

Assessing Full Employment in Australia

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Abstract

Full employment is a longstanding objective of monetary policy in Australia, alongside price stability. The Reserve Bank Board aims to achieve the maximum level of employment consistent with low and stable inflation in the medium term. This article explains how RBA staff form an assessment of how labour market conditions stand relative to full employment. RBA staff draw on a range of labour market indicators, model-based estimates and outcomes for wages growth and inflation. Any single indicator tends to provide a partial view of the labour market and the level of each indicator that is consistent with full employment can change over time as the structure of the economy evolves. Ultimately, assessing how close the labour market is to full employment requires careful judgement, which the RBA sets out in its quarterly *Statement on Monetary Policy*.

Introduction

Monetary policy in Australia has traditionally aimed to maintain price stability and full employment. The price stability objective has, for some time, been defined in terms of the target range for consumer price inflation of 2–3 per cent. In contrast, the full employment objective does not have an equivalent numerical target. Following the 2023 Review of the RBA, the mandate for both objectives has been made more explicit in the updated *Statement on the Conduct of Monetary Policy* agreed between the

Treasurer and the Reserve Bank Board, with the Board committing to regularly communicate ‘its assessment of how conditions in the labour market stand relative to sustained full employment’ (Treasurer and Reserve Bank Board 2023). An explanation about the role of full employment in monetary policy was provided in the February *Statement on Monetary Policy* (RBA 2024). This article explains in more detail how RBA staff form an assessment of labour market conditions relative to sustained full employment.

Full employment and monetary policy

What is full employment?

The Reserve Bank Board aims to achieve sustained full employment. This is the maximum level of employment that is consistent with low and stable inflation in the medium term; it can change over time as the structure of the economy evolves.^[1]

At full employment, there is a balance between demand and supply in the labour market. This results in wages growth that is consistent with low and stable inflation in the medium term, taking into account the rate of productivity growth over time. Sustained full employment also coincides with balance in the markets for goods and services in the medium term, at which point firms' ability to raise prices is also consistent with achieving the inflation target. That said, price and wage-setting frictions and disruptions in the production of goods and services can lead inflation to deviate from the inflation target for a period even when the economy is at full employment.

If there is too little demand for labour – because of a lack of aggregate demand for goods and services – there will be additional people unemployed or underemployed, which can have a large financial and social toll. This 'spare capacity' in the labour market also puts downward pressure on wages growth and inflation. By contrast, if the demand for labour is well above the available supply – because aggregate demand is strong – fewer people will be unemployed or underemployed. Hence, businesses will offer higher wages as they struggle to fill vacancies and experience high staff turnover. Although higher wages growth and employment are features of a strong and productive economy, when aggregate demand is in excess of productive capacity, they can become unsustainable and place upward pressure on inflation. Persistently elevated wages growth that flows into higher inflation is a clear sign that the labour market is tighter than full employment.

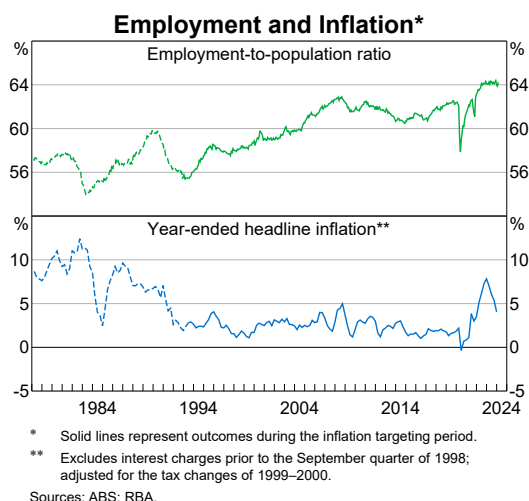
There are still people who are unemployed (i.e. they are looking for a job) or underemployed (i.e. in work, but wanting more hours) when the economy reaches full employment. This is, in large part, because of so-called 'search and matching' frictions,

such as how easily jobseekers can find vacant positions and the extent of any skills or location mismatch between jobseekers and vacancies, which mean that people who are looking for jobs or additional hours may not find them immediately.^[2]

Why is full employment a moving target?

We cannot directly observe the level of full employment, but we know it varies over time due to structural changes in the labour market. For example, over the past 30 years the employment-to-population ratio has steadily increased, while inflation has remained low and stable for most of that period (Graph 1). This suggests that the maximum number of people employed for a given population has increased over this period, alongside the increase in workforce participation. Our assessment of full employment needs to consider not only the number of people in employment relative to those who want to work, but also the number of hours that people currently work relative to the number they would like to work, which may also have changed over time. In general, labour demand must grow with the supply of labour to sustain full employment.

