



Australian Government
Department of Agriculture
ABARES

Measuring the efficiency of horticultural labour

Case study on seasonal workers and working holiday makers

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Research by the Australian Bureau of Agricultural
and Resource Economics and Sciences

Report prepared for the Department of Agriculture's Agricultural
Productivity Division
December 2013



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Cataloguing data

Leith R and Davidson A, 2013, *Measuring the efficiency of horticultural labour: case study on Seasonal Workers and Working Holiday Makers*, ABARES Report to client prepared for the Department of Agriculture's Agricultural Productivity Division), Canberra, November.

ABARES project:43451

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Acknowledgements

The authors wish to thank Ironbark Citrus for supplying data and commentary used in the preparation of this report. The authors also wish to thank Alix Duncan, Daniel Macpherson, Stephen Gray and Cheryl Gibbs from the Department of Agriculture, and Susannah Smith from the Department of Employment for their contributions to this report.

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Summary

This study estimates the relative efficiency of workers hired under the Working Holiday Visa initiative and the Seasonal Worker Program, using the payroll data of a horticultural farm in Queensland. The study found that seasonal workers were, on average, significantly more efficient than working holiday makers. However, no conclusions can be made about the impact of these two labour sources on profitability.

Introduction

The Australian horticulture industry relies on workers being available in regional areas at peak times, because its demand for labour fluctuates throughout the year and by season. To assist the industry in sourcing temporary workers, the Australian Government has introduced a suite of measures over the last decade. These include:

- the second Working Holiday Visa initiative (2005), which currently provides an incentive for visiting backpackers from selected countries to work in agriculture, and
- the Seasonal Worker Program, which allows Australian employers in the horticulture industry to employ workers from eight Pacific island countries and Timor-Leste.

Continuing support for these programs from government and industry will, in part, be determined by the extent to which they meet their intended objectives.

From a farmer's perspective, understanding the efficiency of workers who have been employed under different programs can assist them in workforce planning. Sourcing the most efficient workers may serve to increase their productivity and, in turn, their profitability. Anecdotal evidence from horticultural growers suggests that seasonal workers—particularly those returning for a second season—are more efficient than working holiday makers.

This paper aims to measure the efficiency of seasonal workers and working holiday makers employed on a Queensland citrus farm in 2013 in terms of fruit harvested per unit of time. While a comprehensive assessment of the total costs and benefits of employing workers from each program was beyond the scope of this study, the results point to significant differences in average worker efficiency.

Background

The Working Holiday Maker (WHM) Visa Program, introduced in 1975, allows eligible nationals (aged 18–30) from Australia and its partner countries to enjoy a one-off extended holiday in each other's territory. Participants have the option of engaging in short-term work and study during their stay. In 2012–13, around 250 000 WHM visas were granted (DIAC 2013).

The second Working Holiday Visa initiative is a component of the WHM Visa Program. Established in 2005, the initiative creates an incentive for first-time WHM visa holders to work in regional Australia for a period of three months by granting eligibility for a second WHM visa. Participants are otherwise limited to accessing a single WHM visa in their lifetime.

The type of work that secures eligibility for a second visa under the initiative has evolved over time. At the initiative's inception in 2005, only horticultural work was eligible, but this was expanded to include all forms of agricultural work in 2006. Mining and construction work activities were included in 2008.

To date, the WHM program has proved relatively popular. Hay and Howes (2012) found that 73 per cent of horticultural businesses responding to their survey employed mainly backpackers, most of whom were likely to be participating in the WHM program.

The Seasonal Worker Program began on 1 July 2012, building on the three-year trial known as the Pacific Seasonal Worker Pilot Scheme. It assists horticultural businesses unable to source local Australian labour to fill their seasonal low-skilled vacancies. The businesses are provided with an opportunity to organise a team of seasonal workers in advance of the season. Workers can be recruited from eight Pacific island countries and Timor-Leste which, in turn, contributes to the economic development of these countries. In 2012–13, 2000 places were available to businesses under the Seasonal Worker Program, and the number of places available to employers is increasing.

There are administrative costs to businesses that participate in the Seasonal Worker Program. Employers are required to complete an application and, once their application is approved, they are responsible for organising flights, transport and accommodation for workers. International and domestic travel must be paid for by employers, although a specified share of these costs can be recouped by employers through deductions in seasonal workers' pay. Further, employers are responsible for ensuring seasonal workers have access to a minimum of 30 hours of work per week on average over a period ranging from 14 weeks to six months.

Methodology

Data for the study were provided by a Queensland citrus grower who hires workers under both the WHM and Seasonal Worker Programs. The grower gathered data on the weekly wage and number of hours worked by each worker over three non-consecutive weeks over a five-week period during peak harvesting time (April–May 2013).

