ECONOMIC PAPERS

THE ECONOMIC SOCIETY OF AUSTRALIA

ECONOMIC PAPERS, VOL. 36, NO. 1, MARCH 2017, 3–16

Skill Shortages in Regional New South Wales: The Case of the Riverina*

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Using a survey based method, this paper investigates skill shortages in the Riverina. About 48 per cent of businesses have reported that they have unfilled vacancies. The shortage of qualified applicants, lack of sufficient experience and lack of technical ability are the main causes proffered by regional business for skill shortages. These findings point the importance of investing in quality infrastructure, offering tax incentives and channelling investment into the TAFE and University sector to address regional skill shortages in both short- and long-run.

Keywords: labour, skill shortages, regional labour markets, food production, Riverina.

1. Introduction

The globalisation of the world economy, together with technological advancement, ageing population and structural changes in the world economy, appears to have contributed to skill shortages in many advanced countries. Australia is not immune to this. Within Australia, shortages of skills have been severe in rural and regional areas, significantly undermining their long term viability. Despite this, studies examining the causes and effects of skill shortages in regional Australia are very limited, with a few exceptions (discussed in detail below).

This study meets this gap by investigating the causes and effects of skill shortages in the Riverina region in the state of New South Wales. The study of the Riverina is particularly important for a number of reasons. First, it is often referred to as the "food bowl" of Australia (Rural Industry Research and Development Corporation (RIRDC) 2015). It produces and also processes significant agricultural and forest-based products including meat, rice, cereals, cotton, vegetables, fruit and nuts. It is also one of the major producers of wine in Australia. An understanding of skill shortages in the region is important from both a global food security and export perspective, which will provide valuable input to the design of labour market policy.

Second, the investigation of a regional location such as the Riverina is important in an Australian policy context where the government has attempted to use skilled migration programmes to alleviate skill shortages, for example, the employment of skilled international workers on temporary 457 visas

*The authors acknowledge the financial support from Regional Development Australia (RDA)-Riverina. We are grateful to Ms Lani Houston, the former Executive Officer of RDA-Riverina, for extremely useful advice and guidance during the course of this research. Without her support this research would not have seen the light of the day. The comments from two referees are also gratefully acknowledged. We are also grateful to Emily Webster for help with data tabulation and Katherine Bell for editorial support.

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JEL classifications: J21, J24, R21, R22

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doi: 10.1111/1759-3441.12157

to fill vacancies. While this scheme has been implemented for several years, there has not yet been any attempt to evaluate its effectiveness. From a policy perspective, it is important to investigate to what extent businesses in rural and regional areas have made use of this scheme. This study provides some input to this debate.

While there have been some attempts to investigate the impact of the mining boom on skill shortages in resource-rich regions of Australia (Bahn & Cameron, 2013; Fitzgerald *et al.*, 2013; Pearson & Daff, 2013), studies examining skill shortages in regions that are less mineral-endowed are very limited (Lewis & Corliss, 2010). The available studies on regional labour markets in Australia are either descriptive (see, for example, Cameron, 2011; Bureau of Transport and Regional Economics (BTRE) 2006; National Farmers' Federation (NFF) 2013), or they are based on a highly aggregated national, state or territory level occupational skills data (for example, the study by the Department of Education, 2016).

Studies by Cameron (2011) and the Bureau of Transport and Regional Economics (BTRE) (2006) mainly focus on the causes of skill shortages in Australia and highlight the policy measures taken by the government to address such shortages. They acknowledge that skill shortages in rural and regional Australia are the direct outcome of macroeconomic forces, structural changes in the economy, and a prolonged period of drought. An ageing population and outward migration of youth and young professionals from rural areas to larger metropolitan centres have also contributed to skill shortages. As Corliss and Lewis (2011) note structural changes brought about by the mining and construction boom of the late 1990s and early 2000s, have led to shortages of skills, particularly in trade areas. According to National Farmers' Federation (NFF) (2013) skill shortages have impacted on the productivity of the Australian agricultural sector, suggesting the need to implement a wide range of programmes for developing and upgrading regional infrastructure and services to meet workforce needs. National Farmers' Federation (NFF) (2013) argues that better access to health, education, transport and telecommunications infrastructure will help retain skills in rural areas, improving the profitability of businesses and the lifestyle of those living in rural and regional areas.

Despite growing recognition that skill shortages lead to regional decline, to the best of our knowledge, Storer and Connell (2013), Miles *et al.* (2006) and Rural Industry Research and Development Corporation (RIRDC) (2009) are the only detailed studies of skill shortages in the regional and rural context.[4] Of these, Rural Industry Research and Development Corporation (RIRDC) (2009) is the most comprehensive study covering the Mackay Whitsunday Region (Queensland), Northern Slopes and Northern Central Plains Region (New South Wales), Murray Lands Region (South Australia), East Kimberley Region (Western Australia), Wheatbelt Region (Western Australia) and South West Region (Western Australia). However, as yet, there has not been any attempt to investigate the causes and effects of skill shortages in the entire Riverina Region of New South Wales (NSW). As previously stated, the study of this region is particularly important given its role in food production in Australia and being one of the most important wine exporting regions in the country.

