



Seasonal Employment Patterns in the Horticultural Industry

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Abstract

The study uses Linked-Employer-Employee Data (LEED) to examine short-term and seasonal employment patterns within the New Zealand horticulture industry. The study is a first attempt at using LEED to identify and measure the extent and distribution of seasonal jobs and workers within the New Zealand labour market. Monthly wage and salary information collected by LEED is used to describe the seasonal variation in employment across 10 horticulture sub-industries over a five-year period from October 1999 to September 2005.

The majority (82.1 percent) of employee jobs in the horticulture industry are short term and last 1–9 months. In the year ending September 2003 around one in three short-term jobs were seasonal (part of a long-term seasonal employment relationship between a worker and a horticulture sub-industry) or held by an overseas worker temporarily in New Zealand. The remaining two-thirds of short-term jobs were held by casual workers living in New Zealand.

Over the five-year study period short-term employment in the horticulture industry peaked at between 17,500 and 20,000 jobs in December before falling by half to between 7,500 and 8,500 jobs in September. The apple and pear, berry fruit and citrus growing sub-industries had the largest swings in monthly short-term employment of the 10 sub-industries in the study. Seasonal jobs were more common in months with above average short-term employment. The ratio of overseas workers over casual workers increased steadily towards March before declining during the off-season.

Most workers in short-term horticulture jobs received income from jobs in other industries and government income support. Only about one-third were employed full-year and half received income (from all LEED sources) for the entire year. Around one-third of workers that held jobs outside of the horticulture industry worked in the services to agriculture industry, which is likely to provide contracted labour to growers in the horticulture industry.

While LEED does not directly identify seasonal jobs or workers it does provide meaningful seasonal employment patterns in the horticulture industry. Further work is needed to better identify overseas workers, although it is likely that the identification of Recognised Seasonal Employment (RSE) workers will be aided by the introduction of separate tax rate and code on the 1 April 2009, which could be incorporated into LEED.

Keywords

Employment, seasonal, horticulture, LEED

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1. Introduction

In New Zealand, firms in the horticulture and viticulture industries are finding it increasingly difficult to recruit a sufficient number of local workers, especially during harvesting, and are being forced to look offshore¹. The ongoing shortage of seasonal workers prompted the New Zealand Government to introduce the Recognised Seasonal Employment (RSE) scheme in 2007. The aim of the scheme is to help the horticulture and viticulture industries recruit workers from Pacific countries.² The RSE scheme, together with other government initiatives designed to improve the supply of seasonal workers, has increased the need for information about seasonal workers, firms and industries in New Zealand to support policy decision making. Linked Employer-Employee Data (LEED) could potentially contribute to the information gap on seasonal employment and help support the monitoring and evaluation of the RSE scheme.³

In the past most information on seasonal employment in New Zealand has been gathered from small industry-specific surveys because existing data sources have not been suitable. The Horticulture and Viticulture Seasonal Working Group, formed in 2005, has promoted the development of a seasonal employment forecasting tool (Nana et al, 2005), which has recently been updated and improved using the Survey of Seasonal Labour Employers – Demand and Supply (SSLEDS).⁴ More recently, the Survey of Working Life (SoWL), a supplement to the 2008 March quarter Household Labour Force Survey (HLFS), and the longitudinal Survey of Families, Income and Employment (SoFIE) have included questions that identify individuals in seasonal jobs.⁵

The main weakness of the SoWL is that it is a single snapshot and the small sample (approximately 30,000 individuals) means that only broad industry breakdowns of seasonal employment estimates are possible. While SoFIE can provide longitudinal information on seasonal workers it may miss individuals who provide a different reason for their seasonal job finishing. The SSLEDS captures the distribution of seasonal employment across a single season, but only for a subset of horticulture industries and regions. Going forward, another issue is that there are no firm commitments to repeat SoWL or the SSLEDS and data collection in SoFIE will end in 2010. LEED has the potential to provide ongoing and regularly updated information on seasonal employment

1 "Jobs crises hits Bay Kiwifruit Industry", *Bay of Plenty Times*, 22 March 2008, www.bayofplentytimes.co.nz, "Wine growers fear shortage of workers", *The Press*, 15 March 2008, www.stuff.co.nz, "Bay short of 12,000 fruitpickers", *The Dominion Post*, 1 January 2009, www.stuff.co.nz.

2 See www.immigration.govt.nz/migrant/stream/work/hortandvit/ for further information on the RSE scheme.

3 The Department of Labour has begun an evaluation of the first two years of the RSE scheme (2007/08 and 2008/09). LEED has the potential to examine how the horticulture and viticulture workforce has been affected by the introduction of the RSE scheme, for example, whether New Zealand workers have been substituted by RSE workers.

4 The SSLEDS survey was conducted in the horticulture and viticulture industry after the 2006/07 season by the Department of Labour (SriRamaratnam, 2008) and was limited to regions with significant horticulture and viticulture employment and included the Hawkes Bay, Bay of Plenty, Marlborough and Wairarapa.

5 The SoWL includes two questions that may identify seasonal workers. The first asks those in temporary work whether their job is seasonal (28.4% of all temporary workers, 1.3% of all employees) and the second asks all employees, including permanent employees, whether they are in a seasonal job (2.7% of all employees). See Department of Labour (forthcoming) for an analysis of these variables. SoFIE asks why a job came to an end and includes 'seasonal job' as one of the responses.

patterns, as well as extending the information currently provided by SoWL and SSLEDS. The monthly reporting of earnings of all employees within New Zealand makes LEED ideal for summarising temporary (short-term) employment spells across and between years, which are associated with seasonal jobs, for detailed industries and regions not available in SoWL. LEED could also extend the type of analysis possible with SSLEDS data across for the entire New Zealand labour market. The longitudinal dimension and complete coverage of employees' earnings and government income support in LEED can be used to examine workers who are employed in short-term jobs and to better understand the behaviour of these workers. This includes whether they come back the following season to the same industry or firm and what they do during the off-season (e.g. what proportion of workers move onto government income support at the end of the season).

The main limitation of LEED is the lack of (self-reported) information to identify seasonal jobs from other temporary jobs. However, there are several examples in the literature (see Raaf et al, 2003; Bono & Webber, 2006) of mechanically identifying seasonal jobs and workers that may have advantages over self-reported measures. Raaf et al (2003) raised several concerns about the accuracy of self-reported seasonal work. Workers may report that they work in seasonal employment, but their job does not end for seasonal reasons (eg SoFIE). Or workers may not be aware their job ended for seasonal reasons (eg SoWL).

The main aim of this paper is to evaluate the contribution LEED can make to the measurement and understanding of seasonal employment patterns in the New Zealand horticulture industry. The reason for focusing on the horticulture industry in this study is two-fold. First, the study is motivated by labour shortage problems in the horticulture and viticulture industries and in particular the role of LEED in the evaluation of the RSE scheme. Second, it is argued that jobs that terminate early are more likely to be genuinely seasonal rather than poor job matches that did not last.

The paper describes short-term job patterns in the horticulture industry and for sub-industries. It identifies permanent, seasonal, casual and overseas jobs to describe how the workforce mix varies across the season. It also examines employment and government income support histories in LEED (ie what do workers do during the 'off-season'). The paper also comments on the usefulness of LEED in identifying and helping to monitor the earnings of RSE workers. LEED's usefulness could be enhanced following the introduction of a new tax rate and code for RSE workers on 1 April 2009. These will help identify and follow RSE workers in LEED.

2. Data

Linked Employer-Employee Data (LEED)

LEED contains data on individuals' wage and salary earnings, self-employment earnings, income from Accident Compensation Corporation (ACC) earnings-related compensation, income from working-age benefits, and income from New Zealand Superannuation. Employment activity can be inferred on the basis of whether employee or self-employment income was received.

Employers are required to provide information to Inland Revenue (referred to as the PAYE system) on the tax numbers of their employees and their earnings each calendar month. Most of the income data in LEED has a calendar-month reference period, due to the way the PAYE system operates. The exact start or finish dates of jobs that begin or end during a calendar month are frequently not reported, which means that it is not possible to tell exactly which individuals were employed on any given day during the month. In this paper, an individual is considered to be 'employed' with a particular firm in any calendar month in which they received any employee earnings.

At the time this study began, LEED covered eight years, from 1 April 1999 to 31 May 2007.

Sample

To construct a job spell⁶ in LEED all employment months are selected where employer-employee earnings are greater than zero. Contiguous employment months are joined together to create a job spell. Job spells between an employer and employee consist of at least one or more consecutive months with non-zero earnings separated by at least one month of zero earnings. The longest observable job spell is 98 months, which exists if every employer-employee month between April 1999 and May 2007 has greater than zero earnings.

For each job spell we attach employer and employee characteristics to the middle month. Employee characteristics available in LEED include age, calculated from the individual's birth date and rounded to the nearest year and sex, which is imputed from an individual's title and name. Employer characteristics include industry sector, which is coded to the 5-digit level using the 1996 Australian and New Zealand Standard Industrial Classification (ANZSIC) system, and geographic region, coded using New Zealand regional council boundaries.

We then select all job spells attached to employers in the horticulture industry. This study defines the horticulture industry using the 1996 version of ANZSIC, and the 3-digit group horticulture and fruit growing (A011). There are 10 5-digit sub-classes that are part of the 3-digit horticulture group: plant nurseries (A011100), cut flower and flower seed growing (A011200), vegetable growing (A011300), grape growing (A011400), apple and pear growing (A011500), stone fruit growing (A011600), kiwi fruit growing (A011700), citrus growing (A011910), berry fruit growing (A011920) and other fruit growing not elsewhere classified (A011990). A description of each 5-digit sub-class is provided in appendix I.

Left and right censoring in LEED means that it is not possible to calculate tenure for job spells that begun before or during April 1999, or ended during or after May 2007. To

⁶ For a detailed discussion on the construction of job spells in LEED see Timmins (2008).

ensure that jobs spells with completed tenure of nine months or less are not censored the sample excludes all job spells that started before or during December 1999 or ended after or during September 2006.

To help summarise employment patterns and provide comparisons across time the selected job spells are assigned to annual periods (job spells can be assigned to more than one annual period). The appropriate annual period, in this study, is one that captures a complete seasonal cycle in employment – including an increase in employment ('peak-season') followed by a decline during the off-season. Figure 1 plots monthly job numbers (or employment) in the horticulture industry between April 2000 and May 2006, as measured in LEED. The graph shows a regular pattern in the number of jobs across the six-year period with a peak during December to March followed by a trough that reaches its lowest point in September. There are five annual periods with a complete seasonal employment cycles that end in September 2001–2005, giving an overall study period of five years from October 2000 to September 2005.

Finally, selected individuals are matched to all their job spells (in all other industries) and government income support spells recorded in LEED during the five year period, but we exclude any individual (and all associated job and government income support spells) aged less than 15 years at 15 October in each of the five annual samples.^{7, 8} Table 1 reports the number of individuals selected in each annual sample. There is an average of 61,700 workers in each annual sample who hold an average of 222,300 job spells. Of these spells 89,200 were in the horticulture industry, 100,700 were in all other industries and 32,300 were government income support spells.⁹

Table 2 provides further detail on job spells for each of the ten horticulture industries in the study. The first three columns list the mean annual number of employment months, job spells and workers, across the five years in the study, and columns four and five contain the ratio of job spells and employment months to workers. The horticulture industries have been ranked, in descending order, by employment months. The largest two horticulture industries, vegetable and apple and pear growing, account for nearly half (44.0 percent) of all employment in the horticulture industry, whereas the five smallest industries account for one-fifth (19.0 percent). Table provides some interesting comparisons on how work is organised within different horticulture industries. For example, employment levels in vegetable growing are higher compared with the apple and pear industry, but the number of job spells and workers used is lower. The job spells and employment per worker ratios suggests that multiple job holding is higher among workers in apple and pear growing, but jobs are relatively short, compared with the vegetable growing industry, whose workers are more likely to hold a single job that lasts for one month longer.

