MEASURING JOB VACANCIES IN NEW ZEALAND THROUGH *JOBS ONLINE*

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Abstract

The Department of Labour released a new online job vacancy monitoring series – Jobs Online – in December 2009. This series reports the change in the number of advertisements listed on key job boards: SEEK and Trade Me Jobs. Jobs Online serves as an early indicator of changing labour market and economic conditions.

This paper provides an overview of how job vacancy data was collected in New Zealand and overseas. It outlines how the Department of Labour changed its collection of job vacancy data from the Job Vacancy Monitoring Programme (JVMP) – a manual count of newspaper advertisements – to Jobs Online – an electronic analysis of on-line advertisements on major job boards. The results from Jobs Online are discussed and compared with other labour market indicators.

Overall, the results from Jobs Online show an increase in job vacancies over time in total vacancies and in skilled vacancies. This is in line with employment growth in New Zealand after the recession that started in June 2009. Since October 2010 the growth in job vacancies is easing, but remains positive. The data on skilled vacancies is broken down by region, occupation and industry.

The data from Jobs Online tracks well with other labour market indicators such as the unemployment rate. According to economic theory, the Beveridge curve shows the relationship between the vacancy rate and the unemployment rate over time. The Department's empirical analysis of the Beveridge curve confirmed that a high vacancy rate calculated from Jobs Online was associated with a low unemployment rate. In addition, a low vacancy rate calculated from Jobs Online was associated with a high unemployment rate.

Introduction

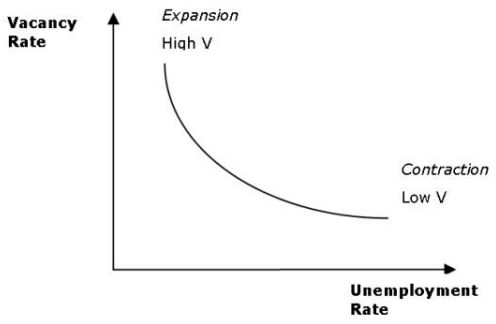
Information on job vacancies is an important indicator of changes in labour market demand. According to Silverstone and Wall (2008), job advertisements indicate that employers are willing to commit resources to advertise, interview and pay ongoing wages or salaries to potential employees. Job vacancy data also provides information about economic changes resulting in job openings for people to produce goods and services. Furthermore, studies of the matching between job vacancies and unemployment can reveal important information about how the labour market is functioning (Bleakley and Furher, 1997).

This paper outlines changes in the way the Department of Labour has collected job vacancy information. The aim of the paper is to raise awareness of the Department's new *Jobs Online* - a useful tool that provides information on job vacancies in New Zealand – and to outline future areas for development. In addition, *Jobs Online* is compared with other labour market indicators.

Relationship between job vacancies and unemployment

The relationship between job vacancies and unemployment in the overall economy is described in economics theory by the Beveridge curve shown in Figure 1 (Petrongolo and Pissarides, 2001, Wall and Zoega, 1997). The Beveridge curve illustrates that a low vacancy rate is associated with high unemployment and a high vacancy rate is associated with low unemployment.

Figure 1: Example of a Beveridge Curve



The Beveridge curve shows that when the economy is expanding, job vacancies are high as the demand for labour is high. Similarly, unemployment is low as most people who are looking for work have already found employment. Alternatively, when the economy is slowing or contracting, unemployment is high as there is little demand for additional workers and available jobs can be filled quickly. These effects result in movements along the Beveridge curve (Bleakley and Furher, 1997).

Silverstone (2004) explains that the above dynamic relationship between vacancies and unemployment can assist policy makers in understanding if there are issues regarding the matching of unemployed people to specific vacancy opportunities. For example, if the vacancy rate leads changes in the unemployment rate, this relationship can assist in forecasting unemployment changes.

Measuring job vacancies in New Zealand

Background

Table 1 gives an overview of various job vacancy series collected in New Zealand since the 1950s.