Graph 1



The balance of labour demand and supply consistent with full employment depends on structural features of the markets for labour, goods and services. For example, search and matching frictions lower the level of full employment.^[3] These structural features can change over time. Government policies can influence both structural

features of markets and labour supply decisions, and so influence the level of full employment.^[4]

Monetary policy has little direct effect on labour supply or structural features of the job market, rather the focus of monetary policy is to minimise short- to medium-term economic cycles. But periods of unemployment can reduce workers' earnings for several years afterwards and long spells can lead to skills atrophy, or cause workers to leave the labour force altogether, eroding the level of full employment that can be sustained (Borland 2020). So by acting to reduce the severity and duration of economic downturns, monetary policy may also be able to limit the extent of these so-called 'hysteresis' or 'scarring effects' on workers who lose their jobs during these episodes.^[5] And by helping to achieve low and stable inflation, monetary policy supports strong and sustained employment growth in the long run. This is because it creates favourable conditions for households and businesses to make sound decisions about how to spend, save and invest.

Assessing how close the labour market is to full employment

We draw on a broad suite of indicators to inform our overall assessment of labour market conditions. This includes labour market data, survey measures, information from liaison with businesses, model-based estimates, and wages growth and inflation outcomes. Our assessment also draws on economic research and the views of academics, market economists, government agencies, international organisations and other central banks. We also engage with key stakeholders that represent the interests of workers and groups that typically have greater difficulty finding employment.

The main focus of our assessment is fluctuations in the balance of demand and supply in the labour market (spare capacity or, conversely, tightness) over the short-to-medium term; that is, deviations of labour market conditions from full employment. By removing slow-moving structural trends from a range of labour market indicators, we can isolate this short- to medium-term cycle. Models are particularly useful in extracting this cyclical signal in a systematic manner.

A key issue for assessing spare capacity in the labour market is determining how it relates to inflationary pressures. Structural changes in the markets for labour, goods and services can all affect the extent of inflationary pressure that a given set of labour market conditions generates. For example, a key component of price inflation is growth in unit labour costs, which are driven by both wages and productivity growth. A persistent change in productivity growth would mean that the rate of wages growth required for inflation to be sustainably in the target range must also change. As such, an assessment of the maximum level of employment that can be sustained with low and stable inflation is best done in the context of a broad view of economic developments.

Careful judgement is needed when making an overall assessment of labour market conditions relative to full employment from this broad set of inputs because each piece of information requires interpretation and only provides a partial view of the labour market. This judgement is explained in the quarterly *Statement on Monetary Policy*, to provide transparency around our assessment of full employment.

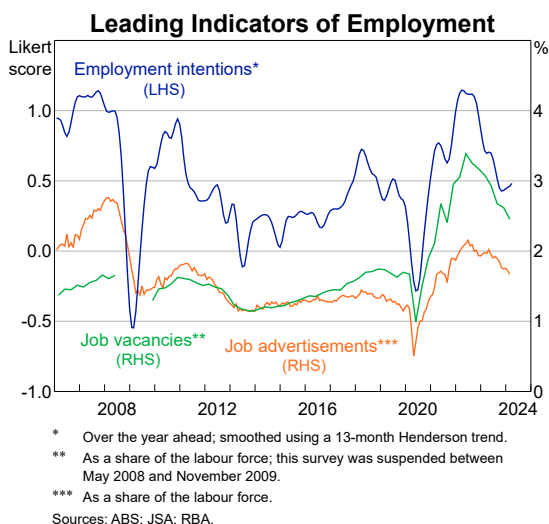
How labour market indicators inform our assessment

There are a wide range of economic indicators that capture different features of the labour market and respond in different ways to the business cycle. These indicators can be broadly summarised as primarily capturing either movements in labour demand, supply, or spare capacity. However, indicators tend to overlap categories because they will reflect both demand and supply forces. Wages growth and consumer price inflation also form an important part of the indicators analysed, though they can also reflect developments outside the labour market. Judgement is required in considering the factors that drive changes in each of these indicators.

Labour demand

Indicators such as the number of job advertisements, job vacancies and measures of firms’ employment intentions from business surveys and the RBA’s liaison program provide information on the demand for new employees (Graph 2). These indicators provide a relatively timely read on firms’ labour demand and employment growth, helping to identify turning points in labour market conditions (Edwards and Gustafsson 2013). They also reflect the balance between labour demand and labour supply. For instance, the large increase in vacancies during the pandemic partly reflected a shortage of suitable applicants, such as the pandemic-related decline in temporary migrants affecting industries like hospitality.