7 For each job spell age is measured at the middle month of the spell using the birth date rounded to the nearest year. If an individual has a number of job or benefit spells and there are at least two or more different middle months across these spells then age at 15 October 2002 could vary by up to a year. In this case we use the youngest age value to determine age at 15 October 2002.

8 Individuals are excluded if, during the annual period, they held another job in a firm with a missing ANZSIC96 industry code, or one of their horticulture or other industry jobs has a missing region identifier. In the year ending September 2003 around 200 (0.3 percent) of individuals were removed.

9 Government income support payments collected by LEED include Accident Compensation Corporation (ACC) earnings-related compensation, working-age benefits (unemployment, sickness and invalids), student allowance, paid parental leave and New Zealand Superannuation.

3. Analysis

We begin by describing monthly short-term employment patterns in the horticulture industry and its 10 sub-industries to identify the extent of seasonal fluctuations in short-term labour. The second part of this section divides short-term job spells into seasonal, casual and overseas jobs to examine the mix of jobs that are used during seasonal peaks in short-term employment. The section ends with a description of the demographic and employment characteristics of workers in seasonal, casual and overseas jobs.

Seasonal variations in employment levels in the horticulture industry

In this study we have followed a number of other studies (Raaf et al, 2003; Bono & Weber, 2008) in identifying seasonal employment spells by using short-term jobs with completed tenure of 1–9 months.¹⁰ Table 3 divides job spells into seven (completed) tenure categories of one month, 2–3 months, 4–6 months, 7–9 months, 10–12 months, 13–24 months and 25 months or more for each of the 10 horticulture sub-industries. The majority (82.1 percent) of job spells in the horticulture industry lasted for 9 months or less, in particular 64.8 percent of job spells lasted for 1–3 months and only 17.6 percent of job spells are defined as long-term (with tenure of 10 months or more). The relatively long duration of long-term job spells means they contribute nearly half (46.8 percent) of employment in the horticulture industry. The share of short-term job spells ranged from 63.0 percent in the plant nurseries industry to 94.0 percent in the berry fruit industry. In seven out of the ten sub-industries 80.0 percent or more of job spells are classified as short-term.

Figure 4 plots the monthly number of short-term and long-term jobs in the horticulture industry, between October 2000 and September 2005. In each month, the number of employment months is counted and divided between short-term and long-term job spells. The monthly number of short-term jobs displays a regular seasonal pattern, rising from a low in September to more than doubling between December and March before declining again. For example, during the middle year of the study period the number of short-term jobs increased from 8,200 in September 2002 to 18,600 in December 2002. In comparison, the monthly number of long-term jobs shows very little variation within individual years, with the exception of a small dip around January (a feature previously found within the New Zealand economy, see Timmins, 2008¹¹). The number of short-term jobs exceeds long-term jobs by between one-fifth and a half during the months November to May, but drop below the number of long-term jobs between June and October (off-season).

The number of long-term jobs in the horticulture industry increased over the five year study period, from 10,800 in October 2000 to 12,100 in September 2005. Most of the increase in the monthly number of long-term jobs occurred between September 2001 and September 2003, remaining at just below 12,500 from September 2003 onwards. The cycle in short-term employment displays similar peaks and troughs in the

¹⁰ Raaf et al (2003) use the same tenure cut-off of nine months to define short-term job spells and Bono and Webber (2008) define permanent jobs as having a minimum duration of 11 months. The analysis of monthly employment patterns of job spells with completed tenure of 10, or 11 months, were found to be similar to job spells with completed tenure of 12 months or more (ie there was less evidence of regular seasonal employment patterns). Therefore, it was decided to classify job spells with completed tenure of 10 months or more as long-term jobs.

¹¹ A common feature of all industries in LEED is for employment relationships to have a one month break in January before resuming in February (Timmins, 2008).

September years 2001–04. However, the traditional seasonal highs in December and March in the year ending September 2005 are noticeably lower (the September dip is slightly lower compared with previous years). The growth in employment through long-term jobs, and the slight dip in employment from short-term jobs, over the study period resulted in a fall in the ratio of annual employment from short-term over long-term job spells – from 1.2 to 1.1 by the year ending September 2005.¹²

The large swing in the monthly number of short-term jobs in Figure 4 will be driven by two factors. First, the size of a change in the number of short-term jobs reflects a change in the number of new job starts and, second, the width of the peak in short-term employment is driven by how long the new short-term jobs last. For example, the narrow one-month peak in short-term employment during December requires an increase in the number of short-term jobs starting and ending during December.

Figure 5 plots the mean number of short-term jobs, by calendar month, over the five-year study period on the left-hand axis and the mean tenure of all short-term jobs in each calendar month on the right-hand axis. Not surprisingly, peaks in the monthly number of short-term jobs are associated with a decline in average job tenure. For example, the increase in short-term jobs between October and December is associated with a fall in mean tenure from four and one-quarter months to just over three months. In other words, monthly employment peaks are associated with an increase in the number of job starts that only last for one or two months.

The peaks in short-term employment during December and March could be driven by one large horticulture industry or a few sub-industries with overlapping demand for short-term labour. Is the aggregate seasonal variation in monthly short-term employment prevalent in all horticulture sub-industries? And to what extent do seasonal cycles overlap across the sub-industries? Figure 6 plots the monthly number of short-term and long-term jobs in the five horticulture sub-industries having the largest average annual employment over the period between October 2000 and September 2005. Individual plots for each of the ten sub-industries are included in table A1 in appendix 2. To help visualise month-to-month changes in short-term employment, the vertical axis has been scaled to the monthly employment range for each industry. All five industries in Figure 6 exhibit considerable variation in monthly employment levels within short-term jobs, and little variation in monthly employment in long-term jobs.

Short-term employment in the vegetable, grape, apple and pear and kiwifruit growing sub-industries is characterised by sharp peaks in employment that are centred on a single month, whereas the plant nurseries sub-industry displays smaller and wider peaks. For example, the number of short-term jobs in apple and pear growing increases from around 1,000 jobs in September to just over 8,000 jobs in March, while the plant nurseries industry displays little monthly variation in short-term employment. However, the number of short-term jobs still increases from eight or nine hundred to close to 1,500.

Monthly employment in short-term jobs in the vegetable and apple and pear sub-industries is centred on a single peak. The kiwifruit sub-industry has two distinctive peaks starting with a relatively small increase in short-term employment that is followed by a much larger increase a few months later. In the plant nurseries sub-industry peaks

¹² One possible explanation for the fall in the ratio of employment from short-term jobs compared with long-term jobs is a move by growers towards contracting labour from employment services firms that are classified by ANZSIC96 as A012 'services to agriculture'.

are more rounded and last for longer. There appears to be considerable variation in month to month short-term employment in the grape sub-industry over the five-year study period, and the graph does not reveal a regular year-to-year pattern compared with the other four sub-industries (see Figure 6). A similar pattern exists for the flower growing sub-industry, which experienced a decline in short-term employment (see table A1 in appendix 2). This may be due to an increase in size and variability in short-term employment in the five-year study period. In comparison, short-term employment in the other four sub-industries remained relatively steady (plant nurseries, and apple and pear) or decreased slightly (vegetable, and kiwi fruit).

Comparisons with the 2006/07 Survey of Seasonal Labour Employers – Demand and Supply (SSLEDS) provide some confidence that LEED measures of short-term employment are a reasonable proxy for seasonal employment. The magnitude and timing of peaks in short-term employment in LEED are similar to those reported for seasonal workers in SSLEDS. SSLEDS estimates the number of seasonal workers in the pip-fruit and summer-fruit sub-industries, based in the Hawke’s Bay and Nelson, to be around 6,000 in December 2006, rising to 12,000 in March 2007 and falling to around 1,500 in September and October 2007 (SirRamaratnam, 2008), which compares well with the LEED short-term employment patterns for the apple and pear growing sub-industry in Figure 6. It is likely that the lower number of short-term jobs recorded by LEED compared with seasonal jobs estimated by SSLEDS reflects the fact that LEED measures of employment in the horticulture industry only include individuals directly employed by the grower and exclude workers supplied to the grower by a contractor. There is also a close concordance between the seasonal worker patterns in SSLEDS and short-term employment patterns in LEED for the kiwifruit sub-industry. The number of seasonal workers involved in the harvesting of kiwifruit in the Bay of Plenty, as estimated by SSLEDS, peaks at just over 3,000 workers in May and June 2007. The peaks in short-term employment in the kiwifruit sub-industry in LEED also occur during May and June, but the employment levels are slightly lower and varied between 2,000 and 3,000 jobs over the five-year study period. Again, the lower employment levels recorded in LEED could be driven by measuring only employees of kiwifruit growers and not outside contractors.

To quantify differences in the variation in monthly short-term employment patterns between horticulture sub-industries we constructed a seasonality index by dividing the standard deviation by the mean monthly short-term employment (often referred to as the coefficient of variation). Table 5 lists the seasonality index for all 10 horticulture sub-industries between the September 2001 and 2005 years. The stone fruit sub-industry had the highest coefficient of variation (seasonal index), followed by the berry fruit, and apple and pear sub-industries. The flower, grape, and plant nurseries sub-industries had the least variation in short-term monthly employment and, therefore, a low seasonal index value. To compare changes over time the average index across 2001 and 2002 was subtracted from the mean index across 2004 and 2005. Between 2001-02 and 2004-05 the apple and pear, plant nurseries, kiwifruit. and other fruit sub-industries had a fall in the seasonality of short-term employment.

To examine the extent to which short-term monthly employment patterns overlap across the five sub-industries plotted in Figure 6, we plot the mean monthly share of annual short-term employment for each calendar month over the five-year study period. Figure 7 plots the share of short-term employment in each month for an average year in the 5-year the study period. The vertical axis measures the share of the total annual short-term employment across the 12 months on the horizontal axis. The area under each line sums to the annual total of short-term employment. If The horizontal line represents an industry with an even distribution of short-term employment months across the 12-

month period. The apple and pear sub-industry displays a distinctive peak across March and April, which accounts for nearly two-fifths of annual short-term employment in the sub-industry. The other four horticulture sub-industries exhibit peaks (of around 10 percent) in the fraction of annual short-term employment, centred on December, March and June. For example, the kiwifruit sub-industry has peaks in short-term employment in December and June, which, on average, account for just over one-third of annual short-term employment in the sub-industry.

Not surprisingly, there is considerable overlap around December, and between February and June, in monthly short-term employment peaks across the five largest horticulture sub-industries. Figure 8 provides a visual representation of the extent to which peaks overlap across the 10 horticulture sub-industries. Figure 8 maps the calendar months where, on average, the share of annual short-term employment is greater than would be expected if employment was evenly distributed across the year ($100 * (1/12 \text{ months}) = 8.33\%$). If the monthly share of annual short-term employment is equal to or less than 8.33 percent, then the month is shaded white. If it is greater than 8.33 percent, the month is shaded light grey if the short-term employment share is less than 9.16 percent, (10 percent higher than 8.33 percent), and dark grey if equal to or greater than 10.0 percent (20 percent higher than 8.33 percent). The black dots mark the month with the largest share of annual short-term employment.

