

Matching workers with jobs: how well is the New Zealand labour market doing?

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Since the trough of the 2008/09 recession, the unemployment rate has remained high. However, some other indicators suggest that there might be less downward pressure on wage and price inflation than the unemployment rate alone implies. We explore this apparent discrepancy by looking at the relationship between vacancies and the number of people unemployed (the Beveridge curve) and by estimating a measure of the effectiveness of the labour market at matching unemployed workers with vacancies. We suggest that both the Canterbury earthquakes and international migration flows may have contributed to an apparent decline in the matching efficiency in the labour market.

1 Introduction

New Zealand's unemployment rate rose sharply from the beginning of 2008 to mid-2009 and has remained high ever since. A persistently high unemployment rate in isolation suggests substantial slack in the labour market and in the economy as a whole. However, that looks inconsistent with some other labour market indicators. Job advertisements, reported skill shortages, and wage growth suggest that the excess capacity that built up during the recession has dissipated gradually over the subsequent three years. Those indicators suggest less downward pressure on inflation than might be implied by the unemployment rate alone.

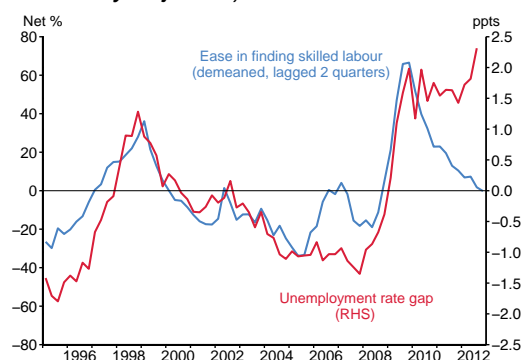
How to reconcile the high number of people looking for work with the other labour market indicators is the focus of this article. We use a couple of analytical techniques to try to shed further light on the issue. We look specifically at how the labour market is doing in matching workers with available jobs, and how that may have changed in recent years. Finally, we offer some thoughts on what may have accounted for the apparent change.

2 Looking at the labour market data

We first look briefly at some of these other labour market indicators. For example, the Quarterly Survey of Business Opinion's (QSBO) measure of how easy it is to find labour has fallen sharply since 2009, and is now around

long-run average levels (figure 1).¹ This is consistent with feedback received during recent Reserve Bank business visits, suggesting that employers are finding it more difficult to fill vacancies for skilled staff. Figure 1 shows how this QSBO measure has historically been moving closely with our estimate of the unemployment rate gap (the deviation of the unemployment rate from its estimated trend rate). However, since 2010 the fall in the QSBO measure has been inconsistent with the persistently high unemployment rate.

Figure 1
Reported ease in finding skilled labour and the unemployment rate gap
(seasonally adjusted)



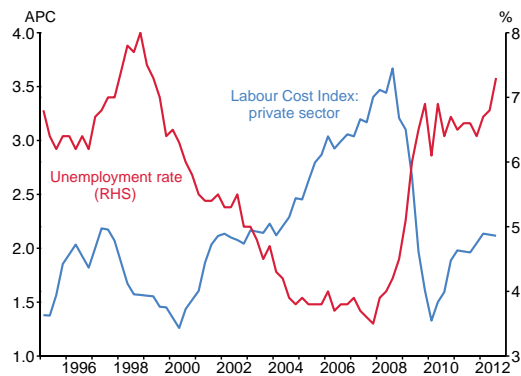
Source: Statistics New Zealand, QSBO, RBNZ estimates. Note: the unemployment rate gap is the deviation of the unemployment rate from its estimated trend rate; ppts is percentage points

Additionally, at least on some measures, wage inflation in the private sector appears at odds with a view of considerable excess capacity. After rising to quite high

¹ A similar profile can be seen in the measure for unskilled labour.

levels during the expansion of the previous decade, wage inflation fell very sharply during the 2008/09 recession (figure 2). The recovery in LCI wage inflation since then appears consistent with at least some reduction in the degree of excess capacity in the labour market.

Figure 2
Private sector annual wage inflation and unemployment rate
(seasonally adjusted)



Source: Statistics New Zealand. Note: APC is annual percent change

So what explains this divergence between the signals from the unemployment rate itself and those from some of the other labour market indicators? One theory that might help explain this divergence is a decline in how well the labour market is doing in matching job seekers with vacant jobs – that is, a decline in matching efficiency.