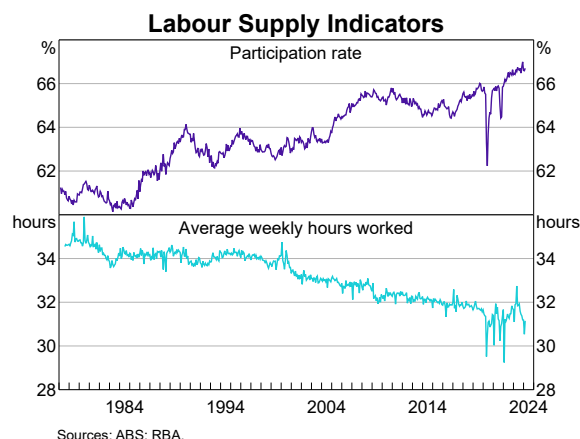
Graph 2



Labour supply

Changes in the participation rate, population growth and average hours worked affect labour supply and therefore the extent of any spare capacity (Graph 3).^[6] These indicators affect the level of full employment since they determine the pool of available labour hours, and so the level of employment that is consistent with low and stable inflation. Population growth adds to labour demand, as well as supply.

Graph 3



Movements in these indicators reflect both structural and cyclical forces. The steady increase in the participation rate over many decades reflects longer run structural trends, such as the increase in female labour force participation and an increased tendency for workers to retire later. Population growth is affected by changes to life expectancy, birth rates and migration. The decline in average hours worked reflects shifts in work preferences and an increase in the part-time share of employment associated with structural changes in the economy and labour market reforms in the 1980s and 1990s. Labour supply also responds to the economic cycle. For example, when labour demand is strong, more people may be willing to work additional hours because wages growth tends to be stronger. In addition, more people tend to be drawn into the measured labour force when demand is strong.^[7] More generally, as with other labour market indicators, it can be difficult to disentangle the cyclical and structural factors at play and obtain a clean read of the extent of labour supply that is consistent with full employment.

Labour market spare capacity

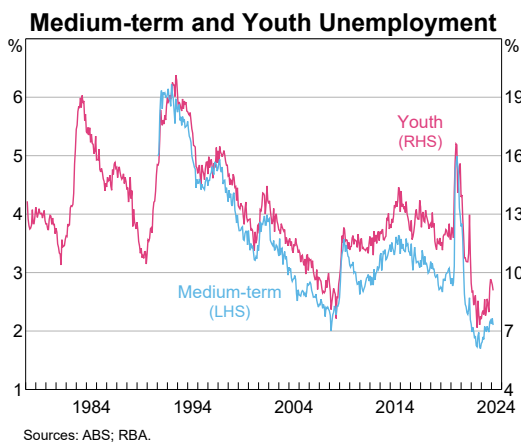
There are a number of measures of spare capacity (or labour market tightness) that are particularly useful for assessing the balance of labour demand and supply.

The unemployment rate has traditionally been the key measure of labour market spare capacity. However, structural trends in the labour market mean that the unemployment rate that is consistent with full employment has changed over

time and will likely continue to do so. These structural factors may be driven by changes in the composition of labour underutilisation, wage-setting practices, welfare systems and labour market regulation. There are various ways to separate these structural changes in the unemployment rate from the cyclical moves that are most relevant for monetary policy. Economic models are particularly helpful in this respect and are discussed further below.

More detailed components of unemployment add colour to the picture of spare capacity and are affected differently by cyclical and structural developments. For instance, movements in unemployment differ depending on the duration of unemployment experienced by jobseekers. In fact, movements in the rate of medium-term unemployment – those that have been unemployed for between four and 52 weeks – better reflect cyclical labour market conditions and are most relevant for wages growth, whereas the long-term unemployment rate is more related to structural factors (Ballantyne, De Voss and Jacobs 2014). The youth unemployment rate also tends to respond more to cyclical conditions (Graph 4; Dhillon and Cassidy 2018).

