EMPLOYMENT AND POPULATION ADJUSTMENT IN RURAL AUSTRALIA

Anne Margaret Garnett

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ABSTRACT

Rural regions in Australia have been, and continue to be, distinguished by very different population and labour market characteristics than those of more urbanised areas. Since the 1980s, rural regions have been exposed to a range of economic events and policies which has impacted on the structure and composition of the population and the labour force. These changes include trade liberalisation and globalisation, deregulation, declining numbers of agricultural establishments, advances in technology, increases in productivity and changes in the levels of public and private provision of goods and services. In addition, in recent years, serious shortages of labour, particularly skilled labour, has emerged as a major issue facing rural regions.

However, there has been little economic research into rural labour markets relative to other labour markets, particularly since the 1980s. While there has been significant public discussion and political debate in recent years on the apparent changes experienced by rural regions, evidence regarding the nature, causes and impacts of these changes has often been anecdotal. For example, there is the popular notion of the 'tree change' which refers to the idea that people are leaving metropolitan areas and moving to rural areas. Concurrently, there is also the significant discussion on the 'rural downturn', which refers to the belief that rural regions are declining in term of population and employment growth. Further, the agricultural sector has continued to be cited as the likely cause for downturns in rural population and employment growth rates in rural areas. However, again, there is a lack of economic research to substantiate these claims.

The aim of this thesis is to redress the lack of economic research and to provide a comprehensive analysis of rural labour markets and population in Australia since the 1980s. Analysis focuses on the changing structure and composition of rural labour markets and the impact of population shifts on rural localities. Evidence is provided on the extent to which two decades of significant structural, technological and regulatory change have impacted on rural labour markets in Australia. This then provides a sound basis for the policy discussion in this thesis on population and labour market changes in rural Australia and the causes and implications of these changes.

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CHAPTER 1 INTRODUCTION

1.1 Background

The fortunes of rural Australia have always been an important part of the national psyche. However, in recent years there has been increased commentary on the economic and social issues facing rural Australia. Although Australia is often characterised as one of the most urbanised countries in the world, almost 37 per cent of the population live outside Australian capital cities. When other metropolitan areas are taken into account there still remains 27 per cent of the population who live outside either a capital city or a metropolitan area (ABS 2003b). Previous research has characterised rural Australia and rural labour markets as having significant differences from metropolitan areas, such as differing rates of population growth, employment growth, unemployment, labour force participation, industry mix and levels of formal education. If such differences continue to exist today, this implies that labour market analysis and economic and social policy designed for urban areas may not be appropriate for rural labour markets. Therefore it is essential to determine the characteristics of rural populations and labour markets.

However, there has been little economic research into rural labour markets relative to other labour markets, particularly since the 1980s. The results of this research gave rise to what was known as the 'rural turnaround' hypothesis, whereby the decline in rural population which had been experienced continuously until the late 1970s had begun to reverse. The Australian economy has undergone significant structural change since the 1970s, the pace of which accelerated in the late 1980s and 1990s

following the implementation of broad-ranging microeconomic reform policies. While policy has changed, industries have also embraced new technologies and have become increasingly involved in the global economy. Debate and comment have recently emerged that suggest that the experiences of non-urban areas are quite different from those of major cities.

1.2 Aim

The aim of this thesis is to redress the lack of economic research and to provide a comprehensive analysis of rural labour markets and population in Australia since the 1980s. Equally important is the need to determine whether or not the characteristics of rural Australia have been changing over time. What may have been true in the 1980s or earlier, may no longer apply in the 2000s, which would also have important policy implications. There has been considerable public discussion about the effect that structural changes within the agricultural sector have had on rural regions. This thesis analyses data on rural population and labour market trends over time to establish a sound basis for policy analysis.

The thesis also aims to provide a contemporary analysis of the characteristics of rural population and labour markets in Australia since the 1980s, particularly with regard to employment, unemployment, participation rates and population shifts. This analysis of structural and compositional change will provide evidence on the extent to which two decades of significant structural, technological and regulatory change have impacted on rural labour markets in Australia.

Once the characteristics and the changing nature of rural labour markets have been established, this thesis then aims to determine specifically what has been happening to the demand for rural labour, and the population movements in rural Australia, given that changes in population size and composition impact significantly on rural labour markets. Econometric modelling is carried out to determine the factors that affect rural labour demand and to establish the long run trend in the demand for labour. Similarly, econometric modelling is carried out for regions in Australia to identify which factors are associated with population growth and which are associated with population decline.

The findings of the changes in the characteristics of rural regions, together with the modelling results are then used as the basis for an analysis of rural policy in Australia. This will provide much needed contemporary economic policy analysis, identifying the important issues and implications of the recent changes in rural population and labour markets in Australia.

1.3 Method

The approach adopted here is to use standard economic analysis, together with data from a range of sources to provide an overview of the Australian rural labour market in the context of economic theory and in relation to the existing literature on rural labour markets. There is very little consensus in this literature as to how to define rural labour markets. Therefore Chapter 2 examines the different approaches and different methods used to define regions in Australia. Perhaps surprisingly, there are at least fourteen different methods used to classify regions in Australia. The merits of

each of these are evaluated, and evidence is provided to establish the preferred classifications for analysis in this thesis.

Chapter 3 uses the preferred methods of classification for quantifying rural regions to present a comprehensive view of Australian rural labour markets today and their developments over the past two decades. The chapter focuses on population and labour force; employment status; industrial composition; unemployment; labour force participation; age; educational attainment; and Indigenous issues.

The agricultural sector remains important in its contribution to rural employment, both directly and indirectly, with strong forward and backward linkages to other sectors in rural economies. The purpose of Chapter 4 is to provide up-to-date economic analysis of agricultural labour markets since the 1990s, and to examine the role of agriculture in rural labour markets. Included in this chapter is an econometric model of the demand for rural labour, the purpose of which is to determine the factors that affect demand and to estimate the trends in agricultural labour markets since the 1980s. These estimates include the impacts of changes in output levels, wages relative to commodity prices, and productivity and scale effects resulting from structural change.

The size and composition of rural populations greatly affects rural labour markets. Chapter 5 examines the components of population growth with respect to fertility rates; mortality rates; international migration and interregional migration. The chapter concentrates on interregional migration as this is found to be the main cause of population changes in rural Australia between 1991 and 2001. A model is

developed based on a review of the literature on interregional migration in order to determine possible causes of the most recent changes in interregional migration patterns in Australia.

Chapter 6 brings together the major results of the thesis in the context of implications for rural labour market policy. It is argued in the thesis that rural labour markets have different characteristics and associated policy issues than do metropolitan labour markets**.** If it is accepted that governments are responsible for the provision of education, health care, transport, infrastructure, and a range of other services, this implies that economic and social policy specific to rural areas is required in order to address the differing set of issues and problems apparent in rural labour markets and economies. Particular policy concerns examined are employment and unemployment, skills shortages, labour market programs; internal migration; Indigenous issues; education and training; and the impact of microeconomic reform.

Chapter 7 provides a general overview of the thesis and summarises the major findings and results. This will demonstrate the importance of this thesis with respect to the new findings regarding rural labour markets and population movements and its discussion of policy issues. The thesis will provide the much needed analysis of what has been occurring in rural labour markets since the 1980s to address to paucity of research in this area.

CHAPTER 2 DEFINING AND QUANTIFYING RURAL AUSTRALIA

2.1 Introduction

There is no definitive method used to classify which regions and townships are considered part of rural Australia and which are not. Instead, there are a number of methods used in Australia to create spatial (geographic) regions for population and labour market analysis. In studies prior to the 1990s, rural Australia was often classified as comprising every region that was outside capital cities, or, more colloquially, 'the Bush', where agriculture dominated rural industry. While the use of two regions to distinguish urban and rural may have been sufficient in the past, the development of other large metropolitan areas and cities has blurred the distinction between what is rural and what is not. Further, while the predominance of agriculture in a region is still often used to define rural localities, (see below), increased industrial diversification has meant that some rural areas are characterised by service industries, such as tourism, while in others, the mining sector is dominant. In more recent times, the rapid development of coastal regions in Australia has led to more difficulties in defining what regions are truly 'rural'.

2.2 Defining Rural Australia

Defining what is 'rural' is an issue that has been debated within and between disciplines and countries, with no particular agreement reached between different groups. Definitions tend to relate to characteristics such as population size, industrial base, (usually agriculture), distance from urban areas, access to services, and sometimes environmental features. Some disciplines use characteristics such as the pace of lifestyle, values and other socio-cultural characteristics, and relate rural to

whether people believe they are living a rural lifestyle (Redman 1991). Definitions also differ between developed and developing countries. For example, population size is often used as a characterising feature of rural communities in developed countries, while in developing countries, population size sometimes has very little relationship to services, infrastructure, degree of development or lifestyle (Couper 2003).

2.2.1 The Social Dimension

In a speech given in the outback town of Bourke, (which was immortalised in the writings of Will Ogilvie, 1952) Prime Minister John Howard referred to rural Australia in terms of lifestyle, national identity and economic base.

> "I can't conceive of the Australia that I grew up in as a child and grew to love along with the rest of you as being in the future what it has meant to me without the maintenance of a very strong rural economy but also without the maintenance of a very distinctive rural way of life. Just as the expression "Back O'Burke" is part and parcel of the Australian lexicon so it is that rural Australia, the Bush, however you define it, country Australia, it depends a bit as you go around the country how you describe it, it is part and parcel of what it means to be an Australian and it is tremendously important that it be preserved and strengthened, not only for economic reasons but also for the most important of social and nationalistic and national interest reasons" (Howard 2000, p.2).

In a submission to the Productivity Commission, the Tasmanian West/North West Councils stated that:

> "rural and regional Australia knows who it is – and the community will define itself around the issue, as opposed to setting boundaries and lines around the area." (Productivity Commission 1999, p.5).

This helps to illustrate that there is a whole social dimension and self-defining identity over and above the economic, political and institutional as to what constitutes rural Australia. Although close investigation of this social and cultural dimension is beyond the scope of this current research, it clearly shows the complications in defining rural Australia, and also shows the need to consider such dimensions in some economic analyses. The use of an appropriate definition raises another issue – that is, that the definition chosen is related to the purpose of the research. This issue is particularly apparent in research related to rural education and rural health services, where rural has been defined in terms of doctor to population ratios (Couper 2003) or daily access to a university or college of Technical and Further Education (TAFE) (Scriven and Walton 1990).

2.2.2 Geographical Location and Industrial Base

Studies carried out by the Commonwealth Government frequently use geographical location to define rural Australia, with rural being almost any area outside capital cities, which comprises around 95 per cent of Australia's land base (Scott 1993). The Australian Bureau of Statistics (ABS) has used and continues to use population size to define and quantitatively measure rural Australia. It defines rural in its Australian

Standard Geographical Classification (ASGC) Section of State Structure as "areas which are not part of any urban area", which is measured as towns and localities with less than 1000 people (ABS 2003a, and see below).

Battersby (1995) stated that there is a general perception that rural Australia refers to regions in which industry is largely land-based, such as agriculture, forestry and mining, and towns are generally small and more highly dispersed. However Battersby took a broader approach in his own research, defining rural regions as areas other than urban and metropolitan centres, which included large rural cities and medium and small towns (1995). In contrast, Scott defined rural Australia as "the remote section of rural Australia and not the larger provincial areas" (1993, p.3). This also raises the issue that some very remote regions may possess a different set of characteristics than less remote rural areas, with Scott using the term 'remote rural' to distinguish very remote regions from other rural areas (1993).

Studies of rural labour markets have often used the definition of rural from the ABS which defines rural employment as "employment in agriculture and services to agriculture" (ABS 2006c). For instance, in the mid 1980s, a study by the Bureau of Labour Market Research (BLMR) examined employment and unemployment in rural regions by emphasising the role of the agricultural sector in direct and indirect employment in rural Australia, using the ABS definition in a significant proportion of their analysis (Powell 1985). Evans (1985) modelled the demand for rural labour by using the ABS measure for rural employment. This was also the case in Lewis (1990), in his analysis of changes in rural labour markets during the 1970s and 1980s. Clearly the agricultural sector has been and remains strongly associated with rural

Australia. Most of these localities originally existed due to agriculture, and agriculture remains the main source of direct and indirect employment in many localities today (see Chapter 4). However, using the ABS definition of rural employment does have its limitations, as increasingly some regions that were once dominated by the agricultural industry have, over time, diversified their industrial bases. Therefore when defining rural Australia, and its labour markets, consideration should be given to more than only the agricultural sector.

2.2.3 Research Purpose

The Productivity Commission (1999) acknowledged that regions are often defined by the availability of data and the purpose for which the data are to be used. The Productivity Commission used a broad classification for rural and regional Australia, which it termed 'Country Australia', which included farms and associated towns, important regional centres and mining towns, while usually excluding major urban-coastal towns and capital cities. The term and concept of 'Country Australia' was also adopted by the Australian Bureau of Agricultural and Resource Economics (ABARE) (Garnaut, Connell, Lindsay and Rodriguez 2001).

As can be seen from the above discussion, rural Australia has been defined in previous research either by the population size, industrial base, the degree of remoteness and access to services, or some combination of these factors. To enable informative and useful analysis, the best regional classifications are those that group areas such that they are more homogenous in terms of economic, geographic, service amenity, and possibly environmental amenity, social and cultural characteristics. As

discussed above, the final choice will depend on the purpose of the research, and on the cost and availability of data.

2.3 Measuring Rural Australia: Methods of Regional Classification

After a useful and appropriate definition for the purposes of the research has been decided upon, a measurement technique is required to quantify rural regions. It is important to note all techniques will contain some degree of arbitrariness which cannot be avoided. For example, what population size should be classified as rural; how many kilometres away from the nearest major service centre makes a town rural?

This section outlines the most commonly used measurement techniques of regional classification in Australia from which rural classifications are, or can be, derived. Many of the below techniques use statistics from the ABS gathered at various levels of the ASGC. The smallest spatial unit is the Collection District (CD), for which data are only available in Population Censuses. There are over 37 000 CDs, which cover the whole of Australia, without gaps or overlaps (ABS 2001). CDs used to be defined as the area that a Census collector could deliver and collect Census forms in about 10 days. This definition no longer strictly applies as Census collectors in urban areas can cover more than one CD, and increasingly so with the introduction in 2006 of electronic submission of Census forms. In cities, CDs cover approximately 225 houses, which usually equates to a suburban block of dwellings, while in rural areas the number of dwellings per CD is often substantially less due to a lower population density (ABS 2001). CDs are the base unit of some of the regional classifications discussed later in this section.

Also commonly used to derive regional classifications that include rural and remote classifications are population data by Statistical Local Area (SLA). An SLA is a spatial unit used by the ABS to collect and analyse statistics from other sources as well as those collected from the Population Censuses. In non-Census years, the SLA is the smallest unit defined in the ASGC. During Census years an SLA consists of one or more CDs. There are over 1 300 SLAs, and like CDs, they cover the whole of Australia without gaps or overlaps.

The use of CDs is very useful for analysis of issues such as high and low income areas within cities or towns, or determining which suburbs have higher unemployment rates, and similar types of analyses. However, the larger areas covered by SLAs, and the collection of data by SLA in inter-censoral years, makes SLAs an appropriate unit of measure by which regional categories can be created for broader analyses. However, when using SLAs for regional analysis, some adjustments may be required for particular SLAs that cover very large geographical areas, with significant differences in industry base, access to services or environmental characteristics.

There are three other main ASGC categories: Statistical Sub-division, Statistical Division and State/Territory. These cover very large areas or entire areas of states and territories and therefore are not suitable for specific labour market analysis of relatively homogeneous regions.

2.3.1 Rural, Remote and Metropolitan Areas Classification

One of the earlier significant attempts to devise classifications which took into account remoteness and service accessibility, not just population size or land use, was

the Rural, Remote and Metropolitan Areas (RRMA) classification, developed by the Department of Primary Industries and Energy and the former Department of Human Services and Health (1994). Under the RRMA an index of remoteness was used to classify all SLAs into seven categories. It was calculated on the basis of distance from the centre of an SLA to the nearest towns/city service centres containing a population of 10 000 or more. Service centres were given a hierarchical ranking in terms of the level and types of services available, which was then factored into the degree of remoteness allocated to a region. The seven categories are:

1. Capital Cities (Metropolitan Zone)
2. Other Metropolitan Centres (Metropolitan Zone) with urban centre population > 100 000
3. Large Rural Centres (Rural Zone) with population 25 000 – 99 000
4. Small Rural Centres (Rural Zone) with population 10 000 – 24 999
5. Other Rural Areas (Rural Zone) with population < 10 000
6. Remote Centres (Remote Zone) with population > 5 000
7. Other Remote Areas (Remote Zone) with population < 5 000

The RRMA was used as the basis of several government programmes which directed funding to rural and remote localities (Department of Health and Ageing 2001). However, it has not been officially updated since its inception, which means that it is still based on data from the Census of 1991. It has also been argued that using the RRMA classification as the criterion upon which eligibility for government remoteness funding is based can lead to inequitable outcomes (GISCA 2000). Specifically, some SLAs are geographically very large, therefore the distance from

various localities within an SLA to the nearest service centre can vary substantially. As the RRMA measures distance from the centre of the SLA to the nearest service centre, some towns may be more remote than the RRMA indicates. These possible weaknesses in the RRMA have been the focus of debate, for although, to a large extent, the RRMA has now been superseded by the Accessibility/Remoteness Index of Australia (ARIA) (see later in this section), it is still used as the basis by Medicare Australia for the payment of loadings and grants for rural and remote medical practices. For example, a medical practice in Zone 4 receives a 20 per cent rural loading, while a practice in Zone 5 receives a 40 per cent loading (Medicare Australia 2003). The use of the RRMA for grants for medical practices is inconsistent with the method used by Medicare Australia to determine remoteness funding for rural and remote pharmacies (see later in this section). These inconsistencies have important implications for the level of funding and hence the level of health service provision in rural Australia. This issue will be taken up later in Chapter 6.

2.3.2 Griffith Service Access Frame

The Griffith Service Access Frame (GSAF) was used to classify regions with the specific purpose of quantifying access by rural and remote communities to educational services (Griffith 1994). This technique was based on the distance and cost from a CD to a service centre. As with the RRMA approach, service centres were hierarchically ranked in terms of their provision of particular services, such as schools and tertiary education, and a CD's remoteness in terms of distance to these centres was then calculated. CDs were then grouped into Zones of Relative Access to particular services (Department of Health and Ageing 2001). The GSAF has been

used to determine accessibility to education in Queensland, South Australia, Western Australia and the Northern Territory.

2.3.3 Accessibility/Remoteness Index of Australia (ARIA)

One of the most widely used and applied remoteness indexes is the ARIA, which was devised by the Department of Health and Ageing (formerly Department of Health and Aged Care) (1999). This index was used by the Department of Health and Ageing to create regional classifications, and has also been used and adapted to generate regional classifications by other organisations including the ABS and ABARE (see below). The intent of the ARIA was to develop an index of remoteness that was not solely population based, but which measured remoteness in term of geographical access to services. This is particularly useful when creating rural and remote regions, which are in part characterised by a relatively lower level of access to services when compared with urban regions. The ARIA has largely superseded the RRMA classification in terms of use for policy and analysis.

