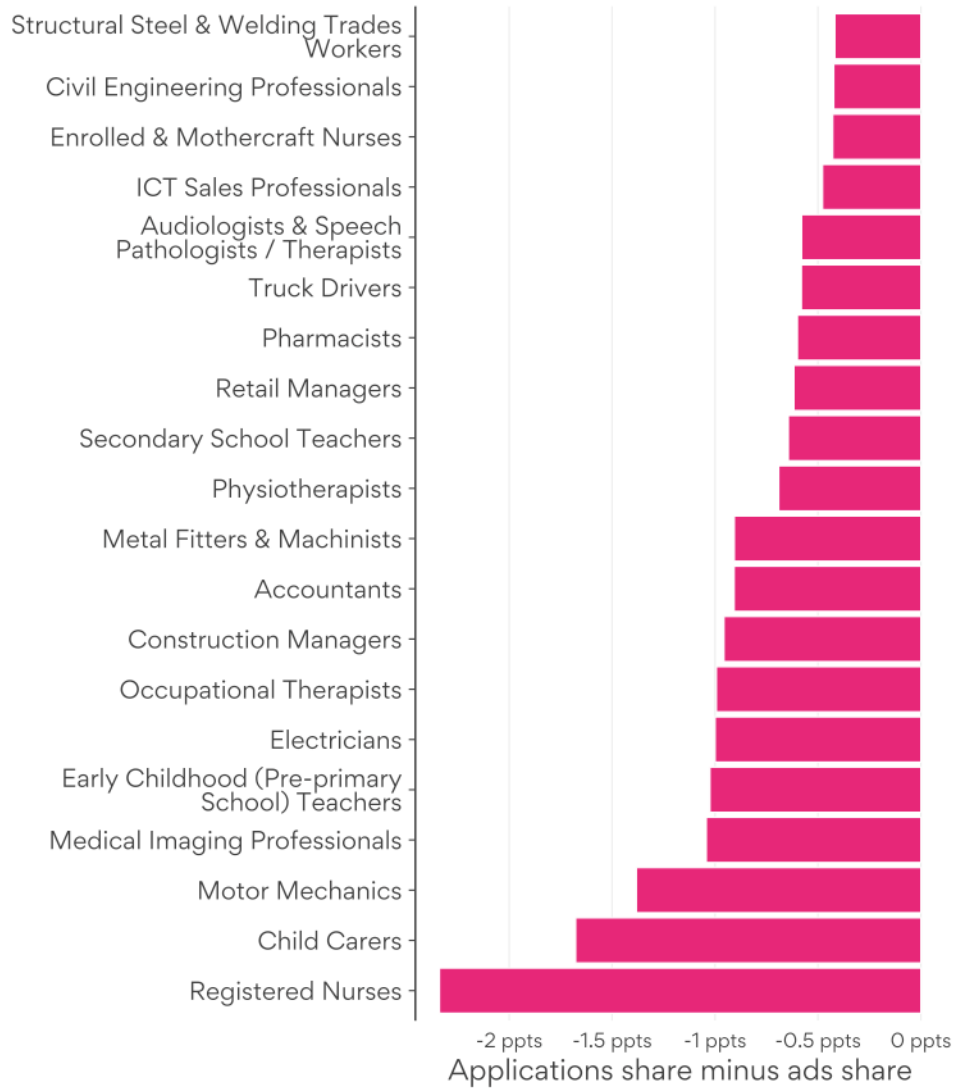
Unemployment rate



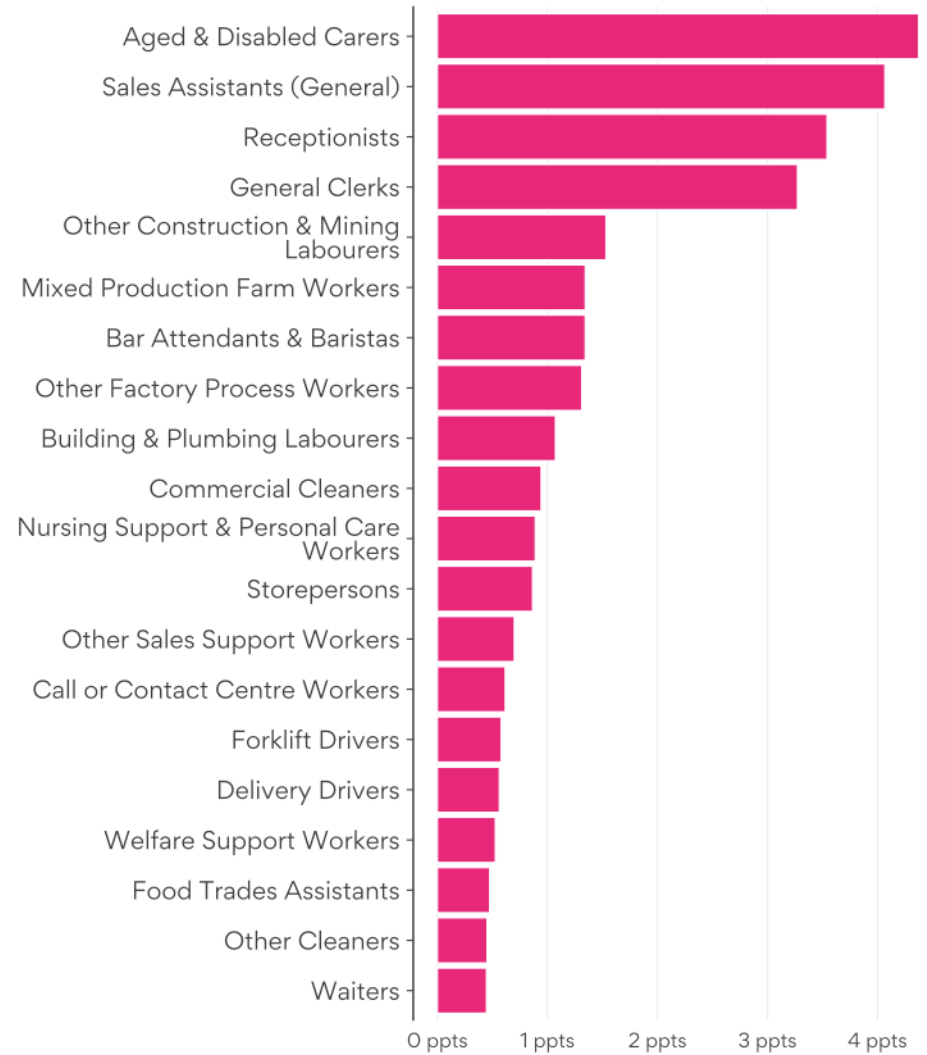
Note: unemployment rates are seasonally adjusted by SEEK; smoothed ('trend') estimates are used.
Source: SEEK and ABS Labour Force Detailed.

Toowoomba (QLD)