Skill shortage is an issue of world-wide interest. For example, in the United States, research has been undertaken by Kahn (2015), Abraham (2015), Cappelli (2015) and Osterman and Weaver (2014). Dalziel (2015) has studied the problem in New Zealand, Eichhorst *et al.* (2015) in Europe and Horwitz (2013) in South Africa. In Canada, the matter was the subject of a Parliamentary report (Komarnicki, 2012). However, as illustrated by Fitzgerald *et al.* (2013) the literature is not definitive regarding the term "skill shortage." Research in the United States has largely acknowledged economists' contribution to the concept of skill shortage in terms of markets failing to clear in the short-run, with structural unemployment the result. Structural unemployment consists of two types. The first is occupational structural unemployment which exists in a region where there is unemployment but the workers do not have the skills to take the jobs available. The other form of structural unemployment discussed in the literature has a geographical element to it in that unemployed workers

[4]In the context of skill shortages in Australia, Cliff *et al.* (2015) present a conceptual framework of the skilled female migrant retention strategy.

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with the requisite skills exist to fill the available vacancies – but those skilled unemployed are in an entirely different location to the available jobs.

Resolving the problem of occupational structural unemployment involves (educational and training) programmes that permit the workforce to adapt to the skills required. Geographic structural unemployment can be remedied by increasing the mobility of skilled workers. Cappelli (2015) and Abraham (2015) both argue that the US evidence is unconvincing in respect to either structural unemployment hypothesis. In essence, if skill shortages existed, then there should be evidence of an increase in real wages – and this was found not to be the case.

On the other hand, Cappelli (2015) found considerable evidence of over qualification – an issue raised by Fitzgerald *et al.* (2013) and illustrated by, for example, the requirement of a degree for entry into an occupation in which education to degree level was clearly not necessary. In such circumstances, the problem is not the lack of degree qualified entrants, but the failure of employers to redesign their jobs and provide training to utilise the available skilled labour. In terms of public policy, this phenomenon lends support to programmes that enhance the transition from school to work. Policy intervention is required because private firms may be reluctant to invest in the requisite training because of its general nature and, consequently, their inability to retain the workers trained. Eichhorst *et al.* (2015) provide evidence from Austria, Denmark, Germany and Switzerland that such programmes, especially where they involve the cooperation of government, firms and unions, have a positive impact in reducing the perception of skill shortages. It is this type of programme on which Dalziel (2015) reports in the context of an economy in which employers report large skill shortages in the presence of high levels of unemployment. Contrasting with the experience of the United States, Europe and New Zealand is the experience of South Africa, where Horwitz (2013) reports substantial skill shortages which require skill building through both public and private education and training to build the necessary human capital for a transitional economy. Limited skill shortages were also found in Canada – principally in the health area where it was predicted that shortages would arise in six of the nine health occupations identified. For other sectors, however, the number of occupations expected to experience shortages were outnumbered by those in which there would be either a balance or surplus of skilled workers. Indeed, in the skilled trades sector, no occupations were predicted to experience a shortage (Komarnicki, 2012).

A further factor that can give rise to an overstatement of skill shortage was raised by Kahn (2015). He noted that firms operating in monopsonistic labour markets will always state that they are willing to employ more workers at the market wage. However, they would not be prepared to take on the higher marginal expense of labour implicit in raising the wage rate to attract more workers in a monopsonistic environment. Kahn (2015) argues that the labour market does not have to consist of one-employer towns in order for firms to be confronted by an upward sloping supply of labour curve – hence an element of monopsony. For rural and regional businesses this would seem to have a degree of resonance.

Like many developed countries, skill shortages are seen as a major issue in the Australian labour market, particularly in rural and regional areas. While what constitutes a skill shortage remains debatable, there exists a set of commonly used definitions and typologies between what a skill shortage is and related concepts such as skill gap and labour shortage (Cameron, 2011). According to Richardson (2007) skill shortages refer to the lack of technical skills, requiring training; while Shah and Burke (2003) define skill shortages as the gap between demand and supply. When the demand for a particular type of labour is greater than its supply under the existing market conditions skill shortages occur, causing lower levels of output, income and productivity (Healy *et al.*, 2015).[5] Following the traditional economists' approach, we define skill shortages to refer to a disequilibrium condition in which the demand for a specific labour type exceeds the supply of workers who are qualified and willing to work at existing conditions (Junankar, 2009). As Sharma *et al.* (2016, p. 35) show

[5]As Lewis and Corliss (2010) note, during the mining and construction boom of the late 1990s and early 2000s when skilled labour was in short supply, there was a significant rise in the number of unqualified tradespersons in some industries, which may have impacted on their productivity.

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the basic argument can be presented with a standard demand and supply diagram, illustrating how the interaction between demand and supply for a particular labour type, say plumbers, in the labour market helps address skill shortages and determine wage rates, if there is enough flexibility in the labour market. Skill shortages occur when the demand for plumbers exceeds its supply, causing an increase in wage rate in the short-run. Over time, however, the wage rise leads to an increase in supply of plumbers, reducing the intensity of shortages.