ARIA (in its original version) defines remoteness based on the physical road distance people travel to reach Service Centres, which are defined as Urban Centres with populations of 5000 or more, where people can access goods and services (Department of Health and Ageing 2001). Service Centres are then categorised into four levels based on the level of services available. For example, Category A is an Urban Centre with more than 250 000 people with access to a full range of services including tertiary education and specialist medical facilities. Category D is the smallest category of Service Centre, with populations of between 5 000 and 18 000 people, with only a limited range of services (Department of Health and Ageing

2001). An ARIA Score for a Population Locality[1] (usually a town) is based on the shortest road distance between a Population Locality and each of the four categories of Service Centres. Population Localities are then given a calculated ARIA score, ranging between 0 and 12, with high scores indicating a greater degree of remoteness. As ARIA is a continuous variable, it can be used to generate a remoteness score for most statistical analyses regardless of whether data is collected by CD, SLA or other spatial units. ARIA values are then grouped into the following five categories:

- Highly Accessible (ARIA score 0 – 1.84)
- Accessible (ARIA score 1.85 – 3.51)
- Moderately Accessible (ARIA score 3.52 – 5.80)
- Remote (ARIA score 5.81 – 9.08)
- Very Remote (ARIA score 9.09 – 12)

The highest ARIA score that a Population Locality can have is 12, which would be the score, for example, of Tennant Creek in the Northern Territory, while the lowest score is zero, which would be the score for a city such as Sydney. ARIA has since been extended to ARIA Plus, which includes an additional category of Service Centres, with populations between 1000 and 5 000, which results in an index value ranging between zero and 15 (Department of Health and Ageing 2001). Further, there is also ARIA Plus Plus , which has six Service Centres, and index values range from zero to 18, and STATE ARIA Plus, which is based on five Service Centres within particular States (GISCA 2006). The more recent versions of ARIA have also changed the technique used to measure the shortest road distance, with the end point being the perimeter of the Urban Centre, rather than a nominal point inside the Urban

[1] A Population Locality is an area from where people might need to travel from to obtain services (ABS 2001).

Centre as in the original version of ARIA. This avoids the problems that arise when a small Urban Centre grows and merges with a larger Urban Centre (ABS 2001).

2.3.4 Section of State Structure

The ABS's ASGC uses the Section of State Structure as one of its methods for classifying regions into urban and rural, using data from the Census of Population and Housing (ABS 2006c). The Section of State comprises four geographic regional classifications (plus a migratory category) which are formed by the aggregation of CDs. The classifications are:

- Major Urban – all cities and towns of 100 000 or more persons
- Other Urban – towns and cities from 1000 to less than 100 000 persons
- Bounded Locality (formerly Rural Locality) – centres from 200 - 999 persons
- Rural Balance – all other areas, but not including 'migratory population'
- Migratory – Off-shore, shipping and migratory CDs

The Bounded (Rural) Locality and Rural Balance classifications have been used to approximate rural Australia by many studies (for example, Powell 1985; Lewis 1990), and is also used to measure rural population by the ABS (2003e).

A shortcoming of the Section of State regional classification is that it is only based on population size. This means that it does not create regions which have a high degree of homogeneity, as no consideration is given to whether the region has coastal or rural characteristics, or whether the region has access to services or not. In particular, the 'Other Urban' classification incorporates towns with populations between 1000 and 100 000, which therefore includes a very broad range of localities with vastly differing characteristics. It includes highly urbanised, service-dominated cities,

together with very small rural towns that are largely based on agricultural and mining activities. It does not enable the analysis of varying regional experiences, where clearly economic and social changes are likely to be quite divergent. It also does not identify coastal regions, which have experienced significant population growth and labour market changes since the 1990s.

2.3.5 ABS Remoteness Structure

In more recent years, largely in response to the need for a regional classification that considered remoteness, the ABS introduced the ABS Remoteness Structure for analysis of Census data (ABS 2001). It uses an adapted version of the Department of Health and Ageing's ARIA Plus (2001). The ABS made small adaptations to the ARIA Plus boundary scores, in particular, increasing the relative size of the remote categories. The five broad regions (plus a migratory category) were also given very different category names. The Remoteness Structure regions are:

- Major Cities: CDs with an average ARIA of 0 – 0.2
- Inner Regional: CDs with an average ARIA of >0.2 – 2.4
- Outer Regional: CDs with an average ARIA of >2.4 – 5.92
- Remote: CDs with an average ARIA of >5.92 – 10.53
- Very Remote: CDs with an average ARIA >10.53

It is difficult to use this classification to separate out which regions are rural – the term rural was not used due to caution about how to define it (ABS 2001). However, it is likely that Outer Regional, Remote and Very Remote, together with some areas in the Inner Regional classification would possess characteristics usually associated with

rural localities, such as some degree of service remoteness and a higher reliance on primary industries.

While clearly improved by the addition of an extra classification, and by the avoidance of such large groupings as the Section of State's 'Other Urban', like the Section of State classification, the Remoteness Area classification lacks a coastal definition. This means, that large coastal cities, for example, Bunbury in Western Australia, are classified as 'Inner Regional', when they may be major service based cities with a well developed coastal tourism industry, making them quite different from other Inner Regional localities that are based on agriculture. Further, the 'Major Cities' classification excludes some capital cities such as Hobart and Darwin, with Hobart being classified as Inner Regional and Darwin as Outer Regional. At the same time Geelong, Wollongong and Newcastle are classified as Major Cities. While anomalies emerge in any system of classification, classifying capital cities as Inner Regional or Outer Regional is likely to reduce economic and social homogeneity, as it is likely that factors affecting population and employment changes in capital cities would differ from other regional areas.

2.3.6 Productivity Commission Classification

The Productivity Commission (1999) conducted its own regional analysis in a report that examined whether competition policy had differing impacts on different areas throughout Australia. The Productivity Commission used four main regions based on SLAs in its analysis of population and employment movements, (disaggregating those regions for other forms of analysis). The regions used were:

- Capital Cities: Eight capital cities (plus migratory)

- Coastal: All SLAs along the coast between Port Douglas in Queensland and Eden in New South Wales, and between Margaret River and the outskirts of Perth in Western Australia.
- Remote: As defined by the Commonwealth Government's Zonal Tax Rebate Scheme
- Rural: All remaining SLAs

This method of classification uses SLAs as its main spatial unit. Its classification of Remote differs from other methods discussed in this chapter, in that it uses the Zonal Tax Rebate Scheme to define remote localities. The Zonal Tax Rebate Scheme was introduced in 1945 to provide tax concessions to give some compensation for the effects of isolation, climate and high living costs for people living in particular remote regions of Australia. The real value of the rebate has declined from the equivalent of 4.5 weeks' average earnings in 1945 to between 0.4 and 1.5 weeks in 2005/06 (Australian Local Government Association 2005). Tax rebate levels vary according to whether people are located in Zone A, Zone B or in 'special areas'. Zones were determined on the basis of latitude, rainfall, distance from population centres, population density, industrial base, cost of groceries, and access to roads and railways (Hicks 2001). Zone boundaries have remained almost unchanged since 1945, with the exception of 'special areas' within zones, which were introduced in 1982, granting higher rebates to very isolated areas. Zone A encompasses the north western areas and the extreme north-eastern areas of Queensland, northern parts of Western Australia and the northern part of the Northern Territory. Zone B includes the southern part of the Northern Territory, the Goldfields and central and southern areas of Western

Australia, the north and west of South Australia, the western parts of Tasmania, western New South Wales, and north eastern, central and south west Queensland. Victoria does not contain any rebate zones (Regional Business Development Analysis 2003).

The use of the Zonal Tax Rebate Scheme as a measure of remoteness is somewhat dubious because the zone boundaries have not been changed since 1945, and there have since been significant changes to features such as population localities, industrial bases of remote areas, types and levels of services considered necessary, rainfall patterns and the relevance of it, and so on. Further, some areas of Australia that could be considered remote are not covered by the scheme, for example, no areas of Victoria are covered. It has been suggested that the classification of remoteness contained in Fringe Benefits Tax (FBT) legislation could provide a better measure or remoteness (Hall 2004). The Fringe Benefits Tax Assessment Act of 1986 classifies remoteness using a measure of distance between localities and service centres. For example, to be classified as remote to receive FBT housing benefits, a locality must be more than 40 kilometres by the shortest practical route from a service centre located with a population of 28 000 or more and at least 100 kilometres from a service centre with a population of 130 000 or more (Australian Tax Office 2000). The FBT measure can therefore account for differences in the distance of towns within large SLAs to service centres.

An advantage of the Productivity Commission method of defining regions is that it introduces a coastal classification, which seems increasingly necessary given the rapid changes in population and employment that towns and cities in coastal areas have

been experiencing (see Chapter 3). However, this means of classification does not capture the very large category of metropolitan areas other than capital cities. These become dispersed in the coastal and rural regions. Yet there has been significant population and employment changes over time in metropolitan areas other than capital cities (see Chapter 3), and such a category exhibits very different characteristics from other regions.

2.3.7 Small Area Labour Market Classification

The Department of Employment and Workplace Relations (DEWR) classifies the Australian labour market into 19 labour market regions as part of their Small Area Labour Market quarterly analysis (2006). These are not grouped for the purpose of creating homogeneous regions and nor it is the intention that they be grouped as such. For example, Melbourne is a region, as is the Northern Territory, and Western Australian is divided into two regions plus Perth. Instead, the regions are established for the purposes of tendering out employment services under the Job Network. These regions are therefore not suitable for this current form of analysis.

DEWR's Small Area Labour Market statistics estimate quarterly employment and unemployment rates for each of the 1350 SLAs in Australia. The estimates are derived from the Structure Preserving Estimation (SPREE) methodology which generates labour force statistics at the SLA level. Data used in SPREE are based on the most recent Census employment and unemployment rates for each SLA, the ABS Labour Force series and Centrelink postcode records of recipients of Newstart and the Youth Allowance. SPREE assumes that benefit recipients are uniformly distributed between postcodes, and that the proportion of the labour force in each SLA remains

stable in inter-census years (Department of Employment and Workplace Relations 2006). This methodology and the large variability for data disaggregated below the SLA level (for example, by postcodes) means that the estimates by SLA may not clearly identify changes in inter-Census years. Neither can the estimates be used to derive reliable estimates by age or gender or any other subset (Department of Employment and Workplace Relations 2006).

2.3.8 Australian Classification of Local Governments

The Australian Classification of Local Governments (ACLG), first published in 1994, groups over 700 local governments into 22 categories. Local government councils included in these groups are those who receive general purpose financial assistance from the Commonwealth Government. These include community councils but exclude county councils, voluntary regional organisations of councils and the Australian Capital Territory (Department of Transport and Regional Services 2003). Councils are classified on the basis of three characteristics: population size, population density, and on the proportion of the population that is considered to be either urban or rural. Each council is then given a three-letter identifier which is then used to classify it into one of the 22 groups. For example, Burke Shire would be classified as rural, agricultural and medium-sized (RAM), and is therefore classified with councils in the RAM group.[2] This is an interesting classification system in that it does not shy away from classifying localities as urban, rural or remote. However, as mentioned above, it does not cover all areas of Australia and the groupings are designed to capture similarities in financial grant needs rather than other types of regional homogeneity.

[2] See the Department of Transport and Regional Services (2003) for full details of this system of classification.

2.3.9 Australian Bureau of Agricultural and Resource Economics Classification

The Australian Bureau of Agricultural and Resource Economics (ABARE) devised their own method of regional classification for use in their research report which focused specifically on that part of Australia they referred to as 'Country Australia' (Garnaut, Connell, Lindsay and Rodriguez 2001). This method has five main classifications, which are generated using SLAs as the primary spatial unit.

The main classifications are:

- Capital Cities: Eight capital cities
- Other Metropolitan: SLAs other than in capital cities that contain whole or part of an urban centre with a population of 100 000 or more
- Coastal: SLAs that are not remote and are within 80 kilometres of the coastline. (SLAs with very little settlement on the coastline and have large inland areas are classified as Inland)
- Remote: Coded by road distance between populations to the nearest urban centre using ARIA; includes the ARIA remote and very remote classifications
- Inland: All remaining SLAs

An advantage that this method has over many of the methods described above is that it contains a classification for other large metropolitan centres, which is separate from capital cities while excluding smaller towns and cities – those with populations of less than 100 000. As will be shown in the next chapter, there has been significant growth

since the 1990s in metropolitan centres outside of capital cities, with these towns and cities often taking on urban characteristics rather than rural. Therefore including a classification for metropolitan areas outside of capital cities allows the measurement and analysis of this growth, and importantly allows the separation of these regions from rural or country Australia.

The ABARE method of classification incorporates the useful features of the Productivity Commission's regional classification, including the use of a coastal classification, which is necessary given the apparent rapid growth since the 1990s of many coastal regions. The chosen distance to define coastal localities - specifically, those localities 80 kilometres or less from the coast (that are not otherwise classified as remote) - reflects the standard measure used by ARIA and various adaptations of it. This distance, although somewhat arbitrary, is equated to one hour of travel time and is considered to be a reasonable distance to ensure accessibility to a locality (GISCA 2006). As discussed earlier, SLAs can be very large in geographical size, which means that this unit of measure could encompass localities with quite different characteristics. Therefore to create a more homogenous coastal classification, the above 80 kilometre rule has been adjusted to exclude SLAs that have very little settlement on the coastline and are characterised by large inland areas. These are instead included in the Inland category.

The ARIA is used to classify the Remote region, which here contains the ARIA Remote and Very Remote categories. ABARE's Inland category includes the remaining SLAs that are not otherwise classified. As with many of the other classification methods discussed above, a remote classification is important to enable

remote localities to be distinguished from less remote rural populations. Some remote regions are characterised by quite a different set of industrial, population, infrastructure and even cultural factors. For example, the industrial base may be mining and not agriculture, which is associated with a 'fly-in/fly-out' labour force. As another example, some remote communities are largely populated by Indigenous people, and have different industrial bases and often very different labour market programmes. For example, under the Community Development Employment Projects (CDEP) scheme for Indigenous people, up to half of all employment in some remote areas are generated by this scheme (Hunter 2002).

2.3.10 Medical Classifications

There have also been a number of classification techniques used by the medical profession, where regions are, for example, classified on the basis of the number of general practitioners per locality (Couper 2003). Medicare Australia uses an adapted version of ARIA to determine remoteness for the purpose of allowances paid to pharmacists in rural and remote locations. This adapted version is the Pharmacy Accessibility Remoteness Index of Australia (PhARIA). It uses the ARIA with remoteness scores from zero to 12, but with six categories, and with remoteness determined by the road distance to the five closest pharmacies (GISCA 2006). There is also a relatively large body of research on nursing in rural regions (see, for example, the association for Australian Rural Nurses and Midwives, formerly the Association for Australian Rural Nurses) where rural regions are defined in terms of isolation from medical facilities and accessibility via known transport links. This again shows that the choice of regional classification is related to the purpose of the

research, and hence such classifications are not always suitable for use in other research.

2.4 Comparison of Classifications

In the above analysis of the various methods of regional classification in Australia, it has been argued that some methods of classification are clearly better than others. The choice of classification method has the potential to significantly influence the outcomes of the analysis of rural labour markets. Table 2.1 demonstrates this by showing the marked differences in the classification of a small sample of cities and towns when using different regional classifications outlined in this chapter.

Table 2.1 Comparisons of Regional Classifications, Australia

	ABS Section of State Structure	**Department of Health and Aging ARIA**	**ABS Remoteness Structure**	**Productivity Commission**	**ABARE**
Alice Springs	Other urban	Remote	Remote	Remote	Remote
Broome	Other urban	Very remote	Very remote	Rural	Remote
Bunbury	Other urban	Highly accessible	Inner regional	Coastal	Coastal
Cairns	Other urban	Accessible	Outer regional	Coastal	Other metropolitan
Darwin	Other urban	Accessible	Outer regional	Capital city	Capital city
Gold Coast	Major urban	Highly accessible	Inner regional	Coastal	Other metropolitan
Hobart	Other urban	Highly accessible	Inner regional	Capital city	Capital city
Noosa Heads	Other urban	Highly accessible	Inner regional	Coastal	Coastal
Port Lincoln	Other urban	Remote	Remote	Rural	Remote
Wollongong	Major urban	Highly accessible	Major city	Coastal	Other metropolitan

Source: ABS (2001); Productivity Commission (1999); Department of Health and Ageing Appendix E (2001); Department of Transport and Regional Services (2005); Garnaut, Connell, Lindsay and Rodriguez (2001).

When looking at Alice Springs, all techniques classify it as remote, except for the ABS's Section of State method. This highlights the weakness of using population size as the only means of classification, as the Section of State does. It classifies Alice Springs as other urban, which given its location in the middle of the desert and its distance from major service centres, does not seem an accurate description. Darwin and Hobart are classified as capital cities by only the Productivity Commission and ABARE. It is argued here that capital cities have a level of service provision, such as tertiary education institutions, major hospitals, and social and justice infrastructure, which separates them from most other large urban areas. Cairns and in particular, the Gold Coast, are highly urbanised and ABARE's classification of them as other metropolitan captures this, as opposed to the ABS's Remoteness Structure which classifies them as outer regional and inner regional respectively. Further, the categories of 'Outer regional' and possibly 'Inner regional' could be associated with regional rural localities, and do not reflect the urbanised nature of such towns and cities. It is not practical, nor perhaps particularly productive, to analyse every locality under every alterative classification method. However, Table 2.1 helps to demonstrate the differences arising from different classification methods.

2.4.1 Characterising Features of Rural Regions

There are two main issues to consider when choosing a classification method. The first issue is how rural is defined. This study takes the view that rural regions are in large part defined by their population size. Smaller populations mean that the level of service provision will not be as great as in highly populous localities such as cities. This then means that the issue of distance to service centres becomes defining in what is considered to be a rural locality. However, population size and distance alone are

not seen here as sufficient to define rural. Industry base also plays an important defining role. It is argued in this study that the agricultural sector has been, and remains, a very important characteristic of what is considered rural in Australia, both in economic and social terms. As shown earlier in this chapter, agriculture has also long been associated with the perception of what is rural in Australia. In economic terms, it is responsible for a significant proportion of output and employment in non-metropolitan areas, either directly, or indirectly, through linkages with other sectors (see Chapter 4). Therefore, in analysing rural labour markets, this study will pay particular attention to agricultural labour markets. However, some localities that were formerly dependent on agriculture are now diversifying, and some have become service based, including the growth of the tourism industry in coastal areas. Therefore, while very important, industry base alone is not seen as sufficient to define rural.

It is obvious that there is no exact description of what defines a rural region in Australia. The defining characteristics differ somewhat between disciplines and research purposes. However, there does appear to be common ground in the defining features, which include rural regions characterised as being non-metropolitan, usually with a lower provision of services due to relatively smaller populations and being some distance from accessing the range of services usually provided in urban areas. Rural localities also continue to be associated with a relatively higher reliance on primary industries, and in particular, agriculture.

2.4.2 Measuring Rural Regions

The second issue when choosing a method of classification then becomes which measurement technique can best quantify rural regions. As discussed earlier, all techniques will contain some degree of arbitrariness and are likely to have some inconsistency. However, for the analysis of rural labour markets since the 1980s and particularly the changes since the 1990s, some techniques are seen as more suitable than others.

As demonstrated earlier, many studies do not separate coastal localities from other regions. Frequently, if coastal localities meet population and distance criteria, they are classified as rural. However, it is argued here, that many coastal localities do not possess the characteristics of rural regions as defined in this study. For example, some are service based tourist towns. As will be shown in the following chapter, coastal localities since the 1990s have also experienced very different population and employment patterns than non-metropolitan inland regions. What has colloquially become known as the 'Sea Change' is borne out by the data, with many coastal towns experiencing high population growth rates while inland rural regions have not. Therefore, it is considered important that the method of regional classification used in this study has a coastal classification that is separate from an inland rural classification. Another important criterion is that the method of classification has a category for remote areas. While many remote areas are considered to be rural in terms of industry base and population size, remote localities are defined as those which, due to distance, have far less access to services than other inland rural areas. In addition, some remote areas may have other distinguishing characteristics, such as a very high Indigenous population. Finally, this study considers it essential that there

be a separation of non-capital city large metropolitan areas from what is considered to be rural. There has been significant growth in both population and workforce of non-capital cities, and most of these have developed into service based regions that are not based on primary industries. Some studies analysed in this chapter do not separate these localities from other inland or rural regions.

This present study will use a variety of classification techniques, dependent on the purpose of the analysis and the availability of data. Clearly there is no one measure that is suitable for all purposes, although the preferred classification system for this current analysis of rural labour markets is that devised by ABARE. It is the only method that meets all the above discussed criteria, namely, separating coastal areas from inland areas, separating large non-capital city metropolitan areas from other regions, and containing a remote classification. For the purposes of this study, the Inland and Remote categories in the ABARE classification are considered to be quantitative measures of rural Australia. Some consideration will also be given to labour markets in coastal areas, for although these localities are not considered to be primarily rural, some still possess some rural characteristics.

