Evaluating indicators of labour market capacity in New Zealand

AN2019/09

Finn Robinson, Jamie Culling, and Gael Price

June 2019

Reserve Bank of New Zealand Analytical Note Series
ISSN 2230-5505

Reserve Bank of New Zealand
PO Box 2498
Wellington
NEW ZEALAND

www.rbnz.govt.nz

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NON-TECHNICAL SUMMARY

The Reserve Bank of New Zealand sets monetary policy to achieve two operational objectives: to keep future annual inflation between 1 and 3 percent over the medium term (with a focus on the 2 percent mid-point) and to support maximum sustainable employment (MSE). The target inflation rate is observable data measured by the Consumer Price Index and produced by Stats NZ. However, the maximum sustainable level of employment is not directly measurable.

The Reserve Bank has always monitored the labour market. Such analysis is important for understanding the transmission of monetary policy and avoiding unnecessary volatility in the real economy. The aspect which is new in the current environment is the concept of maximum sustainable employment as an operational objective. The analysis in this Note provides an initial consideration of this new part of the Reserve Bank’s mandate, allowing us to document our current thinking and learnings about the labour market.

This Note evaluates how well measures of labour market slack are able to explain and forecast key variables – non-tradables inflation, wage inflation, and employment growth. The 44 measures explored in this paper capture aspects of the labour market that are covered in previous Reserve Bank publications, as well as aspects that are new to us. We evaluate the Reserve Bank’s more-traditional measures of capacity pressure. We also evaluate additional labour market indicators, including measures of underemployment, underutilisation, flows in and out of employment, and different dimensions of unemployment, including unemployment by region, age, and ethnicity.

Our results show that labour market indicators that are particularly sensitive to business cycle fluctuations are better at forecasting employment, wages growth, and non-tradables inflation. These well-performing measures include Māori and youth unemployment rates, a reduced form Philips curve model, underutilisation, and the job finding rate.

This exercise may give us some indication of which measures we should pay closer attention to when assessing where employment is compared to MSE. We still see value in keeping track of the full suite of labour market indicators. Different measures can be informative in different situations, and monetary policy formulation benefits from having a holistic view of the labour market over time. By consolidating all these indicators in one suite, we have a more detailed picture of the labour market.

1 The authors would like to thank Yuong Ha, Özer Karagedikli, Punnoose (Reuben) Jacob, Rebecca Williams, Julia Ratcliffe, Christie Smith, and seminar participants at the Reserve Bank of New Zealand for their valuable contributions.

2 See, for example, Jacob and Wadsworth, 2018; Culling and Skilling, 2018; Karagedikli, 2018; Armstrong and Karagedikli, 2017; Armstrong and McDonald, 2016; Armstrong, Kamber and Karagedikli, 2016; McDonald, 2013; Craigie, Gillmore, and Groshenny, 2012.
1. Introduction

On 14th February 2019, the Governor of the Reserve Bank of New Zealand and the Minister of Finance signed the first Remit specifying the Monetary Policy Committee’s (MPC) new dual employment and price stability objectives. The Remit preserves the objective to keep future annual inflation between 1 and 3 percent over the medium term (with a focus on the 2 percent mid-point), while also directing the MPC to support maximum sustainable employment (MSE) within the economy.

Our assessment of spare capacity in the labour market utilises a wide range of indicators. These measures are based on both formal econometric models using aggregate macroeconomic data, and more granular information from various segments of the labour market.

The purpose of this Note is to evaluate how well indicators of spare capacity in the labour market can forecast domestic inflation, wages growth, and employment growth. This evaluation is done using a Phillips curve framework.

In this Note, we focus on the two measures of inflation most likely to be affected by labour market pressures – domestic inflation measured by the non-tradables component of the Consumers Price Index (CPI), and wage inflation measured by the Labour Cost Index. We also examine employment growth, as measured by total employment in the Household Labour Force Survey (HLFS).

The findings reported here allow us to identify some measures that are better at explaining and forecasting inflation and employment. These measures are Māori and youth unemployment rates, underutilisation, the job finding rate, and an unemployment gap calculated using a Phillips curve model of trend unemployment. Based on our approach, these indicators could be given more weight when evaluating if employment is at, above, or below its maximum sustainable level.

This Note proceeds as follows. Section 2 outlines the range of labour market indicators we examine. Section 3 outlines our methodology. Section 4 summarises the data used in the evaluation. Section 5 presents our results. Section 6 discusses policy implications, and section 7 concludes.