Several factors seem to contribute to skill shortages in regional Australia including, structural changes in the economy, an ageing population, and the outward movement of workers to other regions and overseas in search of better opportunities (Bureau of Transport and Regional Economics (BTRE), 2006). According to Rural Industry Research and Development Corporation (RIRDC) (2009), skill shortages in regional Australia occur due to their inability to attract labour and retain them due to negative perceptions about the regional areas, which include: reduced lifestyle opportunities; limited health and education facilities and services; lower wages and cost of living considerations; and cost, availability and quality of housing.

As we have seen above, skill shortages are an issue in a number of countries with governments adopting policies designed to overcome the perceived problems. In Australia, governments at both federal and state level seek to address this challenge through a variety of measures such as: increasing vocational training; the skill immigration programme and the employment of skilled workers on temporary 457 visas; and the "Connection People with Jobs" programme to move people between states.[6] Despite these endeavours, many sectors and regions still face skill shortages. However, the exact nature of such shortages between sectors and within the regions is unknown.[7] This study aims to improve knowledge of this matter through a systematic study of skill shortages in the Riverina region, one of the important economic regions in New South Wales.

The rest of the paper is organised as follows: section two presents a brief profile of the Riverina and skill shortage issues in the region. Section three describes the survey data collection process. The results from the survey are discussed in section four. The final section, section five, concludes with some tentative policy recommendations.

2. Riverina Profile

The Riverina region stretches 500 km east to west across the southern central districts of NSW. It includes two major regional towns, Wagga Wagga and Griffith and an additional thirteen local government areas (LGAs) (RDA-Riverina 2013, 2014). It has a population of 155,720 (2011), with about 21 per cent of its population aged between zero to fourteen years and 16 per cent over sixty-five years (Australian Bureau of Statistics (ABS) 2016, Table 8). According to the 2011 Population Census, the labour force participation rate in the Riverina region is about 61 per cent, with an unemployment rate of below 5 per cent (Australian Bureau of Statistics (ABS), 2016, Table 3). About 50 per cent of its population (age fifteen years and over) have post-school qualifications, while the percentage of people with Bachelor qualifications remains very small – about 8 per cent. Despite some improvements in physical infrastructure and services (namely, schools and hospitals), the region still struggles to attract and retain people; although the net internal migration has only marginally fallen in recent years, from 1,450 in 2010 to 1,064 in 2013 (Australian Bureau of Statistics (ABS), 2016, Tables 22 and 38).

The Riverina is renowned for being one of Australia's largest agricultural hubs. The Riverina region contributes over one quarter of all the fruit and vegetable production in NSW and is one of Australia's

[6]Connecting People with Jobs Scheme offers financial incentives to job seekers who have been unemployed for more than three months to relocate for work or apprenticeships. These and other policies to address skill shortages are widely covered in the literature and are not reproduced here, see for example, Standing Committee on State Development (SCSD) (2006), Bureau of Transport and Regional Economics (BTRE) (2006), Rural Industry Research and Development Corporation (RIRDC) (2009) and Cameron (2011).

[7]Although the Department of Employment is responsible for conducting the Skills Shortage Survey, it does not report disaggregated information at a local or regional level. Further, the survey does not cover all industry and occupational types.

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largest exporters of wine. It not only grows but processes significant agricultural products including meat, rice/cereal, cotton, vegetables, fruits and nuts. In recent years, new sectors have emerged in the region and many retail outlets, manufacturing, health care and services-related activities have expanded (Sharma *et al*., 2015). This expansion has raised the demand for skilled workers in several areas. The skills required are often not available. This, together with an ageing population, the migration of younger people to cities and a prolonged period of drought, has led to frequent complaints of skill shortages in the Riverina region.[8] The recruitment process has proved both time consuming and costly for businesses, and attracting skilled labour into the region is regarded as a challenge.

A recent report by Rural Industry Research and Development Corporation (RIRDC) (2015) acknowledges that most agricultural-related sectors in the Riverina experience skill shortages. This is consistent with the finding of a study conducted by the Griffith City Council (GCC) (2011), which reported that a prolonged period of drought had led to skill shortages in agriculture and farming-related skills in Griffith as people move to new and emerging skill areas (Griffith City Council (GCC), 2011). While a number of large businesses in the Riverina have taken steps to address skill shortages through measures such as higher wages to attract and retain suitable workers and international recruitment, these measures appear not to have produced the desired results. According to the Griffith City Council (GCC) (2011) employers are increasingly interested in recruiting staff that not only have technical ability to complete tasks but also soft skills such as enthusiasm and positivity. The persistent shortage of a skilled workforce has led to increased reliance on automation in some manufacturing industries, while many other businesses are considering investing in innovation and technology to permanently address this problem (Griffith City Council (GCC), 2011).

In 2012, the Department of Education, Employment and Workplace Relations (DEEWR) conducted the Survey of Employers' Recruitment Experiences in the NSW south eastern employment service area comprising thirteen LGAs, of which five were from the Riverina region.[9] The survey found a low level of competition for vacancies, with an average of 4.8 applicants per vacancy, of whom employers considered 1.8 applicants to be suitable. Of those considered unsuitable, the most commonly cited reasons were a lack of experience and insufficient qualifications or training.