However, as stated above, other methods of regional classification will also be used in this study. Not all data required for the analysis of rural labour markets are available at the necessary level of disaggregation to enable the use of the ABARE method. For example, the following chapter will use the Section of State and the ABARE classifications. Chapter 4 examines the labour market for a particular industry - agriculture - and regional analysis is not used at all. Clearly the ABS Labour Force data is the only data source that is appropriate as this provides the quarterly data series

required for the economic modelling of labour demand carried out in this chapter. Chapter 5 utilises data ABARE regional classifications together with the ARIA as a measure of remoteness. Overall, the use of the ABARE system of regional classification, supplemented by other classifications where useful or necessary, will provide a valid and reasonable basis for the analysis of rural labour markets in Australia.

CHAPTER 3 POPULATION AND THE LABOUR MARKET IN RURAL AUSTRALIA

3.1 Introduction

Rural Australia and rural labour markets have been characterised in previous research as having some significant differences from metropolitan areas. These include differences in the rates of population growth, employment growth, unemployment, labour force participation, industry mix and levels of formal education. If such differences continue to exist today, this implies that labour market analysis and economic and social policy designed for urban areas may not be appropriate for rural labour markets. Therefore it is essential to determine the characteristics of rural populations and labour markets.

Equally important is the need to determine whether or not the characteristics of rural Australia have been changing over time. What may have been true in the 1980s or earlier, may no longer apply in the 2000s, which would also have important policy implications. Evidence regarding such possible changes, including population changes, has often been anecdotal, with references in political and media spheres to a 'Sea Change' or 'Tree Change'. These catch-phrases refer to the perception that people are making lifestyle changes by leaving urban areas and moving to coastal regions or rural towns. There has also been considerable public discussion about the effect that the structural changes and misfortunes within the agricultural sector have had on localities in rural regions. This chapter analyses data on rural population and labour market trends over time to establish a sound basis for economic and policy analysis.

3.2 Rural Population and Labour Markets

As demonstrated in Chapter 2, there is no definitive method used to define rural Australia, nor is there a single measure of rural population and labour force. The ABARE method of regional classification was identified as having many advantages, and will be used extensively in this chapter (Garnaut, Connell, Lindsay and Rodriguez 2001). However, not all data are available for use in this classification system and, as with all methods of classification, the ABARE system will undoubtedly have some inconsistencies. Therefore at times other classification measures of rural Australia will be used to substantiate findings and to provide data that would otherwise be unavailable.

3.2.1 Population and Labour Force

The logical starting point is to first determine what proportion of the Australian population and labour force live and work in rural localities. This can be seen from Table 3.1, which shows the percentage of the population who live in each region of Australia and who participate in the labour force. Data is taken from the 2001 Census of Population and Housing (ABS 2003d) and the regions are categorised using the ABARE methodology outlined and evaluated in Chapter 2 (Garnaut, Connell, Lindsay and Rodriguez 2001). As discussed in Chapter 2, the inland and remote categories correspond closely to rural regions, and will be considered as such here. Some consideration must also be given to coastal regions, as some of these localities possess rural characteristics. However, as previously noted, other coastal areas have become highly service based economies, which perhaps have more in common with metropolitan areas than rural areas, (see discussion later in this chapter).

Table 3.1 Population and Labour Force, 2001, per cent

Location	Population	Labour Force
Capital Cities	63.5	65.8
Other Metropolitan	9.3	8.8
Coastal	11.7	10.3
Inland	12.7	12.3
Remote	2.8	2.8

Source: ABS (2003d)

As can be seen from Table 3.1, a little over 27 per cent of the Australian population lives outside of capital cities and other metropolitan areas, while 15.5 per cent live in inland and remote localities. These statistics show that non-metropolitan and rural areas continue to comprise a significant proportion of the population. The distribution of the Australian labour force follows a similar pattern, although capital cities, at 65.8 per cent, comprise a greater proportion of the labour force than it does of the population, reflecting the dominance of service based industries in these areas. Non-metropolitan areas together comprise 25.4 per cent of Australia's labour force, while inland and remote localities comprise a little over 15 per cent.

3.2.2 Employment Status

When examining the composition with respect to employment status of rural labour markets relative to urban labour markets, obvious differences emerge. Table 3.2 shows labour force composition by employment status in 2001, by the ABS Section of State classification using Census data. When using this system of classification, rural Australia includes bounded (rural) locality and rural balance. It is also likely to include some of the towns classified as other urban. As discussed in Chapter 2, the

other urban category includes towns with populations ranging between 1 000 and 100 000 people, and it is difficult to separate out large rural towns from metropolitan centres.

The most obvious difference is in the proportion of people who are employers and own account workers. Own account workers are self-employed workers who do not usually hire other employees. In major urban areas in 2001, (looking at the last column), employers comprised 5.7 per cent of the total major urban labour force, while own account comprised 8.1 per cent. As the extent of regional urbanisation declines, the proportion of employers and own account workers rises substantially. For bounded (rural) locality, the proportion of employers is 7.1 per cent and own account is 11 per cent. Rural balance measures localities with less than 200 people, which comprise a little over 15 per cent of the total population, and clearly it is here where the difference from urban areas is largest, with employers and own account together making up almost 31 per cent of the labour force – more than double that of major urban localities. This of course means that employees make up a much greater proportion of the urban labour force than in rural areas. This indicates that rural areas are characterised by a far greater degree of small businesses and family owned agricultural establishments than urban areas.

When examining the gender mix, females comprise around 46 per cent of the major urban labour force. This falls to 44 per cent for other urban, 42 per cent in bounded (rural) locality and 39 per cent in other rural localities. This is likely to be due to a mix of factors. Female employment is relatively more highly represented in the services sector, and, as demonstrated later in this chapter, rural areas are often

characterised by a large agricultural sector. Therefore there may be less job opportunities for females in rural areas. It has also been demonstrated that in small businesses and family owned agricultural establishments, some females engage in unpaid work but do not classify themselves as part of the labour force (Lewis 1990). This would imply that there are more unpaid contributing family helpers than officially measured.

Birth rates in rural areas are also higher than in urban areas, which would be expected to reduce female participation in the paid labour force. The Australian Institute of Health and Welfare estimated that between the years 2000 and 2002, the fertility rate in rural localities was 2.2 children per woman and in remote localities it was 2.4 children per woman. This compares with 1.7 children per woman in major cities (Australian Institute of Health and Welfare, 2004).

Table 3.2 Population and Workforce by Status and Gender by Community Size, 2001

Community Classification	Employment Status	Males	Males per cent	Females	Females per cent	Persons	Persons per cent
Major Urban	Employee	2 418 297	74.3	2 281 132	83.8	4 699 429	78.6
	Employers	239 930	7.4	101 065	3.7	340 995	5.7
	Own Account	336 295	10.3	146 660	5.4	482 955	8.1
	Family Helper	10 562	0.3	19 835	0.7	30 397	0.5
	Unemployed	251 853	7.7	174 920	6.4	426 773	7.1
	Labour Force	3 256 937	100.0	2 723 612	100.0	5 980 549	100.0
	Population	5 971 151	64.4	6 233 805	65.6	12204956	65.0
Other Urban	Employee	740 098	73.0	650 933	80.4	1 391 031	76.3
	Employers	74 865	7.4	39 701	4.9	114 566	6.3
	Own Account	99 164	9.8	47 728	5.9	146 892	8.1
	Family Helper	4 031	0.4	7 498	0.9	11 529	0.6
	Unemployed	95 545	9.4	64 247	7.9	159 792	8.8
	Labour Force	1 013703	100.0	810 107	100.0	1 823 810	100.0
	Population	2 030 777	21.9	2 108 680	22.2	4 139 457	22.1
Bounded (Rural) Locality	Employee	79 632	69.5	65 174	77.1	144 806	72.7
	Employers	9 177	8.0	5 047	6.0	14 224	7.1
	Own Account	14 819	12.9	7 026	8.3	21 845	11.0
	Family Helper	689	0.6	1 078	1.3	1 767	0.9
	Unemployed	10 327	9.0	6 194	7.3	16 521	8.3
	Labour Force	114 644	100.0	84 519	100.0	199 163	100.0
	Population	242 861	2.6	238 498	2.5	481 359	2.6
Rural Balance	Employee	314 126	57.0	269 115	67.4	583 241	61.4
	Employers	70 296	12.8	37 801	9.5	108 097	11.4
	Own Account	124 111	22.5	60 749	15.2	184 860	19.5
	Family Helper	6 038	1.1	10 482	2.6	16 520	1.7
	Unemployed	36 111	6.6	21 323	5.3	57 434	6.0
	Labour Force	550 682	100.0	399 470	100.0	950 152	100.0
	Population	1 014 865	11.0	919 693	9.7	1 934 558	10.3
Australia	Employee	3 556 493	72.0	3 267 061	81.3	6 823 554	76.2
	Employers	394 409	8.0	183 648	4.6	578 057	6.5
	Own Account	574 560	11.6	262 213	6.5	836 773	9.3
	Family Helper	2 1326	0.4	38 903	1.0	60 229	0.7
	Unemployed	393 967	8.0	266 742	6.6	660 709	7.4
	Labour Force	4 940 755	100.0	4 018 567	100.0	8 959 322	100.0
	Population	9 266 551	100.0	9 502 705	100.0	18769256	100.0

Source: ABS (2003d)

Note: The Migratory category has not been included, (also noting that this category comprises only around 0.06 per cent of the labour force).

There is also the fact that there are more men than women living in rural Australia, hence the relative proportion of women in the labour force is lower. As can be seen from Table 3.2, in 2001, major urban areas contained 65.6 per cent of all females and 64.4 per cent of Australia's males, while rural balance contained 11 per cent of males and 9.7 per cent of Australia's females.

When looking at the status of employment by gender, another interesting difference emerges. The proportion of female employers and own account workers in rural areas, particularly in the rural balance localities, is much greater than in urban areas. For example, in major urban areas, employers comprise 3.7 per cent of the female labour force, which is half that of males at 7.4 per cent, while in rural balance the proportion is 9.5 per cent female employers to 12.8 per cent males. This difference is likely to be the result of many rural businesses being jointly owned by spouses.

Table 3.2 also shows that major urban unemployment rates are lower than the rates in other urban and bounded (rural) localities. Interestingly, the rate of unemployment is lowest in the rural balance localities. The differences in the rate of unemployment between regions will be examined in more detail in the next section of this chapter. In terms of male and female unemployment rates, at the national level there is a higher percentage of males unemployed than females. This pattern is similar in all regions, with male and female unemployment differentials between regions appearing very much the same.

3.2.3 Employment by Industry

As discussed in Chapter 2, there is a long held association between the agricultural sector and rural Australia. In particular, employment in agriculture and services to agriculture has in some studies been used as a proxy for rural labour markets. Table 3.3 illustrates that employment in the agricultural sector is indeed significantly greater in rural regions and that, as expected, the industry mix between urban and rural areas is vastly different.

Table 3.3 Employment by Industry, 2001, per cent

Location	Agriculture	Mining	Manufacturing	Services	Total
Capital Cities	0.9	0.3	13.0	85.8	100.0
Other	1.1	1.0	11.3	86.6	100.0
Coastal	9.5	1.1	11.0	78.4	100.0
Inland	15.6	1.4	11.0	72.0	100.0
Remote	14.9	10.6	4.7	69.8	100.0
Australia	4.0	0.9	12.2	82.9	100.0

Source: ABS (2003d)
Note: Agriculture here includes agriculture, forestry and fishing.

Obviously, the services sector is the largest employer in all regions. In capital cities almost 86 per cent of employment is in this sector. This is very similar in other metropolitan areas, where the services sector provides 86.6 per cent of total employment. This demonstrates the importance of classifying other metropolitan areas separately from rural areas, as these areas are increasingly becoming more urbanised. Employment in services in coastal regions is over 78 per cent, although, as can be seen, agriculture is still an important employer, comprising 9.5 per cent of total employment. Agriculture assumes a much greater importance in inland and remote regions. In 2001, agriculture was responsible for 15.6 per cent of total inland

employment and 14.9 per cent of remote employment. As is demonstrated later in Chapter 4, agriculture assumes a much greater importance in rural regions, as it generates a substantial amount of indirect employment in other sectors. Table 3.3 also illustrates the importance of the mining sector to employment in remote regions, responsible for 10.6 per cent of total employment. Overall, the relative importance of the agricultural sector to employment in rural Australia, and also the mining sector in remote areas, clearly distinguishes rural Australia from metropolitan areas.

Section 2.2 has shown that rural Australia continues to be characterised by very different population and employment characteristics than metropolitan areas. Other areas of difference are likely to include educational attainment, age profile, unemployment rates and labour force participation rates. To avoid unnecessary repetition, the 2001 statistics will not be presented in this section. These are analysed in the following sections which examine changes over time in key population and labour market indicators and characteristics.

3.3 Changes in Rural Population and the Labour Market

Population and employment changes in rural Australia are examined here using census data for the years 1991, 1996 and 2001. At times earlier data will be used when available to determine whether more recent changes are a continuing trend or represent a new trend. It is also important to examine population movements in non-rural regions to discern relative regional population changes.

3.3.1 Population Change

Table 3.4 shows the percentage change in population over the five year period between each census period, by region, using the ABARE regional classification system. The first point that is evident is that the population growth rate in capital cities has remained fairly constant over the period, with a growth rate over the five year period of 5.9 per cent between 1991 and 1996 and a growth rate of 5.8 per cent between 1996 and 2001. The growth rate in the latter five year period is a little lower than the national growth rate. Of more interest is the significant increase in the population growth rate in other metropolitan areas, with rates consistently higher than the national average between 1991 and 1996, at 8.8 per cent, and accelerating to 11.3 per cent between 1996 and 2001. This is a continuation of the trend apparent since the mid 1980s (Garnaut, Connell, Lindsay and Rodriguez 2001).

Table 3.4 Regional Population Growth, 1991–1996; 1996–2001; 2000-2005, per cent

Locality	1991–1996	1996–2001	2000–2005
Capital Cities	5.9	5.8	6.2
Other Metropolitan	8.8	11.3	8.5
Coastal	4.5	9.3	7.2
Inland	1.4	1.2	3.4
Remote	0.5	3.2	0.6
Australia	5.2	6.0	4.0

Source: ABS (1993, 1998, 2003d; 2006b).

The last column in Table 3.4 shows the estimated population growth rates for the five year period between 2000 and 2005. This series was derived from the ABS *Labour Force* survey data and therefore, due to methodological differences, is not strictly

comparable with the Census based series of earlier time periods (ABS 2006a). However, it clearly identifies the continuation of the high population growth rates in other metropolitan areas. Similarly dramatic has been the more recent growth rate of coastal regions. In the 1991 to 1996 period, coastal areas recorded growth rates of 4.5 per cent, below the national average, while in the 1996 to 2001 period, the population growth rate more than doubled to 9.3 per cent. This above average growth continued between 2000 and 2005, at an estimated 7.2 per cent, and lends support to the notion of a 'Sea Change'. (See Chapter 5 for details of net migration to more accurately determine this).

Table 3.4 reveals that rural regions have experienced very low population growth rates since 1991. Inland areas experienced growth rates of only 1.4 per cent between 1991 and 1996, which is about one quarter of the national average, and the growth rate fell to 1.2 per cent between 1996 and 2001, which is around one fifth of the national average. While inland population growth rates were falling, the national average increased over the same period. It is also important to note that the inland population growth rates between 1991 and 2001 are around two-thirds lower than the rates experienced in inland regions in the 1980s (Garnaut, Connell, Lindsay and Rodriguez 2001). Therefore the experience for rural Australia in the 1990s is significantly different than in the previous decade. Between 2000 and 2005, growth in these regions continued to remain below the national average. These low growth rates of the 1990s clearly reveal significant structural changes in population in rural areas. Population growth in remote regions has also been far below the national average, ranging from almost no growth, at 0.5 per cent between 1991 and 1996, to

3.2 per cent between 1996 and 2001, and returning to almost no growth between 2000 and 2005, at 0.6 per cent.

To substantiate these very significant results of what is happening to rural populations, further evidence is provided by the use of Census data, classified by regions according to the ABS Remoteness Index. As analysed in Chapter 2, the regional boundaries of this classification system do not enable the clear distinction of rural Australia. However, after analysing this classification, the outer regional, remote and very remote categories would certainly contain a large proportion of rural Australia. Table 3.5 shows that these three categories experienced the lowest growth rates in population of all regions between 1991 and 2001.

Table 3.5 Regional Population Change, 1991-2001, per cent

Remoteness Area	1991-2001
Major Cities	12.9
Inner Regional	14.3
Outer Regional	4.9
Remote	-0.2
Very Remote	4.5
Australia	11.9

Source: ABS (2003c)
Note: The migratory category has not been included.

In fact, Table 3.5 shows that for the remote regions, population growth was -0.2 per cent during this period. Growth rates in outer regional and very remote localities were less than 5 per cent during the 10 year period, which is less than half that experienced by major cities.

Clearly, Tables 3.4 and 3.5 demonstrate that there exists a major difference in population growth rates between urban and rural areas in Australia, and that rural populations, although generally slowly growing overall in absolute numbers, are becoming smaller relative to urban populations.

3.3.2 Employment Change

When analysing changes in employment over time, it is interesting to find that changes in employment do not mirror the population changes. Table 3.6 shows regional employment growth between 1991 and 1996 and between 1996 and 2001.[3] Capital cities have been responsible for a larger share of the growth in employment relative to their population growth rates. This is not unexpected, as the service sector accounts for a relatively larger share of output in capital cities, and it is the service sector in which the increase in jobs has been greatest during this time (Lewis, Garnett, Hawtrey and Treadgold 2006).

[3] Employment growth by region was not available from ABS surveys, therefore data for 2000–2005 have not been presented in this table. Small area labour market statistics are available (Department of Employment and Workplace Relations (2006), but as discussed in Chapter 2, the method of generation of these data is not seen as sufficiently reliable to use for comparative purposes here.

Table 3.6 Regional Employment Growth, 1991–1996 and 1996–2001, per cent

Location	1991–1996	1996–2001
Capital Cities	8.0	9.4
Other Metropolitan	14.0	11.2
Coastal	10.1	7.2
Inland	2.0	5.9
Remote	4.4	2.3
Australia	7.7	8.7

Source: ABS (1993, 1998, 2003d).

From Table 3.6 it is clear that the other metropolitan regions have experienced the highest rate of employment growth over the ten year period, with growth rates far above that in capital cities. What is more unexpected is that although still relatively high at 11.2 per cent, the rate of employment growth in other metropolitan areas between 1996 and 2001 fell relative to earlier years, while the population growth rate continued to rise during this period.

This experience is similar in the coastal areas. The employment growth rate fell from 10.1 per cent between 1991 and 1996, to 7.2 per cent between 1996 and 2001, which was below the national average. This significant fall in jobs growth occurred at the same time as coastal areas experienced their most dramatic increases in population growth rates (see Table 3.4). This strongly suggests that the move to coastal regions has not been driven by job expectations, but rather by other factors such as amenity and social factors.

When examining employment growth rates in rural areas, a very interesting picture emerges. Employment growth in inland areas almost tripled between the Census periods, from a low 2 per cent between 1991 and 1996, to 5.9 cent between 1996 and 2001. Here again, population growth and employment growth are moving in opposite directions. Table 3.4 shows that population growth in inland areas fell during this period. It should be noted that the change in employment growth rates between the two Census periods comes from a very low base – the 2 per cent growth between 1991 and 1996 reflects a combination of the after-effects of the 1989/90 recession and a drought in 1992. However, throughout the time period, employment growth in inland areas remained consistently below national averages. For remote areas, the picture is different yet again. Here employment and population growth rates are moving in opposite directions, but it is population growth that has risen while employment growth has fallen. However, again, some caution should be exercised when interpreting this change, as the apparent increase in population growth rates here is due to an almost standstill of the population during the 1991 to 1996 period, when growth was a meagre 0.5 per cent and, as shown in Table 3.4, population growth had again stalled between the 2000 and 2005 period. Employment growth in remote areas during the period 1996 to 2001 was only around one-fifth of national levels, at a low 2.3 per cent.