Overall the horticulture industry's short-term employment season runs from December to May. The share of annual short-term employment during December–April is 20 percent higher than if employment was evenly distributed and 10 percent higher in May. December has the highest monthly share of annual short-term employment (11.6 percent). December to February had relatively high annual short-term employment shares across the 10 horticulture sub-industries. Nine out of the 10 sub-industries had higher than expected shares of annual short-term employment during December; with five having shares 20 percent or more above, and four sub-industries experiencing their largest monthly share. By July, most horticulture sub-industries are into the off-season, with the exception of plant nurseries (their peak season runs from June to December), and grape and citrus, which slow down in September.

Figure 7 and Figure 8 show that during the months December to February all horticulture sub-industries, with the exception of plant nurseries, had above average short-term employment. During March and April several sub-industries had average or below average short-term employment (above-average short-term employment in the apple and pear, and vegetable sub-industries, both relatively large employers, contributes to above-average short-term employment overall in the horticulture industry). May and June see a return to above-average short-term employment, although the larger sub-industries (apple and pear, and vegetable growing) are winding down.

Table 6 summarises the concentration of short-term employment across the 10 horticulture sub-industries during the peak short-term employment season. The first column, labelled '# months', is the number of months with above-average short-term employment (greater than 8.33 percent), referred to as the peak-season. The second column is the share of short-term employment within the peak-season, column three displays the mean peak-season monthly share (column two divided by column one) and column four lists the peak-season month with the largest share of short-term employment.

For the horticulture industry as a whole monthly short-term employment is above average for six months and accounts for 63.3 percent of short-term employment.

Season length varies from four months in the kiwi, berry, and stone fruit sub-industries to six months in the apple and pear, grape, and other fruit sub-industries. and seven months in the vegetable, and plant nurseries sub-industries. Shorter seasons tend to be associated with a greater concentration of short-term employment. For example, the berry and stone fruit sub-industries use an average of 16.0 percent and 18.4 percent, respectively, of their annual short-term employment per month during the peak-season. However, outliers include the grape and kiwifruit sub-industries that have relatively low monthly shares of annual short-term employment during a peak-season of only four months. The apple and pear, berry, and stone fruit sub-industries have the highest single month share of annual short-term employment, 19.4, 20.8 and 26.8 percent, respectively. The horticulture sub-industries with the most concentrated monthly short-term employment are, in descending order: stone fruit, berry fruit, and apple and pear growing, followed by a middle group that includes kiwifruit, citrus, other fruit, and vegetable growing. Sub-industries with the lowest concentration are plant nurseries, grape, and flower growing.

Identifying distinct worker employment patterns

The previous section established that there is considerable seasonal variation in short-term employment within horticulture sub-industries. For example, on average, the number of short-term job spells in the apple and pear sub-industry more than quadruples between September and March. Where do they get their workers from during the peak months? Are they locals, returning workers or do they rely on workers from overseas (eg individuals on working holidays)? This section describes the types of workers employed during the peak-season months in the horticulture industry, compares them with off-season workers.

The section divides short-term job spells into seasonal jobs that are held by a worker who returns to the same (5-digit) sub-industry, around the same time each year, in at least three of the five years in the study period. The remaining (non-seasonal) short-term job spells are labelled 'casual jobs' if held by workers resident in New Zealand, or 'overseas jobs' if held by individuals temporarily visiting New Zealand. This section ends with a description of the demographic and job characteristics of workers in permanent (long-term), seasonal, casual, and overseas jobs.

Seasonal, casual and overseas jobs are identified by using a person's longitudinal record in LEED across the five-year study period. To maximise the information on each individual we select all people in the year ending September 2003. This allows us to gather some information on new entrants and individuals who leave LEED.¹³ A seasonal job is part of an employment relationship between an employee and a horticulture (5-digit ANZSIC) sub-industry, and consists of at least three short-term job spells (that last for 9 months or less) in at least three separate years (including the reference year ending September 2003) that all end at about the same time (within a three month window). The reference year contained 73,443 short-term job spells in the horticulture industry, of which just under a third (30.8 percent) had been repeated at least once in the same horticulture sub-industry, and with just under half (13.8 percent of all short-term job spells) being repeated two or more times.¹⁴

13 The problem with selecting job spells and individuals in the last year of the five-year study period is that all new entrants to the horticulture industry with a short-term job would have their job spell classified as a casual job and it wouldn't be possible to make the distinction between a worker resident in New Zealand or a worker visiting from overseas.

14 Half (49.9 percent) of all job spells in the reference year ending September 2003 were repeated in either the horticulture industry or in the services to agriculture industry. This

Overseas workers are individuals who only appear in LEED during the reference year, or the reference year and an adjacent year (to allow workers on 12-month working holiday visa to appear in two years), and received no government income support. Of the 62,400 workers in the reference year ending September 2003, 6,200 were identified as overseas workers with 100 holding a long-term job spell in the horticulture industry and rest employed in short-term job spells.¹⁵ Figure 2 plots the age distribution of overseas workers and New Zealand residents employed in the horticulture industry, as identified in LEED. The majority of overseas workers are aged between 20–30 years, whereas New Zealand residents have a relatively high concentration of workers aged less than 20 years and a smaller, but significant, share of workers aged 25 years and over. The relatively large peak in overseas worker aged 20–30 years matches the age requirements for working holiday visas issued in New Zealand – applicants typically need to be aged 18–30 years. The narrow age range of overseas workers may reflect the identification strategy adopted for this study, and may have resulted in overseas workers being classified as New Zealand residents. For example, an Australian resident that regularly returns to New Zealand to work in a seasonal job.¹⁶

Table 4 sums the number of jobs spells and employment months divided into long-term, seasonal, casual and overseas jobs. Across the horticulture industry just under one-fifth of job spells are categorised as long-term and four-fifths are short-term, but long-term job spells account for just under half of all employment months. Seasonal and overseas jobs account for 13.2 percent and 10.0 percent, respectively, of all job spells. However, the majority of short-term job spells are casual. Around one-third of job spells (and two-thirds of employment) in the plant nurseries and flower growing sub-industries are long-term, compared with less than 10 percent of job spells (and less than one-third of employment) in the apple and pear, stone fruit, citrus, and berry fruit growing sub-industries.

Figure 3 displays the share of seasonal, casual and overseas jobs for each of the 10 horticulture sub-industries. There is little variation in the share of short-term jobs that are seasonal. The plant nurseries, and flower growing sub-industries have the smallest share of seasonal jobs (10.9 percent and 12.2 percent, respectively). The other industries have shares that are similar to that of the horticulture industry (16.1 percent), ranging between 14.2 percent and 18.0 percent. Across sub-industries, there is considerable more variation in the shares of casual and overseas jobs. The apple and pear, stone fruit, and citrus growing industries had the highest shares of overseas jobs (19.3 percent, 19.4 percent and 26.4 percent, respectively), compared with 12.2 percent for the horticulture industry overall.

Figure 9 plots the monthly number of short-term jobs in the horticulture industry during the year ending September 2003 on the left-hand axis. The right-hand axis plots the shares of monthly short-term job spells that are classified as seasonal, casual, and overseas jobs. There is a distinct fall in the share of casual jobs during the months

supports anecdotal evidence that a significant proportion of short-term seasonal horticulture labour is sourced from employment contracting firms.

15 The majority of individuals (79.5%), in the reference year ending September 2003, appeared in LEED in four of the five years covered by the study, and 6.6% only appeared in the reference year.

16 RSE workers, that return to work in a new season, would be classified as a New Zealand resident in this study. A recent survey of RSE employers found that just over half (55 percent) of RSE workers in the 2007/08 season returned to the same firm in the 2008/09 season (Department of Labour, 2009).

where short-term employment is relatively high (December–June). The fall at the beginning of the season is driven by a rise in the share of overseas jobs; the share of seasonal jobs remains largely unchanged over this period. As the horticulture industry moves into the off-season the increase in the share of casual jobs is driven by a fall in the shares of seasonal and overseas jobs. Between October and May around one in five short-term job spells is a seasonal job. The share of seasonal jobs is largely unchanged over this period despite large fluctuations in the monthly number of short-term job spells. During the off-season the share of seasonal jobs falls below one-fifth of jobs to a low of 13.2 percent (one in eight jobs) in September. In contrast, the share of overseas jobs centres on a peak in March following a steady rise that starts in October, up from 5.1 percent to 14.9 percent (one in six jobs). From March the share of overseas jobs falls to 6.5 percent in July, and remains at roughly the same level during August and September.

One explanation for the employment pattern of overseas jobs may be individuals visiting New Zealand on a working holiday visa. It is likely they are filling jobs created by a seasonal demand for short-term labour. That their share peaks in March and not December is probably due to their availability during the summer months, when they are more likely to take a holiday. However, we can only speculate as to why overseas jobs become a bigger share of the workforce during March. Is it because overseas workers are cheaper than locals (casual jobs)? Or do they top-up the workforce because the supply of local workers dries up?

The two peaks in monthly short-term employment in December and March are similar in size, 18,600 and 17,300 jobs respectively, but the composition of short-term job spells shifts from casual jobs to overseas jobs. In December, on average, 71.6 percent of short-term jobs are classified as casual jobs, 19.3 percent are seasonal jobs, and 9.1 percent are overseas jobs. In March the share of seasonal jobs increases slightly to 20.3 percent, but the share of casual jobs drops by over five percentage points to 64.7 percent, and the share of overseas jobs increases from 9.1 percent to 14.9 percent. Despite seasonal and overseas jobs holding an increased share of short-term job spells during the peak months of December and March, the majority of employment is provided by casual jobs.

Figure 10 reproduces Figure 9 for the five largest horticulture sub-industries, in terms of employment. The left-hand vertical axis that measures employment has been scaled to the individual sub-industries. With the exception of the plant nurseries sub-industry the share of casual jobs falls during the peak-season months. In the vegetable sub-industry, the fall in the share of casual jobs is matched by a rise in the share of seasonal jobs (there is little seasonal variation in the share of overseas jobs). The grape sub-industry has a large increase the share of overseas jobs in March and little change in the share of seasonal jobs. The pattern in the apple and pear sub-industry is similar to that for the aggregate horticulture industry, partly due its large size (one-fifth of all horticulture employment). The kiwifruit sub-industry has a rise in the share of seasonal jobs at the beginning of the season, followed by an increase in overseas jobs towards the end of the season.

Seasonal jobs are more common during the peak short-term employment months, whereas overseas jobs are more likely to occur after February. Seasonal jobs typically make up larger shares of short-term job spells during December. Table 7 uses the peak seasons identified in Figure 8 to compare the concentration of employment in long-term, seasonal, casual, and overseas jobs within high-season periods across the 10 horticulture sub-industries. Seasonal, casual and overseas jobs are more concentrated during high-season periods than long-term jobs. For example, just over half (50.1

percent) of employment in long-term jobs occurs during the six month high-season in the horticulture industry, compared with two-thirds (66.9 percent) of seasonal employment, 60.7 percent of casual employment and three-quarters (75.1 percent) from overseas employment. The apple and pear sub-industry's high-season is a similar length to the horticulture industry as a whole, and contains around half the total annual long-term employment, 82.2 percent of seasonal employment, 76.8 percent of casual employment, and 91.0% of overseas employment. In most cases, there is a greater concentration of seasonal and overseas employment than casual employment.