Graph 4

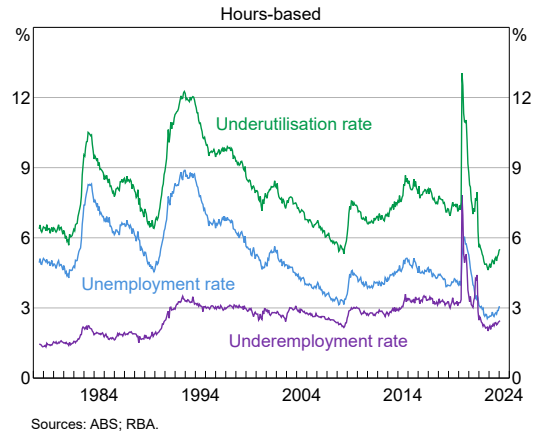


Broader measures such as the hours-based underutilisation rate are important for a full picture of labour market spare capacity. The unemployment rate is a useful headline statistic, but it is a narrow measure, excluding workers who currently have jobs, but would like to work more hours – the underemployed. To account for the

total volume of spare capacity in hours, we look at the hours-based underutilisation rate, which captures the shortfall of hours worked due to both unemployment and underemployment. Like unemployment, underutilisation measures also have structural trends that need to be considered when interpreting the data (Graph 5).

Graph 5

Labour Underutilisation



Job opportunities and the rate at which people move between jobs also provide an indication of labour market tightness. The number of vacancies relative to the number of unemployed people captures the number of job opportunities for each person looking for work. An increase in this ratio indicates a tighter labour market. That could be due to higher labour demand leading to higher vacancies, or because of increasing labour shortages or skill mismatches. Rates of hiring, and involuntary and voluntary job separation can help us understand changes in the amount of spare capacity more deeply. Rates of job switching are also linked with tightness in the labour market and are positively associated with aggregate wages growth (Black and Chow 2022). Survey data that report the extent to which labour is a constraint on output for firms also provides an indication of tightness.

Wage and price indicators

Price and wage indicators, in combination with productivity, provide useful information on the overall balance of demand and supply in the labour market. Detailed wages data can be useful to gauge the breadth of imbalance and whether particular sectors or occupations are tighter than others.

Consumer price inflation outcomes are also informative in gauging the balance of demand and supply in the market for goods and services, which in turn affects conditions in the labour market.

Inflation, wages and labour costs (i.e. wages accounting for productivity) are commonly used in models to generate statistical estimates of full employment (see below).

However, inflation can move for reasons other than imbalances between labour demand and supply. For instance, inflation can be affected by changes in the production of goods and services unrelated to labour markets, including disruptions in foreign supply chains for goods. The relationship between labour market conditions, wages and inflation may also be subject to lags; for example, a large share of Australian wages is set by annually reviewed award rates or by multi-year enterprise bargaining

agreements, both of which can moderate the frequency of wage changes. Given these complications, some judgement is required when determining how wages growth, inflation and productivity inform an assessment of full employment.