It is important to note that a significant proportion of employment in some remote areas is due to the Community Development Employment Projects (CDEP) scheme for Indigenous people, with around half of all employment in some areas generated by this scheme (Hunter 2002). Under this scheme, Indigenous communities receive a benefit similar to the unemployment benefit, and are required to work on a part-time

basis in some form of community work. Some analysts regard the employment status of participants in the scheme as ambiguous (see Hunter 2002), which means that the ABS Census data, which measure those in the scheme as employed, will overstate employment in those localities with a significant proportion of Indigenous people.

3.3.3 Unemployment Rates

Table 3.7 shows regional unemployment rates for the Census years 1991, 1996 and 2001. Here it is very interesting to observe that rural unemployment is generally not higher than rates in metropolitan areas. For example, in 1991, the unemployment rate in capital cities was 11.2 per cent, while in inland and remote areas it was 11.0 per cent and 9.5 per cent respectively. By 2001, the unemployment rate in capital cities had fallen to 5.9 per cent, the same rate as inland areas, while in remote areas the rate was 4.9 per cent. The highest rates by far were consistently experienced in coastal areas followed by other metropolitan areas.

Table 3.7 Regional Unemployment Rates, 1991-2001, per cent

Locality	1991	1996	2001
Capital Cities	11.2	8.5	5.9
Other Metropolitan	13.3	11.8	8.0
Coastal	14.1	12.2	8.2
Inland	11.0	9.0	5.9
Remote	9.5	6.7	4.9
Australia	11.6	9.2	6.3

Source: ABS (1993, 1998, 2003d).

It is hard to disentangle aggregate unemployment rates to determine whether the high unemployment rates in coastal areas are due to demand or supply factors. While it may be tempting to assume that job opportunities are less on the coast, it may also be that the unemployed, particularly the young, move to areas where there are complements to leisure, such as those found in coastal areas.

The same difficulty in disentangling supply and demand effects applies to rural unemployment rates. Table 3.7 shows that rural unemployment rates have generally been similar, and at times lower, than urban unemployment rates. This does not, however, demonstrate that rural job markets are stronger than urban job markets. As shown in Table 3.6, employment growth rates have been substantially lower in rural areas than urban areas. The lower unemployment rates in rural localities could be due to the unemployed leaving the areas in anticipation of better job opportunities elsewhere. Alternatively, the unemployed could be moving to coastal areas, where they may perceive that they can enjoy better environmental and service amenities while they are unemployed. There could also be differences in the rates of hidden unemployment, although this would be difficult to measure. It is also likely that, as discussed above, the CDEP Scheme may be reducing the appearance of unemployment in remote areas.

3.3.4 Participation Rates

Labour force participation rates differ quite significantly between rural Australia and other areas. Table 3.8 shows participation rates by region using census data from 1991, 1996 and 2001. It can be seen that urban participation rates are higher than all other regions. For example, in 2001, the participation rate in capital cities was 71.9

per cent, while in coastal areas it was 66.4 per cent. The participation rate in inland areas is the second highest of all regions, at 71.5 per cent in 2001.

Table 3.8 Regional Labour Force Participation Rates, 1991-2001, per cent

Locality	1991	1996	2001
Capital Cities	72.9	72.3	71.9
Other Metropolitan	69.7	70.2	68.8
Coastal	68.8	68.0	66.4
Inland	72.0	71.3	71.5
Remote	72.4	70.8	69.6
Australia	72.1	71.5	70.9

Source: ABS (1993, 1998, 2003d).
Note: The participation rate here measures the proportion of the population aged 15 years and over to 65 years.

What is also apparent from Table 3.8 is that participation rates in all regions have generally been declining over time. The most significant falls have occurred in coastal regions, where between 1991 and 2001, the rate fell by 2.4 per cent and in remote areas, where the rate fell by 2.5 per cent. This compares to falls of 1 per cent in capital cities, 0.9 per cent in other metropolitan areas and 0.5 per cent in inland areas. The falls in coastal areas may well be due to a higher proportion of retirees living there (Productivity Commission 2005a). This will be examined further later in this chapter, in association with the data in Table 3.12. It should also be noted that it is likely that the participation rate in remote areas could be lower without the influence of the CDEP scheme.

3.3.5 Population and Labour Market Changes, 1981-2001

To enable an examination of population, employment and labour participation over a longer time frame, the ABS Section of State classification is used. Table 3.9 shows annual percentage changes in population, labour force, and employment over time, from 1981-2001, using Census data. Although, as discussed in Chapter 2, the Section of State classification has many weaknesses, the data available can enable some analysis about whether the changes since 1991 represent a new trend, or a continuation of trends in the previous decade.

From Table 3.9, it is evident that annual population growth rates in major urban areas have varied a little since 1981, showing an increase in the second half of the 1990s. Over the same period, towns and cities in the other urban classification were growing until 1996, after which the rates declined. As this category contains a substantial proportion of Australia's rural localities, it is likely that the decline in rural population growth rates in the latter half of the 1990s (demonstrated earlier in this chapter) were responsible for the lower growth rates in this category.

Table 3.9 Annual Increase in Population, Labour Force and Employment, by Community Size, 1981-2001

	1981-1986			1986-1991			1991-1996			1996-2001		
	Male	Female	Persons	Male	Female	Persons	Male	Female	Persons	Male	Female	Persons
	Annual percentage increase over base year											
Major Urban												
Population	1.3	1.3	1.3	1.5	1.6	1.5	1.0	1.1	1.1	2.0	1.8	2.0
Labour Force	0.8	2.4	1.4	1.4	3.7	2.4	0.4	1.6	0.9	1.7	2.3	2.1
Employment	0.1	2.6	0.8	0.5	3.3	1.7	1.0	2.2	1.5	2.1	2.7	2.5
Other Urban												
Population	1.2	1.3	1.3	1.4	1.7	1.6	1.8	1.9	1.9	0.0	0.2	0.1
Labour Force	0.6	2.8	1.4	1.2	4.2	2.3	1.1	2.6	1.7	-0.4	1.0	0.2
Employment	-0.3	1.3	0.4	0.5	4.2	1.9	1.6	3.1	2.2	0.0	1.4	0.6
Bounded (Rural) Locality												
Population	1.7	2.2	1.9	3.0	3.1	3.0	-1.7	-1.6	-1.7	1.6	1.6	1.6
Labour Force	0.9	2.6	1.5	3.0	6.1	4.1	-2.8	-1.2	-2.2	1.1	2.7	1.7
Employment	-0.4	1.5	0.3	2.6	6.4	3.9	-2.3	-0.7	-1.7	1.7	3.2	2.3
Rural Balance												
Population	1.8	2.1	1.9	1.8	1.9	1.8	0.2	0.2	0.2	-1.0	-0.9	-1.0
Labour Force	1.5	2.5	1.7	1.7	3.8	2.5	-0.5	0.9	0	-1.2	-0.1	-0.8
Employment	0.3	1.7	0.8	1.3	3.9	2.3	0	1.4	0.5	-0.8	0.3	-0.4
Australia												
Population	1.4	1.4	1.4	1.5	1.7	1.6	1.0	1.1	1.1	1.2	1.1	1.2
Labour Force	0.8	2.5	1.5	1.4	3.9	2.4	0.4	1.7	0.9	0.9	1.8	1.3
Employment	0.4	1.8	0.7	0.7	3.6	1.8	0.9	2.2	1.5	1.3	2.2	1.7

Source: Garnett and Lewis (2000); ABS (1993, 1998, 2003d)

Population growth rates in bounded (rural) localities and rural balance from 1981 to 1991 were significantly higher than in major urban areas. For example, over the period 1986 to 1991, the annual growth rate for major urban areas was 1.5 per cent, while bounded (rural) localities recorded a population growth rate double that, at 3 per cent. In contrast, over the period 1991 to 1996, bounded (rural) localities recorded an annual growth rate of -1.7 per cent, with rural balance recording almost no percentage change, far below the national growth rate of 1.1 per cent. Therefore, it is clear that in the 1990s, there was a significant change in the population trends from the earlier decade. While during the 1980s, rural localities experienced population growth rates above those in urban areas, this changed to dramatic falls in the growth rates of rural populations relative to urban areas between 1991 and 2001.

The above population changes are mirrored by movements in the labour force. Major urban and other urban areas experienced increases in their labour force in the 1990s, while at the same time a drop was occurring in the growth rates of the labour force in rural localities, with a zero growth rate occurring in rural balance areas. As seen in Table 3.9, this is a complete reversal of the labour force growth trends of the 1980s, where the highest growth rates were recorded in rural locality and rural balance areas. The employment data over time also replicate these changes. The 'rural turnaround' of the late 1970s and 1980s (Evans 1985; Hugo and Smailes 1985; Lewis 1990), where growth in employment in rural areas exceeded that of urban areas, is clearly over and has been reversed.

Another important factor with respect to the labour force is the participation of women. Nationwide and in all regions, the growth rate in the female labour force far

exceeded that of males until 1996. This has been due to changes in job opportunities, growth of the services sector, social acceptability of women in the workforce, sex discrimination legislation, child-care access, equal pay and increased workplace flexibility (Lewis, Garnett, Hawtrey and Treadgold 2006). In the first half of the 1990s, growth in the female labour force participation was strongest in other urban localities, followed by the major urban areas. A similar trend is apparent in female employment rates. This differs to the 1986 to 1991 period, where the highest growth in female labour force participation was in rural localities. Therefore what these data generally show is the Australia-wide overall increase in the rate of growth of female labour force participation in the 1980s and 1990s.

3.4 Changes in Employment by Industry

Table 3.10 shows the distribution of employment by industry by region in 1991, 1996 and 2001. Clearly, the service sector dominates employment in all regions, but becomes less dominant the less urbanised the region.

As shown earlier, employment in agriculture assumes a far greater importance in rural regions, directly employing around 15 per cent of the workforce in 2001 in inland and remote areas. As will be shown in Chapter 4, there are also substantial linkage and flow-on effects between agriculture and other sectors in rural Australia. Therefore when direct and indirect effects are taken into account, the agricultural sector becomes even more important in generating employment in rural areas.

Table 3.10 Employment by Industry, 1991, 1996 and 2001, per cent

Locality	Agriculture	Mining	Manufacturing	Services
1991				
Capital Cities	0.8	0.4	13.9	84.8
Other Metropolitan	1.3	2.0	13.4	83.3
Coastal	10.8	1.3	11.8	76.0
Inland	17.1	1.9	9.3	71.8
Remote	16.2	13.0	4.0	66.8
Australia	4.5	1.2	12.8	81.5
1996				
Capital Cities	0.9	0.4	13.6	85.1
Other Metropolitan	1.2	1.5	12.2	85.0
Coastal	10.2	1.2	11.7	76.9
Inland	16.3	1.8	10.9	71.0
Remote	14.5	12.6	4.1	68.8
Australia	4.2	1.1	12.6	82.0
2001				
Capital Cities	0.9	0.3	13.0	85.8
Other Metropolitan	1.1	1.0	11.3	86.6
Coastal	9.5	1.1	11.0	78.4
Inland	15.6	1.4	11.0	72.0
Remote	14.9	10.6	4.7	69.8
Australia	4.0	0.9	12.2	82.9

Source: ABS (1993; 1998; 2003d).
Note: Agriculture here includes agriculture, forestry and fishing.

As discussed in Chapter 2, some coastal areas possess rural characteristics, including a relatively large agricultural sector. This is borne out by the proportion of total employment in coastal areas accounted for by the agricultural sector, which in 2001 stood at 9.5 per cent, substantially above the rate in other metropolitan areas and

capital cities. Table 3.10 also shows the relative importance of the mining sector to employment in remote localities, directly employing 10.6 per cent of the labour force in 2001.

When examining the changes in employment by industry over time, the relative proportion of people employed in the agricultural sector has fallen since 1991, more so in rural regions. For example, in 1991, the proportion of people employed in agriculture in inland localities was 17.1 per cent. By 2001, this had fallen to 15.6 per cent. Similar falls occurred in remote areas, falling from 16.2 per cent in 1991 to 14.9 per cent in 2001. Relative employment in the mining sector in rural areas also fell during this 10 year period. In contrast, the proportion of people employed in the manufacturing and services sector has increased over time in rural areas. However, it is important to note that during this period absolute employment in the agricultural sector rose, therefore the change in relative employment must be due to more rapid employment growth in other sectors (ABS 2006a). As discussed earlier, the growth rate of employment in the services sector has been the highest of all sectors over this period. For example, the demand for telecommunications services boomed during this period, fuelled by technological advancement in the supply of these services (Productivity Commission 2005b).

Therefore, the trend since 1991 has been a relative decline in employment in the primary industries in rural localities (although there are no data available to date on the impact of the recent mining boom). However, given that the agricultural sector is still one of the largest employers in rural areas, and has been cited by the media and politicians as being in part responsible for a perceived rural decline, a more detailed

analysis is required. Further, the service sector in rural regions is not the same as in urban areas. In urban areas the service sector supplies relatively more consumers, whereas in rural areas there are greater linkages between the service sector and agriculture. This analysis will be carried out in depth in the next chapter. Suffice to reiterate here, that while the proportion of employment in agriculture has been falling, the absolute number of people employed in the sector in rural areas rose between 1991 and 2001 (ABS 2006a). Therefore it is likely that the true story is much more complicated.

3.5 Changes in the Age Profile

It is important to determine whether rural Australia is characterised by a difference in age distribution than other regions, and whether any difference has changed over time. If so, this has potential implications for labour force participation rates, education and health service requirements, and other economic and social infrastructure needs. Examining any changes in age distribution over time can also shed light on the possible contributing causal factors of population changes over time and indicate potential future changes in population growth. For instance, it may be thought that the population increases experienced in coastal regions are due to retirement decisions of older Australians, who are moving from other regions to coastal areas. However, without data, this is anecdotal and may not be true. The media has also popularised the notion that younger people are leaving rural areas. An analysis of regional data is therefore essential to enable the examinations of such claims.

3.5.1 Distribution of Population by Age

Table 3.11 shows the population age distribution by regional classification in the years 1991, 1996 and 2001. For instance, it shows that in 1991, 60.6 per cent of all 0-14 year olds in Australia lived in capital cities.

It was earlier shown (see Table 3.1) that in 2001, capital cities contained 63.5 per cent of the total population. Table 3.11 shows that capital cities contain a relatively higher proportion of the working age population. The proportion of 15-24 year olds is 66.7 per cent, while the proportion of 25-54 year olds is 65.3 per cent. All other regions contain a smaller proportion of the working age population relative to their share of the total population, with the exception of 25-54 year olds in remote areas, where the proportions are approximately the same. It is particularly apparent that coastal and inland areas contain relatively higher proportions of both children (0-14 year olds) and older people (over 54 years of age). Other metropolitan localities also contain a greater proportion of older people relative to their share of the total population.

Therefore the age distribution is clearly different between urban and rural areas. The relatively smaller proportion of working age population and higher proportion of children and older people has important implications for inland and coastal areas. The effects of this occur in terms of a reduction in labour supply, and increased requirements for social infrastructure such as schooling and health infrastructure. This will be examined in Chapter 6.

Table 3.11 Population Age Distribution by Regional Classification, 1991, 1996, 2001, per cent

Location	0–14	15–24	25–54	Over 54
1991				
Capital Cities	60.6	66.5	64.4	61.0
Other Metropolitan	8.1	8.2	8.2	9.7
Coastal	12.3	9.6	10.9	13.0
Inland	15.5	12.8	13.4	14.0
Remote	3.5	2.9	3.1	2.2
Australia	100	100	100	100
1996				
Capital Cities	60.7	66.3	64.5	60.6
Other Metropolitan	8.4	8.9	8.7	9.8
Coastal	12.7	9.9	11.1	13.5
Inland	14.9	12.1	12.7	13.8
Remote	3.3	2.8	3.0	2.2
Australia	100	100	100	100
2001				
Capital Cities	61.6	66.7	65.3	59.9
Other Metropolitan	9.0	9.0	8.9	10.5
Coastal	12.3	9.9	10.8	13.8
Inland	14.0	11.8	12.0	13.5
Remote	3.1	2.6	2.9	2.3
Australia	100	100	100	100

Source: ABS (1993, 1998, 2003d).

From Table 3.11, it is apparent that overall there have not been major changes in the age distribution by region, implying that any changes in population have been across the whole range of age groups rather than large changes in specific groups such as

young families or retirees. For example, the proportion of the total population aged over 54 years living in coastal regions rose only slightly between 1991 and 2001, from 13 per cent to 13.8 per cent. This indicates that the supposed mass movement of retirees to coastal areas reported by the media is not the whole story. There is a small downward trend in capital cities between 1991 and 2001 in the proportion of persons over 54 years of age and a rise of the proportion of children. For rural areas, the population changes have generally been across all age ranges.

3.5.2 Regional Population by Age Group

While there have not been major changes in the age distribution across regions, there may have been changes over time in the age distribution by age group within regions. Table 3.12 shows the proportion of each region's population comprised of each age group for 1991, 1996 and 2001. For example, looking at capital cities in 1991, 21.5 per cent of people living in capital cities were aged between 0 and 14, and 18.9 per cent were aged over 54 years. Table 3.12 reveals the ageing of the population in all regions. The ageing of the Australian population has been well documented by reports such as the Australian Department of Treasury's *Intergenerational Report* (2002) which analysed the fiscal implications of Australia's ageing population, and the Productivity Commission's *Economic Implications of an Ageing Australia* (2005a), which examined labour supply and productivity implications of an ageing population.

Table 3.12 Age Distribution by Age Group for each Regional Classification, 1991, 1996, 2001, per cent

Location	0–14	15–24	25–54	Over 54	Total
1991					
Capital Cities	21.5	16.6	43.0	18.9	**100**
Other Metropolitan	21.4	15.3	40.9	22.4	**100**
Coastal	24.1	13.2	40.2	22.4	**100**
Inland	25.1	14.5	40.6	19.8	**100**
Remote	26.1	15.4	44.2	14.3	**100**
1996					
Capital Cities	20.8	15.3	44.5	19.5	**100**
Other Metropolitan	20.5	14.5	42.5	22.5	**100**
Coastal	23.3	12.2	41.1	23.3	**100**
Inland	24.2	13.2	41.5	21.1	**100**
Remote	24.7	14.1	45.8	15.4	**100**
2001					
Capital Cities	20.2	14.4	44.7	20.8	**100**
Other Metropolitan	20.2	13.3	41.7	24.8	**100**
Coastal	22.0	11.6	40.4	26.0	**100**
Inland	22.9	12.7	41.1	23.3	**100**
Remote	23.4	12.7	45.6	18.3	**100**

Source: ABS (1993, 1998, 2003d).

Table 3.12 shows that the proportion of people living in capital cities aged over 54 years increased from 18.9 per cent in 1991 to 20.8 per cent in 2001, an increase of 1.9 per cent. The increase in other metropolitan areas was higher, at 2.4 per cent. For coastal areas over the same time period, the increase was 3.6 per cent, for inland 3.5 per cent, and for remote areas the increase in the proportion of people aged over 54

years was 4 per cent. This result has serious implications for rural localities, as clearly the proportion of older people in those populations is rising at a much faster rate than in urban areas. The ageing population is also evidenced by the general growth in the proportion of the working age population between 25 and 54 years of age, but a fall in the 15-24 year olds across all regions.

The fall in the proportion of children is also very important for labour markets of the future. In capital cities, the proportion of 0-14 year olds fell from 21.5 per cent in 1991 to 20.2 per cent in 2001, a fall of 1.3 per cent. The falls in the proportion of children is greatest in rural areas, with falls of 2.2 per cent in inland areas and 2.7 per cent in remote areas.

Therefore, while all regions are faced with the problems of an ageing population, rural communities and labour markets are faced with this to an even greater extent, with faster declines in the proportion of children and a faster growth in the proportion of older people. The effects of this will include a relatively slower growth in labour supply, lower participation rates and a fall in the average weekly working hours per worker. Even with current government policy designed to increase the labour force participation by older workers, such as the treatment of superannuation benefits, older workers have a greater tendency to work part-time relative to other age groups (Productivity Commission 2005a). The Productivity Commission has estimated that the rate at which older people are re-entering the workforce will not be sufficient to offset the falls in participation rates (2005a). Therefore, if recent trends continue, rural labour markets are likely to be relatively more affected by the ageing population than their urban counterparts.

