



Understanding regional data: Industry

A region's industry structure is a major factor in determining its level of income and ability to grow. Industry structure can also influence a local economy's resilience and adaptability; for example, the local economy's ability to withstand shocks, or to take advantage of shifts in economic demand.

Industry structure can be analysed across multiple dimensions such as Gross Value Added, business counts and employment. This factsheet provides an overview of regional industry employment data; where to find it and how to use it.



Data sources and classification

Three key data sources for regional industry employment are:

- Australian Bureau of Statistics (ABS), [Labour Force Survey \(LFS\)](#)
- ABS [Census of Population and Housing](#)
- ABS [Jobs in Australia](#).

Industry data is classified using the [Australian and New Zealand Standard Industrial Classification \(ANZSIC\)](#). This hierarchical system classifies industry data at four increasingly specific levels (see table below).

Table 1: ANZSIC classification

Classification level	Example of industry
1-digit or Division	A -Agriculture, Forestry and Fishing
2-digit or Subdivision	01 -Agriculture
3-digit or Group	014 -Sheep, beef cattle and grain farming
4-digit or Class	0146 -Rice growing



Investigating regional industry

Ways to analyse industry employment include looking at:

- a region's industry structure compared to other regions and the national structure;
- the degree of diversity or specialisation of a region's industry structure;
- a region's industrial change over time¹.

A broader discussion on employment data and its characteristics is available in the related fact sheet: [Understanding regional data: Employment](#), which covers key data sources and ways to present the data.



Industry structure

When analysing a local economy, it is critical to consider its industry structure and how it compares to other regions or to the national industry structure. This enables us to assess where a region has a similar industry structure to the

¹ In general, when calculating change between two time points, it is important to consider what was occurring around those time points. For example, COVID-19 should be considered in terms of selecting the timeframe and interpreting the resulting data.

Australian economy, or whether a dominant industry operates in the local economy.

This is important because an economic shock impacting the dominant industry in a region will filter through the local economy. For example, if a region is heavily reliant on agriculture, drought conditions often flow through all levels of the local economy.

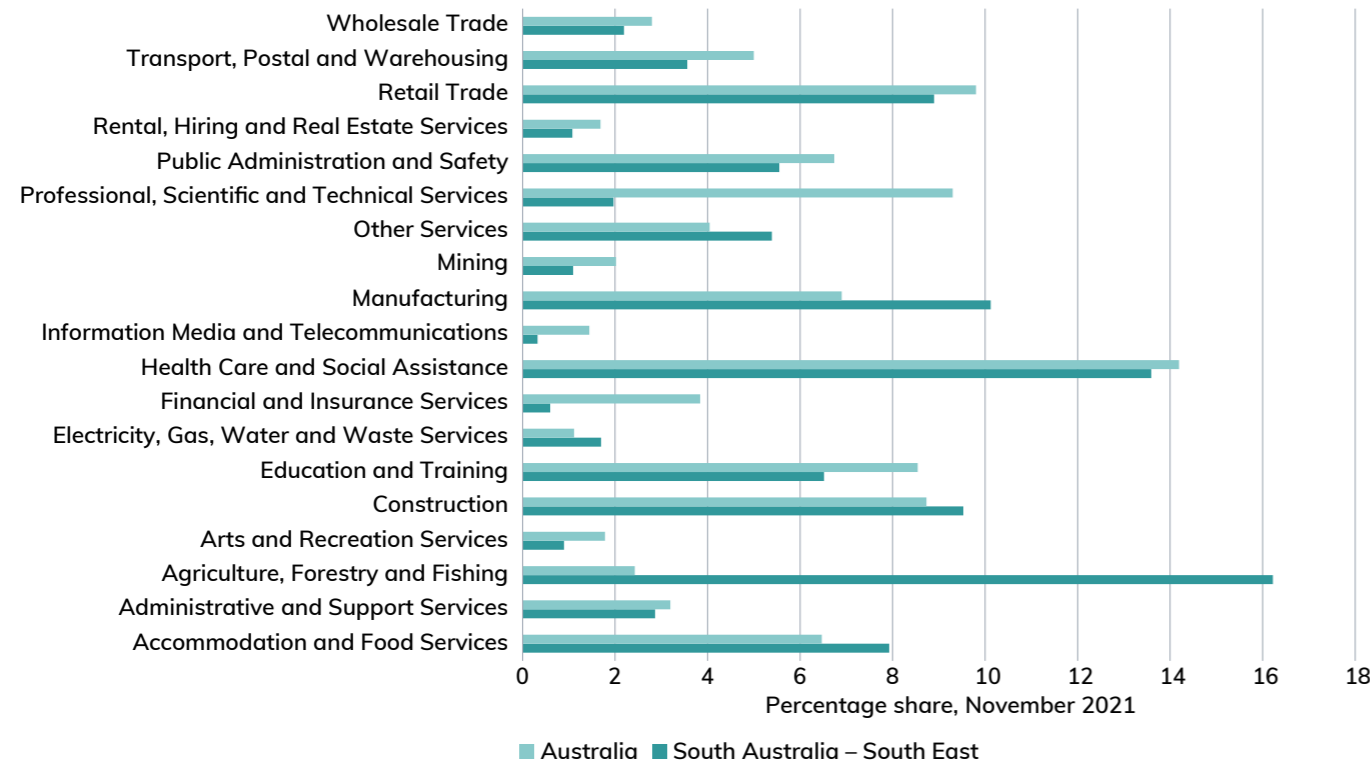
As a worked example, Figure 1 presents the industry share of employment for South Australia – South East (Statistical Area Level 4 (SA4)²) in comparison to the national economy. The industry with the largest employment share in South Australia – South East is *Agriculture, forestry and fishing* at 16 per cent of the region's total employment. Nationally, this same industry makes up only 2 per cent of total employment. In contrast, the share of employment in *Health care and social assistance* in the region is very similar to the Australian share (both 14 per cent of total employment).