SSLEDS also collected information on the supply of seasonal jobs and divided them into locals and workers from overseas. During March 2007, the survey reported that of the 8,000 workers employed in the pip-fruit and summer-fruit industry in the Hawke's Bay region, 5,000 (62.5 percent) were locals and 3,000 (37.5 percent) were from overseas. The share of jobs held by overseas workers is higher when compared with LEED estimates of around 20 percent in the apple and pear growing sub-industry. Although comparisons are difficult, due to different seasons and samples, it may be that some overseas workers in LEED have been categorised as local workers (casual jobs) because they have returned to work in New Zealand in more than one season.

Industries may have a continuous demand for short-term employment spells that are unrelated to seasonal employment demands, and this may explain why casual jobs are more prevalent during the off-season. However, the fact that the share of overseas jobs is greater during the peak-season months provides some confidence that we are capturing useful information from LEED in identifying seasonal, casual, and overseas jobs. In particular, the share of short-term job spells held by overseas workers increases around the time individuals would be expected to be visiting New Zealand for a working holiday.

Further characteristics of workers and their employment patterns

This section provides selected demographic and employment characteristics for permanent, seasonal, casual and overseas workers. It also describes their activity within the horticulture industry, all other industries, and their government income support payments for the year ending September 2003. Workers may hold more than one job type as defined in this study, so to avoid double counting workers each individual has been assigned to a single job type by using a prioritised system. Permanent workers had at least one long-term job in the horticulture industry during the year ending September 2003. Of the remaining workers that only held short-term jobs, seasonal workers held at least one seasonal job, casual workers only held casual jobs, and overseas workers only held overseas jobs. Of the 62,352 workers selected in the year ending September 2003, 24.5 percent were classified as permanent workers, 12.1 percent as seasonal workers, 53.5 percent as casual workers, and 9.8% as overseas workers. The majority (82.1 percent) of permanent workers in the horticulture industry held only a long-term job, 3.6 percent also held a seasonal job, and 15.9 percent had a casual job, and less than one percent were classified as working temporarily in New Zealand (overseas workers). Seasonal workers are more likely to hold a casual job in the horticulture industry (41.9 percent).

Table 8 shows selected individual and employment characteristics for the four groups of workers. The first column includes all workers selected in the year ending September 2003, the subsequent four columns contain workers categorised as permanent, seasonal, casual and overseas. Permanent and overseas workers were less likely to be female (43.2 percent and 42.8 percent respectively), compared with seasonal workers, where just over half were female (50.3 percent), and casual workers (46.7 percent were

female). Casual workers are, on average, younger than long-term and seasonal workers. In particular, 62.8 percent of casual workers and 86.6 percent of overseas workers were aged between 15 and 35 years. Seasonal workers had a higher proportion of individuals aged 55 years and over. In particular, three times as many workers were aged over the New Zealand superannuation eligibility age of 65 years when compared with casual workers.

The next panel in Table 8 describes how individuals supplemented their annual income from the horticulture industry with employment in other industries, government income support, or a combination of the two. Casual workers were the most likely to hold a job outside of the horticulture industry, with over three-quarters (76.3 percent) doing so, followed by seasonal (64.6 percent), overseas (54.8 percent) and permanent (36.1 percent) workers. Around half of casual and seasonal workers who held jobs outside of the horticulture industry also received a government income support, compared with one-quarter of permanent workers. The share of workers who relied solely on government income support outside the horticulture industry was relatively low, at around 1 in 10 workers overall and just under one-fifth (18.3 percent) of all seasonal workers.¹⁷

Very few seasonal (2.4 percent), casual (0.3 percent) and overseas (0.1 percent) workers were employed in the horticulture industry for the entire year (full-year employment is defined as 11 or 12 of 12 calendar months), compared with permanent workers where nearly two-thirds (63.2 percent) were employed all year. This finding is likely to be partly driven by the fact that workers in the horticulture industry typically only hold one job during the year and for these workers (by definition) this job only lasts for nine months or less. However, even when all jobs in all other industries are included only one-quarter of seasonal (27.9 percent) and casual (26.3 percent) workers were in full-year employment (full-year employment is not a feature of overseas workers and probably reflects a short stay in New Zealand, or combining work with a holiday). Once government income support is included, around a half (59.3 percent of seasonal and 54.2 percent of casual workers) receive income over the entire year (there is a high incidence of government income support among these workers compared with permanent workers, discussed in more detail below).

Seasonal workers are employed for five months in the horticulture industry, nearly double the number of months worked by casual (2.8 months) and overseas (2.6 months) workers. Seasonal and overseas workers divide their employment roughly in half between the horticulture industry and all other industries. Casual workers are employed for around one-quarter of their months in the horticulture industry and the remainder three-quarters in all other industries, while permanent workers spend around one-fifth of their employment months in industries outside of horticulture. Permanent workers in the horticulture industry earn, on average, \$2,059 per month, almost double the monthly earnings of seasonal (\$1095.9), casual (\$937.0), and overseas (\$957.7) workers. Seasonal workers report a similar number of months of government income support, both total and income tested¹⁸, compared with casual workers. The two extra months in employment results in a slightly higher annual income for seasonal workers, compared with casual workers, of just over a \$1,000, from all sources, as recorded by

17 Research in Canada by Raaf et al (2003), using a similar dataset to LEED, found that 61 percent of long-term seasonal workers (defined as having a seasonal job in at least three of the five years between 1993 and 1998) followed a seasonal job with employment insurance receipt and 37.6% received employment insurance after each seasonal employment spell.

18 The three main income tested government benefits are unemployment, sickness and invalid.

LEED. Overseas workers earn the least annual income overall, at \$4,589 (approximately two-thirds less compared with seasonal and casual workers).

Table 8 provides further detail on horticulture and other industry employment and government income support. Seasonal workers are more likely to hold more than one horticulture job, with more than half doing so (55.6 percent), but few workers move regions when they switch horticulture jobs. The most mobile groups are seasonal and overseas workers where around one-eighth and one-sixth, respectively, held multiple horticulture jobs in more than one region, compared with around 2 percent of permanent and casual workers. Among workers in short-term horticulture jobs completed tenure was longest for seasonal workers (2.9 months), followed by casual (2.5 months) and overseas (1.9 months) workers.

Casual workers are more likely to hold a job outside of the horticulture industry (76.3 percent). The majority, around one-third of seasonal and casual workers and three-quarters of overseas workers, hold these jobs in the agriculture, forestry and fishing industry within the services to agriculture sub-sector. The prevalence of horticulture workers here suggests that a significant source of horticulture labour is from employment services companies. While most workers held only one horticulture job, multiple job holding in other industries is more common, with around two-thirds of seasonal and casual workers holding two or more jobs. Workers appear to switch industries and regions to hold these jobs. They are often employed in a different region from their horticulture jobs. In particular, around half of overseas workers who have a horticulture and other industry job move regions, which may be explained by their desire to see different parts of New Zealand.

Table 10 examines the industry mix for jobs held outside of horticulture across the four worker groups. The majority of permanent (83.1 percent), seasonal (72.0 percent), and overseas (85.2 percent) workers who held another job outside of the horticulture industry worked in the agriculture, forestry and fishing industry. Casual workers were less likely to hold another job in this industry. Within the agriculture, forestry and fishing industry the services to agriculture was a common destination for overseas workers. For New Zealand-based horticulture workers (permanent, seasonal and casual workers) the main industries worked in outside of the horticulture industry were agriculture, forestry and fishing; manufacturing; and property and business services¹⁹. For overseas workers, industries included hospitality as well as agriculture, forestry and fishing, and property and business services.

Most permanent workers are employed all year in the horticulture industry, with the average job lasting for just over three years. Seasonal workers are older and include a higher proportion of workers who move between employment in the horticulture industry and government income support. Although government income support is more common among seasonal workers, compared with other workers, this may reflect the relatively large share of workers aged 65 years and over who receive New Zealand superannuation in this group. Casual workers are younger, have relatively high student allowance receipt and shorter employment duration in the horticulture industry. They are more likely to have, and be more reliant on income from jobs outside of the horticulture industry. The large proportion of very young people among overseas workers, their propensity to hold other jobs (particularly in the hospitality industry), and their low probability of being employed all year (together with their monthly short-term employment patterns that peak around March (see Figure9)) suggest this group

¹⁹ Property and business services contains employment services that supply labour (usually low skilled) at short notice.

contains many individuals visiting New Zealand on a working holiday visa (which has an upper age limit of 30). It may be that the definition of an overseas worker used in the study does not capture other seasonal workers temporarily in New Zealand, particularly if they return for more than one season.

4. Summary

The study used Linked-Employer-Employee Data (LEED) to examine seasonal variations in employment levels within the New Zealand horticulture industry. The longitudinal dimension of LEED is used to identify the extent to which monthly peaks in short-term employment are supplied by seasonal, casual and overseas jobs. A seasonal job is held by a worker who returns to the same (5-digit) sub-industry, around the same time each year, in at least three of the five years in the study period. The remaining (non-seasonal) short-term job spells are labelled 'casual jobs' if held by workers resident in New Zealand, or 'overseas jobs' if held by individuals temporarily visiting New Zealand. Finally the paper describes selected demographic, job and government income support characteristics for workers in permanent, seasonal, casual and overseas jobs, with the purpose of understanding how the earnings from short-term horticulture employment contribute to a worker's full-year earnings and income.

Not surprisingly the study found that the majority (82.1 percent) of jobs spells in the horticulture industry lasted less than one year (nearly two-thirds only lasted one to three months) and most short-term jobs were held by casual workers (71.6 percent) living in New Zealand. There was considerable variation in the monthly number of short-term jobs over the study period – the number tends to rise quickly and fall just as rapidly, with peaks lasting for one or two months. Of the five largest horticulture sub-industries (in terms of employment), short-term employment in the plant nurseries, vegetable growing, and apple and pear growing is centred around a single peak period. The grape growing sub-industry has three peaks while kiwifruit has two, distinct peaks. Seasonal jobs were more concentrated in the months with above-average shares of short-term jobs (ie seasonal peaks in employment). This pattern was particularly evident in the plant nurseries, vegetable, apple and pear, and stone fruit growing sub-industries. For example, in the apple and pear sub-industry four-fifths (82.2 percent) of employment, provided by seasonal jobs is during the six-month peak season. Similar patterns exist for overseas jobs, which are centred around March at end of the summer months and beginning of autumn.

Comparisons with the short-term employment patterns (across horticulture sub-industries) in SSLEDS suggest that LEED measures of seasonal employment are likely to exclude labour supplied to growers from employment contracting firms. This appeared to be the case with kiwifruit growing, and is further supported by around one-third of jobs held by workers outside horticulture being in services to agriculture sub-industry. While it is possible to capture many of these contracted workers in LEED within the ANZSIC96 classification A021 Services to agriculture, it is not possible to match the workers to specific horticulture employers. One area for future research may be to use region as a way of adding in contracted horticulture labour within those regions that have significant horticulture activity.

There was little variation, across the 10 horticulture sub-industries, in the share of short-term jobs identified as seasonal. However, the share of overseas jobs was particularly high in the apple and pear, stone fruit, and citrus growing sub-industries, which had a corresponding lower share of casual jobs. For some horticulture sub-industries the proportion of seasonal, casual and overseas jobs does not dramatically change over a year; the short-term job spell mix is similar whether short-term employment is low or high. For sub-industries where the monthly mix of seasonal, casual and overseas jobs does change between months, the change is caused by a falling share of casual jobs against a rising share of overseas jobs.