3.6 Educational Attainment

Earlier research has shown a significant disparity in post-compulsory educational qualifications between urban areas and other regions in Australia (Boylan and Alston 1993; Garnett and Lewis 2000; Powell 1985). For example, using the ABS Section of State classification, Powell (1985) found that in 1981, 6.8 per cent of males and 3.5 per cent of females living in major urban areas had a tertiary qualification compared to 3.3 per cent of males and 2.3 per cent of females living in rural areas. By 1996 the disparity still remained large, with 19.2 per cent of males and 18.9 per cent of females in major urban areas possessing a tertiary qualification, while in rural areas only 10.9 per cent of males and 15.8 per cent of females held a tertiary qualification (Garnett and Lewis 2000). Further, rural areas have experienced a 'brain drain', with children leaving to go to more urbanised areas to gain compulsory and post-compulsory education and not returning to rural areas (Rural and Regional Services and Development Committee 2006). This is likely to be due to a number of factors, including a lack of suitable employment in some occupations to enable people to utilise their post-school qualifications, together with lifestyle and amenity choices.

3.6.1 Education Levels by Region

Table 3.13 shows education levels by ABS Remoteness region for 2001 and the percentage change in education levels between 1991 and 2001. As discussed earlier, under the ABS Remoteness system of classification, rural areas are likely to include outer regional, remote and very remote regions. Education levels are classified according to the ABS Australian Standard Classifications of Occupations (1997). Table 13.3 shows the highest educational qualification attained using Census data. It should be noted that the Skilled Vocational category in Table 3.13 measures those

people who hold a TAFE Certificate at level III or level IV. The Compulsory Secondary education and/or Basic Vocational category includes those who have completed schooling at year 10 or above and/or have completed a Certificate I or II at TAFE.

Table 3.13 Regional Educational Attainment by Highest Educational Qualification, 2001, per cent

Remoteness Class	Bachelor degree or higher		Diploma or advanced diploma		Skilled vocational		Compulsory secondary education and/or basic vocational	
	2001	Change since 1991	2001	Change since 1991	2001	Change since 1991	2001	Change since 1991
Major Cities	19.9	95.3	8.6	40.3	16.3	39.7	55.3	-4.2
Inner Regional	12.2	98.1	7.4	18.7	20.7	58.4	59.7	-1.6
Outer Regional	10.6	84.8	6.6	4.4	20.1	49.4	62.7	-9.6
Remote	10.3	78.1	6.1	-6.6	19.6	33.9	63.9	-15.7
Very Remote	9.9	53.5	5.8	-14.9	17.6	20.6	66.8	-28.5
Australia	17.4	94.7	8.1	31.6	17.5	44.3	57.0	-4.7

Source: Bureau of Transport and Regional Economics (2004b)

In 2001, 19.9 per cent of people living in major cities held a bachelor degree or higher. This is almost double the proportion of people with bachelor degrees or higher living in rural areas, with outer regional localities recording 10.6 per cent, remote at 10.3 per cent and very remote at 9.9 per cent. The differences narrow, although still exist, when looking at the proportion of people holding a diploma or advanced diploma. In major cities, 8.6 per cent of people hold a diploma or advanced diploma, compared with 6.6 per cent in outer regional areas and 6.1 per cent in remote areas. It is clear from Table 3.13 that the more remote a region becomes, the smaller

the proportion of the population that possess educational qualifications at the diploma or bachelor level. When looking at basic education levels the differences between rural and urban areas are also significant. In major cities, compulsory schooling and/or basic vocational training was the highest educational attainment for 55.3 per cent of the population. This compares to 62.7 per cent in outer regional areas, and two-thirds of the population in very remote areas.

Industry mix is likely to be one explanation for the disparities in educational attainment between rural and urban localities. The educational composition of those employed in the agricultural sector is characterised by relatively lower formal educational qualifications (Bureau of Transport and Regional Economics 2004b). As was demonstrated earlier in this chapter, a significantly greater proportion of the total labour force in rural areas are employed in the agricultural sector. Other explanations for the lower levels of educational attainment in rural areas include distance from educational institutions, travel time, transport availability, living away from home expenses, seasonal labour commitments to family farms and possibly social and family background (Mageean 1993; Scott 1993).

The data also provide evidence the on-going problem facing rural areas of attracting and retaining skilled professionals in particular occupations. The shortage of rural medical practitioners in rural localities is widely known, with a major study by the Department of Health and Ageing (2000) identifying these shortages. Policies and additional funding to address the shortage of general practitioners in rural areas were announced in the 2004-05 Budget. These included the Workforce Support for Rural General Practitioners Program which provides funds to newly arrived and existing GP

workforce in rural areas and the Bonded Medical Places scheme which pays tertiary education fees of medical students if they contract to work in rural areas upon qualifying (Department of Treasury 2004). The HECS Reimbursement Scheme refunds 20 per cent of a graduate's HECS debt for every year of training undertaken or service provided in a designated rural or remote area (Department of Treasury 2004). Further, the policy of attracting temporary resident doctors (TRD) has been expanded over time, but this has not sufficiently met rural shortages (Department of Health and Ageing 2000).

The lack of people with higher level qualifications in rural and remote areas is also manifest in the shortage of school teachers (Sharplin 2002) and veterinarians (Field 2002). Most studies cite the lack of professional support, lack of career path, isolation, long working hours, lifestyle and amenity factors as reasons for the difficulty in attracting and retaining more highly qualified people in rural and remote regions (Harrison 1997; Kamien 1998; Sharplin 2002).

Table 3.13 also shows that while rural and remote areas are relatively disadvantaged in terms of their educational qualifications, there has been a very substantial increase in bachelor or higher qualifications in all regions between 1991 and 2001. For example, the proportion of bachelor or higher degree holders in major cities almost doubled during this period, with a growth rate of 95.3 per cent. Outer regional and remote areas also recorded very high growth rates, at 84.8 per cent and 78.1 per cent respectively. However, the relatively lower rural growth rates compared to inner regional areas and major cities indicates an increase in the disparity of tertiary educational attainment over this time period. When looking at growth rates of

compulsory and basic educational attainment, the relatively large negative growth rates for rural regions would be indicative not of a decline in educational levels, but of an improvement, as the highest educational qualification for some people is no longer only the completion of compulsory schooling, but is instead a skilled vocational qualification.

3.6.2 Indigenous Education Levels by Region

As discussed in Section 3.3, some remote rural labour markets are characterised by a very high proportion of Indigenous people. Indigenous communities are generally characterised by relatively lower levels of formal educational attainment. Table 3.14 shows the highest level of formal educational attainment of Indigenous people relative to the educational attainment of the total regional population.

Table 3.14 Indigenous and Total Regional Population by Highest Educational Qualification, 2001, per cent

	Bachelor Degree or Higher		Compulsory secondary education and/or basic vocational	
Remoteness Class	**Indigenous**	**Total**	**Indigenous**	**Total**
Major Cities	8.1	19.9	71.8	55.3
Inner Regional	5.0	12.2	75.2	59.7
Outer Regional	3.3	10.6	80.9	62.7
Remote	3.1	10.3	83.3	63.9
Very Remote	1.6	9.9	89.8	66.8

Source: Bureau of Transport and Regional Economics (2004b)

Of the Indigenous population living in major cities, 8.1 per cent hold a bachelor degree or higher. This is less than half the rate of that of the total population living in

major cities, which stands at 19.9 per cent. However, the disparity increases when looking at the proportion of the Indigenous population who hold a bachelor degree or higher relative to that of the total population in outer regional, remote and very remote localities. For example, in very remote communities, only 1.9 per cent of the Indigenous population has a bachelor or higher degree, while the proportion for very remote communities as a whole is around 10 per cent. This represents a major disparity, not just with the rest of the Australian population, but a disparity within regions.

At the lowest level of formal educational attainment, the completion of compulsory schooling or a basic vocational qualification is the highest educational attainment achieved by almost 90 per cent of Indigenous people in very remote communities, compared with 66.8 per cent for very remote communities as a whole. This much lower level of formal educational attainment has significant implications for employment opportunities, the likelihood of unemployment, the income levels of Indigenous populations, and generally for the skill levels of the labour supply in rural and remote areas.

3.7 Distinctiveness of Rural Labour Markets

This chapter has demonstrated that rural Australia continues to be distinguished by very different population and labour market characteristics than those features which characterise more urbanised areas. This implies that some economic and social policy needs to be specific to rural areas in order to address the differing set of issues, problems and challenges apparent in rural labour markets and economies.

The findings of this chapter show that rural Australia experienced significant population and labour market changes in the early 1990s. Population and employment growth rates were extremely low relative to other regions throughout Australia. This very low growth is a reversal of the strong growth in both the population and the labour market that occurred in the late 1970s and 1980s. Population and employment growth in capital cities remained fairly constant over the period. Other metropolitan areas experienced the highest population and employment growth, which was even in excess of the rapidly growing coastal areas, which experienced dramatic population growth in the period 1996 to 2001.

The composition of rural labour markets has also been changing, particularly in the areas of educational attainment, labour force participation rates, age distribution and unemployment rates. Post-compulsory educational qualifications increased significantly during the 1990s, but remain at levels that are substantially lower than urban areas, with some evidence that the disparity is widening between rural and urban educational attainment at the bachelor degree and higher degree levels. This is reflected in labour shortages in rural localities in professions such as teaching and medical practitioners.

Female labour force participation rates increased between 1991 and 2001, which was a continuation of the trend in the 1980s. This occurred in all regions throughout Australia. Interestingly, unemployment rates were not higher in rural Australia than in urban areas, although as discussed, this may be because the unemployed move to more urbanised areas due to the lack of job opportunities in rural areas or for amenity reasons.

There has been some change in the industry mix in rural Australia between 1991 and 2001, with a relative decline in the contribution to employment by the agricultural sector, more so in rural regions. However, it was noted earlier that the linkages between agriculture and other sectors, such as services and manufacturing, are stronger in rural areas than urban areas. The role of agriculture in the changes experienced in rural Australia will be examined in the following chapter.

Finally, it has emerged that the Australia-wide problem of an ageing population is more extreme in rural Australia, where the proportion of the population aged 55 years or older is increasing at a faster rate than in other parts of Australia.

Therefore, the general picture of rural Australia is one in which the population and employment growth rates were very low between 1991 and 2001. This is a significant change from the late 1970s and 1980s, and clearly indicates that structural change is occurring. Rural Australia continues to differ from other regions in terms of industry mix, education levels, change in the age distribution and the composition of the labour market. Chapters 4 and 5 investigate and model the possible causes for the changes demonstrated in this chapter. Chapter 6 will pursue the economic and policy implications of the rural labour market profile, changes and problems, both current and projected, as demonstrated in this chapter.

CHAPTER 4 THE AGRICULTURAL LABOUR MARKET

4.1 Introduction

This chapter focuses on the agricultural sector, which is responsible, either directly or indirectly, for a significant proportion of the employment in a large number of rural areas in Australia (Borland 1998). Agricultural labour markets were the subject of a number of studies throughout the 1970s and 1980s, however research in this area has diminished substantially since the 1990s, particularly in the field of economics. The agricultural sector remains important in its contribution to rural employment, both directly and indirectly, with strong forward and backward linkages to other sectors in rural economies. The importance of the linkages of agriculture with other industries is discussed in following sections. The purpose of this chapter is to address this paucity of economic analysis of agricultural labour markets since the 1990s, and to examine the role of agriculture in rural labour markets.

The structure of agriculture has undergone some significant changes over the past four decades. These changes include significant technological change, which has progressed at a pace greater than that for the economy as a whole; increases in productivity, again at a rate above that for the whole economy (Productivity Commission 2005c); the deregulation of domestic and international marketing arrangements; a significant fall in the number of agricultural establishments; and substantial changes in the composition of the labour market.

This chapter begins by examining the importance of agriculture to rural economies. It then introduces the characteristics of agricultural labour markets, examining the main

changes experienced over time. An analysis of previous studies and models of the demand for agricultural labour is then provided, followed by the model devised by this study. A model of demand for labour is constructed within a neoclassical framework, with the purpose of determining the factors that affect demand and to estimate the trends in agricultural labour markets since the 1980s. These estimates include the impacts of changes in output levels, wages relative to commodity prices, and productivity and scale effects resulting from structural change. This significantly contributes to the analysis of current issues of policy concern in Chapter 6, such as the impacts on rural Australia of declining farm numbers and the corresponding increase in farm size, the effects of microeconomic reform, and the reasons why rural regions have been experiencing substantially slower population and employment growth rates than metropolitan areas.

4.2 The Importance of Agriculture

The direct contribution of the agricultural sector to Gross Domestic Product (GDP) has been declining over time, stabilising at between 3.5 per cent and 5.0 per cent of GDP per year since the 1970s (ABARE 2005). This has occurred while the real value of agricultural output has more than doubled between 1965 and 2005. The direct contribution to total employment has been falling over time, from 8.2 per cent in 1970 to between 4.0 and 4.5 per cent over the decade since 1995 (2002/03 drought excepted) (ABARE 2005). The importance of agriculture to output and employment is far greater when consideration is given to the indirect effects of inter-sectoral linkages. Recent research has estimated that nationally, farm-dependent industries account for around 12 per cent of GDP (Econtech 2005). For example, the agricultural sector is strongly linked to the services sector via transport and marketing industries

and also with the manufacturing sector through the purchasing of inputs such as machinery, storage facilities and chemicals. Multipliers are needed to account for the linkages and flow-on effects between sectors and thereby estimate the total contribution of agriculture to the economy.

The agricultural sector assumes a far greater role when analysing its impact on rural economies. Estimates of flow-on effects indicate that many rural economies exist due to agriculture, with a small number dependent on the mining industry (see next section). Fly in/fly out arrangements with many in the mining labour force has reduced the direct and in-direct impact that mining has on rural employment. In many regions of Australia, rural communities originated to provide labour and services to the agricultural sector. Services such as transport and financial services, and the retailing of consumer and capital goods arose and continue in response to demand created in agricultural areas. Clearly, in many regions, the fortunes of the agricultural sector impact on the income and employment levels of other industries in rural communities. The Productivity Commission (2005c), using data from the Bureau of Transport and Regional Economics, found that direct employment in the agricultural sector accounted for more than 25 percent of total employment in 207 of Australia's 435 labour market regions, and accounted for over 50 per cent of total direct employment in 48 regions.

The estimated size of the flow-on effects from agriculture to the output and employment levels of the national economy and to specific regional and rural economies will be analysed in the following sections.

4.2.1 Regional Multipliers

Since the 1960s, international and national studies have attempted to estimate regional output, income and employment multipliers. These studies usually derived multipliers from econometric models, from survey-based input-output tables or a combination of the two techniques. Due to the lack of data, earlier regional econometric models were often extensions of national models, with many regional variables generated as endogenous variables of the national economy (for example, Bell 1967 and Brown 1972). By the mid 1970s models began to be designed which recognised the difference in the behaviour between regional and national economies, one of the first being the Philadelphia Regional Econometric Model (Glickman 1977). In Australia, regional models to generate multipliers started to appear for particular regions, for example, the Hunter Valley in New South Wales (Keating, Dunlop, Renfrew and McShane 1988; Keating 1989), although such models tended to be limited by the lack of a reasonable period of time series data.

Input-output tables have also been used to derive regional multipliers and have the advantage of being able to provide a high level of regional disaggregation. They have been derived using survey based and non-survey based techniques, and sometimes a combination of the two. Survey based techniques have only been carried out for specific regions due to the cost of gathering data. Non-survey based tables are more common, involving the adaptation of national tables to incorporate regional characteristics, such as the relative importance of agriculture.

A combination of econometrics and survey-based input-output tables has become more common in Australia since the late 1970s following the development of the

partial survey/partial computer generation technique know as the Generation of Regional Input-Output Tables (GRIT), (Jensen, Mandeville and Karunaratne 1979; Jensen and West 1986; Bayne and West 1989). This technique generates regional input-output tables using national input-output tables which are them adjusted using regional data to incorporate regional characteristics, such as industrial mix, production technology and degree of openness. Another econometrics based model that utilises regional data was developed by the Centre of Public Policy in the early 2000s, known as The Enormous Regional Model (TERM), (Wittwer, 2003). This is a computable general equilibrium model, which adopts a 'bottoms up' approach, in which national estimates are driven by regional results, (rather than the opposite 'tops down' approach where regional results are driven by national data). TERM follows on from many such models, including the later versions of the ORANI model (see, for example, Adams and Parmenter 1993), and the Monash Multiregional Forecasting Model (MMRF) (Adams, Horridge and Wittwer 2003). TERM uses a national input-output table and specific regional data for sectoral output and employment to produce input-output tables at the state, statistical division or more aggregated regional level. This model is hence more disaggregated than its predecessors. The original version was static, but this was extended to a multi-period version, incorporating equations including regional labour market adjustments, capital growth and rates of return and industry/investment capital ratios, (Wittwer, Vere, Jones and Griffith 2005).

Multipliers generated from input-output tables must be used in light of the assumptions made when compiling or generating the tables. Such assumptions usually include Leontief technologies such as constant returns to scale, constant technology over the period, fixed input ratios and fixed consumption ratios.

Therefore to use the multipliers at a time period after their derivation would require the assumption of no significant structural change in the relevant industry or economy. In addition, as multipliers reflect current relationships, if there was an increase in agricultural output, the predicted impacts may be inaccurate due to consequent economies of scale or substitution of imports for local production. However, while acknowledging the above limitations, regional multipliers have been widely used in economic impact analysis in Australia.

4.2.2 Multiplier Estimates

Using the above techniques, there have been a number of estimates of agricultural employment multipliers for Australia. Some of these studies have been carried out for particular regions while others estimate the employment effects that agriculture as a whole has on the national economy. The way in which multipliers are quantified and used varies; some multipliers estimate the number of jobs created in other industries as a result of one new job created in agriculture; other multipliers estimate the number of jobs created per dollar of output in agriculture.

Regional multipliers are smaller than national multipliers, since the linkage and flow-on effects are not contained within a particular region. However, as a proportion of total employment, the regional effects are significantly larger. For example, if for every one job in agriculture another two jobs were created in other sectors, this would represent a much greater proportion of regional employment than it would for national employment, given the relatively small proportion of people directly employed in agriculture at the national level and the comparatively large proportion employed at

the regional level, as identified by the Bureau of Transport and Regional Economics above (Productivity Commission, 2005c).

Tamblyn and Powell (1985) estimated that for every person directly employed in agriculture, on average, another 4.2 jobs are created in other sectors. This estimate was calculated with the use of the 1977/78 national input-output tables. The authors compared this estimate with multiplier estimates using data from 1925/26, calculating an employment multiplier of 2.5 for the earlier time period. They argue that multipliers have become larger over time, due to the increasing use of non-farm raw materials and capital equipment, off-farm processing and value-adding, agricultural support services, research services and sophisticated marketing services.

In a regional study based again on input-output tables, Powell (1988) estimated agricultural multipliers for the North Coast region of New South Wales. The agricultural employment multiplier for the region was estimated to be 2.1 jobs for every job in agriculture, with some variation between specific agricultural industries. Clearly, flow-on effects are not contained within specific regions, particularly with an increasing amount of marketing and processing occurring in regions other than where the produce is grown.

In 2001, regional multipliers were developed for the Kimberley region of Western Australia using a hybrid method to derive input-output tables known as Distributive Commodity Balance (DCB) (Johnson 2001). This method begins with the national input-output tables, develops them for Western Australia using output, employment and industry specific data, and then derives region specific tables using region

specific data. The Kimberley region is based on primary industries, largely mining, with mining comprising around 40 per cent of total output, agriculture around 6 per cent of total output and fisheries around 10 per cent. The employment multipliers are expressed as jobs per $1 million of output. For the sheep industry, the multiplier was 1.46, grains 1.48, beef 1.80, dairy 1.39, pigs 2.49 and poultry 2.09.

There have been numerous other studies that generate regional multipliers using hybrid input-output techniques (see, for example, Clements and Ye, 1995; Powell and Chalmers, 1997; EconSearch 2005). The conclusion that can be made from such studies is that in many regions of Australia, one sector, such as agriculture, is responsible for a significant proportion of both direct and indirect employment.