² The [Understanding statistical geography](#) factsheet provides a quick guide to understanding spatial boundaries used to produce, analyse and publish regional data. It describes some common boundaries such as the SA4, and explains how regional data users can choose the most appropriate statistical geography for their region/s of interest.



Presentation tip: Compare a local economy's employment shares to understand how different or similar it is to another region, its own state, or Australia.

Figure 1: Industry share of employment for South Australia – South East and Australia



Source: ABS Labour Force Survey – Detailed 21/09/2022

In the Labour Force Survey, the ABS collects the Industry Division of main job once per quarter (in February, May, August and November). For SA4s (also called Labour Market Regions here), data is published as a four quarter average. This means that all SA4 industry data from this source is presented as smoothed over the year to the reference date.



Industry diversity and specialisation

The degree of industry diversity or specialisation is another way to consider a local economy's industry structure. Industry diversity refers to the overall distribution of employment (or output) across industries within the region.

Diversity is usually characterised as the presence of a wide range of industries and employment distributed across these industries. Specialisation refers to a high concentration of employment in a few or one industry operating within the regional economy.

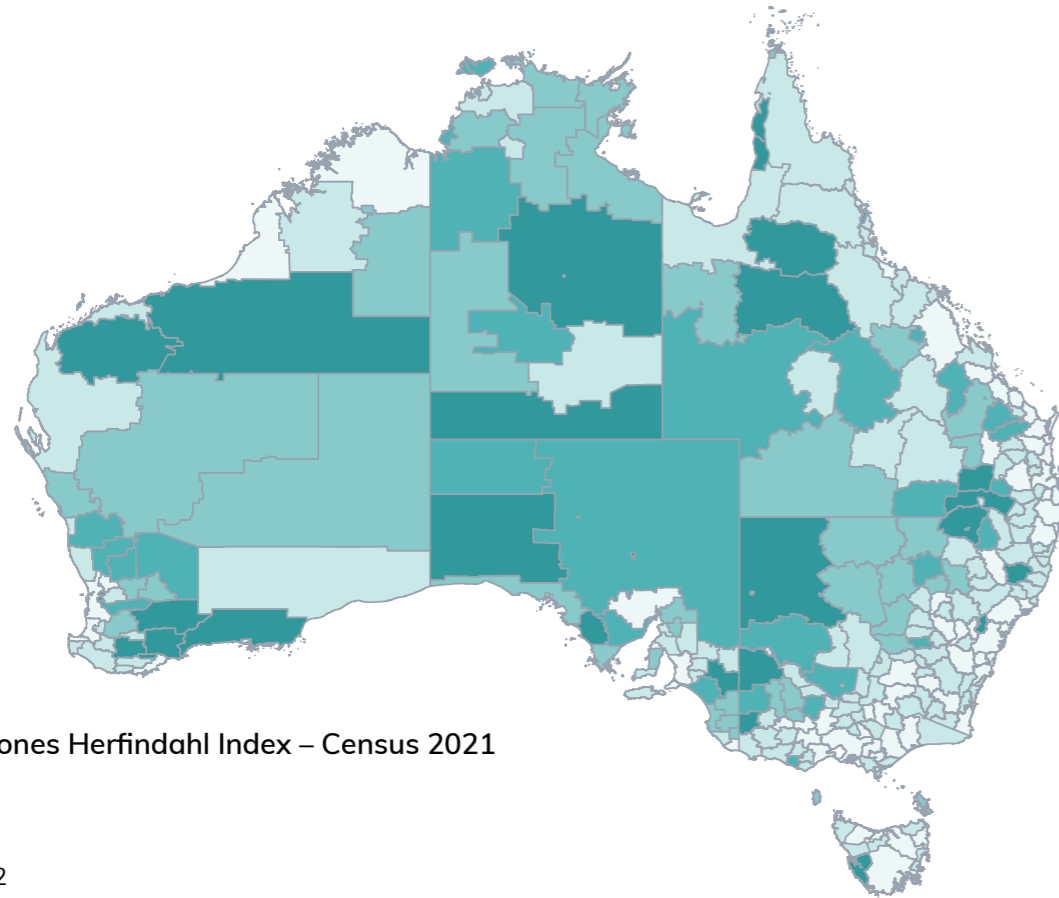
A common method to consider the concentration/diversity of a region's industry structure is the **Herfindahl Index** (also known as Herfindahl–Hirschman Index, or HHI) – regions with a high score have a less diverse mix of industries. These types of indexes are influenced by the size of the region and the number of industry categories (ie whether the analysis uses 1, 2 or 3 digit industry classifications).