The possible importance of such a mismatch issue is currently being discussed in several advanced economies, particularly the United States. Several policy makers have related the persistently high rate of unemployment in the United States to an increase in both sectoral mismatch (a shortage of workers in some industries at the same time as unemployment of workers with different skills from other industries) and geographical mismatch (shortages and unemployment across different regions or states).² A series of studies suggests that matching efficiency in the United States has declined since the 2008/09 recession.³ Some studies have estimated that mismatch accounts for 1 to 1.5 percentage points of the increase in the unemployment rate.⁴

² e.g. Plosser (2010), and Lacker (2012).
³ e.g. Elsby et al. (2010), Barnichon and Figura (2011).
⁴ e.g. Daly et al. (2012), Furlanetto and Groshenny (2012), Sahin et al. (2012).

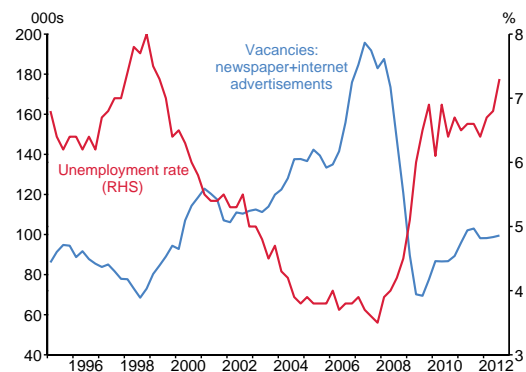
We use two methods to infer the evolution of matching efficiency in New Zealand: firstly, the Beveridge curve; and secondly, an estimated measure of matching efficiency based on a standard model of labour market flows.

3 The Beveridge Curve

Looking at the relationship through time between the number of vacant jobs and the number of people unemployed is one way into the issue. Even doing that has its challenges. Job vacancies are generally proxied by the number of jobs advertised. But in New Zealand we do not have a long time series of job advertisements data, and technological change (the rise of internet advertisements) complicates the interpretation of the data we have (see Box 1 for a discussion of some of the data issues).

Figure 3 uses the available data and shows how job advertisements and the unemployment rate have moved over time. Not surprisingly, these two series generally move in opposite directions. When the unemployment rate increases, the number of job advertisements decreases. However, since 2009 the number of job advertisements has recovered somewhat (though as a percentage of the labour force its absolute level is still low) while the unemployment rate has remained high.

Figure 3
Vacancies (job advertisements) and the unemployment rate
(seasonally adjusted)



Source: Statistics New Zealand, ANZ Bank

The Beveridge curve is another way of plotting the same information but this approach can shed more direct light on whether there has been a decline in matching efficiency. All else equal, points closer to the origin represent greater matching efficiency: for any number of

Box 1

Vacancy data

There are two sources of vacancy data in New Zealand:

ANZ Job Advertisements data

The ANZ job advertisement series measures the number of job advertisements appearing in major newspapers and internet sites each month (<http://www.anz.co.nz/commercial-institutional/economic-markets-research/job-ads/>). Only national aggregate figures are published. The newspaper series dates from June 1994, while the internet series began in March 2000. We convert these monthly series to quarterly figures. In figure 3 the total vacancy series is the sum of the seasonally adjusted ANZ newspapers and internet series.

In constructing the Beveridge curve (figure 5), we remove smooth trends from the ANZ newspaper and

internet advertisements series before summing them to form a total vacancies series. We do this because simply summing the number of advertisements from two quite different technologies, the relative importance of which has changed over time, does not necessarily provide a representative consistent proxy for job vacancies. This procedure has been used in some international literature (see, for example, Shimer (2005)).

MBIE Jobs Online data

Data from the Ministry of Business Innovation and Employment measures changes in job vacancies advertised on two main internet sites from May 2007 (<http://www.dol.govt.nz/publications/jol/index.asp>). These include national aggregate series for both skilled and total vacancies, as well as an industry breakdown and a regional breakdown for skilled vacancies. All series are published as indices, each equal to 100 in May 2007.

advertised vacancies, the unemployment rate is lower – or any particular unemployment rate is maintained with less need to advertise vacancies.