Top 20 occupations with excess demand as at December 2023



Top 20 occupations with excess supply as at December 2023



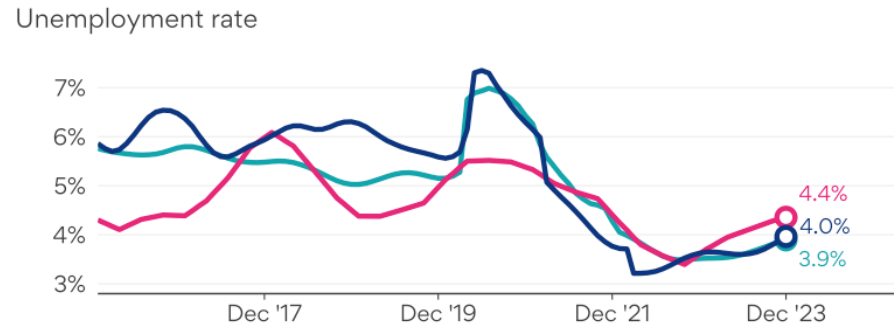
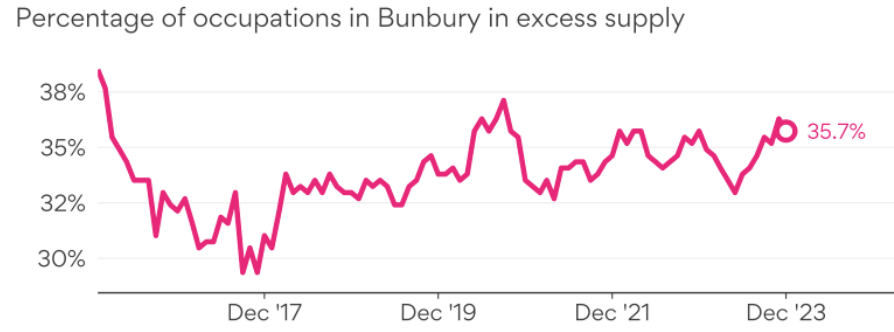
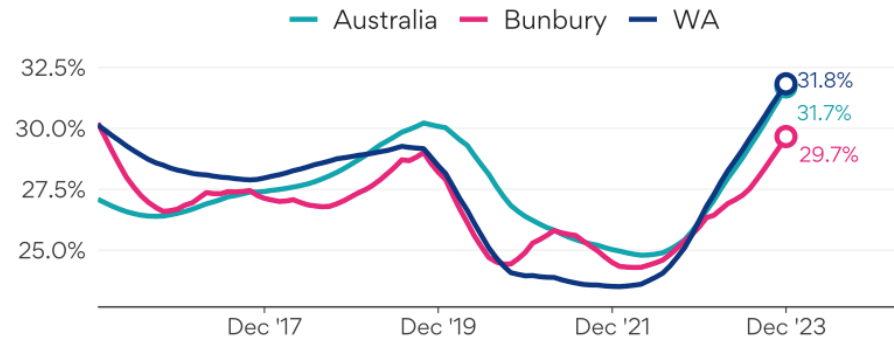
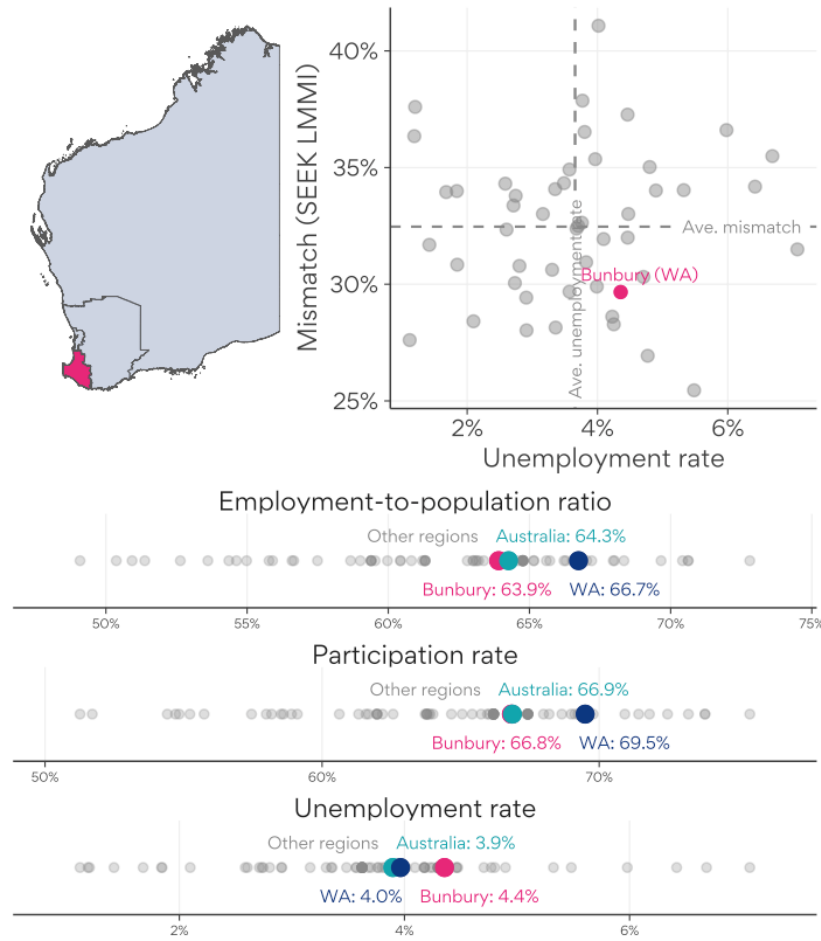
Source: SEEK.