Again, comparisons with SSLEDS suggest that the use of overseas labour may be more intensive than is measured by LEED. The definition used in this study is quite restrictive.

The study appears to have captured individuals in New Zealand on a working holiday, but may have excluded workers that return to New Zealand each season (and are classified as holding casual jobs in this study). The reason for adopting a relatively conservative identification strategy for overseas workers was the difficulty of separating the New Zealand residents who only work in seasonal jobs and do not receive other income from non-seasonal jobs and government income support during the off-season (eg students, parents looking after children etc) from overseas workers who visit once a year to work in a seasonal job. However, the recent introduction of a separate tax rate and code for Recognised Seasonal Employment (RSE) workers may enable LEED to directly identify these workers to provide detailed employment and earnings outcomes for this group.

Seasonal workers are older and include a higher proportion of workers who move between employment in the horticulture industry and receiving government income support. Although government income support receipt is more common among seasonal workers, compared with other workers, this may reflect the relatively large share of workers in this group aged 65 years and over and receiving New Zealand superannuation. Casual workers are younger, have relatively high student allowance receipt and shorter employment duration in the horticulture industry. They are more likely to hold, and be more reliant on, income from jobs outside of the horticulture industry. The large proportion of very young people among overseas workers, their propensity to hold other jobs (particularly in the hospitality industry), and their low probability of being employed all year (together with their monthly short-term employment patterns that peak around March (see Figure 9)) suggest that this group contains many individuals visiting New Zealand on a working holiday visa (which has an upper age limit of 30 years). It may be that the definition of overseas worker used in the study does not capture other seasonal workers temporarily in New Zealand, particularly if they return for more than one season.

LEED potentially provides a useful complimentary resource for monitoring seasonal employment within New Zealand, due to the ongoing monthly reporting of earnings by detailed industries. Using longitudinal information to identify long-term seasonal workers revealed a group of individuals that was distinct from other workers engaged in temporary employment in the horticulture industry. An attempt to identify overseas workers in the horticulture industry may have only captured a select group of overseas workers, those coming on a working holiday visa, due to a relatively restricted identification strategy.

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6. Tables

Table 1

Number of workers and job spells selected in each year ending September

2001–05

	2001	2002	2003	2004	2005	Average
Horticulture job spells	89,900	91,400	89,700	90,000	85,200	89,200
Other industry job spells	99,400	102,400	98,300	101,900	101,700	100,700
Benefit spells	37,600	36,000	32,100	29,900	26,000	32,300
Total						
Job spells	226,900	229,800	220,100	221,800	212,900	222,300
Workers	60,200	61,900	62,400	63,100	60,900	61,700

Table 2

Mean annual counts of job spells, employment months, and workers, by horticulture sub-industry

October 1999–September 2005

Industry	Employment (months)	Jobs	Workers	Jobs / workers	Employment / workers
Vegetable	67,700	17,000	13,400	1.27	5.07
Apple & pear	62,700	21,800	16,500	1.32	3.80
Plant nurseries	45,200	9,400	7,900	1.19	5.74
Grape	33,700	10,900	7,800	1.39	4.31
Kiwifruit	30,600	10,300	7,600	1.35	4.01
Flowers	16,400	3,900	3,200	1.23	5.10
Berry fruit	16,400	6,600	5,500	1.21	3.00
Other fruit	9,600	3,500	2,800	1.26	3.49
Stone fruit	7,800	3,200	2,800	1.16	2.81
Citrus	6,100	2,700	1,800	1.49	3.36
Horticulture	296,300	89,200	61,700	1.45	4.80

Note: Horticulture sectors have been ranked, in descending order, by their mean annual employment months.

Table 3
Share of job spells within selected tenure bands
Pooled across years ending September 2001–05

Industry	Short-term jobs				Total	Long-term jobs			Total
	Tenure (months)					Tenure (months)			
	1	2–3	4–6	7–9		10–12	13–24	>25	
	Percent								
Plant nurseries	18.9	22.3	15.0	6.8	63.0	4.2	8.8	23.4	36.4
Flowers	25.9	23.4	13.7	7.8	70.8	4.7	7.8	16.0	28.5
Vegetable	28.7	25.9	13.2	5.8	73.6	3.5	7.4	15.0	25.9
Grape	39.6	27.2	11.1	4.7	82.6	2.7	5.3	9.1	17.1
Apple & pear	38.2	34.9	13.6	3.0	89.7	1.6	2.7	5.8	10.1
Stone fruit	47.4	34.2	8.3	2.3	92.2	1.2	1.9	4.6	7.7
Kiwi fruit	36.5	33.1	11.6	4.8	86.0	3.2	3.5	7.2	13.9
Citrus	50.3	31.3	8.0	2.6	92.2	1.2	2.3	4.2	7.7
Berry fruit	40.2	36.8	14.0	3.0	94.0	1.1	1.7	3.2	6.0
Other fruit	42.7	29.4	10.8	4.3	87.2	2.1	4.2	6.4	12.7
Total									
Job spells	34.8	30.0	12.7	4.6	82.1	2.6	4.8	10.2	17.6
Employment	10.5	20.2	14.8	7.0	52.5	4.7	10.4	31.7	46.8

Table 4
Job spells divided by long-term and short-term worker type
Year ending September 2003

Industry	Job spells (No.)	Long-term workers		Short-term workers		
		Percent	Percent	Seasonal	Casual	Overseas
Plant nurseries	10,000	34.5	(67.3)	7.1 (4.1)	54.2 (26.8)	4.2 (1.8)
Flowers	3,600	32.9	(64.4)	8.2 (4.6)	54.6 (29.0)	4.3 (2.0)
Vegetable	17,300	26.2	(58.8)	11.9 (7.4)	57.1 (31.5)	4.8 (2.3)
Grape	11,200	17.6	(48.3)	13.0 (8.2)	61.3 (38.9)	8.1 (4.6)
Apple & pear	22,500	10.5	(33.5)	16.1 (15.6)	56.1 (40.2)	17.3 (10.6)
Stone fruit	2,600	9.1	(32.5)	12.9 (12.8)	60.3 (43.3)	17.7 (11.4)
Kiwifruit	9,800	14.8	(41.3)	15.0 (11.9)	61.3 (41.8)	8.8 (4.9)
Citrus	2,800	7.5	(29.8)	16.2 (13.2)	51.9 (41.4)	24.4 (15.7)
Berry fruit	7,000	5.7	(20.1)	14.4 (16.1)	72.5 (58.4)	7.4 (5.4)
Other fruit	2,900	14.7	(44.1)	15.0 (10.7)	62.5 (41.1)	7.7 (4.1)
Horticulture	89,700	18.1	(48.1)	13.2 (9.9)	58.7 (36.7)	10.0 (5.3)

Note: Percentages in parentheses have been weighted by employment months.

Table 5

Seasonality index for short-term employment

By sub-industries ranked, in descending order, by employment

Industry 2	001	2002	2003	2004	2005	Mean	Change
Vegetable	0.301	0.268	0.290	0.315	0.323	0.299	0.035
Apple & pear	0.772	0.788	0.734	0.695	0.717	0.741	-0.074
Plant nurseries	0.170	0.199	0.192	0.198	0.147	0.181	-0.012
Grape	0.149	0.115	0.152	0.182	0.169	0.153	0.044
Kiwifruit	0.365	0.255	0.285	0.256	0.266	0.285	-0.049
Berry fruit	0.705	0.687	0.802	0.810	0.829	0.767	0.124
Flowers	0.076	0.132	0.166	0.118	0.114	0.121	0.012
Other fruit	0.341	0.400	0.248	0.166	0.231	0.277	-0.172
Stone fruit	0.986	1.071	1.087	1.100	1.001	1.049	0.022
Citrus	0.367	0.285	0.358	0.373	0.369	0.350	0.045
Horticulture	0.309	0.289	0.302	0.313	0.301	0.303	0.008

Note: The column labelled 'Change' subtracts the mean seasonal index during 2004-05 from the mean index in 2001-02.

Table 6

Peak-season short-term employment by horticulture sub-industry

Pooled across years ending September 2001–05

#	months	Share of short-term employment	Mean share / months	Maximum monthly share	
				Share	Month
Vegetable	7	71.09%	10.16%	11.96%	Dec
Apple & pear	6	80.86%	13.48%	19.38%	Mar
Plant nurseries	7	65.71%	9.39%	9.79%	Dec
Grape	6	55.25%	9.21%	9.98%	Apr
Kiwifruit	4	42.89%	10.72%	13.34%	May
Berry fruit	4	63.82%	15.95%	20.76%	Dec
Flowers	5	45.15%	9.03%	10.04%	Dec
Other fruit	6	61.35%	10.22%	11.77%	Jan
Stone fruit	4	73.39%	18.35%	26.76%	Jan
Citrus	6	63.46%	10.58%	12.83%	Jan
Horticulture	6	63.28%	10.55%	11.62%	Dec

Table 7

Share of annual employment during peak season by horticulture sub-industry

Year ending September 2003

	Peak season length (months)	Peak season employment shares			
		Long-term	Seasonal	Casual	Overseas
Plant nurseries	7.0	58.4	70.5	66.3	59.9
Flowers	6.0	50.5	59.3	55.9	68.7
Vegetable	7.0	58.3	77.0	68.5	74.9
Grape	5.0	41.6	49.5	47.8	44.7
Apple & pear	6.0	50.9	82.2	76.8	91.0
Stone fruit	4.0	35.3	78.2	73.4	79.5
Kiwifruit	4.0	33.2	44.4	43.3	51.5
Citrus	5.0	42.0	48.6	52.8	70.7
Berry fruit	4.0	34.1	66.4	64.5	63.0
Other fruit	6.0	50.3	62.3	58.8	70.3
Horticulture	6.0	50.1	66.9	60.7	75.1

Table 8

Selected characteristics of horticulture workers, by worker-type

Year ending September 2003

	All	Permanent	Seasonal	Casual	Overseas
Female	45.88	43.21	50.29	46.67	42.83
Mean age	33.2	38.22	38.23	30.96	26.68
15 - <25 years	32.8	15.7	25.87	40.8	40.34
25 - <35 years	24.07	23.37	16.48	22.04	46.27
35 - <45 years	19.15	26.32	19.57	18.01	6.96
45 - <55 years	13.73	20.46	18.4	11.33	4.31
55 - <65 years	7.63	11.39	12.95	5.74	1.94
65 and over	2.62	2.76	6.73	2.08	0.16
Hort. only	24.68	50.87	17.1	10.64	45.21
Hort and other ind.	38.04	27.14	34.97	40.66	54.79
Hort and benefit	12.39	13.02	18.34	13.03	0
Hort, other ind. and ben.	24.88	8.97	29.59	35.67	0
Full-yr hort. emp	15.95	63.17	2.40	0.29	0.10
Full-yr emp.	36.94	79.02	27.89	26.3	1.05
Full-yr inc.	57.39	85.99	59.33	54.18	1.05
# hort. mon	4.84	10.17	4.97	2.78	2.59
# other ind. mon	4.63	2.31	5.02	6.06	2.15
# inc. tested govt. inc.	2.27	0.99	3.01	3.11	0.00
# of govt. inc. mon.	2.95	1.51	4.19	3.86	0.00
# inc. mon	12.42	13.99	14.19	12.71	4.74
# inc. cal. mon	9.22	11.29	9.57	9.2	3.75
Annual hort. earn	7,433.47	20,942.11	5,446.8	2,604.92	2,480.47
Annual other ind. earn	5,882.14	3,277.78	5,789.76	7,784.92	2,117.98
Ann. inc. tested ben. earn	1,813.4	787.87	2,405.04	2,481.64	0
Annual benefit earn	2,418.86	1,338.94	3,509.95	3,110.24	0
Total annual earn	15,734.47	25,558.83	14,746.51	13,500.08	4,598.45
Observations	62,352 (100.0%)	15,292 (24.5%)	7,537 (12.1%)	33,403 (53.6%)	6,120 (9.8%)

Note: Age is measured at 17 October 2002. Full-year is defined as 11 of the 12 calendar months.