Map 1 presents the HHI for Working Zones³ (WZ) across the country based on the 2-digit industry level. The five largest capital cities have the lowest HHI indexes, indicating highly diversified economies. In contrast, the highest HHI indexes are often concentrated in local economies reliant on agriculture and mining. For example, the WZs of Gnowangerup (WA), Karoonda-Lameroo (SA) and Barkly (NT) have high levels of agricultural employment and the highest HHI scores across Australia (25).

³ Working Zones are regions defined to reflect the commuting patterns of Australian workers and can be used to best analyse labour market activity [Working Zones 2016 | Bureau of Infrastructure and Transport Research Economics \(bitre.gov.au\)](https://www.bitre.gov.au/Working_Zones_2016)



Map 1: Working Zones Herfindahl index, 2021



Working Zones Herfindahl Index – Census 2021

- 0 to 4
- 4 to 8
- 8 to 12
- 12 to 16
- above 16

Source: Analysis of ABS 2021 Census
Note: HHI has been multiplied by 100.

Structural change

Structural change refers to shifts in the distribution of employment across industries. The emergence, growth, decline or loss of an industry affects whether, and how, local economies are changing over time. Table 2 presents three SA4s illustrating differences in the growth and share that regions can experience. For example, in the Mid North Coast (NSW), the *Health care and social assistance* industry's employment grew by an annual average of nearly 9 per cent over 5 years in comparison to only 3.8 per cent at the national level. This increase also indicates an increasing degree of specialisation in its local economy.

Table 2: Health care and social assistance shifts in employment, 2016–2021

Statistical Area 4 of residence	Health care and social assistance			
	Employed Nov 2021 (persons)	Average annual growth over 5 years (per cent)	Share of employment Nov 2021 (per cent)	Change in share 2016–2021 (percentage points)
Mid North Coast	21,521	8.9	25.5	9.5
Queensland - Outback	5,478	20.6	14.7	8.5
Western Australia - Wheat Belt	5,392	-4.5	7.9	-3.7
Australia	1,861,566	3.8	14.2	1.3

Source: ABS Labour Force Survey - Detailed 21/09/2022

A method to consider structural change is the **Structural Change Index (SCI)**. This index uses a single value for the region over a specified period of time. The SCI provides a measure of the extent to which industries within regions are changing due to changes in the composition of employment.

SCIs do not necessarily imply 'good' or 'bad' adjustments. The index reflects a shift in employment regardless of whether it represents employment growth or decline. For example, the opening of a manufacturing firm may substantially increase the region's share of employment in that industry. In another region a manufacturing firm's closure may result in an equivalent reduction in their share of employment in manufacturing. Using a SCI will result in a similar score, despite one declining and the other expanding.