Table 1: Job vacancy series in New Zealand

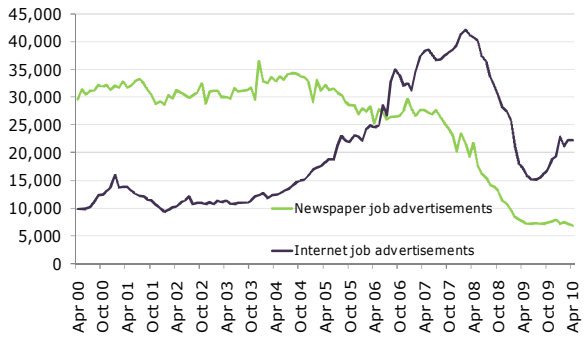
Series name	Year
Three official job vacancy series	1956 – 1989
ANZ job ads series	1990 – today
Job vacancy monitoring programme (JVMP)	2002 – 2007
SEEK Employment Index (SEI)	2009 – today
Jobs Online	2009 – today

The longest running series is the ANZ job advertisements series. This was originally published by the ANZ Banking Group in 1990, starting as a monthly aggregate count of newspaper job advertisements (ANZ Banking Group, 1990-2007). In 2000, data from the newspaper job advertisements was combined with job advertisements from New Zealand's major internet job boards. The Department took over producing the ANZ job advertisements series from the ANZ bank in March 2007.

From 2002 to 2007, the Department ran the Job Vacancy Monitoring Programme (JVMP), addressing the growing demand for labour market information. Compared with the ANZ job advertisements series, the JVMP captured and analysed each unique job vacancy separately and was disaggregated by occupation and region. JVMP collected job vacancy advertisements once a month from twenty-five major newspapers in New Zealand.

Due to the growth of internet advertising, job vacancy data gathered from only newspapers was no longer a reliable representation of labour market change. Figure 2 shows that newspaper job advertisements steadily decreased between October 2004 and May 2009, while at the same time online job advertisements continued increasing until March 2008. As a result, in December 2008, the Department decided to discontinue the JVMP.

Figure 2: Comparison of the number of job ads appearing in newspapers and the internet



Source: ANZ job ads series, Department of Labour

In November 2009, SEEK first published the SEEK Employment Index (SEI). The SEI is released monthly and includes a monthly index of the ratio of new job advertisements to the number of new job applications. The report also includes a monthly index of vacancies posted on the SEEK website (SEEK, 2009).

In December 2009, the Department released the first *Jobs Online* monthly report; this is discussed later in this paper.

International Experience

I n Britain, William Beveridge first identified the relationship between vacancies and unemployment in the early 1940s (Bleakley and Fuhrer, 1997). This led many countries to begin capturing vacancy data as a leading indicator of changing labour market conditions. For example, job advertisements in newspapers were monitored in the USA for 55 years until 2008.

The move to collect job vacancy information from newspaper to online sources is also happening overseas (see Appendix Table A1). For example, the United States Conference Board published the Help Wanted Online (HWOL) series in 2005 replacing its long-standing newspaper-based Help Wanted (HW) series. The HWOL series provides a timely monthly measure of labour demand using unique job advertisements from approximately 1,200 websites (Office of National Statistics, 2009).

The Organisation for Economic Co-operation and Development (OECD) undertook a comparison of Beveridge curves across 14 OECD countries including

Australia and New Zealand from the 1960s to the 1990s (Nickell, Nunziata, Ochel, Qunitini, 2002). This comparison required the collation of vacancy data to calculate the vacancy rate.

In Australia, the Department of Education, Employment and Workplace Relations (DEEWR) published its Internet Vacancy Index in 2009. This is a monthly report based on a count of online job vacancies covering all occupations, across all skill levels (Australian Bureau of Statistics, 2009).

Department of Labour's *Jobs Online*

The Department's *Jobs Online* was first released in December 2009 and tracks changes in the number of advertised vacancies by occupation, industry and region, over time. The data series starts from May 2007, which is when data from both job boards became available. *Jobs Online* is available at the 4 digit unit level of occupation rather than as an aggregate like the ANZ job advertisements series or SEEK series. The Department requires a unit record series for the key applications to provide information at a disaggregated level, particularly occupations. *Jobs Online* uses unique job advertisements listed on major internet job boards such as SEEK and Trade Me Jobs.

The move to an online job vacancy index was developed in partnership with Australia's DEEWR. The Department has been working with DEEWR to ensure that methods and products from both countries are consistent (Department of Labour, 2009).