3. Research Method

3.1 The Survey Instrument

In endeavouring to identify the causes of skill shortages and their impact on regional business, a questionnaire was developed and circulated to academics and practitioners for comments before pilot and field application. The questionnaire focused on a number of issues including: areas of skill shortage, the causes of skill shortages and actions taken to address these shortages.[10] Information was also collected on the location of businesses, their age and industry sector. Ethics approval was obtained for distributing the questionnaire and following a pilot survey, the final instrument was utilised for data collection.

3.2 Data Collection

Data for this study were collected through an electronic distribution of the survey instrument using the SurveyMonkey program. Potential participants were identified using an email database of Regional Development Australia (RDA) – Riverina, and businesses were invited to participate.[11] A media release and media interviews were conducted to seek support from businesses to participate in the

[8]The Standing Committee on New South Wales Development prepared a report in 2006 entitled *Inquiry into skill shortages in rural and regional NSW*, which reported a widespread shortage of skills in rural and regional NSW, undermining competitiveness. See, Standing Committee on State Development (SCSD) (2006).

[9]The survey collected responses from 327 employers, of which over one-third were small businesses.

[10]To measure skill shortages firms were asked to indicate how many unfilled vacancies they had in different categories over the last twelve months. Discussions on this and the next sections draw on Sharma *et al.* (2015).

[11]RDA-R database consists of over 178 contacts across the region.

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research. Following the initial invitation, two follow-up email reminders were sent to businesses to complete the survey. The survey was open for six weeks during July and August 2015.

In total, ninety-three responses were initiated through SurveyMonkey. This resulted in forty-six usable responses where the majority of survey questions were answered. Of the forty-seven omitted respondents, twenty-five answered no questions, nine only answered questions relating to business age, location and industry type and thirteen did not answer any of the questions relating to skill shortages.

3.3 Data Characteristics

Using data on the Riverina from Australian Bureau of Statistics (ABS) (2015) as the base, the representativeness of the sample data with regard to: (i) location as determined by LGA, (ii) industry type and (iii) employee size was examined by comparing the number of sample respondents in each of the three categories against the ABS population characteristics.[12] For all three comparisons, there are statistically significant differences between the sample and the expected outcomes based on the ABS population data. Spatially, the sample over-represents Griffith and Narrandera, and under-represents Wagga Wagga. Industrially, the sample over-represents Manufacturing and Public Administration & Safety, and under-represents Agriculture, Forestry & Fishing and Construction. In terms of the employment level of firms, the sample over-represents large (20–199) and very large (200 or more) employee size businesses, and under-represents very small (1–4) employee size businesses.

In summary, the main variation between the sample and the ABS population characteristics relates to the non-responses from small agricultural operations (farmers) which dominate the Riverina in terms of industry type (30 per cent of all industry types) and employee organisation size (68 per cent of all employee sizes). Although the invitation to participate in the survey was sent to businesses throughout the region, only those operating in nine LGAs completed the survey. Of these, 35 per cent were located in Griffith, followed by Wagga Wagga (20 per cent) and Narrandera (13 per cent). The remaining 32 per cent of responses came from Bland, Murrumbidgee, Temora, Cootamundra, Leeton and Tumut; with no responses from Hay, Carrathool, Coolamon, Junee, Lockhart and Gundagai. The largest proportion of responding businesses were in Manufacturing (24 per cent), followed by Agriculture, Forestry & Fishing (15 per cent). Health Care & Social Assistance; and Accommodation & Food Services, each represented about 11 per cent of the sample. About 78 per cent of the responding businesses had been operating for ten years or more, with just over 2 per cent being less than two years old. Most responding businesses supplied regional markets, either with a sole focus (50 per cent) or with additional markets elsewhere in Australia or internationally (an additional 28 per cent of businesses).

Given that survey responses were not fully representative of the region, consideration was given to various data weighting schemes using the ABS population counts. Weighting the data seeks to convert sample responses to reflect the known population characteristics. Unfortunately, because no responses were received from a number of locations (six out of fifteen LGAs) and industry types (six out of nineteen) weighting based on these characteristics was not possible as the data cannot be generalised to regions and industry types from which no responses were received. However, given the wide coverage of businesses across the four employee size groups, we were able to apply post-stratification sampling weights for employee size. The employed post-stratification sampling weights are: 1–4 employees (3.4643), 5–19 (0.8221), 20–199 (0.1405) and over 200 employees (0.0064). In the next section, we report both unweighted and weighted (by employee size) results.

4. Survey Results

Given the unrepresentative nature and small size of the sample, the results from the survey need to be treated with caution and the interpretation of results should have specific regard to the sample characteristics as described above.

[12]Comparison tables are available from the authors on request.

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4.1 Vacancy Rates

A commonly used indicator of skill shortages is the vacancy rate (VR), which is defined as the number of unfilled vacancies divided by employment demand (i.e. the sum of unfilled vacancies plus total employment), multiplied by 100. This is defined as the total vacancy rate (TVR). We also estimate the average vacancy rate (AVR), which is each individual businesses' VR added up and then averaged across a group of businesses (AVR).