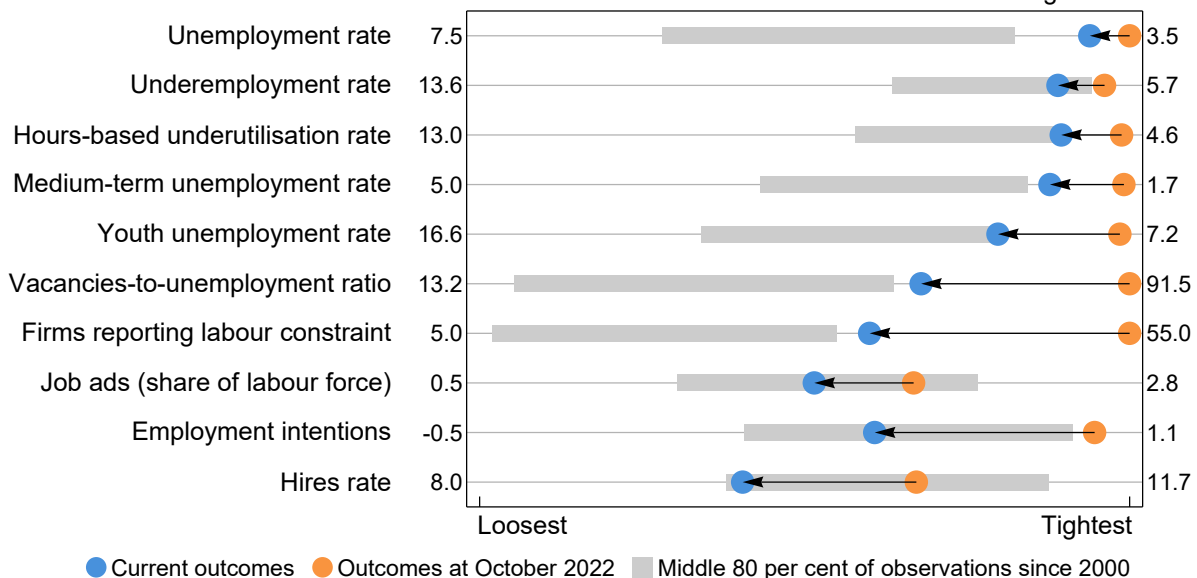
Drawing key indicators together

Any single indicator provides only a partial view of spare capacity in the labour market. Looking at the pattern across a range of indicators provides a more comprehensive picture. Graph 6 provides a visual summary of some of the key indicators. It compares the latest observation of each indicator (blue dots) with the middle 80 per cent of observations since 2000 (grey bars) for historical context. It suggests that the labour market remains tight but has eased relative to when the labour market was very tight in late 2022 (shown as orange dots, which for many indicators are close to their tightest level on record). The easing in the labour market since late 2022 is most evident in measures that tend to be leading indicators, such as firms' employment intentions.

Graph 6

Full Employment Indicators

Current conditions relative to 2000–2024 range

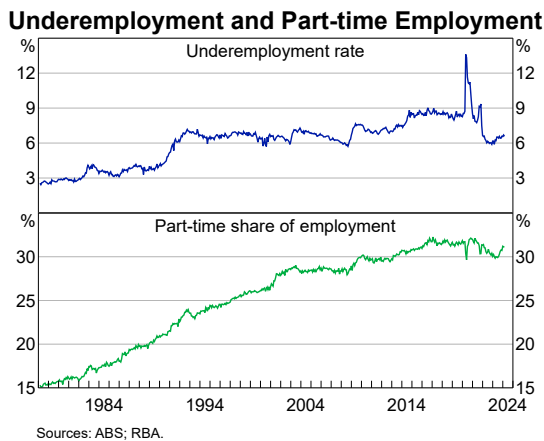


Sources: ABS; JSA; NAB; RBA.

In practice, there is no mechanical link between this summary and our overall assessment of labour market conditions relative to full employment, which is set out in the quarterly *Statement on Monetary Policy*. Although history may be a guide to finding the full employment level of these variables, there are several limitations with this approach that mean the relevant benchmark is uncertain and so judgement is required when interpreting the graph.

One limitation is that these variables may have trended up or down over time, so looking at the current level of an indicator relative to history can be misleading. Focusing on the values of these indicators when the economy was previously near full employment is also problematic since the level of full employment changes over time and is uncertain itself. For example, the underemployment rate has trended upward over time, along with the part-time share of employment (Graph 7; Chambers, Chapman and Rogerson 2021). This has occurred alongside structural changes to the Australian economy, such as the shift to a greater employment share in services industries and labour market reforms that have made it easier for firms to adjust the working hours of their employees (Bishop, Gustafsson and Plumb 2016). So the very low level of underemployment in the 1970s is not a good guide for the level of underemployment consistent with full employment today. We have models that can help us extract the cyclical signal from the trend in labour market indicators, but they are not available for every variable.

Graph 7



Another reason judgement is required when making comparisons across the indicators is because the distribution of historical outcomes varies from one indicator to the next. For example, unemployment spikes upwards during downturns, but tends to move down gradually during economic expansions. Because of this, and a longer run downward trend over recent decades, outcomes of the unemployment rate tend to be located towards the right-hand side of Graph 6. This contrasts with the recent behaviour of the vacancies-to-unemployment ratio, which increased sharply as the labour market tightened. As a result, movements in this ratio have been greater in magnitude lately, while the position of typical levels of this indicator are much further to the left than for other indicators.^[8]

Finally, the summary in Graph 6 should not be thought of as being static. The indicators on the graph may change as further work is done, new data sources become available or alternative data sources become better suited to illustrating the state of the labour market. Microdata are increasingly being used to unlock perspectives on the labour market that were not previously available, and more indicators built on these data could be constructed in the future.