Jobs Online has four essential features:

- *Use of administrative data*

Jobs Online data is gathered from administrative data that is collected when jobs are advertised online. The data is very timely as it is available for processing within a few days of the end of the reference period without imposing major collection costs or adding survey respondent burden.

Access to the electronic data of online vacancies vastly increased the number of job advertisements, while substantially reducing the cost of processing the data. In the past, processing absorbed three full time workers to produce each monthly report. In contrast, processing the data and writing the report currently takes about a week for one person.

- *Vacancies coded to an occupation standard*

Each of the job vacancies are coded to an occupation (4-digit Australian and New Zealand Standard Classification of Occupations – ANZSCO) that enables comparison of the data with other labour market statistics. The Department developed a computer programme that automatically codes each advertised job to an occupation using key words and phrases from the advertisement. In addition, the programme automatically removes duplicates within and between the two internet job boards. This programme was then shared with DEEWR, leading to further improvements.

- *Focus on skilled vacancies*

Jobs Online focuses on skilled vacancies as they are highly representative of job openings for skilled occupations[1]. The 2008 Business Operations Survey (BOS) collected data on the total number of vacancies during the previous year. An analysis of *Jobs Online* data for that period found that 69% of skilled vacancies from BOS were covered by *Jobs Online*, compared to 36% of vacancies for all occupations. As a result, the reporting of *Jobs Online* focuses on skilled vacancies.

- *Vacancy data presented as an index*

Finally, the data is presented as an index because the Department does not know the total number of job advertisements from all advertising sources in New Zealand. The index had the additional benefit of protecting the market sensitivity of the job board data. The Department agreed with the internet job boards to conceal the actual number of vacancies advertised online for commercial sensitivity reasons. In addition, monthly volatility in advertised vacancies requires an indexed trend series to remove seasonal and irregular components from the data and show the change in advertised vacancies over time. The data is presented as an index with a base month of May 2007, set to 100.

How does the Department of Labour use Jobs Online?

- *Ministerial purposes*

Jobs Online provides the Department's Ministers with valuable advice and information on labour market conditions in a timely manner. Information from *Jobs Online* is used to indicate changes in regional and occupational vacancies. The Department also uses *Jobs Online* information along with other quantitative and qualitative information to assess employment growth in the short term. The Department publishes these findings on its external website in the quarterly report called "Likely Areas of Growth in Employment Opportunities".

- *Other purposes*

Jobs Online provides valuable information in supporting policy decisions related to the labour market. The job advertisements in *Jobs Online* are coded to a 4-digit ANZSCO occupation so that they can be used to assist in identifying skill shortages. For example, Immigration New Zealand (INZ) is responsible for publishing the Essential Skills in Demand List (ESDL) on its website. The ESDL includes two lists: the Long Term Skill Shortage List (LTSSL) and the Immediate Skill Shortage List

(ISSL)[2]. The LTSSL identifies those occupations where there is an absolute shortage of skilled workers both globally and throughout New Zealand while the ISSL identifies occupations that have an immediate shortage of skilled workers in New Zealand. Both lists are an indication to potential overseas migrants about what sort of occupations are in demand in New Zealand.

The results from *Jobs Online* contribute to INZ's biannual review of the ESDL. *Jobs Online* information is used along with other quantitative and qualitative information to determine if an occupation on the ESDL will stay, be added or deleted from the list. Where an occupation is identified as being in shortage, the occupation may be added to an ESID list, making it easier for employers to attract migrants from overseas to fill job vacancies for those occupations.

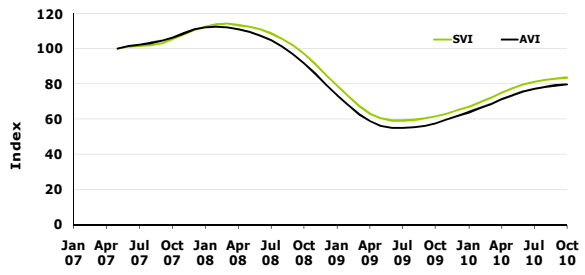
Results from *Jobs Online*

Results used in this section show *Jobs Online* data from May 2007 to October 2010 (Department of Labour, 2010).