Figure 4

A stylised Beveridge Curve

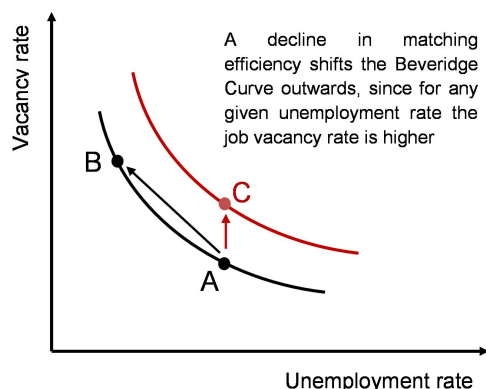


Figure 4 shows a stylised Beveridge Curve, with the unemployment rate on the horizontal axis and the vacancy rate (the ratio of vacancies to the labour force) on the vertical axis. The relationship is negative, with movements along the curve representing cyclical changes in the aggregate demand for labour. During booms, firms create more new jobs (vacancies increase) and unemployment

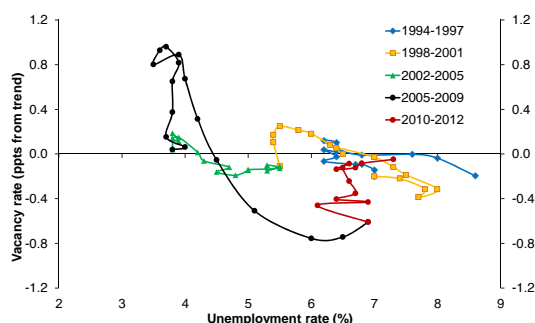
declines (moving from A to B). In bad times, firms create fewer new jobs (vacancies decrease) and unemployment rises. The convex shape of the curve is consistent with the idea that as the labour market becomes tighter in the expansionary phase of cycles, firms need to advertise more and more vacancies as they compete for a shrinking pool of unemployed workers. Similarly, when the labour market becomes slacker during recessions, firms can reduce their search efforts and yet still fill the remaining vacancies.

A wide variety of factors can cause shifts in the Beveridge Curve. These include changes in matching efficiency, changes in the supply of labour, or changes in labour market regulation. A decline in matching efficiency, all else equal, will result in an outward move in the Beveridge curve. For example, firms are advertising more vacancies (labour demand has increased) and yet the unemployment rate remains high (employers are unable to find suitable workers), for example, a move from A to C in figure 4.

Figure 5 presents the Beveridge Curve for the New Zealand economy from 1994. Unemployment rate data are taken from the quarterly Household Labour Force

Survey (HLFS). Because of doubts about whether one can simply aggregate newspaper and internet advertisements, we construct the Beveridge Curve using percentage deviations from trend for the vacancies variable, rather than the more usual levels format.

Figure 5
A New Zealand Beveridge curve, 1994-2012



Source: ANZ Bank, Statistics New Zealand, RBNZ estimates.

The relationship between the unemployment and vacancy rates is negative, as expected. It appears that the curve had shifted inwards during the recession in 2009 (the last few black dots in figure 5). During that period vacancies fell away faster than would have been expected given the unemployment rate. Over 2010 and early 2011 the previous relationship looks to have re-established itself (the first 6 or 7 red dots in figure 5).⁵ This is the same period in which the reported ease in finding labour has decreased (see figure 1).

Previous research has identified “a counterclockwise adjustment pattern” (i.e. an upward movement, before a leftward movement) in Beveridge Curves in the aftermath of severe recessions, as vacancies adjust more rapidly than the unemployment rate as the economy recovers.⁵ This lagged response of the unemployment rate to increases in vacancies may have contributed to the apparent inward shift in the New Zealand Beveridge Curve during the recession and the move back outwards from 2010.

4. A measure of matching efficiency

Taken on its own, the simple New Zealand Beveridge curve shown in the previous section might suggest that there was no sustained departure from previous labour market relationships. In this section we consider a more formal approach to measuring the matching efficiency of the labour market.

We outline how our measure of matching efficiency is estimated in Box 2 overleaf. It starts from the insight that the number of new hires (that is, the matches of job seekers with vacancies) depends on both the number of job seekers and the number of vacancies; but also on how effective the labour market is at matching job seekers with vacancies. For example, an increase in the matching efficiency of the labour market will create more jobs with the same number of job seekers and vacancies. This matching efficiency, which can vary over time, is what we are trying to estimate here.

Matching efficiency is affected by the alignment between vacancies and workers’ characteristics (i.e. the skills required/possessed and geographical location), as well as by how intensely firms and workers are searching (to fill and find jobs respectively). These characteristics are captured implicitly in our measure of matching efficiency.