Table 8 (continued)

Selected characteristics of horticulture workers, by worker-type

Year ending September 2003

	All	Permanent	Seasonal	Casual O	verseas
Horticulture employment					
One hort. job	72.76	77.52	44.37	77.45	70.18
Job tenure (months)	11.2	38.2	2.9	2.5	1.9
Hort. jobs in multi regions	3.83	2.07	4.5	2.99	11.99
Other ind. employment	62.93	36.11	64.56	76.33	54.79
Agriculture/forestry/fishing	36.99	30.01	46.63	35.39	46.67
Services to agr.	23.46	16.28	28.36	21.97	39.49
Multiple other ind. jobs	37.59	14.97	39.09	49.44	27.52
Diff industries	26.13	8.98	23.63	35.62	20.23
Diff regions	16.39	4.56	14.2	22.04	17.78
Diff. hort/other ind. region	15.55	7.51	11.8	17.82	27.83
Govt. income support payment	37.27	21.99	47.92	48.7	0
Single benefit	25.88	18.19	30.7	33.05	0
Superannuation	2.79	2.8	7.32	2.27	0
Inc. tested benefit	29.84	14.33	36.71	40.85	0
Student allowance	4.92	1.62	5.08	7.29	0
ACC	3.15	3.96	2.26	3.57	0
Paid parental leave	0.24	0.63	0.05	0.14	0
Observations	62,352	15,292	7,537	33,403	6,120

Table 9

Location of other industry jobs by one-digit industry sector, by worker-type

Year ending September 2003

	All	Permanent	Seasonal	Casual O	verseas
Agriculture/forestry/fishing	36.99	30.01	46.63	35.39	46.67
Mining	0.18	0.24	0.16	0.18	0.03
Manufacturing	23.76	17.33	24.56	26.10	15.39
Utilities	0.10	0.13	0.06	0.11	0.03
Construction	6.29	5.89	4.52	7.06	3.64
Wholesale	8.75	8.78	8.92	8.62	9.48
Retail	15.37	13.91	10.48	17.57	8.08
Hospitality	15.27	10.29	9.54	16.04	26.01
Transport/storage	5.13	4.42	5.01	5.42	4.21
Communication	0.83	0.69	0.64	0.96	0.27
Finance/insurance	0.78	0.60	0.45	0.91	0.57
Property/business	22.84	18.31	19.21	24.11	25.86
Government/defence	1.44	1.48	1.36	1.62	0.15
Education	6.02	5.60	6.25	6.64	1.61
Health/community	5.99	6.37	5.34	6.64	1.43
Cultural/recreational	3.87	3.30	2.98	4.15	4.00
Personal/other	3.65	3.57	2.96	4.07	1.61
Observations	62,352	15,292	7,537	33,403	6,120

8. Figures

Figure 1

Monthly LEED employment in the horticultural industry

April 2000 to May 2006

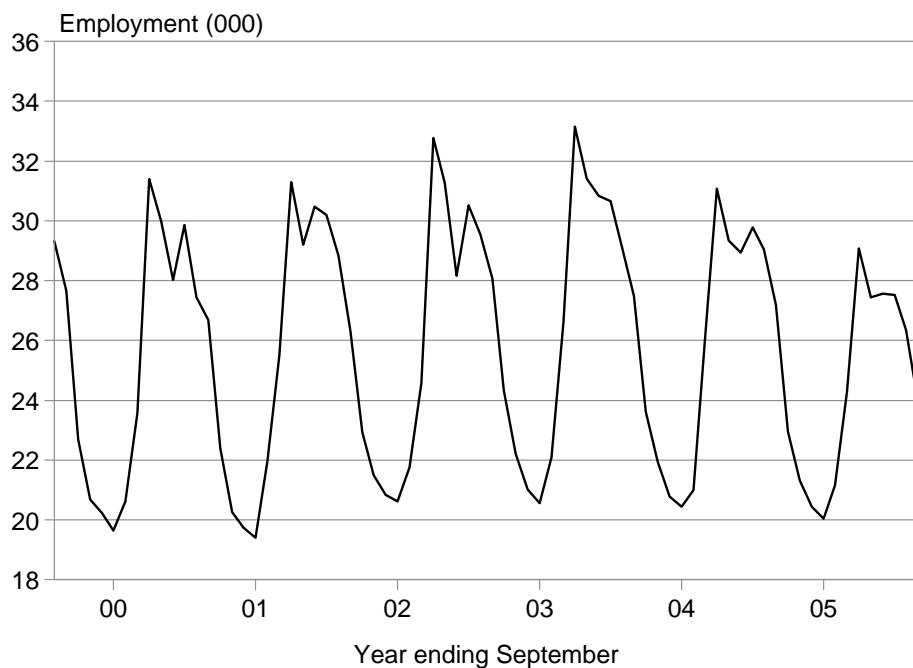


Figure 2

Age distribution for New Zealand-resident and overseas workers in the horticulture industry

Year ending September 2003

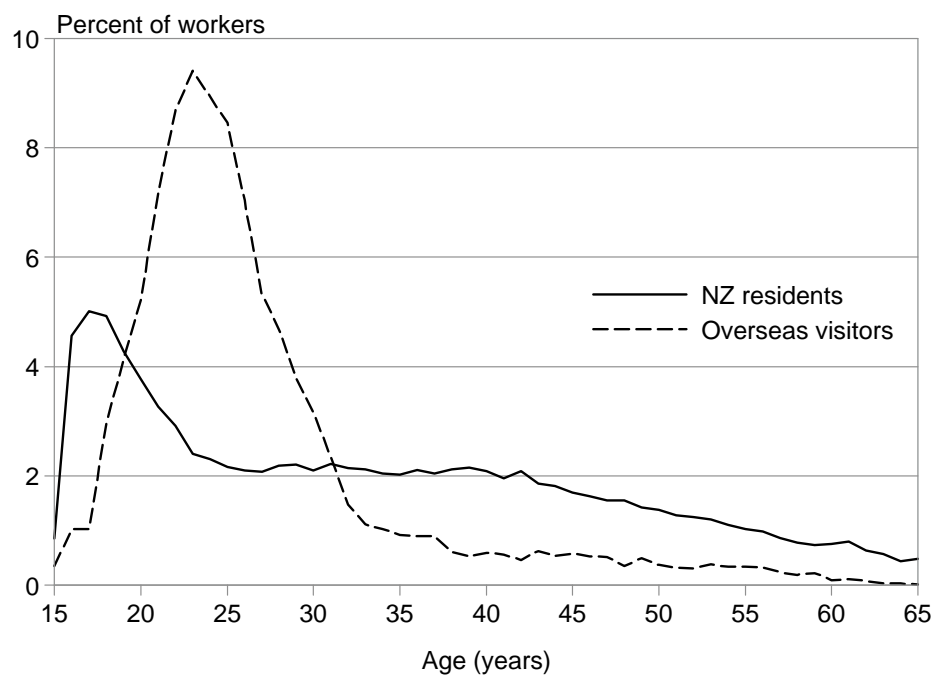


Figure 3

Share of short-term spells in horticulture industry by worker type
Year ending September 2003

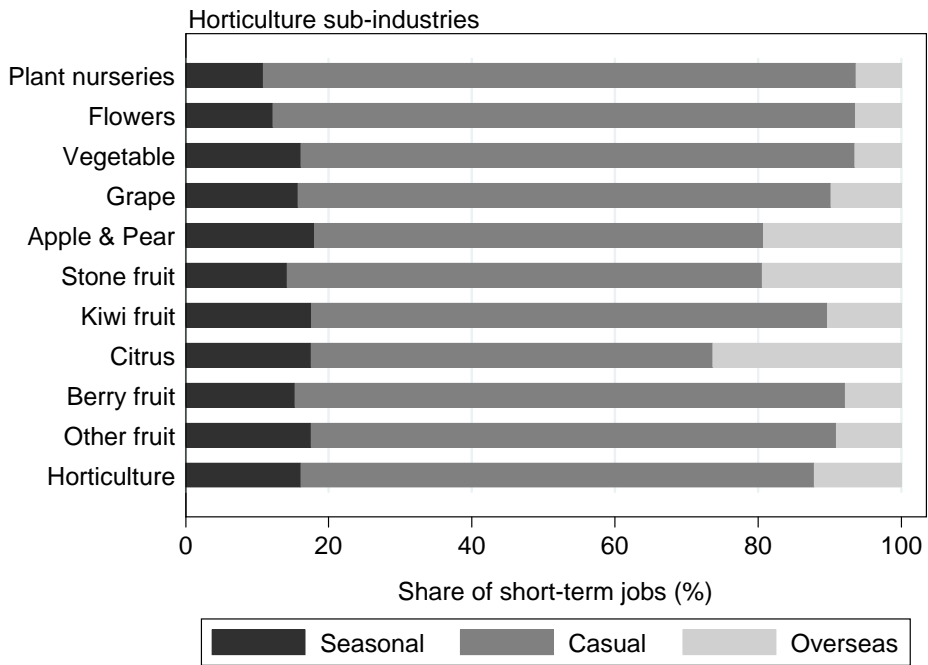


Figure 4

Monthly short-term and long-term job spells in horticulture industry
October 2000 to September 2005

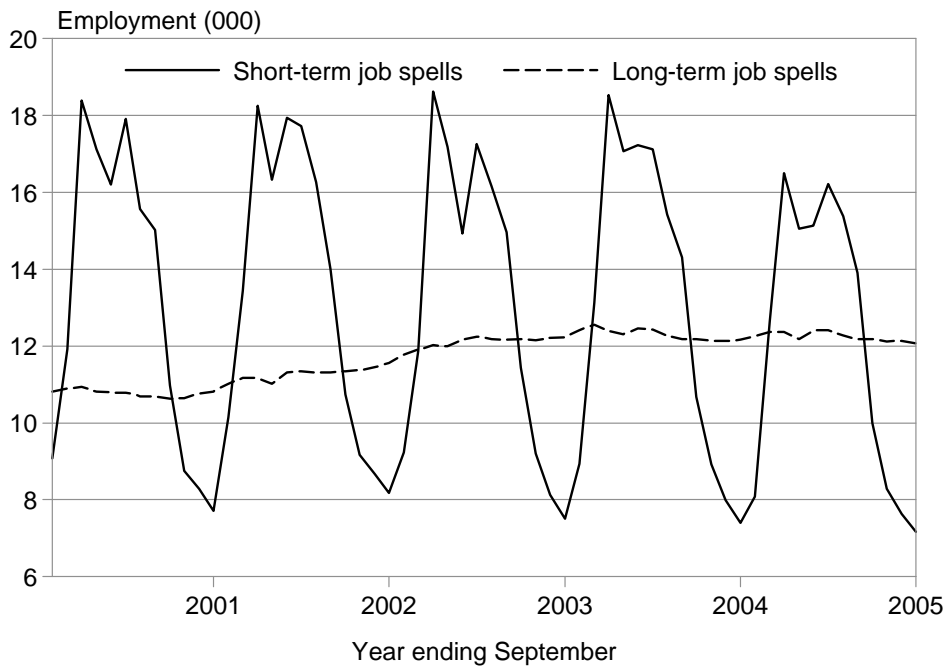


Figure 5

Monthly short-term employment and short-term job tenure
Pooled across years ending September 2001–05

