MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

# Change to the seasonal adjustment process for Jobs Online

## Introduction

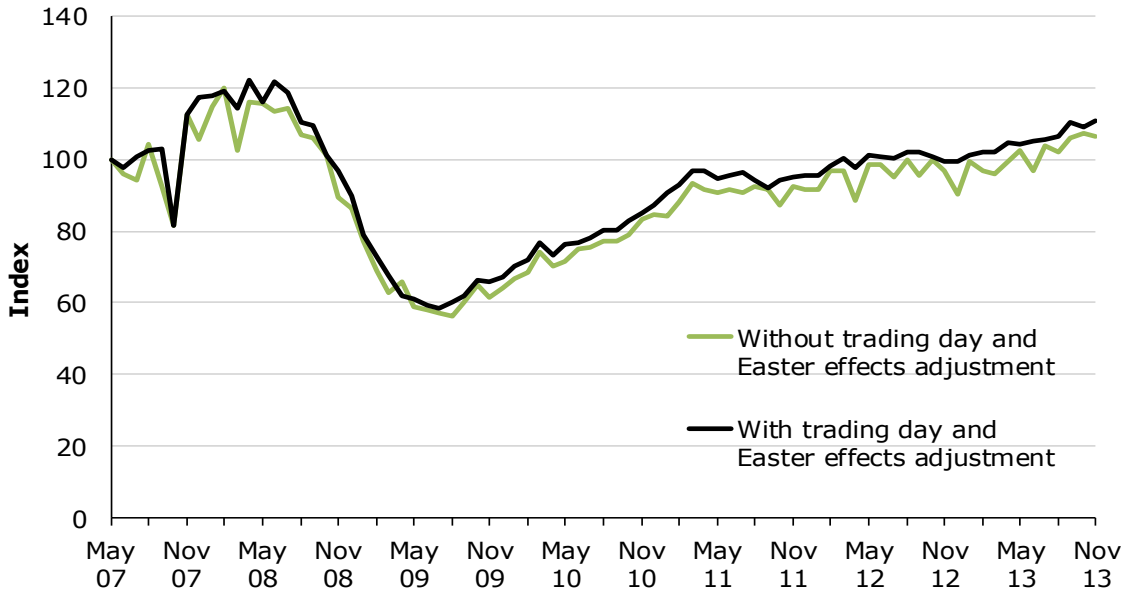
*Jobs Online* measures changes in job vacancies advertised by businesses on the two main internet job boards – SEEK and Trade Me Jobs. The *Jobs Online* data is presented as an All Vacancy Index (AVI) and Skilled Vacancy Index (SVI). The SVI is then broken down by industry[1], occupation[2] and region[3]. These indices are used as indicators of demand for labour.

This paper briefly describes the change to the seasonal adjustment of the SEEK and Trade Me Jobs vacancies series that are used to calculate the monthly SVI and AVI. The change in the process is a result of the investigation into trading day and Easter effects on the monthly vacancies series. The Ministry worked closely with Statistics New Zealand to ensure that the new process is robust. The change in the seasonal adjustment process is introduced in November 2013.

## What the new seasonal process does

The new process removes the effects of different numbers of trading days[4] in each month (trading day effect), and the effect of Easter falling on different dates each year (Easter effect). This resulted had a minimal impact on the trend series. The change in seasonal adjustment process reduces the month-to-month volatility of the vacancies series and provides a clearer picture of job vacancy trends (see Figure 1 below). In some cases, the change has revealed a previously hidden trend. For example, the change has also resulted in a noticeable difference in the overall trends of skilled vacancies in Canterbury region, following the February 2011 earthquake.

**Figure 1 Skilled Vacancies Index (May 2007=100)**
**Seasonally adjusted series: With and without trading day effect and Easter effect adjustments**




[1] The industries are accounting, HR, legal and administration; construction and engineering; information technology; healthcare and medical; sales, retail, marketing and advertising; education and training; hospitality and tourism; and other.
[2] The occupations are managers; professionals; and trades and technicians.
[3] The regions are Auckland, Wellington, Canterbury, South Island (excluding Canterbury), and North Island (excluding Auckland and Wellington).
[4] Trading days are simply weekdays (Mondays to Fridays).

## Why we need to make trading day adjustments

Trading day effects make it difficult for the *Jobs Online* vacancies to be compared across months or compare movements in one series with movements in another series. The trading day adjustment is required as job advertisements tend to decreased in the weekends. Standard tests[5] for detecting and confirming trading day effects show that Tuesday and Friday have more online vacancies advertised, while Sunday has fewer advertisements. The number of jobs advertised online also tends to rise in months with more weekdays days relative to other months. These underlying components in the data showed a need to make adjustments for trading day effects in the *Jobs Online* vacancies indices.

## *Why we need to make Easter adjustments*

Apart from weekday composition of the month, other calendar effects such as public holidays may also affect monthly series. Unlike other public holidays, Easter in New Zealand, can fall on different dates, in either March or April. Activity levels tend to fluctuate before, during and after Easter. Daily data shows that skilled vacancies in 2013 spiked just before Easter. There was also a four-day low, rather than two day low over the Easter weekend. These periodic fluctuation in the vacancies series need to be detected and removed to allow for better comparison of vacancies series over time, and interpretation of job vacancy trends. The X-12-ARIMA package, a statistical program developed by the US Census Bureau, provides an automatic outlier detection procedure that can be used to detect Easter effects in the monthly *Jobs Online* vacancies. This process confirmed the decreases in the March/April months where Easter occurs over the past seven years, suggesting a need to make Easter effect adjustments.

## Seasonal adjustment with correction for trading day and Easter effects

The RegARIMA[6] part of X-12-ARIMA makes adjustments for trading day and Easter effects from the original series. The seasonal adjustment procedure includes these adjustments as regressors when modelling vacancies series using the X-12-ARIMA procedure in SAS® (Statistical Analysis Software). Online vacancies are modelled using a six-day coefficient effect for the trading day effect (TD) regressor, and a two-part Easter regressor. TD estimates a separate regression coefficient for six days of the week and an implied coefficient for Sunday. Easter effect is modelled as two parts: a pre-Easter effect (days before Easter to Good Friday) and an Easter holiday effect starting on Good Friday and lasting until Easter.[7] The quality of the seasonally adjusted series is assessed on standard diagnostics for the presence of seasonality.

[5] This test includes evaluation of "visually significant" peaks in the spectral plots comparison of sample-size modified Akaike Information Criterion values, and comparison of the out-of-sample forecast error.

[6] A time series modelling (combines regression and ARIMA model) developed to identify and estimate outliers, trading day and holiday effects that may exist in the series.

[7] For details about this method, see Monsell, B. (2010). *Issues in modelling and adjusting for calendar effects in economic time series*. http://www.census.gov/ts/papers/ices2007bcm.pdf