The VRs for various business characteristics are presented in Tables 1–4 for both unweighted and weighted data. TVR for the region as a whole was 3.7 per cent (or 13.5 per cent with weighted data). AVR for the region was 9.6 per cent (or 13.8 with weighted data). In total 47.8 per cent of businesses reported they had unfilled vacancies (Table 1).[13] According to the LGA classifications (Table 1), Cootamundra (41.7 per cent) had the highest TVR rate followed by Bland (20 per cent) and Leeton (8.9 per cent), based on unweighted survey data. Cootamundra (22.2 per cent) and Bland (20 per cent) also had the highest AVRs. The single responding business from Tumut reported no vacancies. However, when survey responses were weighted by employment size, vacancy measures changed. For instance, TVR for Narrandera, rose from 2.8 per cent to 13.6 per cent and fell for Leeton from 8.9 per cent to 2.2 per cent. In all cases, the differences between unweighted and weighted results reflect the relatively greater emphasis of large business and the weaker emphasis of small business in the unweighted or raw data.

When the TVR was examined by industry type (Table 2) Accommodation & Food Services (28.4 per cent) and Professional Services (18.2 per cent) had the highest rates, while Agriculture, Forestry and Fishing had one of the lowest TVRs (4.3 per cent). The result with respect to a low TVR in Agriculture, Forestry and Fishing contrasts with the findings of an earlier study by GCC (Griffith City Council (GCC), 2011), which reported severe skill shortages in agriculture. One possible explanation for the difference could be that the earlier study was conducted at a time of prolonged drought which, together with an ageing population and migration of youth towards urban centres, might have led to an exit of skilled workers, and the industry has subsequently adapted its production processes to accommodate this change. For AVRs, Financial & Insurance Services (25 per cent) had the highest rate followed by Electricity, Gas, Water & Waste Services (23.8 per cent). Responding businesses in Retail Trade, Information Media & Telecommunications, and Administration & Support Services, reported zero VRs. Again, when responses were weighted by employment size, we found some substantial differences. For example, TVR for Financial & Insurance Services increased from 12.5 per cent to 29.2 per cent; and for Agriculture, Forestry & Fishing it jumped from 4.3 per cent to 9.7 per cent.

When examined by occupation group (Table 3), TVRs were reasonably similar, varying from 1 per cent to 3 per cent. When examining AVRs, skill shortages appeared to be a problem in Trades (12.7 per cent) followed by Managers & Other Professional Areas (7.8 per cent). Information Technology had the lowest VR of approximately 1 per cent, irrespective of whether TVR or AVR was used. This possibly indicates an adequate supply of skills in Information Technology. The main differences when employing weighted data related to Mechanical Engineering, jumping from 4.4 per cent to 34 per cent for AVR; and Accounting, Finance & Administration rising from 3.2 per cent to 12 per cent for TVR and from 4.8 per cent to 18 per cent for AVR.

Table 4 presents VRs by employee size. Very small companies, employing between one and four people had high rates (26 per cent for TVR and 15 per cent for AVR). In contrast to very large companies, which employed 200 or more people, VRs were less than 1 per cent. In part, the high VRs in small companies were a reflection of the small number of employees in these businesses.

4.2 Business Perceptions of Skill Shortage Issues: Causes, Consequences and Remedies

Business explanations of the causes of skill shortages are reported in Table 5. The three main causes of skill shortages identified were: a shortage of qualified applicants (with 81 per cent of businesses

[13]Unfortunately, we were unable to compare our VR estimates for the Riverina with other Australian regions as they are not readily available. The Department of Employment which is responsible for providing skill shortages data reports on types of skills currently in demand.

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Table 1. *Vacancy Rates by Local Government Area**

Local government area	*N*	Total vacancy rate	Average vacancy rate (AVR)	Standard error of AVR	% of businesses with vacancies
Bland	1	20.0 (20.0)	20.0 (20.0)	0 (0)	100.0
Cootamundra	3	41.7 (41.7)	22.2 (22.2)	11.1 (11.1)	66.7
Griffith	16	3.7 (11.5)	7.5 (4.2)	2.9 (2.9)	62.5
Leeton	4	8.9 (2.2)	3.6 (0.4)	3.6 (0.4)	25.0
Murrumbidgee	2	3.2 (3.2)	2.2 (2.2)	2.2 (1.6)	50.0
Narrandera	6	2.8 (13.6)	18.8 (36.2)	12.0 (10.6)	33.3
Temora	4	5.4 (1.8)	2.3 (0.2)	2.3 (0.3)	25.0
Tumut	1	0 (0)	0 (0)	0 (0)	0
Wagga Wagga	9	3.6 (9.2)	15.5 (9.4)	5.0 (5.6)	44.4
All	46	3.7 (13.5)	9.6 (13.8)	2.3 (4.4)	47.8

Note: *Weighted by employee size estimates in parentheses.