Jobs Online has two main indexes: the all vacancies index (AVI) and the skilled vacancy index (SVI). The AVI includes all listed job vacancies. The SVI includes skilled occupations only, using skill levels 1-3 under ANZSCO. Figure 3 compares the AVI with the SVI.

Online job vacancies shown in Figure 3 were increasing since the beginning of the series until March 2008 (when it was at its peak) and decreased since then. There was consistent growth in job advertisements after June 2009 indicating an improvement in labour market conditions. Growth in job advertisements eased in the three months to the end of October 2010, but remains positive.

Figure 3: Skilled Vacancies Index (SVI) and All Vacancies Index (AVI)



Source: *Jobs Online*, Department of Labour

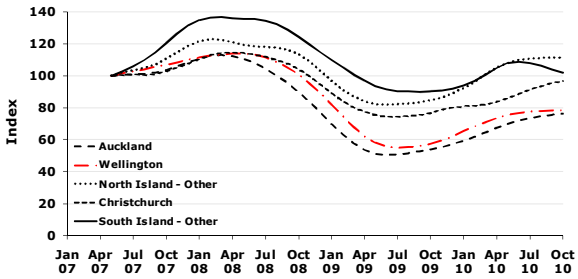
Job advertisements by region

Figure 4 shows that after the low point in June 2009 due to the recession, skilled vacancies increased in all regions.

Auckland and Wellington were the hardest hit by the recession. Vacancy numbers began to fall earlier and more sharply here than in other regions. The biggest regional growth since June 2009 was in Auckland (up 51.9%) and Wellington (up 40.5%). However, growth in job advertisements in Auckland has picked up post June 2009.

The South Island region (excluding Christchurch) experienced the least growth. This region experienced a drop in skilled vacancies in the three months to October 2010 (down 5.6%).

Figure 4: Skilled Vacancies Index (SVI) by region



Source: *Jobs Online*, Department of Labour

Job advertisements by industry

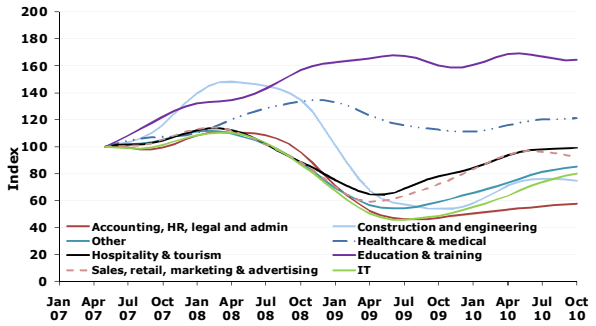
Figure 5 shows growth in the number of advertised skilled vacancies varied significantly across industry groups. Skilled job advertisements in most industries grew since June 2009. After June 2009, the largest increase was in information technology (up 74.1%) to the end of October 2010. Both the hospitality and tourism, and sales, retail, marketing and advertising industries showed strong growth of 51.3% since the recession.

Job advertisements in the education and training sector rose during the recession as increasing numbers of people entered or remained in education. However, since then, vacancies in the education and training sector showed a slight decrease of 2.0% to the end of October 2010.

The results for the education and training sector are associated with demand for and funding of tertiary education. Demand for tertiary education is typically counter cyclical. When there is a boom in the economy people find it easy to obtain work and less tertiary education is demanded. When there is a recession in the economy the demand for tertiary education increases as jobs are harder to get.

The second factor is that Government policy has recently reduced the allocation of funds to the tertiary sector.

Figure 5: Skilled Vacancies Index (SVI) by industry group

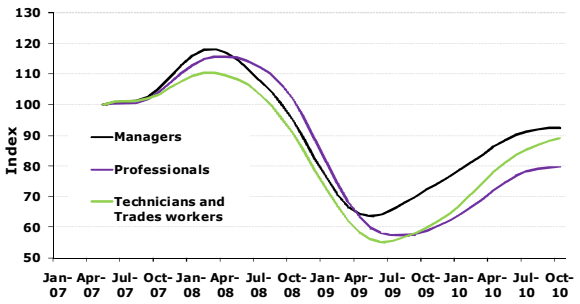


Source: *Jobs Online*, Department of Labour

Job advertisements by occupation

Figure 6 shows strong vacancy growth across all the major skilled occupational groups. Job advertisements for technicians and trades workers showed the strongest growth since June 2009 to the end of October 2010 (up 61.6%), followed by managers (up 44.1%) and professionals (up 37.7 %).