4.3 Agricultural Labour Markets Over Time

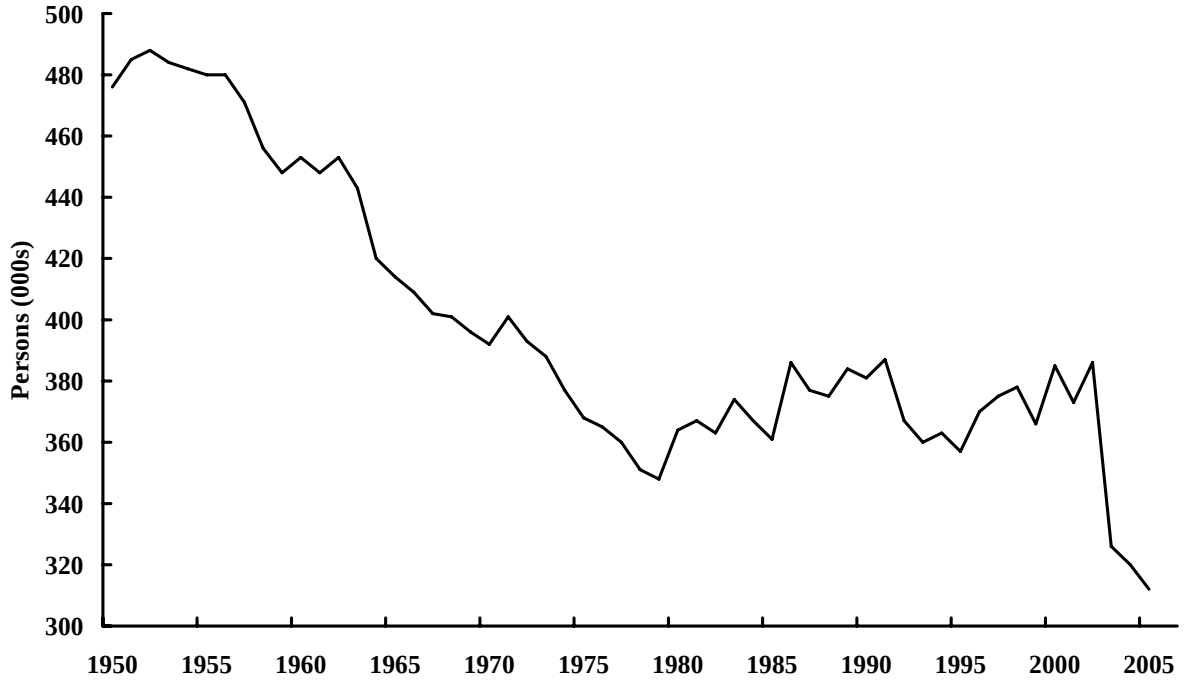
Historically, employment in agriculture has been dominated by owner-operators and family labour, but also with significant reliance on hired labour. Technological advances in machinery, equipment, fertilisers and pest control throughout the mid to later decades of the twentieth century reduced the need for both hired and family labour (Lewis 1990). However, more recent increases in both labour and capital productivity appear to have reversed this trend, as will be examined later in this chapter.

4.3.1 Total Employment

The ABS defines employment in rural Australia as "employment in agriculture and services to agriculture", omitting employment in agricultural establishments that produce less than $22 500 of output per year, (ABS 2006a). The ABS, in its *Labour*

Force series, (accessible from the DataCubes) provides quarterly data on agricultural employment, dividing it into four categories – wage and salary earners, self-employed, employers and contributing family workers. This breakdown of labour is particularly useful when examining the causes of changes in the labour market. Further, the Labour Force quarterly data reveal changes in employment at regular intervals, as opposed to the previously discussed Census data, (Chapter 2), which allow only a snap-shot view once every 5 years. Figure 4.1 shows total employment in agriculture in Australia from 1950 to 2005.

Figure 4.1 Total Employment in Agriculture, 1950-2005



Source: ABARE (2004; 2005); ABS (2006a). (Above figure excludes direct services to agriculture due to unavailability of data in earlier time periods).

From Figure 4.1, it can be seen that the decline in agricultural employment from around the mid 1950s until 1977 was almost uninterrupted. From 1977 to 1990, employment trended upwards, often referred to as the 'rural turnaround'. For example, referring back to Chapter 3, Table 3.9, employment growth rates between

1986 and 1991 were 3.9 per cent for localities classified as rural balance, 2.3 per cent in the rural localities classifications, compared to 1.7 per cent for major urban localities. The growth in population and employment in rural areas continued until the interest-rate-induced recession of 1989/90, after which the number of agricultural establishments and employment dropped. The drought in 1994/95 caused employment levels to fall again. After 1995, agricultural employment levels rose again, and returned to the levels of the late 1970s. On average, between 1995 and 2002 employment grew by approximately 1.2 per cent per year, until the severe effects of the 2002/03 drought period, which caused employment in agriculture to drop by 15 per cent. In comparison, previous droughts caused employment to fall by about one per cent. This general post-recession/post-drought upward trend in agricultural employment is not captured by the Census data.

The major methodological differences between the use of the Census data and the ABS Labour Force survey data were discussed in Chapter 2. Further, and importantly, the breakdown of employment between full-time and part-time shows that both categories recorded employment increases, although the rate of increase was greatest among part-time workers (see Table 4.1).

The employment growth post 1995 could be interpreted as a return to the previous employment levels of the 1980s. This could mean that the latest growth in employment (2002/03 drought excepted) reflects a permanent structural change in the labour market that emerged in the late 1970s, with the effects of the 1988/89 high interest rate regime and droughts causing temporary deviations from this. Or, alternatively, as this newest trend of rising employment has occurred two decades

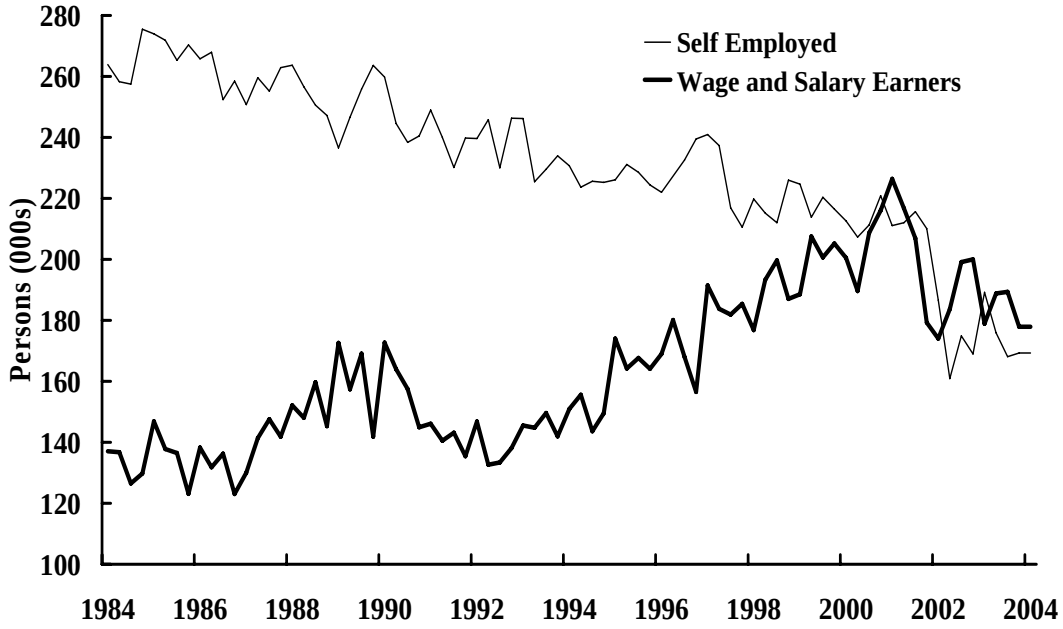
after the 1978 growth, it could be due to a different set of factors, given that there have been structural changes in agriculture since then.

Evans (1985), in his analysis of the growth in agricultural employment from 1978 to 1985, cited changes in relative input prices as a likely explanation. During that period, labour became cheaper relative to other inputs, in part due to a decision by the Arbitration Commission to defer agricultural award rises. The introduction of the Prices and Incomes Accord, which was operative from 1983 to 1996, also saw a decline in real wage levels over most of the period of the Accord (Lewis 1990). The more recent increase in agricultural employment is analysed below and later in this chapter.

4.3.2 The Structure and Composition of Employment

To analyse the changes in agricultural employment, it is useful to first look at the changes in the composition of agricultural employment. Agricultural employment is characterised by an unusually high degree of self-employment. In 2004, the number of self-employed comprised 47.6 per cent of agricultural employment. However, this is lower than for all previous years. As can be seen from Figure 4.2, the number of self-employed has been trending downwards over time, from almost 263 900 in 1985 (63.9 per cent of employment), to its 2004 level of 169 300. In contrast, as is clearly shown in Figure 4.2, wage and salary earners as a proportion of total employment generally rose over the period, except when it fell noticeably during the after-effects of the 1989/90 recession and during the 2002 drought. In 1984 wage and salary earners stood at 137 000 or 33.2 per cent of total employment, climbing to 178 00 or 50 per cent by 2004.

Figure 4.2 Composition of Employment, Australia, 1984-2004



Source: ABS (2006a)

Table 4.1 shows agricultural employment by gender from 1968 to 2004. It is clear that the more recent drop in self-employed has been borne by both men and women. However, while the number of male self-employed has been falling, from 217 400 in 1968 to 115 100 in 2004, female self-employed were increasing until around the 1990s, after which numbers started to fall dramatically, from 77 000 in 1988 to 55 900 in 2004.

Table 4.1 Composition of Agricultural Employment by Employment Status and Gender, Australia, 1968-2004

		1968	1978	1988	1998	2002	2004
Total full-time	Male	333.9	267.0	265.0	259.3	248.3	217.7
	Female	37.1	40.6	55.8	68.6	60.8	58.5
Total part-time	Male	13.7	14.6	21.2	31.8	37.3	33.0
	Female	26.0	40.7	63.1	61.7	65.7	57.5
Self-employed	Male	217.4	179.1	172.8	150.3	137.3	115.1
	Female	26.2	55.6	77.0	70.9	68.8	55.9
Wages & salary earners	Male	124.3	95.5	100.5	131.7	140.8	130.4
	Female	17.6	18.7	30.3	50.3	53.5	54.9

Source: Lewis (1990) and ABS (2006a)

In contrast, as also shown in Figure 4.2, wage and salary earners, although subject to significant fluctuations over time, have been trending upwards. The rate of increase has jumped since 1995, with the number of wage and salary earners rising by 31 per cent between 1995 and 1999. This far exceeds the 10.5 per cent growth rate in total agricultural employment over the same period. Equally significant, as Figure 4.2 illustrates, is that the number of wage and salary earners, in recent years, exceeds the number of self-employed for the first time. Clearly this represents an important compositional change in agricultural employment. Table 4.1 shows that this change is significant for both men and women.

The other category of agricultural labour which is of lesser size is the contributing family workers (formerly classified as 'unpaid family helpers'). Contributing family workers over time represent a relatively small component of total agricultural

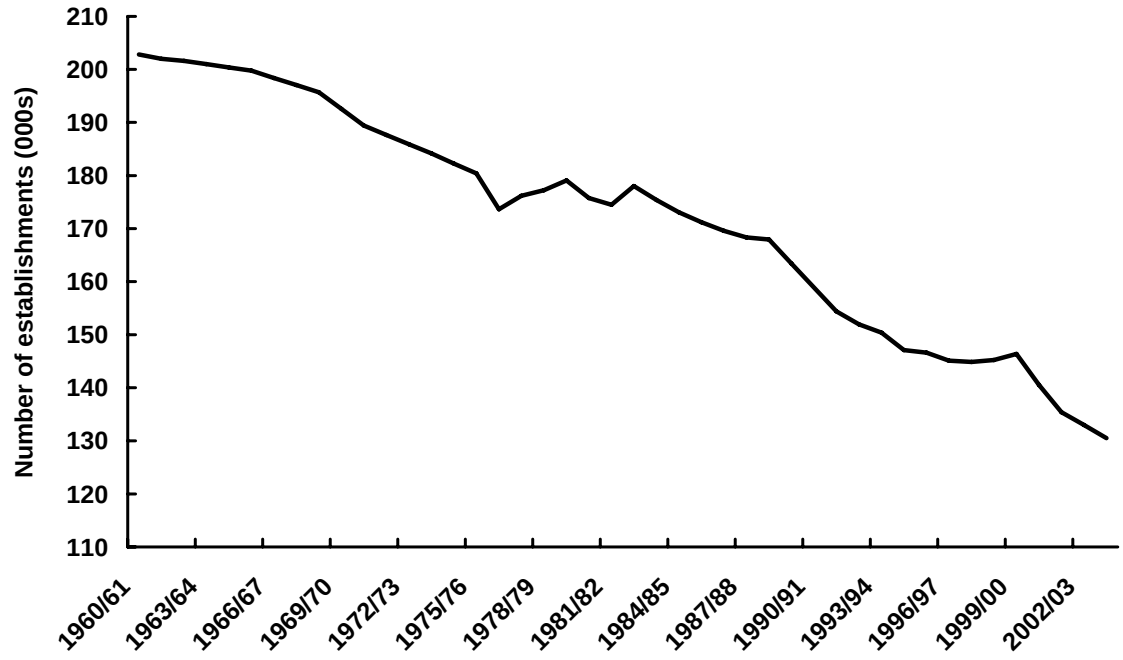
employment. However, despite their small size they play an important part in adjustment of labour supply to temporary fluctuations in demand, such as during harvesting. Contributing family workers were around 10 000 in 2004, or 2.8 per cent of agricultural employment. This proportion has fluctuated over time, with a general downward trend since the mid 1980s.

While most of this chapter is concerned with long term trends in agriculture, it is important to note here that there is considerable seasonality in employment – that is, considerable variation around the trend. This is evident from Figure 4.2. The issue of seasonality and the associated labour shortages of more recent years will be discussed in Chapter 6.

Figure 4.3 shows the number of agricultural establishments in Australia from 1960/61 to 2003/04, measuring establishments with an estimated value of agricultural operations (EVAO) of $5000 or more. The figure shows that the number of agricultural establishments in Australia has been declining significantly over time. One important reason for this is the declining terms of trade, which is a function of falling real prices for agricultural output and rising input costs, which has ultimately led to insufficient income or even losses (ABARE 1997). The majority of establishments that have been sold are the smaller sized establishments (ABARE 1997). What remains generally are larger establishments which are able to gain economies of scale. There was growth in industries such as horticulture and viticulture during the late 1980s and 1990s, which tempered the apparent rate of overall decline during that time period, but somewhat disguised the continuing decline in the number of broadacre industries (ABARE unpublished data).

The interest-rate induced recession of the late 1980s had a very large effect on the number of agricultural establishments. Figure 4.3 shows this rapid rate of decline in numbers throughout the early to mid 1990s, when between 1988/89 and 1995/96, the number of agricultural establishments fell by almost 13 per cent. The effects of the Australia-wide drought of the early 2000s can also be seen.

Figure 4.3 Agricultural Establishments, Australia, 1960/61 to 2003/04



Source: ABARE (2004; 2005)

The effects of declining numbers of agricultural establishments on agricultural employment have been mixed. The merging of small units into larger ones, particularly in broadacre agriculture, leading to economies of scale may have reduced the need for some forms of labour, as larger establishments usually use larger and more technologically advanced machinery, reducing the need for labour. The number

of owners and managers would also decline. However, as output volumes do not go down due to mergers, there is no decline in the quantity of labour required to harvest or process the output and it is possible that some former owners would become employees of the merged establishments. As demonstrated in Figures 4.1 and 4.2, since the 1980s, employment in agriculture has not been falling. Clearly, therefore, there have been numerous other factors changing during this period that have offset any possible falls in the demand for labour caused by declining numbers of agricultural establishments.

4.3.3 Off-Farm Income

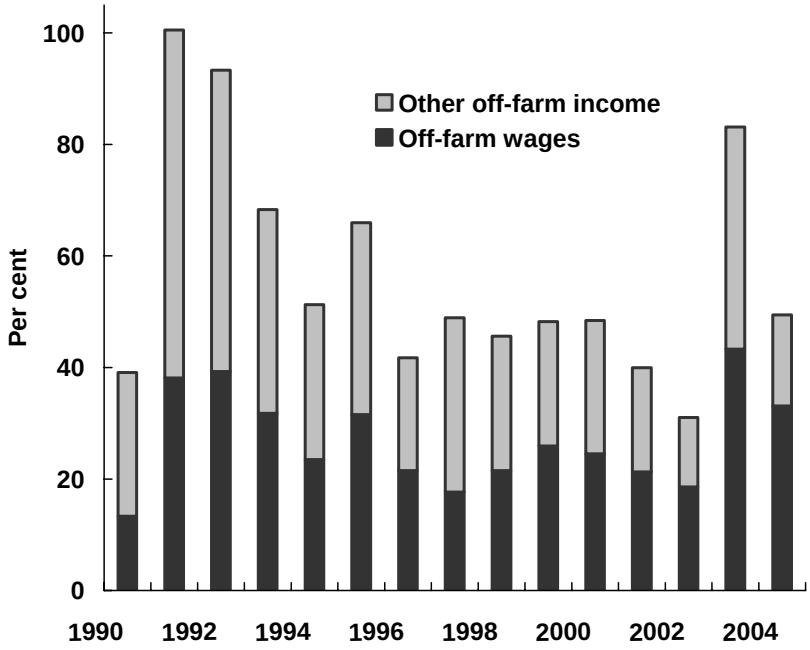
Income from off-farm sources such as wages, salaries, returns from other businesses and investments and government support payments has been generally increasing over time for self-employed agricultural workers (owners/operators and spouses) (ABARE 2006a). ABARE collects annual survey data for broadacre farms which includes estimates of on-farm and off-farm earnings. In 1990 around 35 per cent of farms owners/operators and/or spouses generated income off-farm. This rose steadily to 45 per cent of farms generating income off-farm by 2004. For farms who earn off-farm income, usually more than half of their total farm family income comes from off-farm sources (see Table 4.4, discussed below). The largest single source of off-farm income comes from off-farm wages and salaries, followed by interest and returns to other businesses and investments, with the smallest proportion usually coming from government support (ABARE 2006a).

There are a number of likely contributing factors to the rise in the significance of off-farm earnings. Declining on-farm income caused by declining agricultural terms of

trade has been well documented by ABARE (2006a and previous years). The smaller establishments have suffered the greatest falls in on-farm income, and it is this same group who work more hours in off-farm employment. (Garnaut and Lim-Applegate 1998). Therefore it is likely that declining on-farm incomes has led to the necessity for increasing off-farm earnings. In addition, education levels of farmers' spouses have risen significantly over time, (Garnaut, Connell, Lindsay and Rodriguez 2001, and as shown in Chapter 3). This would increase their ability to gain employment off-farm, along with changing social attitudes that have made it more acceptable for women with children to enter the paid workforce. Government assistance support payments, such as drought assistance at various times, have increased the proportion of total earnings that come from off-farm sources. It is at such times that on-farm earnings are their lowest, with off-farm support payments sometimes becoming the only source of income.

Figure 4.4 shows the proportion of total farm family income accounted for by off-farm earnings between 1990 and 2004. This is divided into wages and salaries, and all other sources of off-farm income, which includes interest, dividends, rent and government assistance. Total family income is measured as the family share of farm cash income (total cash receipts minus total cash costs) less family share of depreciation plus all off-farm income of owners/manager and spouses.

Figure 4.4 Off-Farm Income as a Percentage of Total Family Income, 1990-2004



Source: ABARE (2006a)

The significant fluctuations in off-farm income as a proportion of total farm income can clearly be seen. This reflects fluctuations in on-farm earnings rather than off-farm earnings. For example, off-farm income jumped substantially as a proportion of total farm income in the post-recession years of 1992 and 1993, as on-farm income was low or even negative due to rising debts from high interest rates, and also during the drought years of 1994/95 and 2002/03. It is during such times that earnings from government assistance often rise. Wages comprised between one third and one half of off-farm earnings between 1990 and 2004, the largest proportion of which is usually earned by women in part-time off-farm employment (Garnaut, Connell, Lindsay and Rodriguez 2001).