Figure 6 plots our time-varying estimate of matching efficiency. On this measure, the ease with which job seekers are matched to job vacancies has varied considerably over time.⁶ Matching efficiency reached a low in late 2007, at the peak of the long boom, when the unemployment rate was very low and firms with vacant jobs were finding it difficult to find the right people to fill them. It is estimated to have risen through the 2008-2009 recession: vacancies fell, but it became materially easier to fill the vacancies that existed. After reaching a peak around mid-2010, this measure of matching efficiency has been continuously deteriorating and is currently at a new record low. The implication of this measure is that the labour market is doing as bad a job at matching

⁵ Daly et al. (2012); Dutu et al. (2009).

⁶ The very narrow bands around the matching efficiency estimate between 2000 and 2004 may reflect the introduction of and sharp increase in internet vacancies over this period.

Box 2

A measure of matching efficiency

We apply the methodology proposed by Furlanetto and Groshenny (2012a, 2012b) to estimate variations in matching efficiency in the New Zealand labour market over time. This approach is based on search and matching models of labour market flows developed by Diamond, Mortensen and Pissarides (Pissarides (2000) contains a full presentation of the search and matching model).

In this model, the number of people employed (N_t) is represented through time as

$$N_t = (1 - \delta_t)N_{t-1} + M_t \quad (1)$$

where δ_t (delta) denotes the separation rate (the rate at which those who were employed in the previous period become unemployed or exit the labour force) and M_t is the flow of newly hired workers in period t .

The number of newly-hired workers (M_t) is a function of the number of job seekers (S_t) and the number of vacancies (V_t), which are combined using a “matching function”. Consistent with extensive empirical evidence in the literature, we assume that the matching function is Cobb-Douglas with constant returns to scale:

$$M_t = \zeta_t S_t^\sigma V_t^{1-\sigma} \quad (2)$$

The pool of job seekers in period t is given by

$$S_t = L_t - (1 - \delta_t)N_{t-1} \quad (3)$$

where (L_t) denotes the labour force, the sum of the

numbers employed (N_t) and the numbers of people unemployed (U_t),

$$L_t = N_t + U_t \quad (4)$$

So the number of people seeking jobs in a particular period is the number unemployed in the previous period and those leaving their current jobs in this period.

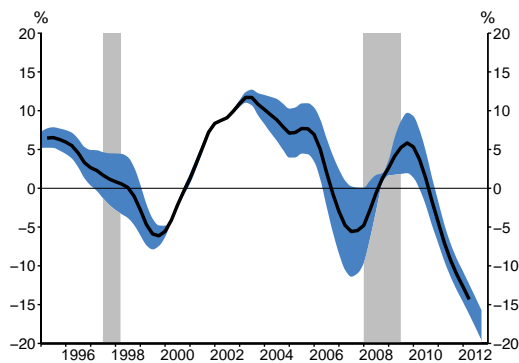
Putting in estimates for each of these terms (M_t , S_t , V_t) we can then jointly estimate ζ_t (zeta) and σ (sigma). Zeta is our measure of matching efficiency (or the effectiveness of the labour market at matching job seekers with vacancies), and can vary over time. Sigma is the elasticity of new jobs with respect to the number of job seekers for any given degree of matching efficiency, and is a constant in our model.

For the empirical estimation we use quarterly data (not detrended) from 1995:Q1 to 2012:Q2 on the labour force, vacancies, unemployment, separations and new hires to jointly estimate σ and matching efficiency ζ_t . (Data on separations and new hires used here are not published, but were supplied by Statistics New Zealand from their HLFS survey by special request. Statistics New Zealand’s Linked Employer-Employee Data (LEED) is qualitatively similar, but less up to date.)

Our estimate of σ lies around 0.6, which implies (because it is greater than 0.5) that changes in the number of job seekers has a greater impact on the number of new hires than a similar percentage change in the number of vacancies. This value is in line with a broad empirical literature on the matching function. (See Petrongolo and Pissarides (2001) for a survey of the empirical literature on the matching function).

workers to vacancies as at any time over the past 15 years – even worse than at the peak of the cycle when the unemployment rate was only 3.5 percent. Over the period 2006-2012 our estimates of matching efficiency are not inconsistent with developments in the QSBO “ease of finding skilled workers” measure when compared with the unemployment rate itself (figure 1).