How models inform our assessment

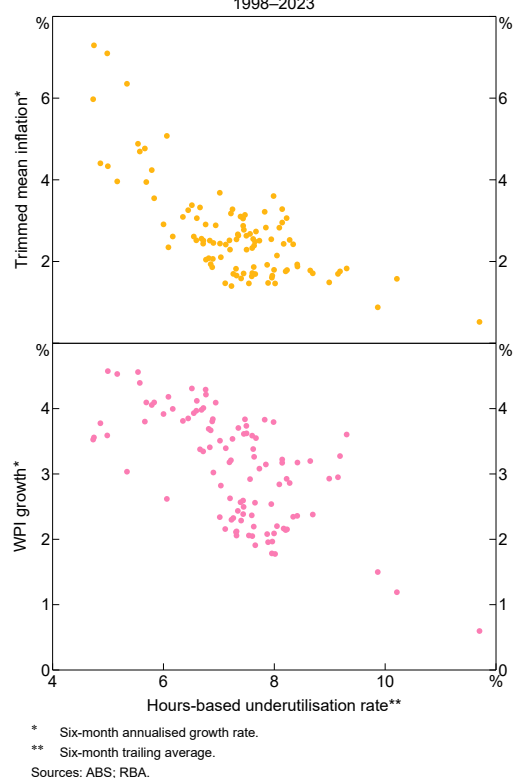
By exploiting historical relationships between labour market indicators, models help us synthesise information into quantitative assessments of labour market conditions. They are particularly useful for capturing the relationship between the labour market, wages growth and inflation. However, there is considerable uncertainty around these model-based assessments, as there is only so much information models can provide about unobservable concepts like full employment. Even so, models are a useful input into our overall assessment of labour market conditions.

Separating trend and cycle

Models rely on a combination of economic theory and statistical techniques to separate spare capacity (cyclical variation in the data) from any structural trends and noise (such as measurement error). This provides a formal framework for analysing the history of a single or several labour market indicators, and the output can be cross-checked against what we know about historical developments to ensure consistency. The structural trends extracted from the data may be of economic interest themselves, but primarily allow for a cleaner read on how current conditions differ from a labour market with labour supply and demand in balance. For example, underutilisation typically ranged between 5½ per cent and 8 per cent over 2000–2024 (i.e. the light grey range in Graph 6), but our models suggest that the rate of underutilisation that can be sustained without creating inflationary pressure was at the lower end of this range at around 6–7 per cent at the end of 2023.

Most models used to assess spare capacity in the labour market exploit historical relationships between unemployment or hours-based underutilisation and other variables measuring inflationary pressures. For example, there is typically an inverse relationship between the hours-based underutilisation rate and wages growth or inflation in the short term – this is a version of the Phillips curve (Graph 8).^[9] Based on this relationship, our models use movements in wages or prices to infer the gap between the hours-based underutilisation rate and its full-employment level. If we see high wages growth or upward pressure on inflation, it suggests a tight labour market with strong labour demand relative to supply, and so the current hours-based underutilisation rate is likely to be below its full-employment level. If we see low wages growth or downward pressure on inflation, it suggests that there is spare capacity in the labour market with weak labour demand relative to supply, and so the current hours-based underutilisation rate is likely to be above its full-employment level.

Graph 8
Inflation, Wages and Labour Underutilisation
1998–2023



The non-accelerating inflation rate of unemployment or NAIRU

Many central banks, including the RBA, have traditionally used Phillips curve models to estimate spare capacity in the labour market, in particular a type of Phillips curve model that estimates a non-accelerating inflation rate of unemployment (NAIRU).^[10] The (unobservable) NAIRU is often thought of as the unemployment rate at which inflation is neither rising nor falling, and is estimated using a specific set of assumptions. A key feature is that it incorporates a role for inflation expectations into the Phillips curve; if unemployment remains too low for too long, inflation expectations will rise, which risks ingraining higher rates of inflation. In this way, any attempt to push unemployment permanently lower than the NAIRU will lead to ever increasing rates of inflation.

However, the way the NAIRU is modelled has evolved since it was introduced in the 1970s. One innovation is the extension to broader measures of spare capacity, such as the non-accelerating inflation rate of labour underutilisation (NAIRLU) that uses the hours-based underutilisation rate instead of unemployment. A more fundamental refinement has been the treatment of inflation expectations. In the form currently implemented at the RBA, the NAIRU models measure the rate of unemployment that would be consistent with actual inflation being in line with expected inflation. That is, when unemployment is at the NAIRU, the models predict that inflation will drift from its current rate towards inflation expectations and then remain stable. (The same holds for the underutilisation-based NAIRLU models.) In this framework, it is only when inflation expectations become unanchored that continually rising inflation is possible, so the ‘non-accelerating’ part of the name does not describe the modern application well. The models do not mechanically require unemployment above the NAIRU for inflation to fall from a high level back towards target if inflation expectations remain anchored.