Off-farm earnings from wages often comprise a greater proportion of total earnings for younger farmers with families, while for farms owned by older families, a greater proportion of off-farm income comes from interest and dividends (Garnaut and Lim-Applegate, 1998). Earnings from off-farm sources for owners/managers and spouses are generally lower in remote areas than for those living in rural centres or living closer to metropolitan areas. This is to be expected given the limited employment opportunities in remote regions (Garnaut and Lim-Applegate 1998).

4.4 Modelling Labour Demand

The above discussion introduced and examined the unique structural and compositional features of the agricultural labour market in Australia. The following sections report on modelling the demand for agricultural labour in Australia. The first section below summarises earlier models of labour demand. This is followed by the introduction of the model used in this study, together with discussion and interpretation of the estimated results.

4.4.1 Labour Demand Models

During the 1970s and 1980s, there were a number of studies that attempted to model the demand for agricultural labour. However, as evident from the literature discussed below, there has been very little research devoted to modelling agricultural labour demand in more recent years, hence the purpose of this current study. This chapter will concentrate on Australian studies due to the significant differences in variables affecting the modelling of agricultural labour demand in other countries. For instance, there have been a number of studies carried out in the United States of America (US) that model agricultural labour demand. However, agricultural labour

demand in the US is very difficult to model due to the significant proportion of illegal workers. It has been estimated that the undocumented agricultural workforce could comprise as much as 50 per cent of farm labour in some states in the US, (Lake and Holt, 2000). Nevertheless, an extensive study by Tokle and Huffman (1991) suggested that the agricultural wage, prices received, priced paid for non-labour inputs and time were significant explanatory variables.

In the European Union (EU) many variables affecting agriculture are controlled by EU policy, and as such do not have great relevance to the relatively deregulated Australian labour market. For example, the output and labour market distortions caused by strong agricultural protection policies such as the Common Agricultural Policy, lead to output levels and the corresponding demand for labour far in excess of free market levels. Since the 1990s, EU protection policies also pay farmers in some areas *not* to produce output, in their land 'set-aside' provisions, in an attempt to reduce the over-supply of output of the 1980s, which led to the infamous wine lakes, butter mountains and milk irrigation. Market and labour market distortions resulting from significant agriculture protection also widely exist in the US, Japan and some developing countries. While Australia has, in the past, used its own protection policies, this has not been of the scale of the EU or US. Further, Australian protection for agriculture was largely progressively dismantled throughout the 1980s.

In general, because of the lack of similarity between Australia and other countries, the Australian literature on agricultural labour markets has not relied greatly on overseas literature.

4.4.2 Previous Models

As indicated earlier, many models of agricultural labour demand in Australia are now quite dated. The results from the Australian models are summarized in Table 4.2. An early study by Ryan and Duncan (1974) used a static model to specify the demand for agricultural labour as a function of wages, prices received and prices paid for inputs other than labour. They estimated the demand for total labour, self-employed labour and hired labour, using data from 1949 to 1968. Estimated short-run and long-run elasticities were less than one, as seen in Table 4.2, which is considerably different to most other models, where long-run elasticities were generally found to be quite large. However, the lack of dynamics, that is, the assumption of full and immediate market adjustment, appears to be an important omission in the modelling technique used.

Joyce (1975) estimated the demand for operator (self-employed) labour and hired labour using a distributed lag model, with data from 1950 to 1971. Labour demand was assumed to depend on agricultural wages, prices of non-labour inputs and prices received. The results indicated that both forms of labour demand were own-price inelastic in the short run but elastic in the long run. The long run elasticity for hired labour was greater than for operator labour, at -1.31 and -1.18 respectively. Also, both operator and hired labour were sensitive to agricultural wages relative to the prices of other inputs (the substitution effect).

Bhati produced two labour demand models (1978, 1980), the first modelling total labour demand, and the second modelling the demand for hired labour. The earlier model estimated labour demand for Australia and at the state level, using data from 1953 to 1975. Results indicated that the demand for labour with respect to wages was

elastic in the long run, with an elasticity of -1.18. When the demand for hired labour was modelled (1980), using data from 1954 to 1978, demand was found to be highly elastic both in the short run and long run. This latter model was estimated by geographical zone – pastoral, high rainfall, and wheat-sheep. As Table 4.2 shows, high elasticities were found in the short run and long run for pastoral regions (short run, -3.31; long run, -4.01) and for high rainfall regions (short run, -4.32; long run, -5.21). As can be seen, wheat-sheep regions were found to be more inelastic (short run -0.78; long run -0.95).

Crowley and Spasojevik (1980) examined the responsiveness of hired labour to changes in agricultural wages and exogenous shocks such as structural and technological change, over the period 1964 to 1978. In the short run, demand for labour was found to be own-price inelastic (-0.19), while being elastic in the long run (-1.28). They also found that self employed labour responded faster to shocks than hired labour.

Ellahi (1981) modelled the demand for hired and operator labour, over the period 1954 to 1978, for New South Wales. Results showed that both types of labour were own-price elastic in the long run. The substitution of capital for labour was also apparent when modelling hired labour. A responsiveness of labour demand to technological change was also significant, with results indicating that technological change was labour saving.

Evans and Lewis (1986) estimated the demand for total labour, hired labour and family labour, using data from 1967 to 1984. The model's determinants of labour

demand were agricultural wages relative to prices received, prices paid for non-farm inputs relative to prices received, and technological change. Results showed that in the long run, the demand for hired labour was very responsive to wages (-1.15), and more so than family labour (-0.44). Technical progress was found to reduce the demand for total labour, with the effect being more marked for hired labour, which indicates that technology was labour saving during this period. Total labour and hired labour were elastic with respect to changes in relative input prices. An interesting additional result was that prices received did not affect the demand for labour.

Lewis (1987) used a pooled cross section/time series data systems model to estimate the short run demand for hired labour for sheep farms and beef farms. His results indicated an inelastic response in the demand for hired labour in the short run with a wage elasticity of –0.23 for sheep farms, and –0.37 for beef farms.

Table 4.2 Wage Elasticities of Demand for Labour

Author	Type of Labour	Region	Elasticity	
			Short Run	Long Run
Ryan and Duncan (1974)	Total labour	Australia	-0.25	-0.50
	Self-employed	Australia	-0.19	-0.38
	Hired labour	Australia	-0.29	-0.58
Joyce (1975)	Operator labour	Australia	-0.46	-1.18
	Hired labour	Australia	-0.54	-1.31
Bhati (1978)	Total labour	Australia	na	-1.18
Bhati (1980)	Hired labour	Pastoral	-3.31	-4.01
	Hired labour	High Rainfall	-4.32	-5.21
	Hired labour	Wheat-Sheep	-0.78	-0.95
Crowley and Spasojevic (1980)	Hired labour	Australia	-0.19	-1.28
Ellahi (1981)	Operator labour	NSW	na	-2.20
	Hired labour	NSW	na	-2.28
Evans and Lewis (1986)	Total labour	Australia	na	-0.84
	Hired labour	Australia	na	-1.48
	Family labour	Australia	na	-0.44
Lewis (1987)	Hired labour	Sheep farms	-0.23	na
	Family labour	Beef farms	-0.37	na

Overall, previous studies show that the demand for agricultural labour is responsive to wage changes in the long run, particularly for hired labour, although there is little agreement on the size of the wage elasticity. Further, the demand for hired labour in particular has been responsive to technological change. Farming practices are relatively more rigid in the short-run, with little possibility of substitution between labour and other resources. However, changes in farming techniques and practices can occur over time, leading to relatively larger elasticities in the long run.

Although the results of these studies are fairly consistent, they are now rather dated. The modelling in this chapter picks up where these studies left off, estimating the demand for agricultural labour using data from 1984 to 2004.

4.4.3 A Model of Labour Demand

The demand for agricultural labour is assumed to be the result of profit maximising behaviour by agricultural enterprises. It is usual to measure labour demand by employment levels (Lewis and MacDonald 2002). In this study the total number of employed persons in agriculture is modelled as a function of total agricultural output, real wages and time. As output levels rise, either constant, increasing or decreasing returns to scale will occur, therefore the coefficient on output can be interpreted as indicative of returns to scale. The marginal productivity of labour is equated to the competitive wage. In accordance with standard neo-classical theory, it is anticipated that as real wages rise, the demand for labour will fall. This may be the result of the substitution between capital and labour; and an output effect due to the costs of production rising and hence input demand falling. When hired labour is modelled separately, it is expected that in addition to the standard input substitution argument,

as real wages rise there will be a fall in labour demand due to the substitution between hired labour and family labour. Time is used as a proxy for technological progress and structural change. The coefficient on time will be negative if technology is labour saving. However, a priori, it is not clear whether there will be a positive or negative relationship between time and the demand for labour in the agricultural sector. Over time, technological change has led to the development of labour saving capital equipment, as found in previous studies. However, technology can also increase yields per hectare of land, which would lead to an increase in the demand for labour.

The data used are in quarterly seasonally adjusted form, for the period 1984 quarter one through to 2004 quarter three, giving 83 observations. Employment data, measured in persons, are taken from the ABS (2006a) *Labour Force* series where employment is defined using the ABS classification of 'persons employed in agriculture and services to agriculture'. This includes owners/operators, employees (hired labour) and contributing family workers, and those providing direct services to agriculture such as shearers, contract sprayers and soil analysts. It does not include employment on farms whose Estimated Value of Agricultural Operations (EVAO) is less than $22 500, which helps to exclude hobby farmers. Data for nominal agricultural wages and agricultural prices received have been sourced from *Australian Commodity Statistics* (ABARE 2005), *Farm Surveys Report* data (ABARE, 2006a), together with unpublished data from ABARE. The real wage has been calculated as nominal wages divided by prices received. Output data are taken from the *Australian National Accounts, National Income and Expenditure Product*, (ABS 2005). Given the unusual importance of family labour in agriculture, and the likely differences

between demand responses to changes in wage rates between family and hired labour, the demand for hired labour is modelled separately.

The above discussion of the theory and assumptions of the demand for agricultural labour leads to the following general function:

$$L^D = L^D (Q, W, t) \quad (1)$$

where L^D is the demand for labour

Q is the output of the agricultural sector

W is the real wage rate (nominal wages relative to prices received)

t is a time trend (taken to be a proxy for technological and structural change).

The method of estimation follows that used by Lewis and MacDonald (2002), as outlined below. For ease of interpretation a linear in natural logarithms specification is adopted for the equilibrium relationship:

$$ld_t = \alpha_0 + \alpha_1 q_t + \alpha_2 w_t + \alpha_3 t \quad (2)$$

where lower case variables are the natural logarithms of their equivalents in (1). The equilibrium relationship (2) can be interpreted as the marginal productivity condition, MP_L = real wage, derived from a CES production function (Lewis 1987, 1998). The parameter α_2 is the elasticity of substitution between capital and labour. The wage elasticity of demand for labour is $(1-s)\alpha_2$ where s is labour's share of total costs. The parameter α_1 is the scale parameter - a value of unity, less than unity and greater than unity, indicating constant, increasing and decreasing returns to scale, respectively. A specification of dynamics needs to be included to represent the short run partial adjustment of labour demand to changes in the independent variable. As seen earlier in the summary of previous models, the adjustment process seems to be quite slow.

As outlined in Lewis and MacDonald (2002) it is not appropriate to use Ordinary Least Squares for equations such as (2) due to the potential for spurious regression outcomes. To overcome this problem, the autoregressive distributed lag (ARDL) specification and estimation technique will be used (Pesaran and Shin 1999). Therefore short-run dynamics are incorporated in this model through specification of the ARDL model:

$$ld_t = \beta_0 + \beta_1 t + \sum_{j=1}^{p} \alpha_j l_{t-j} + \sum_{i=1}^{2} \lambda_j \sum_{j=0}^{q} x_{it-j} + u_t \qquad (3)$$

where x_i refers to the independent variable in (2). The lag lengths p,q are chosen in relation to an appropriate criterion (here the Schwarz Bayesian criterion).

Ordinary least squares yields consistent estimates of (3) and using the procedure of Pesaran, Shin and Smith (1996), the long run coefficients and their asymptotic standard errors of (2) can be derived. Finally, from the long run solution the error correction version of (3) can be estimated.

The ARDL method consists of four steps. A long run causal relationship, cointegration, needs to be established. Second, a short run ARDL model is estimated. Third, a long run solution is derived. Finally, an error correction mechanism (ECM) version of the short-run model is estimated. The first of these steps is elaborated in the following paragraph.

It is well documented in the literature that there is an isomorphism between cointegration and the existence of an ECM. According to Pesaran, Shin and Smith (1996), a test of cointegration can be carried out based on estimating the vector autoregressive (VAR) version of (2) and then applying a variable addition test for the

significance of the lagged levels variables in the VAR model. Therefore the VAR model below is estimated.

$$Dl_t = \delta_0 + \sum_{i=1}^{P} \delta_{1i} Dl_{t-i} + \sum_{i=1}^{P} \delta_{2i} Dq_{t-i} + \sum_{i=1}^{P} \delta_{3i} Dw_{t-i} + u_t \qquad (4)$$

where D denotes the difference operator.

The minimum lag length p is such that there is no autocorrelation in u.

The variables ld_{t-1}, q_{t-1} and w_{t-1} are added to the model and an F test is then used to test the null hypothesis that the coefficients on the lagged variables, when taken together, are equal to zero. The F statistic has a non standard distribution. Pesaran, Shin and Smith (1996) have calculated upper and lower bounds for F depending on whether the variables are I(0) or I(1) respectively. If the calculated F statistic falls below the lower bound then cointegration is rejected and it can be concluded that a long run relationship between the variables does not exist. If the calculated F statistic is above the upper bound then cointegration is accepted and it can be concluded that there is a long run relationship between the variables. If the calculated F is between the lower and upper bounds, no conclusion can be made, and standard tests must be carried out on the variables to establish whether they are I(0) or I(1).

4.4.4 Estimated Results for Labour Demand

Total employment

The lag length sufficient to remove autocorrelation was determined by using the Schwarz Bayesian criterion. A fourth order VAR was found to be sufficient to remove autocorrelation, therefore allowing the testing for the existence of a cointegrating long run relationship. The F test for the significance of the lagged

levels variables in the VAR was found to be 7.28. The critical upper and lower bound values at the 5 per cent level are 4.07 and 5.12. Since the calculated value of the F statistic lies well above the upper bound it can be concluded that a long run relationship exists and that the ARDL estimation is valid.

The ARDL estimates for total agricultural employment are:

$$ld_t = \underset{(2.01)}{1.01} + \underset{(7.96)}{0.71}l_{t-1} + \underset{(2.04)}{0.093}q_t - \underset{(0.62)}{0.032}w_t + \underset{(2.04)}{0.0079}t \qquad (5)$$

(Figures in parentheses are absolute t values)

$\overline{R}^2 = 0.63$

Serial correlation $\chi^2(4) = 4.08$

Functional form $\chi^2(1) = 1.48$

Normality $\chi^2(2) = 0.88.$

Heteroscedasticity $\chi^2(1) = 4.00$

The corresponding long run solution is:

$$ld_t = \underset{(2.94)}{3.46} + \underset{(2.59)}{0.32}q_t - \underset{(1.92)}{0.11}w_t + \underset{(2.28)}{0.00279}t \qquad (6)$$

The adjustment coefficient in the error correction equation is -0.29 with a t-statistic of 3.28, which indicates a fairly slow speed of adjustment.

An interesting feature of the results is the size of the coefficient on the agricultural output variable. It is positively signed, suggesting that an increase in output is associated with an increase in the demand for labour. However, it is relatively small which suggests that total employment is relatively insensitive to output changes. As

the agricultural labour force is dominated by employers, self-employed and family members, this is perhaps, not so surprising. As expected, employment is negatively related to real wages, although the elasticity is relatively small.

The coefficient of the time trend indicates that, after accounting for all the effects of price changes, there has been a general trend for agricultural employment to rise by about 1 per cent per year. This trend is an important issue and will be returned to later in the paper.

Hired labour

As discussed earlier, it is likely that there are behavioural factors relating to hired labour that differ from agricultural employment as a whole. Specifically, hired labour is a factor of production, whereas self-employed and employer labour are not only labour inputs in terms of factors of production, but also capture the input of farmers into entrepreneurship. Therefore a separate estimation of hired labour could give different results from those of total employment.

As with the previous equation the F test for the significance of the lagged levels term in the VAR was carried out and in this case an F value of 7.35 was found. Since this is greater than the upper bound of 5.12, it is concluded that there is a long run equilibrium relationship between demand for hired labour and the independent variables.

The ARDL results for hired labour are:

$$ld_t = \underset{(0.81)}{0.54} + \underset{(3.06)}{0.36}l_{t-1} + \underset{(2.19)}{0.25}\, l_{t-2} + \underset{(1.83)}{0.17}q_t - \underset{(1.62)}{0.17}w_t + \underset{(2.24)}{0.0018}t \qquad (7)$$

(Figures in parentheses are absolute t values)

$\overline{R}^2 = 0.83$

Serial correlation $\chi^2(4) = 4.88$

Functional form $\chi^2(1) = 2.01$

Normality $\chi^2(2) = 0.52$

Heteroscedasticity $\chi^2(1) = 0.52$

The long run solution is:

$$ld_t = \underset{(0.85)}{1.39} + \underset{(2.12)}{0.42}q_t - \underset{(2.59)}{0.42}w_t + \underset{(2.79)}{0.0046}t \qquad (8)$$

The adjustment coefficient in the error correction mechanism equation is –0.39 with a t statistic of 3.33 which is slightly faster than the speed of adjustment for total labour demand.

As anticipated, the results for the estimation of hired labour are different than for total labour. The corrected R^2 of 0.83 is significantly higher then the corrected R^2 of 0.63 for the total labour model, indicating that the model provides a much better fit for hired labour than for total labour demand. The output variable is significant, but although the coefficient is relatively larger than for labour as a whole, it is still less than unity, indicating that increases in output result in a less than proportionate rise in the demand for labour. The elasticity of substitution between capital and hired is estimated to be -0.4. Given hired labour's share of total costs this implies wage

elasticity of about -0.5. Demand for hired labour is substantially more elastic with respect to wages than is the demand for total labour. This is expected as it is possible for agricultural enterprises to substitute own labour and family labour for hired labour. However, if an owner/operator was to reduce their own labour input, this could require them to sell their business.

The coefficient on the time trend shows that after accounting for the effects of price changes, structural and technological change has *increased* the demand for hired labour over time by almost 2 per cent per year. This result is interesting, as it suggests that the net effect has not been to displace hired labour but has instead led to an increase in the demand for hired labour. Possible reasons for this are analysed in the next section.

4.5 Discussion of Results

The results for the wages coefficient in both the model for total labour and for hired labour accord with economic theory. An increase in wages leads to a fall in the demand for labour. The coefficient for hired labour is larger than for total labour, which shows that labour adjustments are largely borne by hired labour.