Figure 6: Skilled Vacancies Index (SVI) by occupation group



Source: *Jobs Online*, Department of Labour

Comparing *Jobs Online* to the unemployment rate

This section outlines the relationship between *Jobs Online* and the unemployment rate.

The unemployment rate

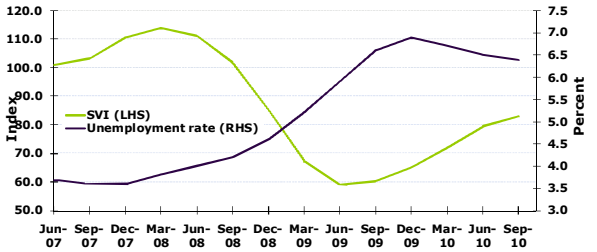
The unemployment rate is sourced from the Household Labour Force Survey (HLFS) conducted by Statistics New Zealand and is compared with the SVI from *Jobs Online*. Figure 7 shows a strong negative relationship between changes in the unemployment rate and changes in the SVI with a correlation coefficient of 0.86. This very strong relationship suggests that the SVI has the potential to be an early indicator of change in the unemployment rate.

- A strong increase in vacancies at the start of the series (between June 2007 and December 2007) and a slight decrease in the unemployment rate for the same time period. During this period, the transition from print to online advertising was still occurring.

- A large fall in vacancies from March 2008 to the end of June 2009, corresponding with a large increase in the unemployment rate.

- An increase in advertised vacancies since June 2009. This corresponds to a six month lagged decrease in the unemployment rate from December 2009.

Figure 7: Unemployment Rate and the Skilled Vacancies Index (SVI)



Source: Jobs *Online*, Department of Labour and HLFS, Statistics NZ

The unemployment rate and the Beveridge curve

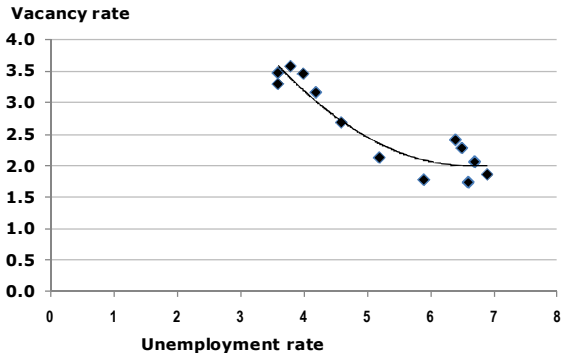
The Beveridge curve shows the relationship between the unemployment rate and vacancy rate. Figure 8 shows an empirical analysis of the Beveridge curve with three and a quarter years of *Jobs Online* vacancy data. The vacancy rate is calculated using all vacancies data from *Jobs Online* and the total number of persons in the labour force from the HLFS.

$$\text{Vacancy rate} = \frac{\text{total job advertisements}}{\text{total in labour force}} \times 100$$

Figure 8 shows that there is a strong relationship between the vacancy rate and unemployment rate with a correlation coefficient of 0.91. A polynomial regression line was fitted through the data points, with an R^2 of 0.88. As expected, a high vacancy rate is associated with a low unemployment rate. In addition, a low vacancy rate is associated with a high unemployment rate.

The correlation between the vacancy rate and unemployment rate increased to 0.97 and the regression R^2 increased to 0.93 when a time lag of three months was introduced for the unemployment rate. This indicates that vacancy rates are a leading indicator of changes in the unemployment rate.

Figure 8: Beveridge curve, September 2007 quarter to September 2010 quarter



Source: *Jobs Online*, Department of Labour and HLFS, Statistics NZ

Comparing *Jobs Online* to other labour market indicators

We now compare *Jobs Online* with labour market expectations using data from the Quarterly Survey of Business Opinion (QSBO) conducted by the New Zealand Institute of Economic Research (NZIER). The time period used for comparison is from June 2007 to September 2010. The QSBO measures three key indicators that we might expect to correlate with vacancy change: labour turnover, difficulty finding labour and labour as a constraint.