Bunbury (WA)

Bunbury (WA)

Unemployment rate vs LMMI, Dec '23

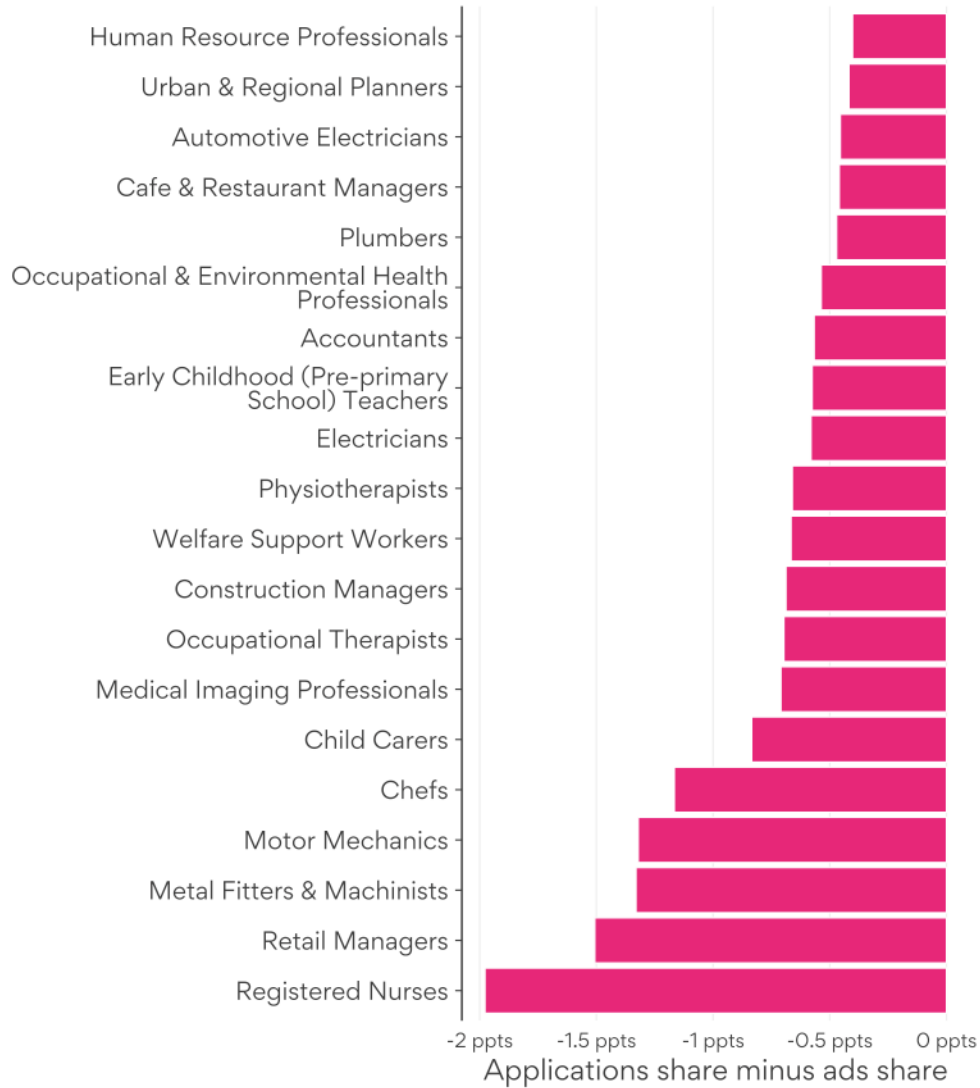
SEEK Labour Market Mismatch indicator



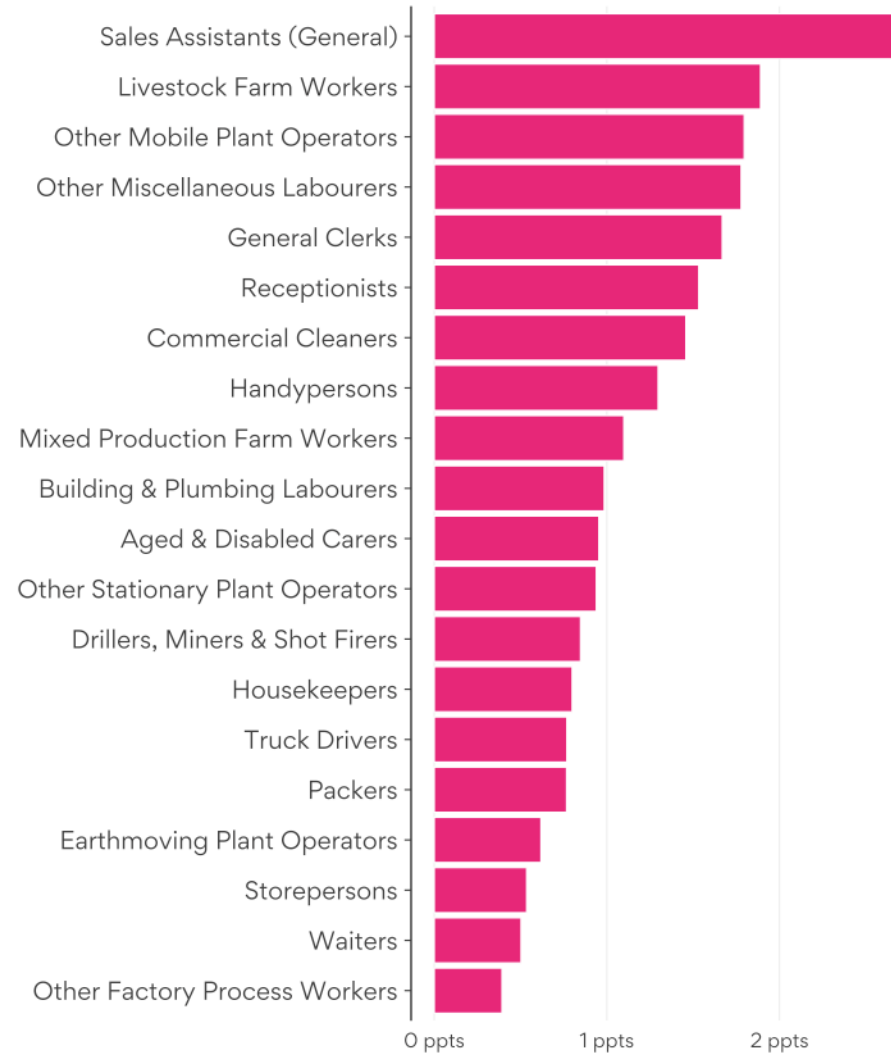
Note: unemployment rates are seasonally adjusted by SEEK; smoothed ('trend') estimates are used.
Source: SEEK and ABS Labour Force Detailed.

Bunbury (WA)

Top 20 occupations with excess demand as at December 2023



Top 20 occupations with excess supply as at December 2023



Source: SEEK.

8. Appendix A: Constructing the SEEK Labour Market Mismatch Indicator

The SEEK LMMI takes a value from zero to 100%. A value of zero indicates that labour supply and demand within a region are perfectly balanced across occupations — in other words, the ratio of applications to ads is equal for all occupations in the region in question. The higher the value, the greater the difference in the pattern between supply and demand. The indicator measures the proportion of labour supply (applications) that would need to be redirected to different occupations in order to equalise the ratio of applications-per-ad across all occupations in the region. For example, a value of 36% would mean that 36% of applications in a given month would need to be reallocated to different occupations in order to bring the pattern of supply and demand into balance.

‘Excess supply’ for a particular occupation is measured as the occupation’s share of job applications in a region in a month, minus the occupation’s share of job ads in the same region in the same month. For example, if an occupation represented 10% of ads in a region, but 20% of applications, then the excess supply for that occupation would be 10 percentage points. When an occupation’s share of applications is less than its share of ads, this is represented as a negative number, which is referred to as ‘excess demand’. The absolute values of these excess supply values are then summed across all occupations, then divided by two, to get the SEEK LMMI for the region in that month.¹⁰ Note that individual jobseekers can — and often do — apply for multiple roles; each application is treated as a separate ‘unit’ of supply in this analysis.