Figure 6
New Zealand labour market matching efficiency
(deviation from mean)



Note: The blue shading represents a 5 to 95 percent confidence interval around our estimate. The grey bars indicate recessions (at least two successive quarters of negative GDP growth).

Quite how we should interpret these changes in the matching efficiency parameter is not clear. On the one hand, the model is estimated over a relatively short period of data (constrained by the absence of earlier vacancies data), amounting to less than two full cycles in economic activity and employment. But on the other hand, the gap between what the unemployment rate taken in isolation might suggest, and what some of the other labour market indicators suggest, implies that the recent deterioration in the matching efficiency parameter is probably capturing something real. If so, what might be explaining the apparent deterioration?

5 Why might matching efficiency have worsened?

In this section we consider two possible factors which may have influenced matching efficiency in New Zealand over the past few years.

The Canterbury earthquakes

The Canterbury earthquakes of 2010 and 2011 severely disrupted the local labour market. Many thousands of people left Christchurch for other parts of the country or overseas. The earthquakes caused a major change in the pattern of demand.⁷ Most notably, the tourist and accommodation sectors were hit hard as many of the city’s hotels were destroyed or made inaccessible. The number of international tourist arrivals dropped, and the number of foreign students studying in Christchurch also fell sharply. On the other hand, demand for demolition, repairs and construction skills, and associated professional services, has risen considerably.

As a result, there has been a change in the pattern of employment – for example, a marked decline in retail and hospitality employment while demand for construction workers and, for example, geotechnical engineers has increased. Many of the displaced workers will have had quite different characteristics than the requirements of the newly available jobs. Despite a fall in aggregate employment, there have been signs of difficulties in recruiting workers with desired skills. Online advertisements for skilled workers in Canterbury have doubled since early 2011, and there appears to have been growing difficulty in matching workers with vacancies.

Regional vacancy data are only available since 2007, but they allow us to construct regional Beveridge Curves for the last five years, encompassing the impact of the earthquakes.

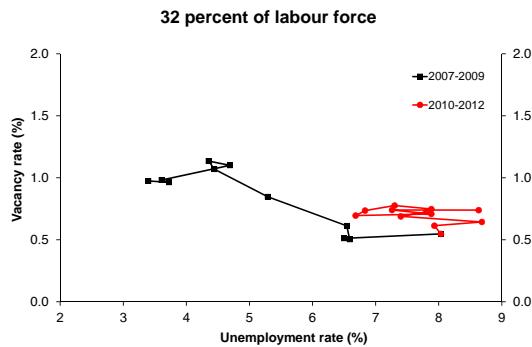
The regional Beveridge Curves (figure 7) help illustrate that the size of a labour market influences the degree of matching efficiency. In large labour markets there is a higher probability that employers will find an exact match for the skills and experience they are looking for to fill each job opening (even when the large and small markets have the same vacancy to unemployment ratios).⁸ Similarly, in larger labour markets displaced workers will typically find it easier to find a new job closely matching their skills and aspirations. So we would expect matching efficiency to be higher and more resilient to exogenous influences in larger labour markets.

⁷ Parker & Steenkamp (2012).

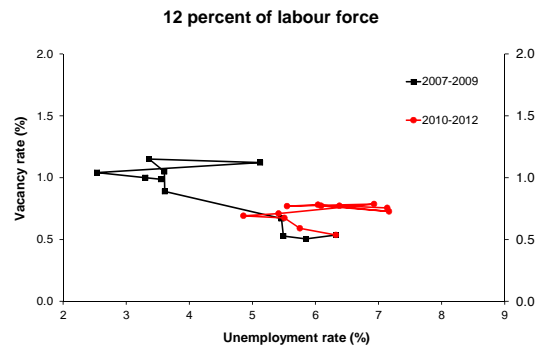
⁸ Moretti (2012, pp.125-127).