Labour turnover

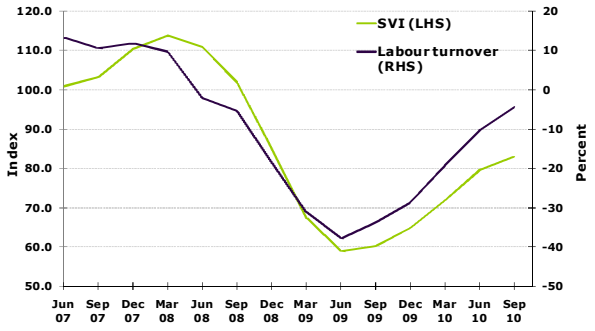
The QSBO measures labour turnover through the following question:

Excluding seasonal variations, what has been your firm's experience during the past three months in respect of labour turnover?

Respondents can answer that labour turnover increased or decreased over the last three months. The final labour turnover figure presents the net percentage of firms who said turnover went up minus the percentage who said turnover went down. Therefore, as the labour market softens and turnover goes down, the net percentage will fall.

We would expect that changes in vacancy growth will show a positive relationship with changes in labour turnover. Figure 9 compares the answer to this question with changes in advertised vacancies. As expected, there was a strong correlation (0.92) between annual vacancy growth and the net balance of responses.

Figure 9: Skilled Vacancies Index (SVI) and labour turnover



Source: *Jobs Online*, Department of Labour and QSBO, NZIER

Difficulty finding labour

The QSBO measures the difficulty in finding labour through the following question:

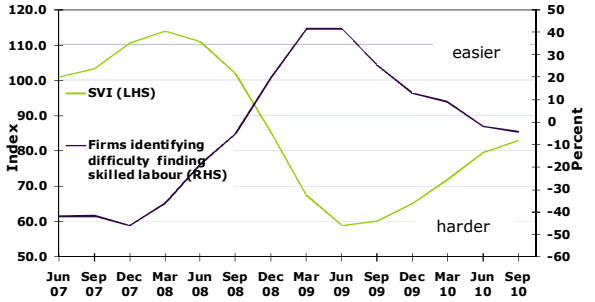
Is finding the skilled or specialist staff you want today compared to three months ago harder, the same or easier?

The result is presented as the net percentage of firms who said it was easier to find skilled labour minus the percentage who said it was harder. Therefore, as the labour market softens and skilled employees are easier to find, the net percentage will rise.

Intuitively and from past experience with vacancy data, we would expect high vacancy growth to be associated with greater difficulty in finding skilled staff.

Figure 10 compares *Jobs Online* against the net balance of responses. As expected, there was a negative correlation (0.88) between annual vacancy growth and annual changes in the net balance of responses.

Figure 10: Skilled Vacancies Index (SVI) and difficulty finding skilled labour



Source: *Jobs Online*, Department of Labour and QSBO, NZIER

Figure 10 shows an association between the skilled vacancy index and difficulty in finding skilled labour since the recession to the end of September 2010. This suggests the increase in advertised vacancies to the end of September 2010 occurred when there was an increase in the difficulty in finding skilled labour.

Labour as a constraint

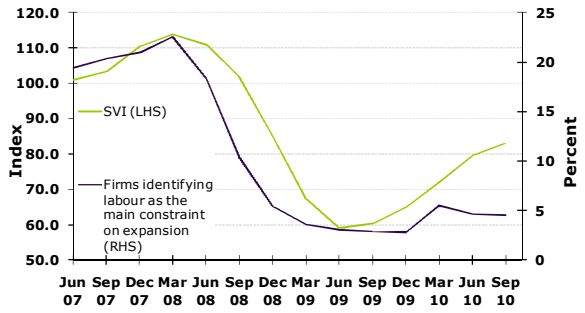
The third question the QSBO asks refers to labour as the main constraint on expansion:

What single factor, if any, is most limiting your ability to increase production?

A shortage of labour is one of the six factors firms may select. It is expected that high vacancy growth will be positively related to the number of firms identifying a shortage of labour as their most limiting factor.

Figure 11 compares the SVI with annual changes in the number of firms saying that labour is the single most limiting factor constraining production. As expected, there was a positive correlation of 0.92 between the SVI and annual changes in the proportion of firms identifying labour as being the limiting factor.