The SEEK LMMI is measured at regional level, across 49 regions: the eight ‘greater capital city regions’ plus 41 rural and regional areas. The rural and regional areas are ABS ‘Statistical Area 4’ (SA4s). The definition of an occupation used for the SEEK LMMI is a 4-digit occupational unit group from the Australian and New Zealand Standard Classification of Occupations (ANZSCO).¹¹ All data in this report is ‘trend’ estimates of seasonally adjusted data, unless otherwise noted.¹²

Further details on the construction and calculation of the SEEK LMMI are available at [Appendix A](#) of this report. This includes further information about the data and the measurement of excess supply and demand.

There are many potential dimensions to mismatch in the labour market. The SEEK LMMI measures only one aspect of mismatch, namely the differences between the pattern of supply and demand across occupations within a region. It draws on previous work using job vacancies and unemployed people to measure mismatch.¹³

¹¹ Australian Bureau of Statistics (2022)

¹² SEEK seasonally adjusts applications and advertisement volumes at the region-occupation level before calculating the level of mismatch and the SEEK LMMI. SEEK also seasonally adjusts ABS SA4 labour force data, which is not seasonally adjusted by the ABS. The same procedure is used for both; see Section 4 of Hyndman and Athanasopoulous (2021) for details.

¹³ For example, see Lazear and Spletzer (2012), Sinclair and Gimbel (2020) and Fahrner and Pease (1993). There are other ways to measure mismatch in the labour market, such as those explored in Şahin et al. (2014); future work could explore the feasibility of these approaches with Australian data.

The SEEK LMMI does not measure the suitability of existing staff for their jobs — the question of whether employees are under- or over-skilled for the roles they hold.¹⁴ It also does not measure whether the qualifications held by jobseekers fit the requirements of available roles; instead, each application is taken as an indication that the job seeker believes themselves to be suitable for the role. There is the potential for further work to examine the question of candidate quality or suitability, including through using SEEK data. The SEEK LMMI also does not measure the level of labour demand within a region — two regions with very different levels of demand for workers could have the same LMMI.

The insights from this analysis are a new and innovative way to measure supply and demand in the Australian labour market, but they do not tell the whole story. The SEEK LMMI and the associated data in this report should be viewed as a diagnostic tool that may point to areas where further investigation into how the labour market is functioning is warranted. Policy makers, employers and jobseekers alike can use these insights to indicate where challenges and opportunities may exist. However, the actions that flow from this requires further analysis and work to understand what is driving the underlying labour market dynamics.

As a simple example, imagine that a region featured only three occupations: butchers, bakers, and software developers. The following is a fictional table showing the demand and supply for these occupations in this region for a given month.