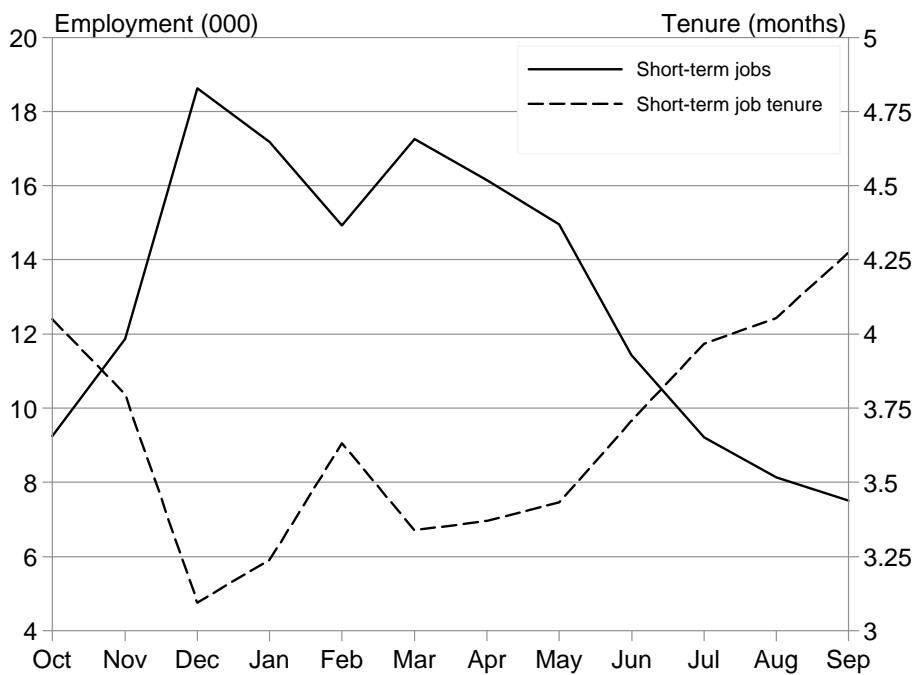


Figure 6

Monthly short-term and long-term jobs by horticulture sub-industries (5-digit ANZSIC)
October 2000–September 2005

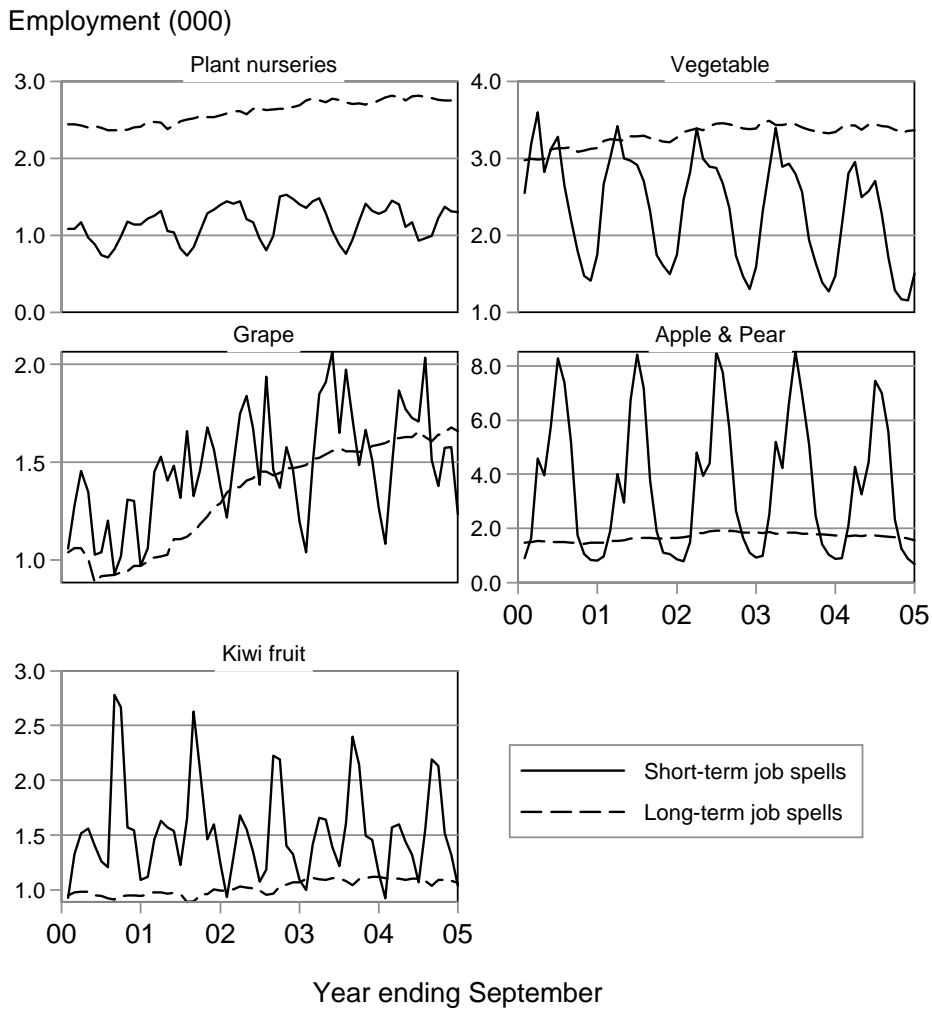


Figure 7

Monthly short-term employment shares for selected horticulture sub-industries (5-digit ANZSIC)

Pooled across years ending September 2001–05

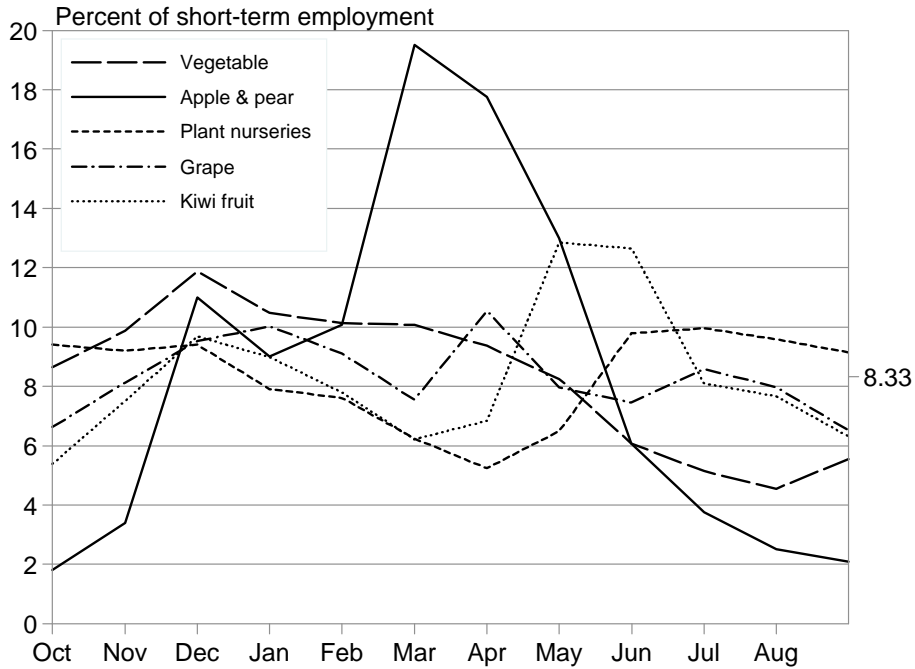


Figure 8

Seasonal employment map for each horticulture sub-industry (5-digit ANZSIC)

Pooled across years ending September 2001–05

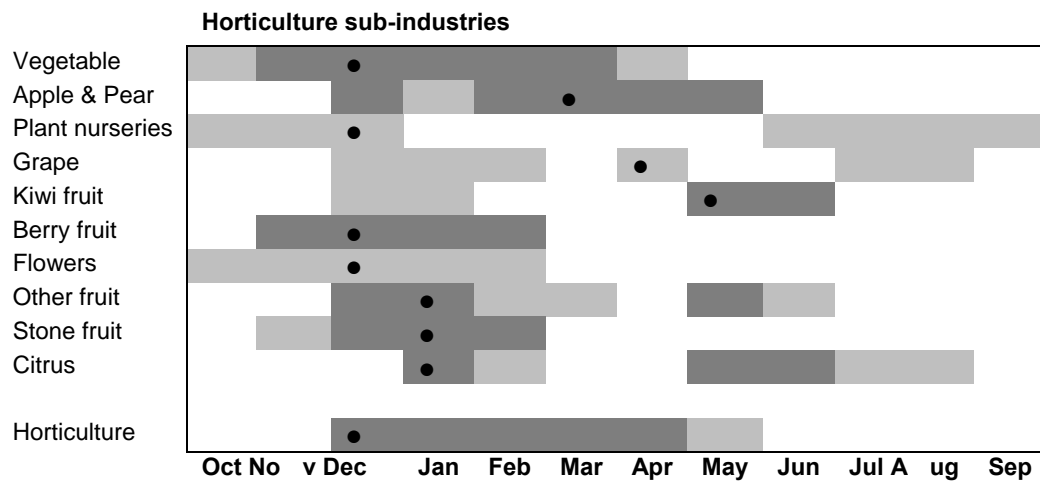


Figure 9

Share of short-term employment worked by long-term seasonal and overseas workers
Year ending September 2003