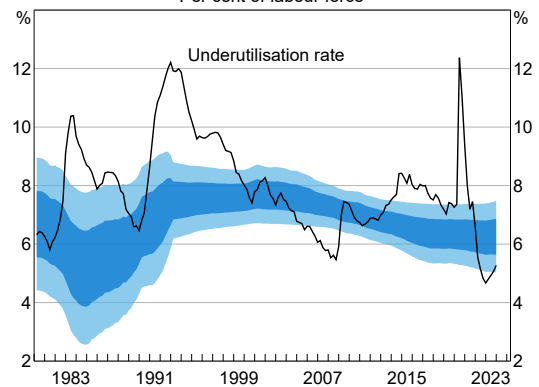
Because we cannot observe the NAIRU directly, we use statistical models to estimate it based on the relationships between inflation, labour costs and the unemployment rate. If the unemployment rate declines and inflation does not increase by as much as historical relationships would suggest, then model estimates of the NAIRU will decline, all else equal. This has been broadly the case over the past two decades, with estimates of the NAIRU declining gradually by roughly 2 percentage points. In today’s labour force, that equates to a little over 290,000 additional workers that can be sustainably employed.

NAIRU models are a useful starting point and there is extensive literature about them; however, as with all models, there are limitations and critiques.^[11] In particular, the estimates can be sensitive to the model details, are prone to revision as new data come in, and have large uncertainty around them. The structural determinants of the NAIRU are not modelled, and the models do not provide forecasts of how the NAIRU might change in future. In

addition, the NAIRU models used in the RBA do not specify how inflation expectations will evolve – this is of crucial importance to the inflation outlook and is addressed in other models.

Recently developed NAIRU and NAIRLU models by the RBA take greater signal from wage outcomes over inflation outcomes and incorporate a more explicit role for productivity growth. But all of the model estimates have a wide band of uncertainty. Graph 9 shows the range of uncertainty around one particular model that feeds into our suite of NAIRLU models, which is fairly typical of the uncertainty around the central estimates of other suite models.

Graph 9
Uncertainty around
Model Estimates of Full Employment*
Per cent of labour force

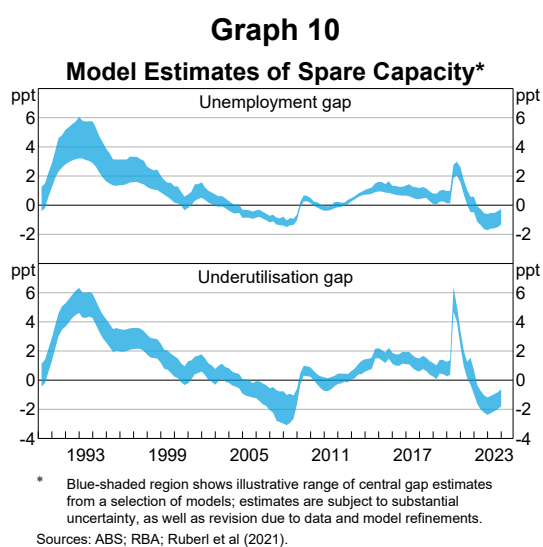


* Shaded areas represent one and two standard error bands for smoothed estimates of a single model, accounting for filtering and parameter uncertainty.

Sources: ABS; RBA.

A suite of models for inferring spare capacity

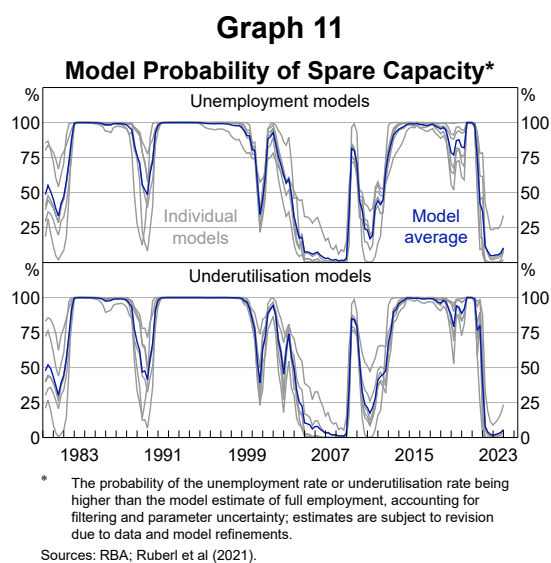
Different models will have different strengths and weaknesses, and no model sufficiently captures all dimensions of labour market spare capacity. We use a suite of models to capture a range of perspectives, which extend beyond the NAIRU and NAIRLU framework. The suite includes models developed within the RBA and models developed externally.^[12] We look at model estimates of spare capacity in terms of the ‘gaps’ between the current unemployment and underutilisation rates and the model-based estimates of their full-employment rates (Graph 10). The estimates suggest that the labour market remains tight, but has eased relative to its peak.