Table 2. *Vacancy Rates by Industry Type**

Industry type	*N*	Total vacancy rate	Average vacancy rate (AVR)	Standard error of AVR	% of businesses with vacancies
Agriculture, forestry & fishing	7	4.3 (9.7)	10.2 (27.0)	5.0 (4.6)	57.1
Manufacturing	11	3.1 (10.9)	8.6 (9.5)	4.1 (6.0)	63.6
Electricity, gas, water & waste services	2	15.8 (20.7)	23.8 (30.6)	9.5 (3.3)	100
Construction	2	4.2 (2.5)	2.2 (1.7)	2.2 (0.2)	50.0
Retail trade	1	0 (0)	0 (0)	0 (0)	0
Accommodation & food services	5	28.4 (35.6)	18.9 (20.9)	11.7 (12.4)	60.0
Information, media & telecommunications	1	0 (0)	0 (0)	0 (0)	0
Financial & insurance services	2	12.5 (29.2)	25.0 (40.4)	25.0 (10.6)	50.0
Professional, scientific & technical services	3	18.2 (11.5)	11.1 (5.4)	11.1 (5.7)	33.3
Administrative & support services	1	0 (0)	0 (0)	0 (0)	0
Public administration & safety	4	0.8 (0.8)	2.1 (0.3)	2.1 (0.4)	25.0
Health care & social assistance	5	1.1 (0.9)	0.6 (0.1)	0.6 (0.2)	20.0
Arts & recreation services	2	8.3 (19.5)	16.7 (27.0)	16.7 (7.0)	50.0
All	46	3.7 (13.5)	9.6 (13.8)	2.3 (4.4)	47.8

Note: *Weighted by employee size estimates in parentheses.

providing an agreeable response), lack of sufficient experience (72 per cent) and lack of technical ability (67 per cent). The lack of succession planning (13 per cent) and competition from other employers for workers (40 per cent) were less important. In general, this pattern prevailed across most business sizes. The only noticeable differences are for very small businesses where the "strongly agree" and "agree" responses are lower than other business sizes, possibly due to the involvement of family members.

The perceived impacts of skill shortages on various aspects of business operations are reported in Table 6. For all businesses, the major impact appeared to relate to the failure to meet deadlines (58 per cent) followed by a loss of company credibility (54 per cent) and lower productivity (50 per cent);

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Table 3. *Vacancy Rates by Occupation Type**

Occupation type	*N*	Total vacancy rate	Average vacancy rate (AVR)	Standard error of AVR	% of businesses with vacancies
Accounting, finance & administration	29	3.2 (12.0)	4.8 (18.0)	2.6 (8.7)	17.2
Sales & marketing	17	2.8 (5.8)	5.9 (3.5)	3.9 (2.1)	29.4
Mechanical engineering	12	1.6 (4.8)	4.4 (34.0)	4.2 (0)	16.7
Information technology	13	1.1 (1.2)	1.6 (0.09)	1.1 (0)	15.4
Production & process workers	20	2.8 (6.1)	4.6 (17.2)	2.2 (0.1)	25.0
Trades	22	2.1 (9.7)	12.7 (17.5)	4.3 (9.9)	40.9
Managers & other professionals	32	3.3 (8.9)	7.8 (3.9)	2.6 (1.7)	28.1

Note: *Weighted by employee size estimates in parentheses.

Table 4. *Vacancy Rates by Employee Size**

Employee size	*N*	Total vacancy rate	Average vacancy rate (AVR)	Standard error of AVR	% of businesses with vacancies
1–4	8	25.9	15.2	6.5	44.5
5–19	1,555	16.8	11.5	4.9	33.3
20–199	17	5.7	7.5	2.7	48.8
200 or more	6	0.9	0.7	0.4	60.0
Total	46	3.7 (13.5)	9.6 (13.8)	2.3 (4.4)	47.8

Note: *Weighted by employee size estimates in parentheses for all businesses. Note that weighing by size does not affect the within group size estimates.

Table 5. *Causes of Skill Shortages by Employee Size* (% of strongly agree and agree responses)*

Employee size	Shortages of qualified applicants	Lack of technical ability	Lack of sufficient experience among applicants	Not attractive pay rates	Competition from other employers	Lack of succession planning
1–4	55.6	55.6	55.6	37.5	14.3	0
5–19	85.7	69.2	73.3	42.9	33.3	15.4
20–199	85.7	66.7	71.4	30.8	42.9	15.3
Over 200	100	80.0	100	60.0	80.0	20.0
All	81.0 (65.2)	66.7 (59.8)	72.1 (61.2)	40.0 (38.1)	39.5 (20.9)	13.2 (4.9)

Notes: *Weighted by employee size estimates in parentheses for all businesses. The weighing by size does not affect the within group size estimates.

while the least important impact related to the loss of orders (29 per cent). However, all medium-sized companies (employing between five and nineteen people) and large-sized companies (employing between 20 and 199 people), reported that skill shortages impacted on all aspects of their operations. In general, it appears that very large businesses (employing over 200 people) perceived less of an impact of skills shortages than the other business sizes. Note that when the responses for all

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Table 6. *Impact of Skill Shortages by Employee Size* (% of strongly agree and agree responses)*

Employee size	Low productivity	Loss of orders	Lower quality of goods/services	Higher running costs	Failure to meet deadlines	Impact on company's credibility	Impact on company's viability
1–4	11.1	33.3	0	33.3	33.3	33.3	50.0
5–19	66.7	41.7	61.5	53.8	76.9	76.9	46.2
20–199	68.8	25.0	53.3	60.0	62.5	62.5	50.0
Over 200	20.0	0	20.0	20.0	40.0	0	20.0
All	50.0 (29.0)	28.6 (35.1)	40.5 (19.3)	47.6 (40.2)	58.1 (46.5)	53.5 (46.5)	45.2 (48.9)

Notes: *Weighted by employee size estimates in parentheses. The weighing by size does not affect the within group size estimates.

businesses were weighted (the last row in parentheses) the impact on lower quality goods/services and low productivity was reduced substantially.