2. Introducing the labour market indicators

In this section we introduce the 44 labour market indicators used in this analysis (table 1). These provide a more comprehensive overview of capacity pressures in the labour market than simply looking at the headline unemployment rate. Appendix A in the technical appendix provides a more comprehensive overview of each indicator.
## Table 1: List of labour market indicators

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\(^3\) Household Labour Force Survey published by Stats NZ.

\(^4\) Quarterly Employment Survey published by Stats NZ.

\(^5\) The hours worked gap is calculated similarly to the unemployment and employment rate gaps, but makes an adjustment that excludes changes in the size of the labour force from the indicator. The formula for this measure is:

\[
\text{Hours gap}_t = \log\left(\frac{1 - u_t}{1 - u^*}\right) + \log\left(\frac{\text{hpp}_t}{\text{hpp}^*}\right)
\]

where \(u_t\) = the unemployment rate, \(u^*\) = RBNZ internal measure of trend unemployment, \(\text{hpp}_t\) = hours worked per person, and \(\text{hpp}^*\) = RBNZ internal measure of trend hours worked per person.

\(^6\) A modified version of the labour utilisation composite index developed by Armstrong, Kamber, and Karagedikli, (2016), but restricted to use only levels measures rather than combining level and change measures.
3. Evaluation Methodology

In this section we outline our approach to evaluating the information content of the various labour market indicators. The evaluation is based on the idea that when the labour market is tight we would expect increased domestic inflation and wages growth. And, we would expect employment growth to slow down as firms struggle to fill vacancies and costs build up. This is similar to the logic applied in Armstrong (2015) and Marcellino and Musso (2010) when evaluating output gap estimates.

We test whether each indicator:

1. is statistically significant in explaining domestic inflation, wages growth, and employment growth over history; and
2. forecasts domestic inflation, wages growth, and employment growth better than the unemployment rate.

These tests are carried out for two domestic inflation measures: the non-tradables component of the CPI, and a measure of wage inflation from the LCI. We also conduct the same tests with employment growth (total employment from the HLFS).

Our evaluations are carried out using a Phillips curve framework. Both tests use the same general specification for the Phillips curve:

\[ Y_{t+h} = \beta_1 + \beta_2 d_t + \beta_3 \pi_t^e + \beta_4 X_{t-p} + \varepsilon_t, \quad (1) \]

where:

- \( Y \) is one of non-tradables CPI inflation, LCI inflation, or employment growth (all measured in quarterly percent change);
- \( d \) is a set of dummy variables controlling for various changes in labour market regimes over history;\(^7\)
- \( \pi^e \) is one-year-ahead inflation expectations from the RBNZ Survey of Expectations;\(^8\) and
- \( X \) is one of the set of 44 indicators being evaluated.

The parameters \( h \) and \( p \) are model-selection parameters that are used to adjust the specification as appropriate for each test. Further details are available in Appendix B in the technical appendix.

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\(^7\) The regime changes dummyd out are: (1) The enforcement date of the Employment Contracts Act 1991 (April 1991); (2) the enforcement date of the Employment Relations Act 2000 (April 2000); (3) changes to the youth minimum wage regime in April 2001, April 2003, April 2008, and April 2013 (source: MBIE, https://www.employment.govt.nz/hours-and-wages/pay/minimum-wage/previous-rates/).

\(^8\) We also ran the analysis using two-year-ahead wage inflation expectations from the RBNZ Survey of Expectations. There was very little difference in the results.
4. Data

The data used in our evaluation run from 1992Q1 to 2018Q3. The in-sample significance tests are carried out on the final vintage of data. All data (except the dummy variables) are seasonally adjusted before use.

For the forecast evaluation, real-time vintages of variables are used, with the earliest vintage running from 1992Q1-2001Q1, and the latest has an end date of 2018Q3. If real-time vintages of the data are not available, we trim the final vintage of the data to what would have been available at the time. All seasonal adjustment is carried out in real time, as the seasonal pattern may change.

In both evaluations, non-tradables inflation and the inflation expectations measure are both adjusted to remove the effect of the increase in the rate of Goods and Services Tax (GST) in 2010.

See the Appendix D in the technical appendix for further details.

5. Results

5.1. Forecast performance of the unemployment rate benchmark

In the absence of the suite of labour market indicators, the Reserve Bank would likely turn to the unemployment rate as a proxy for labour market slack. Therefore any variable that performs better than the unemployment rate is an improvement over this simple default position. However, just because an indicator improves on the unemployment rate does not necessarily mean it is a good indicator in its own right.

This section demonstrates that the unemployment rate performs relatively poorly in forecasting all three variables of interest. Therefore, while our main results suggest that some indicators out-perform the unemployment rate, these measures may not be the best possible forecasting models for any of the variables.