We have been further developing our modelling suite to both refine our estimates and broaden the frameworks used. For example, a recently developed model incorporates information from a wider range of labour market indicators, including leading indicators of labour demand like vacancies and job advertisements. The suite of models will continue to evolve.

The range of estimates in Graph 10 covers the central estimates from the selection of models in our suite, but does not capture the uncertainty around each estimate. To provide a view from the models that accounts for all of the most important forms of uncertainty, we can look at the implied probability in each model that there is spare

capacity in the labour market (i.e. the probability that the current rate of unemployment or underutilisation is above its sustainable level; Graph 11). A probability of 50 per cent broadly accords with a labour market that is in balance, according to the models. A simple average across the models suggests that the probability that the labour market was operating with spare capacity at the end of 2023 is modest, around 10 per cent based on most of the models of unemployment and around half of that based on hours-based underutilisation.



Conclusion

Assessing the level of full employment consistent with low and stable inflation is an important task for central banks. Staff at the RBA consider a wide range of inputs to form an overall assessment of the (unobservable) level of full employment. This includes using various labour market indicators, and models that combine information on labour market conditions and inflationary pressures based on economic theory. However, simply looking at the current level of indicators relative to history can be misleading and there may also be developments that models do not fully capture. As a result, careful judgement is required to weight all available information to assess how close the labour market is to full employment.

Endnotes

- [*] Alexander Ballantyne and Avish Sharma are from Economic Analysis Department and Tim Taylor contributed while on secondment in Economic Group. They would like to thank Ewan Rankin, Nick Stenner, Matt Read, Tom Rosewall, Marion Kohler, David Norman, Michelle Lewis, Sue Black, Lynne Cockerell, Sarah Hunter, Chris Kent, Brad Jones, Jeff Borland and Anthony Brassil for comments on this article.
- [1] Full employment has a long history in Australia and internationally, but there is no universally accepted definition and there are subtle differences between definitions used by fiscal and monetary authorities. Nonetheless, the definition used in the *Statement on the Conduct of Monetary Policy* is consistent with that used by several peer central banks.
- [2] There are also other factors that can affect the amount of unemployment that occurs when the economy is at full employment, such as market power, industrial relations regulation and social support systems.
- [3] For example, changes in the patterns of demand or production can require workers with a different skill set to what are currently available, which increases the structural mismatch in the labour market and lowers full employment.
- [4] The Australian Government (2023) has released a White Paper setting out its 'inclusive' full employment objective – to broaden labour market opportunities and to lift the level of employment that can be sustained over time.
- [5] A sustained strong labour market might permanently increase labour supply by encouraging more people into the workforce and providing opportunities to gain new skills and experience. The extent to which this happens remains an open question.
- [6] People's preferred hours of work will also affect labour supply. However, detailed data on the preferred hours of work for those not in the labour force is currently not available, so it is difficult to gauge total potential hours in the economy.
- [7] There are a large group of potential workers who are not counted as part of the labour force but wish to work. These individuals typically do not meet the Australian Bureau of Statistics' definition of unemployment because they are either not immediately available or not actively searching for a job. But these potential workers represent another source of labour supply and their flows into and out of the labour force in each month are large (Evans, Moore and Rees 2018; Gray, Heath and Hunter 2005). Measuring this broader group of potential workers remains a challenge.
- [8] The choice of the historical range shown in Graph 6 is also a judgement call and can influence any inferences made. Increasing the historical range means the variables are more susceptible to structural trends, whereas a shorter range may mean there is less cyclical variation in the indicators.
- [9] The Beveridge curve, which shows that the unemployment rate is inversely related to the vacancy rate, is the other most commonly used framework for modelling full employment.
- [10] Central bank literature on the NAIRU includes: Gruen, Pagan and Thompson (1999); Cusbert (2017); Crump, Nekarda and Petrosky-Nadeau (2020); Jacob and Wong (2018).
- [11] Further literature on the NAIRU includes: Gordon (1997); Staiger, Stock and Watson (1997); Espinosa-Vega and Russell (1997); Ball and Mankiw (2002).
- [12] External estimates have also been used as part of the suite, primarily those produced by the OECD; however, the OECD has discontinued updating their estimates and so they are not included here.

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