Figure 7
Regional Beveridge curves⁹

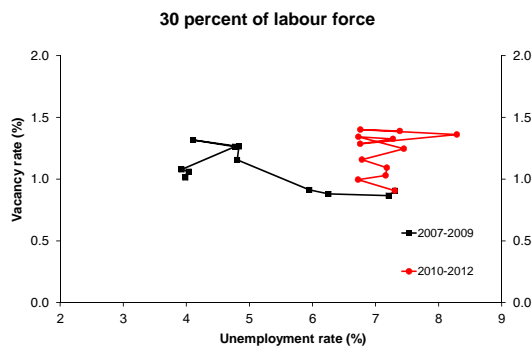
7a: Auckland



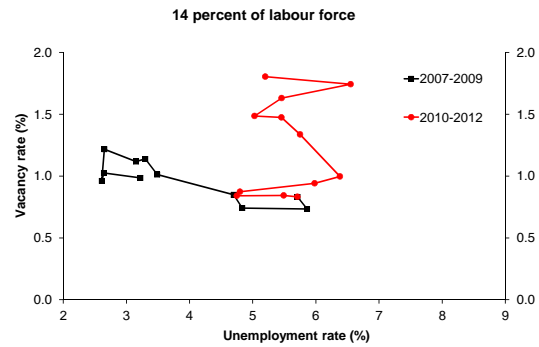
7b: Wellington



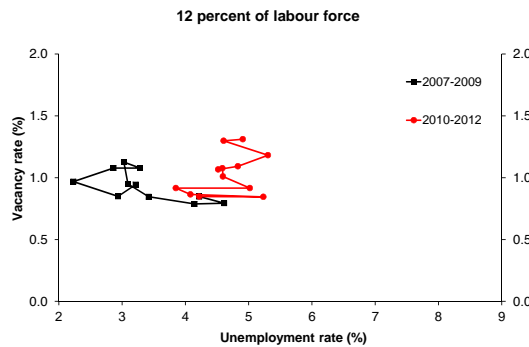
7c: North Island Other



7d: Canterbury



7e: South Island Other



Source: Ministry of Business Innovation and Employment, Statistics New Zealand, RBNZ estimates.

Note: The region North Island Other is the North Island excluding Auckland and Wellington regions, while South Island Other is the South Island excluding Canterbury.

Regions dominated by major cities, with their larger and more concentrated labour markets, should have relatively higher matching efficiency and more compact Beveridge Curves. This is what we see for Auckland and

Wellington (figures 7a and 7b). By contrast, we would also expect that regions such as North Island Other and South Island Other, which are aggregates of many smaller labour markets, to have lower matching efficiency and therefore more dispersed Beveridge Curves. This may partly explain the dispersion we observe in figures 7c and 7e.

The Canterbury Beveridge Curve is an obvious exception. We would normally expect it to look more

⁹ As the regional Jobs Online data are available only in indexed form, vacancy rates have been calculated by indexing the labour force for each region to the same quarter as the vacancy data (June 2007) and using these indices as denominators. Unemployment rates for the various regions have been calculated using unemployment and labour force data from the Household Labour Force Survey.

like the curves of Auckland and Wellington, given that Canterbury's labour market is dominated by the larger Christchurch labour market.

The rise in job advertisements in Canterbury has far outpaced that of other regions of the country over the past two years, but the unemployment rate has remained high. This dramatic rise in vacancies appears to reflect both the increased intensity of search that firms have had to undertake to attract the specific sorts of workers they need, and on the other hand the high unemployment rate probably reflects the displacement of workers from the industries that shrank – many of whom cannot readily transfer into other sorts of jobs. Such a sizable disruption of the region's economy (which represents 14 percent of the country's labour market) may also have been large enough to materially influence aggregate matching efficiency.

International migration

In New Zealand, more than in most advanced economies, international migration flows are large compared to the size of the labour market. Migration flows influence the quality, variety and quantity of workers' skills available on the local labour market. As such, these flows may be an important determinant of matching efficiency. The nature and direction of that influence is not clear a priori.

Much of the movement in net migration reflects, and is reflected in, cyclical factors that do not affect matching efficiency (i.e. they are associated with movements along the Beveridge Curve, rather than shift of the curve). In the short-run, the demand effects of increased net immigration outweigh the supply effects, so that increased migration increases economic activity and reduces unemployment. For example, during a boom in the domestic economy fewer workers are tempted to depart and others living overseas may return.

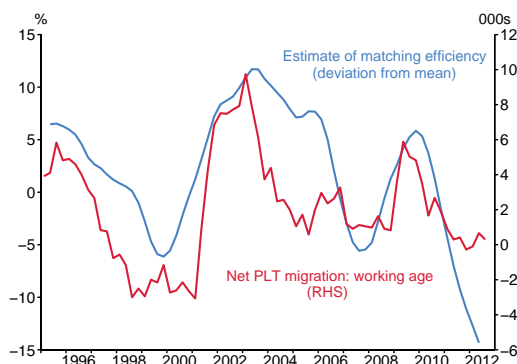
However, net migration flows can also change the mix of skills in the economy, which can have structural implications for the economy. A net population outflow may reduce the pool of skilled labour, and if the demand for skilled labour has not also fallen, there will be fewer suitable people available to fill any vacancies, implying

a decline in matching efficiency. On the other hand, if net outward migration of skilled labour increases in response to an autonomous decline in demand for skilled labour, then the outflow would tend to improve matching efficiency – the unemployment rate for those skills would not rise as far as the decline in vacancies might suggest. Ultimately the contribution of migration to the evolution of New Zealand's labour market matching efficiency is an empirical question. Here, we can only offer some initial suggestions.