We assess how well the unemployment rate forecasts each variable of interest, compared to an autoregressive process of order 1 – an AR(1). The forecast evaluation is carried out both in real-time (using the initial vintage that would have been available over history) and pseudo-real-time (using the final vintage of the data up to the quarter it was available for that estimation period). The specification is the same as used for the forecast performance tests described in section 3 above, but using an autoregressive process rather than an indicator variable.

Figure 1 shows the results for forecasts from 1 to 8 quarters ahead. For all target variables, the unemployment rate performs better than an AR(1) only at longer horizons. The improvement is statistically significant only at 8 quarters ahead for non-tradables inflation and employment growth, and at quarters 6 to 8 for LCI inflation. In all cases the forecast performance of the final vintage of unemployment is very similar
to its real-time performance, although the significance of the results does vary across specifications.

Figure 1a: Forecast performance (non-tradables CPI inflation)

Figure 1b: Forecast performance (LCI inflation)

Figure 1c: Forecast performance (HLFS employment growth)

Source: RBNZ estimates.

Note: The horizontal axis measures the number of quarterly horizons ahead. A result less than 1 indicates that the unemployment rate outperforms an AR forecast at the given horizon. Differences which are statistically significant at the 10% level are marked with a triangle (Δ).
5.2. Summary of main results

Figure 2 contains a Venn diagram showing which indicators are significantly better than the unemployment rate at forecasting non-tradables inflation, wages growth, and employment growth. Indicators that are not in any of the circles of the diagram either performed similarly to the unemployment rate, or worse.

Overall, measures of the labour market reflecting groups particularly vulnerable to the business cycle are better at explaining and forecasting wage and non-tradables inflation (figure 1). These indicators include:

- the Māori unemployment rate and its deviation from the headline unemployment rate;
- youth unemployment rates and their deviation from the headline unemployment rate;
- the Phillips curve unemployment gap; and,
- the underutilisation rate (and underemployment rate, which is a subset of underutilisation).

Results for the in-sample significance test and out-of-sample forecast evaluation are reported fully in Appendix C in the technical appendix.

The empirical results do not allow us to state definitively which indicators are superior measures of labour market slack. The question of exactly how labour market capacity pressures influence non-tradables inflation, wage inflation, and employment growth, is also unanswered. This is a question best answered by structural modelling. For the time being, then, we treat the empirical results purely as a guide, not a definitive test of indicator quality.
Figure 2: Results of forecasting exercise

Note: NT = non-tradables inflation, LCI = wage inflation from Labour Cost Index, and EMP = employment growth. Indicators in each circle are significantly better at forecasting the variable labelled in bold than the unemployment rate. E.g. the job finding rate is significantly better than the unemployment rate at forecasting employment growth and wage inflation.
6. Policy implications

This Note has evaluated the performance of a range of labour market indicators at forecasting and explaining key labour market variables. These indicators are useful in forming an assessment of how much spare capacity exists in the labour market.

The monetary policy Remit requires the Bank to support maximum sustainable employment in the economy. However, unlike inflation, the highest level of employment that can be considered sustainable is an unobservable concept that is subject to significant measurement uncertainty. In the same way that monetary policy has little effect on potential output, it also cannot significantly affect the level of MSE. This is acknowledged in the Remit, which notes that “the level of maximum sustainable employment is largely determined by non-monetary factors that affect the structure and dynamics of the labour market and is not directly measurable.”

The indicators considered in this Note could assist the Bank in assessing whether employment is near its maximum sustainable level, as they provide a holistic view of capacity pressures in the labour market. The broad range of the indicators also means that it is possible to isolate pockets of slack. For example, even if the unemployment rate is at an historic low, a high underemployment rate could signal that there is still spare labour that can be sustainably employed.

Using a large variety of labour market indicators to assess labour market capacity pressures is also consistent with the directions in the Remit. The Remit states that “the MPC should consider a broad range of labour market indicators to form a view of where employment is relative to its maximum sustainable level.”

7. Conclusion

This Note has evaluated a wide range of indicators of spare capacity in the New Zealand labour market. The suite of measures we have considered is broad in scope. We have identified some indicators of labour market slack that may be more reliable than others, given their ability to explain and forecast inflation and employment. However, this is a preliminary analysis, so we will continue to examine a broad suite of indicators to maintain a comprehensive picture of the labour market as we work to further refine our understanding. We intend to keep track of all these measures over time and continue improving the suite.

The suite of indicators that we have evaluated will be useful for the Bank’s assessment of where employment is relative to its maximum sustainable level. The wide range of measures that is considered means that a comprehensive view of labour market capacity can be developed.
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