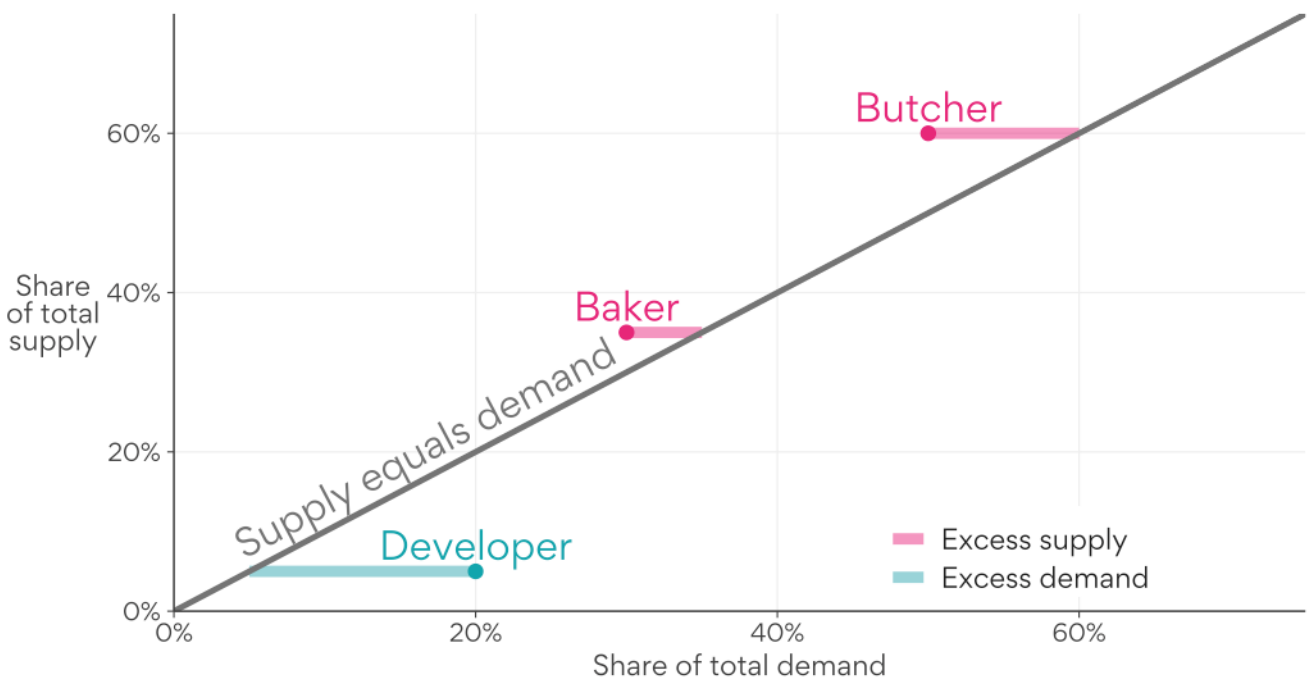
Example: measuring excess supply

¹⁴ For discussion of this in the Australian context, see for example Mavromaras, McGuinness, and Wooden (2007).

• Occupation	• Demand (ads)	• Supply (applications)	• Demand share	• Supply share	• Excess supply (ppts)
• Butcher	• 150	• 2400	• 50%	• 60%	• 10
• Baker	• 90	• 1400	• 30%	• 35%	• 5
• Developer	• 60	• 200	• 20%	• 5%	• -15
• Total	• 300	• 500	• 100%	• 100%	• 0

Example of excess supply and demand calculations that underpin the mismatch index

Occupations' share of total supply and demand in a region (stylised example)



Note: stylised example, not real data.

In this example, labour supply and demand are not balanced across occupations. Butchers have an average of 16 applications per ad (2400 / 150), while developers have an average of 3.3. There's an 'excess supply' of butchers, with the occupation's share of total applications (60%) exceeding its share of total ads (50%). The difference between these two numbers — 10 percentage points — is our measure of excess supply. For developers, the share of applications (5%) is lower than the share of ads (20%), so there's a negative excess supply — i.e. 'excess demand' — of developers. We measure this as minus 15 percentage points. Note that the sum of excess supply and excess demand is always zero — in this example the sum of the excess supply of butchers (10 ppts or 0.1) and bakers (5 ppts or 0.05) offsets the excess demand (negative excess supply) of developers (-15 ppts or -0.15).

Constructing the mismatch indicator

As in the simple example above, we calculate the share of total labour demand (denoted D) and supply (S) for each occupation (j) in each region (i) in each month (t).

The mismatch indicator is calculated as:

$$M_{it} = \frac{1}{2} \sum_j^n \left| \frac{S_{ijt}}{S_{it}} - \frac{D_{ijt}}{D_{it}} \right|$$

In our example, this gives:

$$M_{it} = 0.5 \times (0.1 + 0.05 + 0.15) = 0.15 = 15\%$$

This means that, in our fictional example, 15% of applications would need to be redistributed to other occupations in order to eliminate the mismatch present in the market.

As set out above, the mismatch indicator is calculated as the average of the absolute difference between the share of applications and the share of ads for each occupation in a region. The index takes a value between 0 and 1, where 0 indicates perfect balance between supply and demand, and 1 indicates complete imbalance.

The mismatch indicator is a form of ‘dissimilarity index’ or ‘segregation index’, also known as a ‘Duncan index’.¹⁵ This type of index was developed for applications in geography and sociology — it measures the proportion of people who would need to change their location in order to achieve a balanced distribution of people across locations. In our case, we are measuring the proportion of applications that would need to be redirected in order to achieve a balanced distribution of applications across occupations.

Versions of this mismatch index have been used in the labour economics literature. For example, Lazear and Spletzer (2012) use a version of this to measure the mismatch between unemployed people and job vacancies in the United States. Sinclair and Gimbel (2020) is the closest to the approach in this paper — they measure the difference between the broad industry of job advertisements and either unemployed people or active jobseekers on the platform Indeed. A Reserve Bank of Australia Research Discussion Paper in the 1990s (Fahrer and Pease 1993) measured mismatch in Australia using an index of this type, comparing the (very broad) industry of unemployed people to job vacancies.

Definitions and data

To construct the measure of excess supply/demand and therefore the mismatch indicator, we need to define and measure:

- labour demand;
- labour supply;
- occupations; and
- geographical regions.

At SEEK we have extensive microdata from all the ads placed on our marketplace and all the applications responding to those ads. The microdata we have utilised for this analysis starts in January

¹⁵ Duncan and Duncan (1955)

2016. Over the period from 2016 to 2023 (inclusive), the dataset includes on average around 200,000 job advertisements per month.

Labour demand

Labour demand is measured using job advertisements. Each advertisement is one ‘unit’ of demand. This is consistent with the approach adopted in previous academic research.¹⁶

The data does not include duplicate ads (which are removed prior to analysis) and does not include any ads scraped from other sites. SEEK has maintained a high and broadly consistent share of total Australian job advertisements over this time, so the data is broadly representative of the market.

The ads included in this dataset are paid ads. This means there is a certain threshold for recruiting intensity that must be met before a job vacancy becomes a job advertisement and is included in the data.

Job ads on SEEK remain on the site for 30 days, unless the advertising employers chooses to remove it earlier. Ads are then either removed, or re-listed, for an additional fee. This means we measure the ‘flow’ of new advertising, rather than a ‘stock’ of outstanding vacancies at a point in time.