Table 7 reports responses on the steps taken to address skill shortages. The three most popular actions taken included: (i) training existing staff (71 per cent agreeable responses), (ii) just carrying on looking for skilled workers (67 per cent), and (iii) recruit less qualified staff (54 per cent). Offering higher salaries (26 per cent), and recruiting from other companies (28 per cent) or internationally (28 per cent) were the least popular options for addressing skill shortages – and the weighted percentage points for these were even lower. Small companies in the region did not engage in international recruitment possibly due to the costs and time involved, instead, they appeared to recruit less qualified staff to address skill shortages – a finding similar to earlier studies by Griffith City Council (GCC) (2011) and Rural Industry Research and Development Corporation (RIRDC) (2009). It appears that large businesses do recruit internationally (80 per cent) and train existing staff (100 per cent) instead of recruiting less qualified staff (20 per cent) and increasing salaries (20 per cent).

4.3 Business Perceptions of the Role of Government and Educational Institutions

Table 8 reports on the survey results pertaining to the role of government in addressing skill shortages. Most businesses felt (percentage of important and most important responses) that improving services, facilities and infrastructure (79 per cent), providing tax incentives (76 per cent), and investing in TAFE and universities (52 per cent) were three important roles of the government in addressing skill shortages in the region. This was true for both weighted and unweighted responses. By contrast, improving procedures for recruiting skilled migrants (33 per cent) was considered the least important role for government. However, there appeared to be some variation across business sizes of

Table 7. *Actions Taken to Address Skill Shortages by Employee Size* (% of strongly agree and agree responses)*

Employee size	Recruit from other companies	Recruit internationally	Recruit less qualified staff	Train existing staff	Increase salaries	Just carry on looking for workers	Increase reliance on automation
1–4	0	0	55.6	37.5	0	44.4	44.4
5–19	7.7	0	53.3	57.1	42.5	78.6	21.4
20–199	47.1	47.1	43.8	88.2	25.0	58.8	56.3
Over 200	60.0	80.0	20.0	100	20.0	100	40.0
All	27.9 (4.5)	27.9 (2.5)	46.7 (54.3)	70.5 (45.4)	25.6 (12.8)	66.7 (54.8)	40.9 (38.9)

Notes: *Weighted by employee size estimates in parentheses. The weighing by size does not affect the within group size estimates.

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Table 8. *Role of Government in Addressing Skill Shortages by Employee Size* (% of most important and important responses)*

Employee size	Invest in TAFE and Universities	Improve services, facilities & infrastructure	Improve procedures for recruiting skill migrant	Provide tax incentives
1–4	85.7	87.5	28.6	50.0
5–19	42.9	71.4	21.4	83.3
20–199	43.9	81.3	37.5	81.3
Over 200	60.0	80.0	60.0	80.0
All	52.4 (50.0)	79.1 (76.6)	33.3 (36.9)	75.6 (76.8)

Notes: *Weighted by employee size estimates in parentheses. The weighing by size does not affect the within group size estimates.

the expected role of government. Very small businesses (employing between one and four people) appeared to offer more support for investing in TAFE & universities (86 per cent) and improving services and infrastructure (87 per cent), while very large businesses (employing over 200 people), in addition to wanting improved services and infrastructure (80 per cent), also highlighted the importance of tax incentives (80 per cent) for training new recruits as a means of addressing skill shortages. Rural Industry Research and Development Corporation (RIRDC) (2009) found that competitive employment packages, opportunities for career advancement and improved access to health and education facilities can help alleviate skill shortages in regional Australia.

Table 9 reports on the most important skills that businesses felt TAFE and universities should provide for graduates. For all businesses, communication skills (86 per cent) were clearly the most dominant required skills from graduates. This was followed by information technology skills (67 per cent). When responses were weighted, the percentages for these skill groups increased further. Similarly, weighted responses for accounting and finance, and sales and marketing showed significant increases from 60 per cent to 86 per cent, and 48 per cent to 71 per cent respectively. Across business sizes, very small businesses desired accounting, finance and administration skills (100 per cent), and sales and marketing skills (75 per cent) more than other sized businesses, while engineering skills (80 per cent) were most sought after by very large businesses. Design skills (38 per cent) were considered the least

Table 9. *Skills that TAFE and Universities Need to Provide for Graduates by Employee Size* (% of most important and important responses)*

Employee size	Design	R&D	Engineering	IT	Manufacturing & production	Communication	Accounting, finance & admin	Sales & marketing
1–4	50.0	62.5	62.5	87.5	62.5	100	100	75.0
5–19	30.8	61.5	46.2	69.2	46.2	92.3	61.5	69.2
20–199	37.5	52.6	56.3	50.0	50.0	68.8	31.3	18.8
Over 200	40.0	40.0	80.0	80.0	60.0	100	80.0	40.0
All	38.1 (44.2)	57.1 (61.9)	57.1 (57.8)	66.7 (80.7)	52.4 (57.5)	85.7 (96.3)	59.5 (86.1)	47.6 (70.5)

Notes: *Weighted by employee size estimates in parentheses. The weighing by size does not affect the within group size estimates.