Figure 11: Skilled Vacancies Index (SVI) and change in labour being the main constraint on expansion



Source: *Jobs Online*, Department of Labour and QSBO, NZIER

Further developments

To increase the representativeness of all vacancies, the Department is considering adding data from other internet job boards. The Department could potentially investigate splicing other job boards such as Heraldjobs into *Jobs Online* and produce a seasonally adjusted time series. The Department could also research issues arising out of the Beveridge curve.

- *Generalised job boards*

Job advertisements from the Heraldjobs have been provided by the New Zealand Herald to the Department since May 2009. This data set could be added to *Jobs Online* once a sufficient time series is available.

The Department could also investigate adding other generalised job boards like the Work and Income job search database to *Jobs Online*.

- *Specialist job boards*

The Department recently tested how suitable it was to add vacancies appearing in the Education Gazette to *Jobs Online*. The Department limited the test to school vacancies to minimise difficulties in identifying duplicates with other internet job boards. The test found that the Education Gazette was suitable for *Jobs Online* as most of the data could potentially be coded directly to ANZSCO occupations. In addition, the Education Gazette data will provide wider coverage of education vacancies at the school level than *Jobs Online* does currently.

There are other specialist job boards the Department could investigate. Examples of these job boards include: information technology job boards (Computerworld), and agriculture and horticulture (Fonterra – Fencepost Jobs).

- *Seasonal adjustment*

The Department could investigate adding a seasonally adjusted time series to *Jobs Online*. The seasonal adjustment removes long term seasonal trends from the time series and requires a time series of at least 3 years. Currently *Jobs Online* is only available as a trend series.

- *Investigating research issues*

The Department could investigate the influence time and other intervening factors have on the Beveridge curve in New Zealand. There is evidence from overseas that the Beveridge curve shifts over time. These shifts in the Beveridge curve may be due to growth, churn or efficiency gains in the labour market, (Bleakley and Furher, 1997).

The potential for using the vacancy rate calculated from *Jobs Online* to forecast the unemployment rate could also be investigated.

Conclusion

Jobs Online is an administrative dataset that vastly increased the number of job advertisements collected, while substantially reducing the administrative costs.

The Beveridge curve applies to the relationship between the vacancy rate that was calculated using *Jobs Online* data and the unemployment rate in New Zealand.

Ongoing improvements to Jobs Online can be made, these include splicing in other job boards like Heraldjobs and producing a seasonally adjusted series.

Notes

[Notes]1. Skill level 3 is equivalent to the National Certificate of Educational Achievement (NCEA) level 4 qualifications. For example "Engineering Manager" is classified as skill level 1, "Electrical Engineering Draftsperson and Technician" is classified as skill level 2 and "Electrician" is classified as skill level 3.

2. The Long Term Skill Shortage List (LTSSL) indicates sustained and ongoing shortages of skilled workers for selected occupations and is used for temporary work and residence policies. The Immediate Skill Shortage List (ISSL) indicates current shortages of skilled workers for selected occupations and is used for temporary work permits only. For further information please see: http://www.immigration.govt.nz/migrant/general/generalinformation/review.htm

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Appendix

Table A1: Recent examples of job vacancy series overseas

Country	Type of data collection	Series name	Year
United States	Advertised vacancy count	Help Wanted Online	2005 - today
United States	Vacancy survey	Job Openings and Labor Turnover Survey	2000 - today
United Kingdom	Vacancy survey	Office for National Statistics' vacancy survey	2002 - 2008
European Communities	Both advertised vacancy count and vacancy survey	Statistical Office of the European Communities' job vacancy surveys	2002 - today
Australia	Vacancy survey	Job vacancies, Australia	1993 - May 2008 July 2010 - today
Australia	Advertised vacancy count	Internet vacancy index	2009 - today
Australia	Advertised vacancy count	Skilled vacancy index	1983 – today
Singapore	Vacancy survey	Singapore Manpower Research and Statistics Department: Labour Market Survey	1998 - today
Singapore	Vacancy survey	Singapore Manpower Research and Statistics Department: Job Vacancy Survey	1998 - today

Source: Statistical Office of the European Communities
Australian Bureau of Statistics (Australia)
Office of National Statistics (United States)
Ministry of Manpower (Singapore)