Dutu et al. (2009) find that increases in net migration are associated with deterioration in their measure of matching efficiency for the New Zealand labour market. They rationalise their result by suggesting that, within the observed net inflow of migrants, there must have been a net outflow of qualified workers – thus driving down matching efficiency. However, we show some data which might appear to suggest the opposite conclusion about the role that migration flows have played in New Zealand, especially in the past couple of years.

Figure 8 plots our estimate of matching efficiency against net migration (permanent and long-term migration flows of working age). These two series move together to some extent, although the relationship is not tight, suggesting that migration is only one of many influences. The matching efficiency troughs in 1999 and 2007 coincide with periods of weak net immigration. Similarly, the decline in matching efficiency during 2010 and 2011 is associated with a decline in net migration.

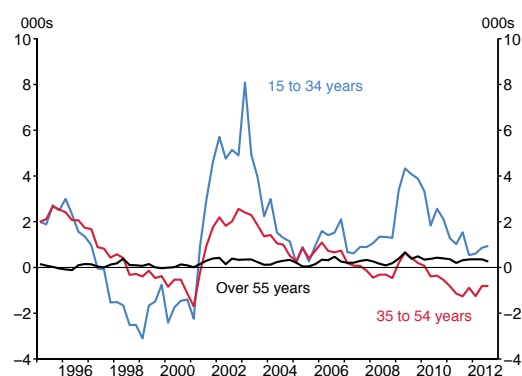
Figure 8
Matching efficiency and net permanent long-term migration
(quarterly, seasonally adjusted)



Source: Statistics New Zealand, RBNZ estimates.

New Zealand's migration data do not give us information about the skills of migrants arriving in or leaving the country. But one possible way to proxy skill flows is to look at the age composition of net migration. If prime age workers are more skilled and experienced than their younger cohorts, a net loss in prime age workers (relative to the net flow of younger workers) would imply that the skill content of the labour force has decreased (all else equal). If the demand for skilled workers had not fallen to the same extent, this would lead to a deterioration in matching efficiency. Of course, it is also possible to see shifts in the demands for different types of skills: in some cases, skills possessed more often by younger workers might be those most heavily in demand, in which case relatively larger net outflows of younger workers could also worsen matching efficiency.

Figure 9
Net permanent migration (arrivals less departures), by age
Quarterly, seasonally adjusted



Source: Statistics New Zealand, RBNZ estimates.

Figure 9 shows the age composition of New Zealand's net permanent and long term migration (arrivals less departures) over time. Even though net migration has been fairly flat over the past couple of years, what is striking is the shift since 2010 towards a substantial net outflow of those aged between 35 and 54 (the group with the highest labour force participation rate and the lowest unemployment rate). By contrast, there has still been a net inflow of those aged between 15 and 34 – a different situation than over the 1998 to 2000 period when there were net outflows of both the more experienced and less experienced cohorts. To the extent that demand for skilled

workers remains strong, as the QSBO would suggest, this net outflow of prime age workers would be consistent with the estimated decline in matching efficiency.

6 Conclusion

In this paper, we use some analytical techniques to try to shed some light on what has been going on in the New Zealand labour market over the past few years. The unemployment rate suggests a lot of excess capacity in the labour market (and there are certainly a lot of people unemployed, looking for work), but some other indicators suggest that the labour market is tighter, and less disinflationary than the unemployment rate alone might suggest. We report estimates of a modelling exercise suggesting that the labour market has become less efficient in matching the skills required by employers and those of job seekers. The Canterbury earthquakes, and the big structural changes in the patterns of economic activity in Christchurch, appear to have caused a significant regional decline in matching efficiency. The net outflow from New Zealand of prime age workers over the past couple of years, even as demand for skilled labour has been increasing, may also have contributed to the apparent decline in matching efficiency across the entire country.

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