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important by regional businesses, perhaps due to the dominance of agriculture and processing industries in the region.

In addition to the quantitative survey responses, some businesses mentioned that TAFE and university graduates should not only have technical skills but also soft skills such as, the ability for lateral thinking and problem solving. This result is similar to Griffith City Council (GCC) (2011) who also reported the importance of soft skills in graduates in addition to technical skills. Excessive use of phones and iPads, and a loss of old work values, were raised as concerns among some employers, suggesting a need for "a law about not being able to take these into any place of work."

5. Conclusion

Based on a survey of regional businesses, this paper reports on business perceptions about the extent, causes and effects of skill shortages in the Riverina, and their likely remedies. While our results are interesting and provide additional insights into the issues of skill shortages in regional NSW, given the unrepresentative nature and small size of the sample, they should be treated with caution. Businesses in the Riverina region reported that during July 2014 to July 2015, they had unfilled vacancies. The TVR was approximately 4 per cent and the AVR was approximately 10 per cent. The largest TVRs and AVRs are associated with very small businesses, employing between one and four people. However, the use of VRs as a measure of skill shortage is problematic – particularly in regional locations in which monopsonistic factors might be at play (Kahn, 2015). This is given some credence by the finding that offering higher salaries was amongst the least popular of the remedies adopted by businesses in the survey. This finding would not have been expected if neoclassical conditions prevailed; for example, wage increases should alleviate skill shortages, at least in the short-run. The fact that regional businesses did not see wage rises as a means of addressing skill shortages tends to suggest that these regional and/or domestic market-oriented businesses appear to have very small profit margins compared with international market-oriented businesses such as mining; where wage rises are a common response to skill shortages (see Lewis & Corliss, 2010; Corliss & Lewis, 2011). Instead of wage increases, regional firms just carry on looking for workers or increase their reliance on automation as our findings suggest. Some firms even recruit less qualified workers at the time of skill shortages and provide workplace-specific training. The shortage of qualified applicants, lack of sufficient experience and lack of technical ability were the main causes proffered by regional business for skill shortages. While this may be the result of unreasonable expectations on behalf of employers (Cappelli, 2015; Osterman & Weaver, 2014; Fitzgerald *et al.* 2013), the fact that most businesses in the region offered training for existing staff suggests that at least some of these claims are sound.

Somewhat surprisingly, recruiting from other companies, or internationally, were among the least popular options for businesses in the Riverina region. This was despite awareness that skill shortages can lead to inability to meet deadlines, loss of credibility and lower productivity. This may reflect the fact that a large proportion of businesses are regionally, rather than globally, oriented, and are, as yet, not sufficiently familiar with the potential benefits of the skilled migration programme; and that firms (and workers) remain somewhat inward looking (Bahn & Cameron, 2013) and are not sufficiently familiar with the benefits of labour mobility (Kennett, 2013). Our finding with respect to the limited use of international recruitment under programmes such as the 457 visa provisions has important policy implications, requiring a thorough review to establish why regional businesses are not keen to utilise this scheme.

In keeping with findings from other countries (Dalziel 2015; Eichhorst *et al*., 2015; Komarnicki, 2012) and in Australia (Rural Industry Research and Development Corporation (RIRDC), 2009; Storer & Connell, 2013; National Farmers' Federation (NFF), 2013; Healy *et al*., 2015; Sharma *et al*., 2016) local businesses indicated a greater role for the government, particularly for improving services, facilities and infrastructure, providing tax incentives, and investing in TAFE and universities. They have also indicated that TAFE and universities should equip their graduates with improved communication and information technology skills.

These findings point to the importance of investing in quality infrastructure, offering tax incentives and channelling investment into the TAFE and university sector to address regional skill shortages in

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both the short- and long-run. Similar observations were made in previous Australian studies by Rural Industry Research and Development Corporation (RIRDC) (2009), Corliss and Lewis (2011), Lewis and Corliss (2010) and National Farmers' Federation (NFF) (2013). The TAFE and university sector in the Riverina region should aim to equip graduates with soft skills including sound communication and IT skills rather than offering standard qualifications – a finding similar to the study conducted by Griffith City Council (GCC) (2011) in Griffith City Council area. Tax concessions could potentially be provided to businesses to further promote more in-house training to address skill deficiencies.

Overall, the results confirm the complexity of the issue of skill shortages. Although measurement of skill shortages is imprecise, it undoubtedly exists, notwithstanding an overstatement of the problem in some contexts. Where it does exist, it clearly has an adverse impact on businesses and therefore on the regions in which they are located. Finding remedies requires both a cultural shift on behalf of employers and workers, and appropriate government intervention. Remedial action, however, is hampered by the fact that the nature of the problem somewhat differs across regions so that, in terms of policy, one size (remedy) will not fit all.

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