Fruit pickers at the orchard were paid by piece rates based on the number of bins they filled, allowing for differences in the time required to pick various types of fruit. For example, if an average worker takes two hours to fill a bin with fruit A and four hours to fill a bin with fruit B, workers would be paid twice as much, per bin, to pick fruit B than fruit A. We therefore assumed that the weekly wage is a standardised measure of workers' output. In other words, the greater the wage, the greater the work performed. Workers who did not pick fruit were excluded from the sample, as they received a flat hourly rate.

The efficiency of each fruit picker was measured by estimating the picker's average hourly wage. This measure approximates how efficiently they completed their work because it captures how many 'standardised' tasks they completed every hour. The average hourly wage for each worker was estimated by dividing the total weekly wage by the number of hours worked during the pay week.

Results

The results of the analysis indicated that seasonal workers were more efficient than working holiday makers. Seasonal workers earned an average of \$4.50 an hour (22 per cent) more than WHMs (Table 1), indicating that they harvested fruit at a faster rate. This difference in efficiency was found to be statistically significant, as shown in the Appendix.

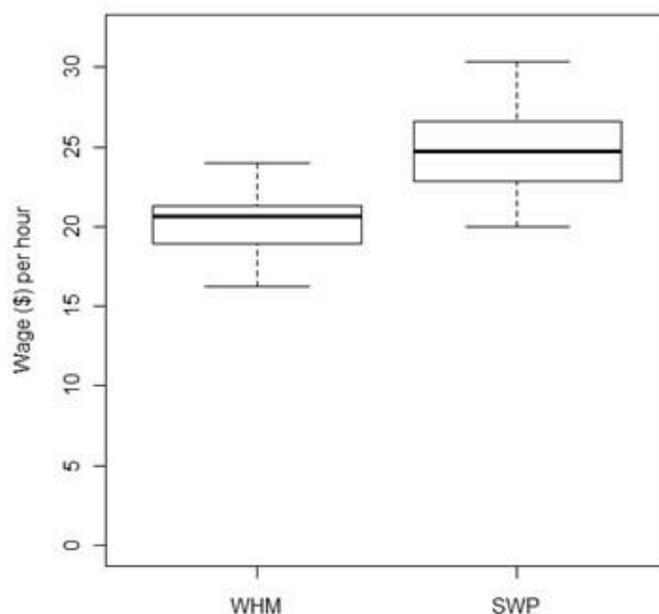
Table 1 Summary statistics, by group

Description	WHMs	Seasonal workers*		
		All	New	Returning
Number of workers	34	30	7	22
Total weeks worked	76	80	18	59
Average weekly wage (\$)	427	887	776	942
Average hours worked per week	20.6	34.8	33.4	35.7
<u>Average efficiency (\$/hour)</u>	<u>20.2</u>	<u>24.7</u>	<u>22.8</u>	<u>25.6</u>

Note: * The status (new/returning) of one seasonal worker could not be determined.

Figure 1 shows considerable differences in the efficiency distributions of the two groups. The box plots depict the distribution of worker efficiencies, by quartile, for both groups. The bold lines represent the median efficiencies; the heights of the boxes represent the interquartile ranges (the middle 50 per cent of workers); while the outermost lines represent the minimum and maximum efficiencies. The least efficient seasonal worker is only marginally less efficient than the median WHM.

Figure 1 Worker efficiency, by group



In addition, the results suggest that returning seasonal workers worked more efficiently than new seasonal workers. However, there were insufficient data to test the statistical significance of this difference. Nevertheless, returning seasonal workers earned \$2.80 an hour (12 per cent) more on average than new workers (Table 1).

Many factors are likely to have affected the relative efficiency of WHMs and seasonal workers, such as their work experience, motivation, education level and age. Therefore, it is not possible to attribute differences in efficiency solely to the nature of the people making themselves available under the programs.

Although it was beyond the scope of this study to test the significance of other factors, it appears that three factors in particular are likely to have contributed to the higher efficiency of seasonal workers.

- 1) In general, seasonal workers had more on-farm experience than WHMs. The proportion of seasonal workers with a farming background and harvesting experience was relatively high compared with WHMs. In addition, most seasonal workers had returned to the same orchard for a second season and were therefore more familiar with its operating procedures than the WHMs. Australian growers have identified this as a key benefit of the Seasonal Worker Program (Hay & Howes 2012). Similarly, New Zealand growers participating in the Recognised Seasonal Employer Program—a Pacific seasonal migration program similar to the Seasonal Worker Program—also reported greater productivity from returning workers (Evaluate Research 2010).
- 2) Unlike seasonal workers, WHMs receive eligibility for a second visa solely by working for three months, regardless of their efficiency. It is reasonable to expect that workers whose primary incentive for working is to extend their holiday in Australia may be less motivated to work hard, and therefore less efficient than those working solely for income.
- 3) Notwithstanding the weight of evidence presented above, there are some factors that need to be borne in mind when interpreting and drawing conclusions from the data.
 - Some fruit pickers in the study were, at times, paid a flat hourly rate, rather than strictly piece rates. This occurred when they performed tasks other than picking fruit. Nevertheless, the pay they received for such tasks represented a small share of their total pay over the sample period and is unlikely to have affected the broad conclusions.
 - There is potentially greater uncertainty about the estimates relating to WHMs due to their shorter stints. The majority of seasonal workers worked in all three weeks, enabling their average efficiency to be measured from data collected over a longer period. While this scenario would typically lead to more precise estimates and less variance in the group containing more data, this was not observed in the results. The variance in the estimated efficiencies is higher for seasonal workers than it is for WHMs (see Table 2 in the Appendix), suggesting that the estimated mean efficiency for WHMs is robust, and thus unlikely to have affected the conclusion that seasonal workers are more efficient.