Note that we group advertisements (and associated applications) by month — this is the calendar month in which the ad is first placed on SEEK. The advertisement may remain on site into the next calendar month, but it is only counted once.

A limitation of the data is that some ads may pertain to multiple vacant jobs. For example, a fast food franchise may place an ad indicating that there are roles available at multiple restaurants. This will be counted only as one unit of ‘demand’ in our analysis.

Labour supply

We use the number of applications for each job ad as our measure of labour supply. All job advertisements on SEEK include the ability for jobseekers to apply for the role. In many cases, this is done on SEEK’s platform itself. In some cases, clicking ‘Apply’ will take the job seeker to a third party website. In either case, initiating an application is taken as one unit of labour supply.

A strength of this measure is that the measure of labour supply is directly related to individual jobs. Unlike some previous research, we are not inferring the occupation or location in which jobseekers may be interested in jobs by looking at either the occupation and location in which they were previously employed. By using actual applications data, we can have some assurance that jobseekers are genuinely interested in, and believe themselves suited for, the roles in question.

Applications are allocated to the geographical region of the job ad, which is not necessarily the same region that the applicant lives in. For example, an applicant who lives in Sydney may apply for a job in Melbourne; this will be counted towards the measure of labour supply in Melbourne.

A limitation of this data is that individual jobseekers can, and often do, lodge applications for multiple vacant roles. For this reason, we explored using ‘unique applicants’ as the measure of labour supply. However, this data is less precisely measured, as some applicants may initiate applications while not logged in to SEEK, which means we cannot identify them as unique applicants. For this reason, we use the number of applications as our measure of labour supply.

¹⁶ For example, Sinclair and Gimbel (2020) and Lazear and Spletzer (2012).

Regions

We are interested in labour market mismatch within geographical regions. To measure this, we must define what we mean as a ‘region’. There is no single, agreed definition of what constitutes a ‘labour market region’. Previous academic research has tended to use either states (in Australia or the US) or even groups of states. Other work uses ‘commuting zones’.¹⁷

Australian states are mostly very large; Western Australia is around three times the size of France, for example. For this reason, states are too broad as a measure of a labour market region for the purposes of measuring labour market mismatch.

Commuting zones, as a concept, is appealing and well-suited to this analysis. However, data limitations mean this is unsuitable for this work. For a minority of ads on SEEK, we do not have the specific suburb location (for example, ‘Richmond’), we only have the broader area (‘Melbourne’). This means we cannot reliably disaggregate all ads within capital cities to sub-city units such as commuting zones. The approach we take is to treat each capital city (e.g. ‘Greater Melbourne’) as one geographical region. Outside the capital cities, we use ABS Statistical Area Level 4s (SA4).¹⁸ This means we have 49 regions in our analysis — 8 capital cities and 41 SA4s outside the capital cities. The regions included in this data are below:

New South Wales: Capital Region; Central West; Coffs Harbour-Grafton; Far West and Orana; Greater Sydney; Hunter Valley, excluding Newcastle; Illawarra; Murray; Newcastle and Lake Macquarie; Mid-Nort Coast; New England and North West; Richmond-Tweed; Riverina; and Southern Highlands and Shoalhaven.

Victoria: Ballarat; Bendigo; Geelong; Greater Melbourne; Hume; LaTrobe-Gippsland; North West; Shepparton; South West and Warrnambool.

Queensland: Cairns; Darling Downs-Maranoa; Fitzroy; Gold Coast; Greater Brisbane; Mackay; Queensland-Outback; Sunshine Coast; Toowoomba; Townsville; and Wide Bay.

Western Australia: Bunbury; Greater Perth; Western Australia – Outback; and Western Australia – Wheat Belt.

South Australia: Barossa-Yorke-Mid North; Greater Adelaide; South Australia Outback; and South Australia – South East.

Tasmania: Greater Hobart; Launceston and North East; South East and West and North West.

Northern Territory: Greater Darwin and Northern Territory Outback.

Australian Capital Territory: Australian Capital Territory.

¹⁷ For example, Department of Infrastructure (2023) defines these for Australia. Bishop and Greenland (2021) and Coelli, Maccarrone, and Borland (2021) also construct commuting zones.

¹⁸ Australian Bureau of Statistics (2016)

Occupations

To measure excess supply, and therefore mismatch, we need some way to group together similar jobs. We use the Australia and New Zealand Standard Classification of Occupations (ANZSCO), in which there are many different levels at which we could group together similar jobs.

In our simple example above, we used ‘Butcher’, ‘Baker’, and ‘Developer’ as individual job types. Both butchers and bakers are part of the same one-digit ANZSCO group (‘3 - Technicians’), and two-digit sub-major group (‘35 - Food Trades Workers’). They have different four-digit ANZSCO codes (‘3511 - Bakers and Pastrycooks’ and ‘3512 - Butchers and Smallgoods Makers’). It’s possible to get even more granular — for example, the four-digit occupation ‘3512 - Bakers and Pastrycooks’ is split into two six-digit occupations: ‘351211 - Baker’ and ‘351212 - Pastrycook’.