Hence, while SCIs are useful in identifying compositional shifts in employment in a region, it is important to consider the SCI in conjunction with the employment growth/decline within each region.



Table 3 shows WZs with a high SCI (indicating greater structural change) and either high or low employment growth, along with WZs with a low SCI and either high or low employment growth. This table shows that the SCI can be high while total employment is declining and vice versa. Regions that are similar to the national average for employment growth and are similar to the group median SCI have been removed to illustrate contrast in the results. For example, Robinvale (Vic) has experienced high structural change with an index of 14.1. This is combined with high employment growth over the five years to 2021 at 21.6 per cent, with the growth primarily in the *Agriculture, forestry and fishing industry* but also declines in the share of *Health care and social assistance*, and *Education and training*. Consequently, while employment growth has been high, there has also been shifts in the structure of the local economy. In comparison, Ballarat and surrounds (Vic) had very little shifts in the local share of industries, with employment growth occurring in several industries such as *Construction; Electricity, gas, water and waste services; and Public administration and safety*.

Table 3: Structural change and employment growth, 2016–2021

Working Zones	Low SCI	Low (negative) employment growth	Working Zones	High SCI	Low (negative) employment growth
Waikerie (SA)	2.7	1.3	Ashburton (WA)	29.4	-53.5
St Arnaud (Vic.)	2.8	1.9	Aurukun (QLD)	25.5	-26.2
Barcaldine-Blackall (QLD)	3.0	-0.4	Barkly (NT)	19.4	7.9
Narrogin and Wagin (WA)	3.1	2.1	Yuendumu-Anmatjere (NT)	19.2	-16.7

Working Zones	Low SCI	High employment growth	Working Zones	High SCI	High employment growth
Brisbane and surrounds (QLD)	3.1	16.3	Elsy (NT)	18.6	26.2
Canberra and surrounds (ACT and NSW)	3.3	21.0	West Arnhem (NT)	16.7	19.3
Macleay-Yamba-Iluka (NSW)	3.4	16.7	Robinvale (Vic.)	14.1	21.6
Ballarat and surrounds (Vic.)	3.6	18.2	Norfolk Island (OT)	10.6	17.2

Source: Census 2016 and 2021, industry data at 1 digit level.
OT = Other Territories



Measuring structural change

Structural Change index

An accepted method of measuring structural change of a regional economy involves using changes in the industry shares of total employment over time to construct a single index – Structural Change index (SCI). The SCI is half the sum of the absolute value of changes in the percentage shares of employment of different industries for a given period.

$$SCI_t = \frac{1}{2} \sum_{i=1}^n |X_{i,t} - X_{i,t-1}|$$

where $X_{i,t}$ is the percentage employment share of industry (i) in the economy at time (t). It is recommended to have a longer period such as five years, between baseline ($t-1$) and end period (t) to capture longer-term trends rather than short-term variability.

The SCI provides a measure of the extent to which industries are growing at different rates, thereby reflecting the changes in the industry structure composition for the region over time. Where changes are small, the value of the index is small, indicating that there has been little structural change. Conversely, where changes in shares are large, the index registers a higher value indicating larger structural change. A SCI is bounded by 0 and 100. Consequently, a SCI of 10 means that 10 per cent of the workforce in the region moved into a different industry.



Measuring industry diversity and specialisation

1. Herfindahl index

A method to measure economic concentration is the Herfindahl index (also known as Herfindahl–Hirschman Index, or HHI). HHI is calculated by summing the square of each industry's share of total employment. A higher index is associated with larger (dominant) industries in a less diverse regional economy.

HHI is expressed as follows:

$$HHI = S_1^2 + S_2^2 + S_3^2 \dots S_n^2$$

Where S_1 to S_n are the various industries' shares of total employment.

2. The National Average index

The National Average index is used to measure industry diversity by comparing the industry structure of a region against that of the nation as a benchmark. Higher values of the index indicate greater divergence between a region's industry structure and the national structure. Smaller values indicate similarity. The National Average index is calculated by summing for each of the industry groups; the squared differences between the regional share of employment and the national share for the industry, divided by the national employment share for the industry.

National Average index is expressed as follows:

$$NA_j = \sum_{i=1}^n \frac{(P_{ij} - M_i)^2}{M_i}$$

Where P_{ij} is the regional share of employment for industry (i) in region (j) and M_i is the national share of employment for industry (i).