Discussion

From a farmer's perspective, the broader issue is whether employing particular types of workers is more profitable. While ABARES analysis found that seasonal workers picked more fruit per hour than WHMs, the wage cost per unit volume picked was the same. This is a direct result of all workers being paid by piece rates—the same pay per bin.

However, it is also important to consider the benefits and non-wage costs associated with employing workers. In particular, non-wage costs can be categorised as those: specific to seasonal workers; specific to WHMs; or common to both groups, as set out below.

Non-wage costs specific to hiring seasonal workers:

- Applying to become an 'approved employer': one-off cost for business
- Compliance: reporting to the Department of Employment
- Travel expenses: a flat fee of \$A500 per worker
- Responsibility for organising accommodation, transport and welfare: time commitment

Non-wage costs specific to hiring working holiday makers:

- Visa checking: time commitment
- Employment verification forms: time commitment

Hiring and induction costs common to both groups:

- Training: workplace health and safety, technical, orientation, etc.
- Administrative: payroll, superannuation, tax, etc.
- Search costs: locating and screening job seekers.

A comprehensive comparison of the relative profitability of these two programs would need to consider these non-wage costs and their frequency, in order to determine whether the benefits of having a more efficient workforce hired under the Seasonal Worker Program offset the additional costs. Hay and Howes (2012) found that a quarter of growers who were aware of the program in its pilot form had decided not to use it because of the high cost or risk associated with it. While there are costs involved in the hiring of WHMs, they are generally not as high as those under the Seasonal Worker Program.

Given that picking costs per unit volume are the same, a farmer's cost-minimising decisions will be influenced by the relative non-wage costs of employing seasonal workers and WHMs. However, it is likely that WHMs will have a higher turnover, since a requirement of the Seasonal Worker Program is that each employer offer a minimum 14 weeks of work. Higher frequency staff turnover increases the costs of hiring and inducting new workers. Therefore, farmers will need to weigh the higher administrative and lower hiring and induction cost of employing returning seasonal workers against the lower administrative and higher hiring and induction cost for WHMs.

A variety of other factors may also influence hiring decisions. For example, employers may incur higher costs in managing a larger team of WHMs, relative to a smaller team of more efficient seasonal workers. These may become more acute with shorter harvest windows, particularly where inexperienced WHMs require greater supervision. In addition, businesses that choose to employ large numbers of WHMs at short notice during a harvest season risk being unable to find adequate labour within tight harvesting and marketing timeframes. On the other hand, the SWP requires employers to commit to providing 14 weeks of work well in advance. This lack of flexibility could impose considerable costs on the employer where, for example, seasonal conditions deteriorate. The relative size of these risks will differ greatly across industries, regions, years and farms.

Conclusion

This case study has estimated the relative efficiency of WHMs and seasonal workers, using payroll data collected from a citrus grower in Queensland. The study found that seasonal workers were, on average, significantly more efficient than WHMs. Of the seasonal workers, those who returned for another season were more efficient than new workers.

These findings are intended to inform horticultural businesses about the relative merits of hiring workers under these two prominent programs. The study, however, has not quantified the costs and risks of employing workers from these programs, and therefore, no conclusions on overall profitability can be made from these findings.

There is considerable scope to conduct further research into the total relative benefits and costs associated with hiring seasonal workers and WHMs. Ideally this would include quantifying non-wage costs, particularly the administrative costs resulting from participation in each of the programs. This would better assist farm managers in making workforce decisions that improve the productivity and profitability of their businesses.

Appendix: Significance test

An independent, 2-group Welch's t-test was used to test the mean efficiency of seasonal workers against the mean efficiency of working holiday makers, which assumes unequal variance in the two samples:

Null hypothesis:

Alternative hypothesis:

where μ_1 is the mean efficiency of seasonal workers and μ_2 is the mean efficiency of the WHMs.

Table 2 Results from one-sided t-test

	Seasonal worker	Working holiday maker
Mean	24.7	20.2
Variance	6.6	3.2
Observations	30	34
Degrees of freedom	51	
t Stat	8.1	
P(T<=t) one-tail	0	
t Critical one-tail	2.4	

Since the absolute value of the t statistic is greater than the critical value, we reject the null hypothesis at the 99 per cent confidence interval, and accept the alternative: that seasonal workers are more efficient than working holiday makers.

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