The choice of the level of aggregation is somewhat arbitrary. If we use a very broad level of aggregation, we will have a small number of occupations, which will mean we spuriously group together dissimilar occupations — for example, butchers and bakers; or registered nurses and dancers, both of which are part of major group 2 - Professionals. If we use a very fine-grained level of aggregation, we will draw distinctions between occupations that are very similar; for example, bakers and pastrycooks.

For this analysis we chose to use the four-digit ANZSCO code as our measure of occupation. This is a level of aggregation that is commonly used in the Australian labour market, and is the level at which the ABS publishes labour market statistics. In our judgement, the four-digit level best balances the need to group together similar occupations, while not grouping together occupations that are too dissimilar.

Job ads on SEEK are not classified using ANZSCO codes. Instead, SEEK uses its own classification system. Employers are asked to select the SEEK classification and subclassification that best matches the role they are advertising. Employers also enter a job title for each ad, which is ‘free text’. We use this information, as well as the contents of the job ads themselves, to assign ads to an ANZSCO occupation. Further information about the process by which we do this is provided at [Appendix B](#).

Smoothing and aggregating

This analysis starts by calculating the total number of ads and applications for each four-digit ANZSCO occupation, in each region, in each month. The ads and applications data within each region-occupation group is then seasonally adjusted. The ‘trend’ estimate from this seasonal adjustment process is then used. This forms the basis of the excess supply calculations for each occupation in each region in each month, which in turn is used to calculate the mismatch indicator.

At the state- and national-level, our mismatch indicator is an average of the regional indicators, weighted by the number of ads in each region in each month.

9. Appendix B: Translating SEEK data to ANZSCO

The [Australian and New Zealand Standard Classification of Occupations \(ANZSCO\)](#) is a system used to classify occupations.¹⁹ It is used by government agencies, researchers and other organisations to collect, analyse and disseminate data on the labour market. The classification is hierarchical, with four levels of aggregation: major group, sub-major group, minor group and unit group. The unit group is the most detailed level of the classification, and is the level at which occupations are defined. ANZSCO is derived from the [International Standard Classification of Occupations \(ISCO\)](#) and is (to some extent) mappable to ISCO, which allows Australian data to be compared to international data.²⁰

SEEK does not use ANZSCO in the operation of its employment marketplace. Instead, hirers provide the ‘classification’ and ‘subclassification’ of the job when they post an ad; these are pre-defined, structured data. These are SEEK’s own classifications, which are not directly comparable to ANZSCO. SEEK’s classifications are designed to be intuitive for hirers and jobseekers. Hirers also provide a role title, which is free text and can be anything the hirer chooses. SEEK has internal processes for identifying the role title (“normalised role title”) based on this free text — for example, the free text “Register Your Interest - Enrolled Nurses and Registered Nurses”, “Calling for Expressions of interest - Registered Nurse (casual)”, and “Registered Nurse (RN) - Agency (TEMP) - Werribee” would all be assigned to the normalised role title “Registered Nurse”.

For this report, we create a mapping from SEEK’s data to ANZSCO. We have around 460,000 unique combinations of classification-subclassification-normalised role title. We assign each of these 460,000 SEEK job types to a six-digit ANZSCO occupation. The process in simplified terms is:

1. We assemble a range of text describing each SEEK job type. We have text describing each classification and subclassification, manually created by SEEK. We assemble a range of keywords for each job type based on the text used in the role titles and descriptions of individual job ads.²¹
2. We assemble a range of text describing each ANZSCO occupation. We use the ANZSCO publication from the ABS²² and information from the Australian Skills Classification.²³
3. We use a large language model called e5²⁴ to extract ‘embeddings’ —numeric vector representations —of the text describing each SEEK job type and each ANZSCO occupation.

¹⁹ Australian Bureau of Statistics (2022)

²⁰ International Labour Organization (2008)

²¹ For each job type, we take the top 10 keywords, ranked by term frequency-inverse document frequency (TF-IDF).

²² Australian Bureau of Statistics (2022)

²³ Jobs and Skills Australia (2023)

²⁴ Wang et al. (2022)

4. We compare the embeddings for each SEEK job type to each ANZSCO occupation, using cosine similarity. This gives us a set of 'similarity scores'. We assign each SEEK job ad type to the ANZSCO occupation with the highest similarity score.

This process is done at the 6-digit ANZSCO occupation level. In this report, we use only the 4-digit ANZSCO unit groups. ANZSCO is a hierarchical structure, so SEEK job types matched to a 6-digit occupation are also matched to the 4-digit ANZSCO unit group of which the occupation is a part.

The process for matching SEEK job types to ANZSCO is not perfect, although it performs well when compared to manual human assignment. However, this should not meaningfully affect the analysis in this report. This is because:

1. The mismatch indicator is calculated at the 4-digit ANZSCO level, so any occupations that are assigned to the 'wrong' 6-digit but 'right' 4-digit occupation will be correctly assigned.
2. The same ANZSCO mapping process is used for both ads and applications, so any errors in the mapping process will be consistent across the two sides of the market.

10. References

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