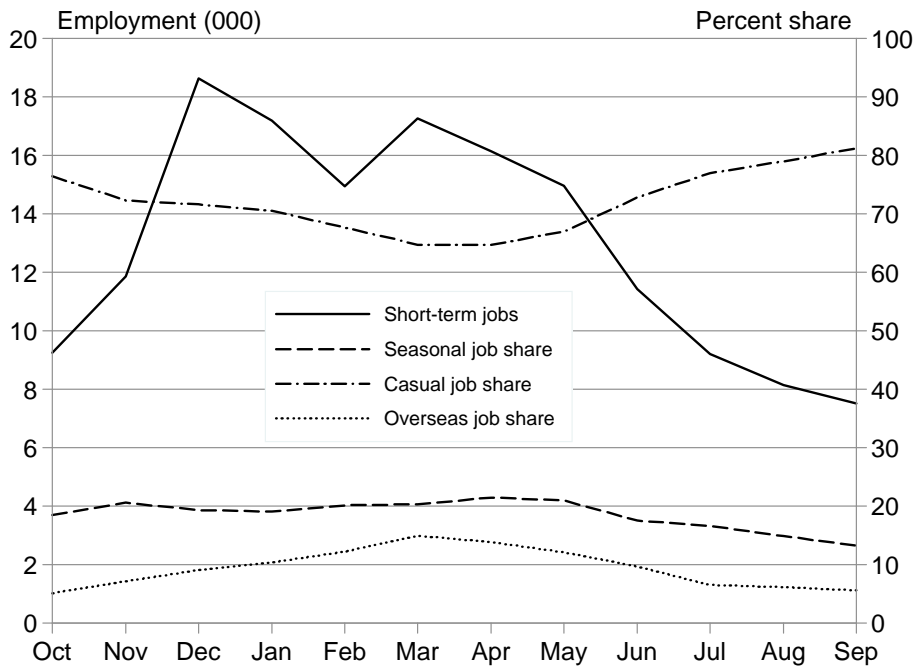
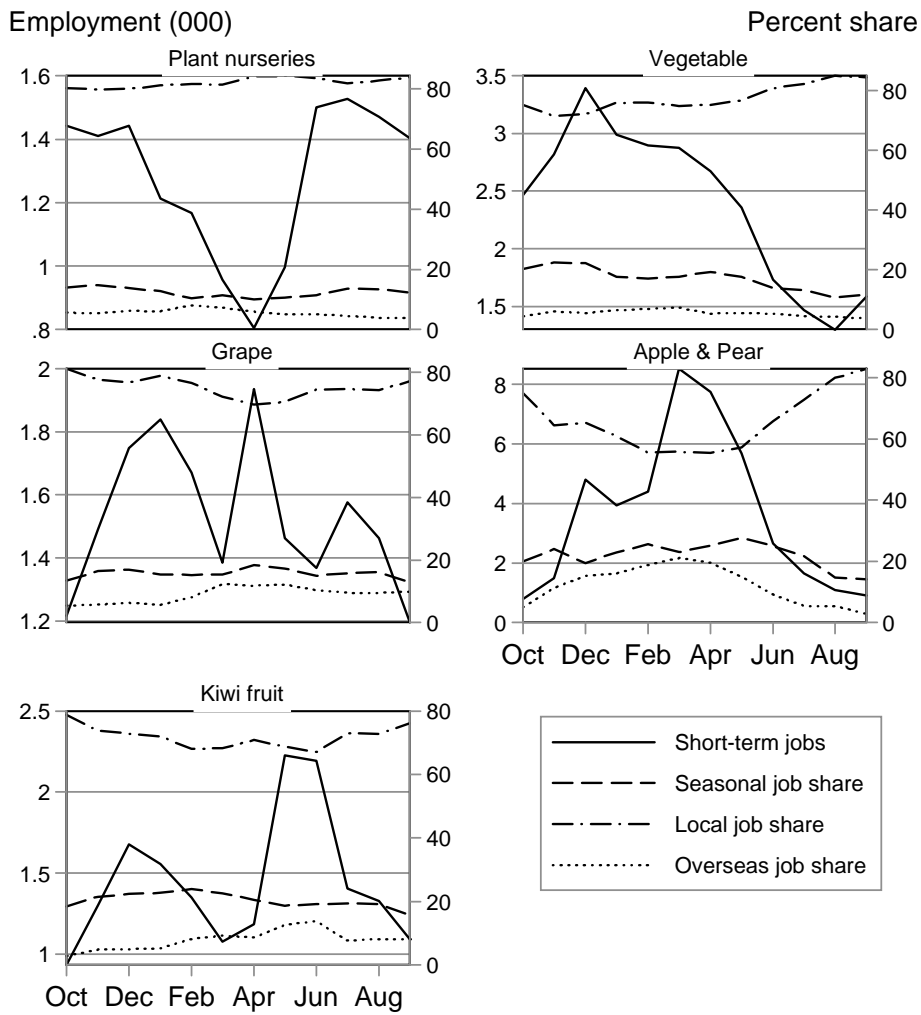


Figure 10

Short-term employment in selected horticulture sub-industries by worker type
Year ending September 2003



Appendix 1

Subclass	Subclass description	Index of primary activities
A011100	Plant Nurseries	Bulb propagating, fruit tree nursery operation, ornamental plant, plant stock nec, turf, vine stock nursery operation
A011200	Cut flower and flower seed growing	Display foliage, flower and seed growing
A011300	Vegetable growing	Beans (except dry field beans or soybeans), garlic, herbs nec, kumara, melons, onions, potato, sugar beet, sweet potato (kumara), tomato, vegetable seed, vegetables (except dry field peas or beans or soybeans), seed potato
A011400	Grape growing	Grapes, grapes sun-drying, table grapes, Vineyard operation
A011500	Apple and pear growing	Apples, nashi pear, pears, quinces
A011600	Stone fruit growing	Apricots, cherries, nectarine, peach, plum or prune
A011700	Kiwifruit growing	Kiwifruit
A011910	Citrus growing	Grapefruit, lemon, mandarin, orange, orchard (citrus), tangelo
A011920	Berry fruit growing	Blackberry, blackcurrant, blueberry, boysenberry, cranberry, gooseberry, loganberry, orchard, berryfruit, raspberry, redcurrant, strawberry
A011990	Other fruit growing nec	Avocado, babaco, banana, cherimoya, custard apple, feijoa, fig, fruit nec, mango, nut bearing tree, olive, passionfruit, pawpaw, persimmon, pineapple, tamarillo

Appendix 2

Table A1

Job spells divided into long-term, seasonal, and casual jobs during the reference year ending September 2003 and ranked, in descending order, by employment

Industry	No.	Permanent	Seasonal	Casual	Overseas
		Percent			
Job spells					
Plant nurseries	10,000	34.5	7.1	53.6	4.7
Flowers	3,600	32.9	8.2	53.8	5.1
Vegetable	17,300	26.2	11.9	56.5	5.4
Grape	11,200	17.6	13.0	60.5	9.0
Apple & pear	22,500	10.5	16.1	55.0	18.4
Stone fruit	2,600	9.1	12.9	59.0	19.0
Kiwifruit	9,800	14.8	15.0	60.4	9.7
Citrus	2,800	7.5	16.2	50.9	25.3
Berry fruit	7,000	5.7	14.4	71.5	8.4
Other fruit	2,900	14.7	15.0	61.7	8.6
Horticulture	89,700	18.1	13.2	57.9	10.8
Employment					
Plant nurseries	46,900	67.3	4.1	26.5	2.0
Flowers	15,900	64.4	4.6	28.5	2.5
Vegetable	69,300	58.8	7.4	31.1	2.7
Grape	35,500	48.3	8.2	38.4	5.1
Apple & pear	65,700	33.5	15.6	39.4	11.4
Stone fruit	6,500	32.5	12.8	42.5	12.2
Kiwifruit	29,500	41.3	11.9	41.3	5.5
Citrus	6,400	29.8	13.2	40.7	16.3
Berry fruit	17,400	20.1	16.1	57.6	6.2
Other fruit	8,600	44.1	10.7	40.6	4.6
Horticulture	301,800	48.1	9.9	36.2	5.8
Workers					
Plant nurseries	8,400	39.5	6.8	54.6	5.1
Flowers	3,000	37.5	7.7	55.7	5.5
Vegetable	13,600	31.8	10.5	58.9	6.2
Grape	8,000	23.3	10.7	64.3	10.0
Apple & pear	17,100	13.3	16.5	59.0	18.3
Stone fruit	2,200	10.3	13.4	60.8	19.1
Kiwifruit	7,200	18.5	14.0	65.9	11.1
Citrus	1,900	10.2	7.5	53.8	32.6
Berry fruit	5,900	6.5	14.7	74.4	9.1
Other fruit	2,300	18.4	12.3	65.2	10.3
Horticulture	62,400	24.5	13.0	61.7	10.7

Note: Long-term jobs are spells of employment that lasted for 10 months or more. Short-term jobs only lasted for 1–9 months and have been separated into seasonal and casual jobs. Seasonal jobs are part of an employer-employee relationship that consists of at least three short-term jobs in the same 5-digit horticulture industry, and that ended in the same calendar month in at least three separate years, including the reference year ending September 2003. Casual jobs are all other short-term employment that is not labelled as seasonal. Overseas workers are defined as individuals who only appear in LEED in years 2–4 and did not receive any benefit income.

Figure A1

Number of short-term and long-term jobs by month between October 2000 and September 2005

Employment (000)

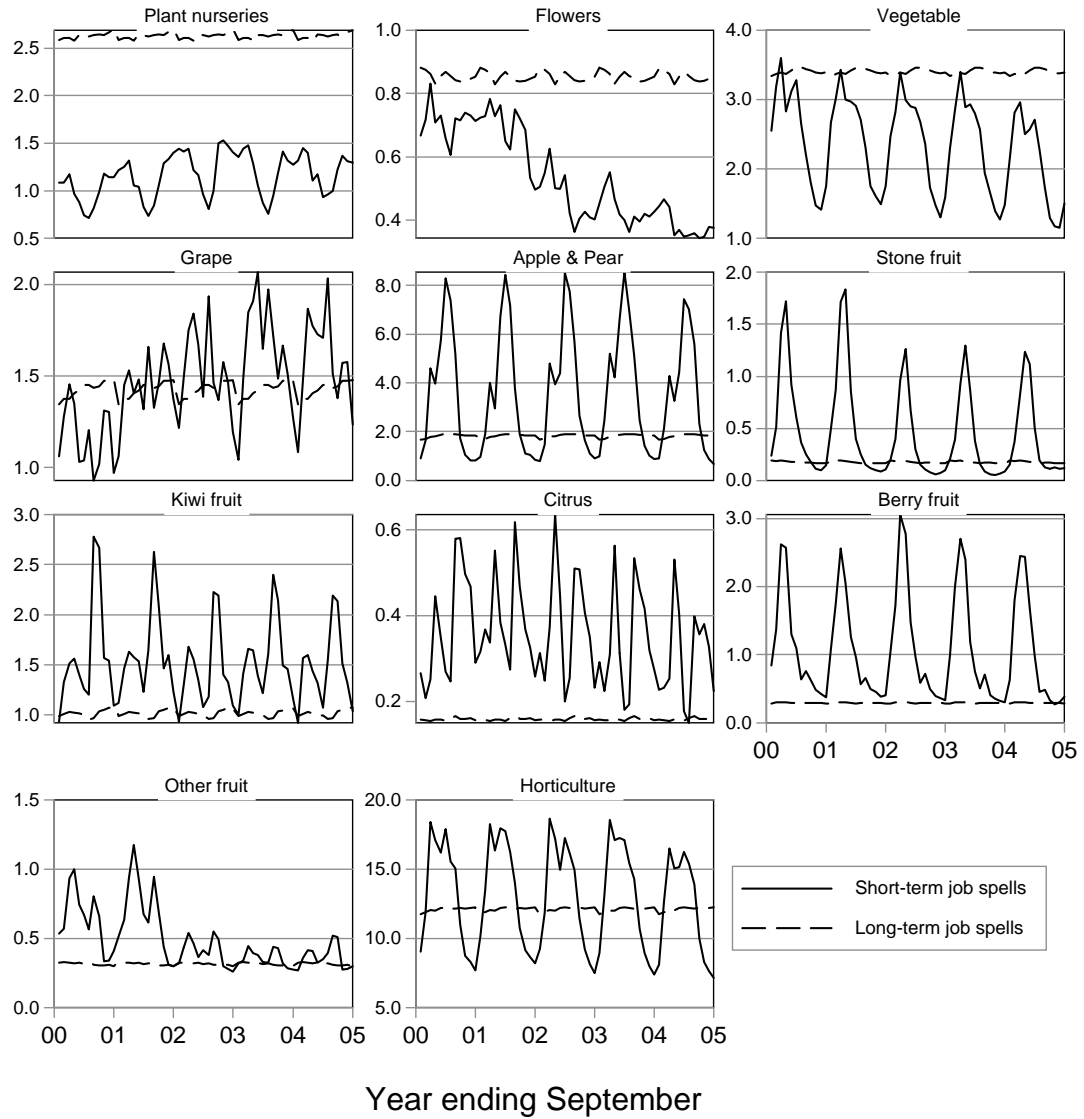


Figure A2

Share of short-term employment worked by long-term seasonal and overseas employees during year ending September 2003