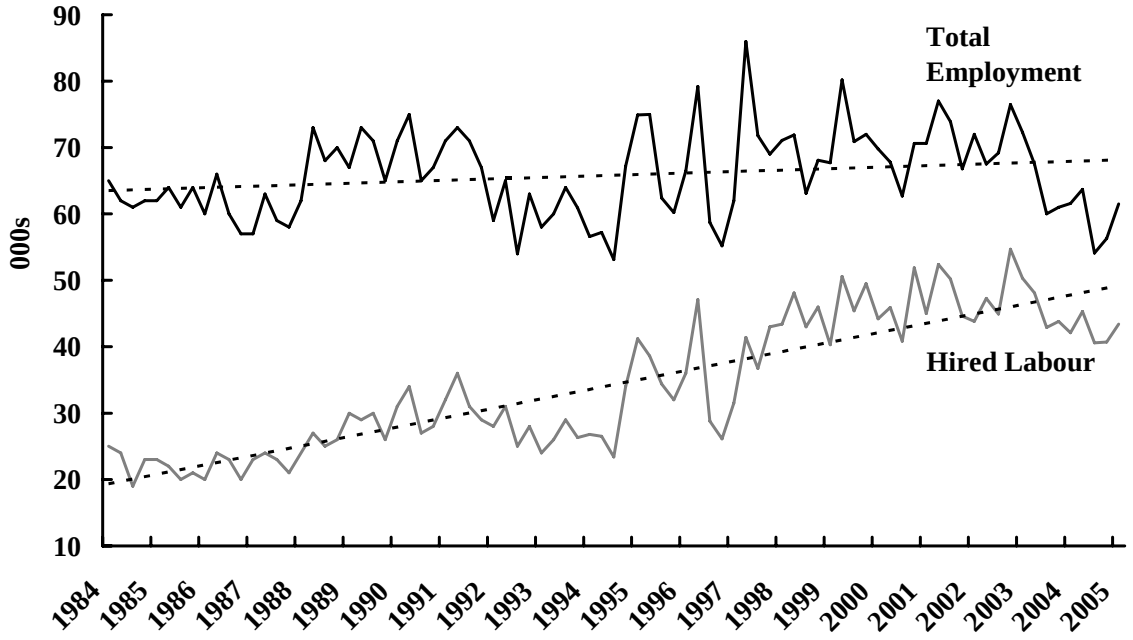
The results show that output levels are more important in explaining the demand for hired labour than for total labour. This is not unexpected given that a large proportion of the agricultural labour market comprises self-employed and employers, with some unpaid family labour. This means that when output levels change, owner/operators are able to redistribute labour between themselves and other family members rather than change the total amount.

The time trend, a proxy for structural and technological change, is an important variable for hired labour. Even after holding output and wages constant, there has been a general increase in the demand for labour over the period. As mentioned earlier, this is in contrast to the results of studies over previous time periods, which showed a decline in the demand for labour, generally attributed to technological change being labour and capital saving.

4.5.1 Growth in Labour Intensive Industries

The increase in the demand for labour could be explained by two different possibilities. The first is that there may have been an increase in production in more labour intensive agricultural industries, in particular, horticulture and viticulture, which comprised between 20 and 30 per cent of total employment in agriculture over the period. Figure 4.5 shows hired labour and total employment in horticulture and fruit growing from 1984 to 2005. Trend lines have been added to more clearly show the changes in employment over time. Figure 4.5 clearly demonstrates that there has been a significant increase in the employment of hired labour over this period, and a small increase in total employment (prior to the 2002/03 drought). Hired labour as a proportion of total labour rose from approximately 36 per cent in 1984 to 72 per cent in 2005. Therefore the growth experienced in this labour intensive industry over the estimated time period is a likely contributing factor in the increase in the demand for hired labour over time seen in the regression results above.

Figure 4.5 Employment in Horticulture and Fruit Growing, 1984-2005 (000s)



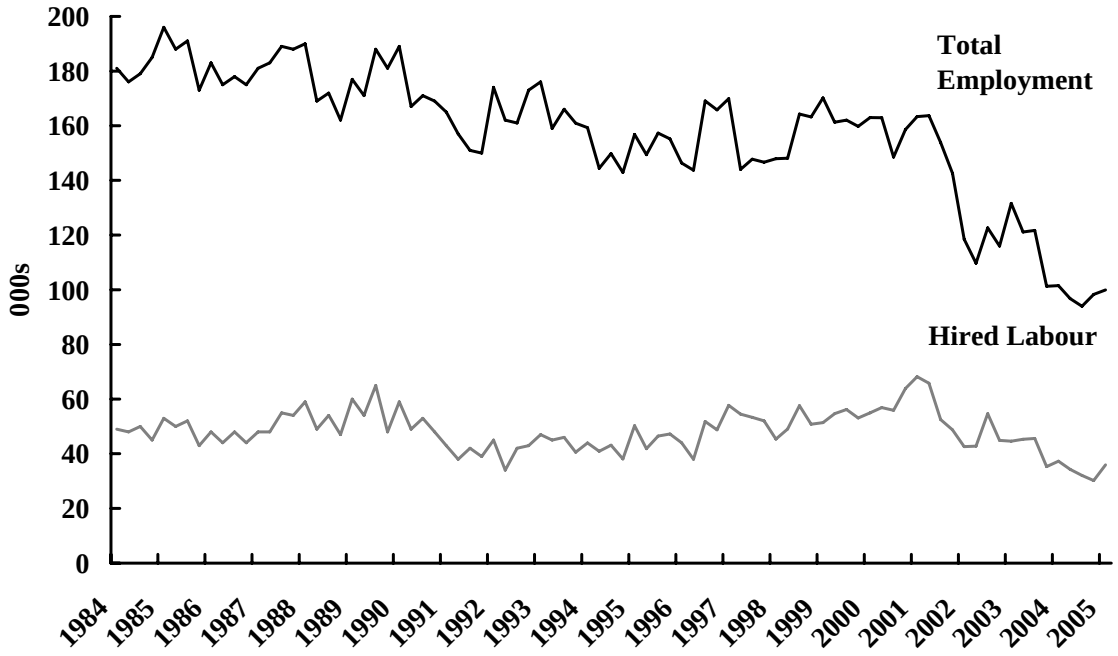
Source: ABS (2006a)

Other agricultural industries are generally less labour intensive than horticulture and viticulture. However, for completeness, the other industry sub-divisions that have experienced increases in total and hired labour over the period until the 2002/03 drought are services to agriculture and other cropping. The dairy industry recorded an increase in total employment, but interestingly, this was largely owner/operator labour, with minimal increases in hired labour. Together, these industries comprised between 15 and 20 per cent of total agricultural employment.

The other largest employer is the grain, sheep and beef industry, (broadacre industries) which employed between approximately 50 and 60 per cent of total agricultural labour over the same pre-drought period. As can be seen from Figure 4.6, there was a downward movement in total employment throughout the 1980s, with

levels stabilising throughout the post-recession 1990s, until the 2002 drought. The fall in total employment until the mid 1990s was largely due to the fall in owner/operator employment - an expected outcome given the significant falls in agricultural establishments (particularly broadacre), as shown earlier in Figure 4.3. There was a slight upward trend in hired labour throughout the 1990s until the drought, although this may in part reflect previous owners now working as employees on newly merged properties, and levels were not significantly different to pre-recession levels.

Figure 4.6 Employment in Grain, Sheep and Beef, 1984-2005 (000s)



Source: ABS (2006a)

4.5.2 Technological Change

The other explanation for the positive affect of technological change on the demand for labour, and for hired labour in particular, can be seen by looking at the productivity changes over the estimation period. In agriculture, productivity gains

mean that more output is being produced from a fixed amount of land. Until the 1980s new technology was labour saving and reduced the amount of labour required to produce and service this output (Lewis, Martin and Savage 1988). Therefore, the question arises as to why the growth of productivity in more recent times could have contributed to an increase in labour demand.

ABARE (2004) estimated that total factor productivity for broadacre producers rose at an annual average rate of 2.7 per cent from 1977/78 to 2001/02. This is similar to the estimate of Martin and Savage (1988) for the period 1965/66 to 1985/86, and 0.5 per cent higher than estimates by Males, Davidson, Knopke, Loncar and Roarty (1990) for the period 1977/78 to 1998/99. Productivity growth has been greatest in agricultural establishments specialising in cropping – 3.3 per cent, followed by mixed crops and livestock at 2.5 per cent, 1.8 per cent for beef specialists and only 0.9 per cent for producers specialising in sheep (ABARE 2004).

Productivity in cropping is strongly affected by soil moisture. The higher rate of productivity growth in cropping can be partially explained by improved cultivation practices such as minimum till and direct drill, which conserve moisture in the soil (ABARE 2006b). Other factors include higher yielding crop varieties, better use of crop rotations, greater and more efficient use of fertiliser and higher owner/operator education levels.

While in the 1970s and 1980s technological change tended to save labour at a greater rate than capital (Lewis, Martin and Savage 1988) it appears that the most recent period of technological change has been characterised by substantial improvements in

the productivity of the land base (ABARE 2006). Since this would increase total output, an increase in demand for labour would be expected particularly with harvesting. This is borne out by the empirical evidence presented here.

4.6 Conclusion

The agricultural sector has experienced significant structural and composition changes over time, and there has been a fall in the relative importance of agricultural output to GDP. However, total agricultural output has more than doubled in the 40 years since 1965, and it remains a very important source of direct and indirect employment in particular regions of Australia.

As demonstrated, direct employment in agriculture fell continually from 1950 until around 1980, which likely reflects technological change, and a movement of formerly on-farm jobs to off-farm jobs, including a movement of jobs formerly classified as agriculture to now being classified as manufacturing or services. However, for more than 20 years after 1980 – except during the 1989/90 recession – employment stopped falling, and even rose continually during the 1980s and the second half of the 1990s until the drought of 2002/03. Employment stabilised in the 1990s in even the largest employing industries - grain, sheep and beef - which largely dominate agriculture in inland and remote regions of Australia, where population and employment growth rates have been falling (see Chapter 3).

The estimated models of the demand for total labour and hired labour accord with economic theory. An increase in wages is found to lead to a fall in the demand for labour, particularly hired labour, and output is positively related to labour demand.

The interesting finding that technological change has led to an increase in the demand for labour over the estimated period is a reversal of the findings of earlier studies, and provides an explanation for the observed increase in employment in agriculture.

The findings in this chapter have interesting implications for the so-called 'rural decline' and defy the popular notion that employment in the agricultural sector is shrinking (with the exception of drought years). While it cannot be concluded that particular towns within particular regions have not been affected by misfortunes in agriculture, it also cannot be concluded that the agricultural sector is responsible for trend declines in population and employment in rural Australia.

CHAPTER 5 FACTORS AFFECTING RURAL POPULATION

5.1 Introduction

The size and composition of rural populations greatly affects rural labour markets. As was clearly demonstrated in Chapter 3, since 1991, rural populations in Australia have been experiencing significantly lower growth rates than the growth rates of capital cities, other metropolitan areas and coastal regions. This is a change in direction from the rural turnaround of the 1970s and 1980s. Media commentators have frequently cited a downturn in the agricultural sector and falling employment in this sector as a major reason for the relatively slow population growth in rural Australia. However, as demonstrated in Chapter 4, during the period examined in this study, the agricultural sector is not the main determinant of the changes experienced.

To determine why rural population growth rates have slowed significantly, the components that influence population growth need to be disaggregated. These components are:

- Fertility rates
- Mortality rates
- International migration – people arriving from overseas and departing overseas
- Interregional migration – the flows of people between regions within Australia

Once the above factors have been analysed and any changes identified, possible causes of these changes can be examined. This chapter concentrates on interregional

migration as this was found to be the main cause of the population changes in the rural regional classifications between 1991 and 2001.

The following section examines fertility and mortality rates, and international migration flows in rural Australia in order to identify any changes between 1991 and 2001. Section 5.3 examines net regional changes in population in Australia since 1991, concentrating on interregional population inflows and outflows. Section 5.4 examines previous studies of interregional migration. From the review of the literature, the most important variables likely to affect interregional migration are identified and included in the model detailed in Section 5.5. The model is developed to determine possible causal factors of the most recent changes in interregional migration patterns in Australia. Discussion of the results of the model is presented in Section 5.6, with concluding comments in Section 5.7.

5.2 Fertility, Mortality, and International Migration

In order for fertility and/or mortality to be significant contributing factors to the very slow population growth of rural Australia, fertility rates would need to have declined, and/or mortality rates would need to have increased. This section examines the data relating to both of these factors.

5.2.1 Fertility Rates

It is well known that in Australia and many countries throughout the world that birth rates have been falling over many decades (Productivity Commission 2005a). In Australia, birth rates in rural areas have been higher than the rates in metropolitan areas. According to recent estimates from the Australian Institute of Health and

Welfare, this difference still remains today. Fertility rates of women in rural areas of Australia in 2000 were 2.2 children per woman and in remote localities it was slightly higher at 2.4 children per woman. This compares with 1.7 children per woman in major cities (Australian Institute of Health and Welfare 2004). Using the ABS Remoteness classification, between 1999 and 2001, birth rates in inner regional areas were 1.03 times the birth rate in major cities. In outer regional areas, the birth rate was 1.14 times the birth rate in major cities. For remote areas, birth rates were 1.35 times that of major cities and for very remote the corresponding rate is 1.47 (Australian Institute of Health and Welfare 2005).

The issue here is whether fertility rates in rural areas have declined over the 1991-2001 period. Table 5.1 compares available data of fertility rates in the early part of the 1990s with fertility rates in 1999-2001, using the ABS Remoteness classification (see Chapter 2 for a description of this classification) (ABS 2006c). The first obvious point is that even over this relatively short period of time, birth rates continued their downward trend throughout all regional classifications. The only classification recording very little change was the very remote localities, although fertility data for these localities is not precise due to unrecorded births in some Indigenous communities (Australian Institute of Health and Welfare 2005).

Table 5.1 Fertility Rates, 1992-1995 and 1999-2001, Australia

Remoteness Class	1992-1995	1999-2001
Major Cities	1.79	1.70
Inner Regional	2.15	1.75
Outer Regional	2.30	1.94
Remote	2.43	2.30
Very Remote	2.51	2.50

Source: Glover, Harris and Tennant (1999); Derived from Australian Institute of Health and Welfare (2005).

Note: The remoteness classes used by Glover, Harris and Tennant (1999) were those from the ARIA (Department of Health and Ageing 1999). As shown in Chapter 2, these are very similar to, but not exactly comparable to, the ABS remoteness classes.

Table 5.1 shows that declining birth rates are clearly a contributing factor to slower population growth rates over the period. As in earlier chapters, it is assumed here that outer regional, remote and very remote regions, and possibly some of the inner regional areas, measure rural Australia. Declining fertility rates are most evident in inner regional and outer regional areas. For example, the birth rate in outer regional areas fell from 2.3 births per woman to 1.94 births per woman, a fall of about 16 per cent. Therefore, not only are falling birth rates a contributing factor to slow population growth rates, but as shown, the decline in the birth rate has been greater in rural Australia, thus contributing to the relative differences in the changes in population growth between urban and rural areas.

5.2.2 Mortality Rates

Mortality rates, together with life expectancy, differ between urban and rural areas in Australia. Mortality rates are higher and life expectancy is lower in rural and remote areas (Australian Institute of Health and Welfare 2005). One reason for this is the

greater proportion of Indigenous people living in rural and remote areas. According to all measures of health, including the ultimate measure - mortality rates – Indigenous Australian's are worse off than the non-Indigenous population (Australian Institute of Health and Welfare 2005; Biddle and Hunter 2005). Other studies have shown that rural and remote areas in general are relatively worse off in terms of health and mortality due to substantially reduced medical and health services, including hospital access and hospital facilities, shortages of medical practitioners, reduced access to medical specialists, and other factors affecting health including lower income and lower education levels (Humphreys 1989; Harrison 1997). Further, there is a higher relative incidence of work related and traffic related accidents causing death in rural areas relative to urban areas (Australian Institute of Health and Welfare 2005).

It is not particularly useful or accurate to make comparisons of mortality rates between regional classifications in Australia over time. Comparisons can be misleading, as mortality rates can be a function of inward or outward migration. Therefore measuring changes in mortality rates may actually be measuring changes in interregional migration. For example, in 1997-1999, mortality rates were relatively lower in very remote regions, where the mortality rate was 0.9 of the rate in cities – giving very remote localities the lowest mortality rates of all regional classifications (Australian Institute of Health and Welfare 2005). However, this appears to be due to older people moving out of those regions by necessity, to gain access to aged care facilities, hospitals and necessary health care. Suffice to say here, that it is very unlikely that rural mortality rates or life expectancy have deteriorated between 1991 and 2001, and therefore changes in mortality rates are not likely to be a contributing

factor to the slow rural population growth rates. This conclusion is shared by Hugo (2001), who examined the earlier period of 1986-1996. Hugo (2001) found that it was the differences in migration rates that were the main reason for regional population changes and not significant changes in either fertility or mortality rates.

5.2.3 International Migration

In terms of the impact of international migration on regional populations, the impact has been much greater in major cities than in rural areas. This has been the case since the post-World War II immigration program in Australia. The proportion of all overseas-born people in Australia who live in rural areas has fallen significantly between 1947 and 1996. For example, in 1947, 24.7 per cent of all overseas born people living in Australia lived in rural areas, compared to 7.4 per cent by 1996 (Hugo 2001). However, in absolute numbers and as a proportion of rural populations, the number of overseas-born people rose slowly over time, from 7.6 per cent in 1947 to 12.1 per cent in 1996. What is apparent is that there had not been a significant change in international migration rates to rural areas in the 1990s, and it cannot, therefore, explain the fall in population growth rates in between the 1991 and 2001 Censuses (ABS 1993; ABS 2003d).

5.3 Net Migration Flows

From the above discussion, it is clear that the explanation for the fall in rural population growth rates in the 1990s (see Chapter 3, Table 3.9) must largely be the result of changes in interregional migration patterns. The outflow of people from rural regions must have been in excess of the inflow of people, with consequential effects on rural labour markets.

Standard labour market theory views labour mobility as providing flexibility to labour markets, and contributing to the reduction in structural unemployment. In this respect, internal migration is seen as a requirement for efficiently operating labour markets. However, when examining regional labour markets, particularly in recent years, the issue of interregional migration has far more serious consequences for rural labour markets. Out migration is usually viewed by local government and business as a signal that there are underlying problems in the area, and could be the start of a downward spiral effect (Powell 1985).

5.3.1 Regional Net Migration

While average regional population growth rates, as shown in Chapter 3, identify the significant variability between regional classifications, they do not provide information as to whether the variability is due to people choosing to leave a particular type of locality. That is, they do not identify whether net outflow are the cause of the slow rural population growth rates. It is, therefore, essential to examine *net* migration at the regional level. In addition, determining where people are moving to and moving from greatly assists in determining likely causal factors of regional population and employment changes.

Table 5.2 shows net migration for each regional classification using the ABARE system of classifying regions (see Chapter 2 for a description of this classification). The columns show both the absolute numbers of net migration, and also net migration as a proportion of each classification's population. The data are unpublished Census data from the ABS for the periods 1991-1996 and 1996-2001.

Table 5.2 Net Migration by Regional Classification, Australia, 1991-1996 and 1996-2001

Locality	1991-1996 Persons	Percentage of population	1996-2001 Persons	Percentage of population
Capital Cities	-32 992	-0.3	2 814	0.02
Other Metropolitan	80 234	5.6	69 168	4.3
Coastal	29 053	1.5	23 651	1.1
Inland	-45 076	-1.9	-56 135	-2.4
Remote	-31 219	-6.2	-39 498	-7.6

Source: ABS unpublished Census data.

From Table 5.2, it is clear that many more people were leaving rural areas than were migrating to them. As a proportion of the total populations of rural areas, the movements are significant. For example, when looking at the difference between the number of people coming into a regional area and leaving that area between 1991 and 1996, over 45 000 people left inland regions, which represents almost 2 per cent of their population. Between 1996 and 2001, the net migration figure is even larger, with an overall net figure of another 56 135 people leaving inland areas, which represents 2.4 per cent of their population. The result is even more pronounced in remote areas, with net migration representing a loss of 6.2 per cent of the population in the 1991-1996 period, and 7.6 per cent in the 1996-2001 period. These proportions represent very substantial outward movements, with corresponding likely effects on businesses and services in rural towns.

Table 5.2 also shows that significantly more people are moving into other metropolitan areas and coastal areas than are leaving. Both classifications recorded positive net migration figures during the two Census periods. In particular, it is clear

that it has been the other metropolitan areas that experienced the highest absolute number and relative proportion of positive net migration of all the classifications. Capital cities overall have experienced very little change in terms of net migration. It is interesting to note that more people were leaving capital cities than moving into them during the 1991-1996 period, with net migration at almost –33 000, while during the following Census period, net migration was almost zero.

5.3.2 Origins and Destinations of People Moving

With these significant net migration changes, particularly in rural Australia, it is useful to know where the people are moving. The columns in Table 5.3 show where people are moving *from*, (the place of origin), while the rows illustrate where they are moving *to* (the destination). Again, the data are unpublished Census data from the ABS. A very interesting observation is that about half of the people leaving rural areas are moving to capital cities. For example, of all the people leaving inland regions during the 1991-1996 period, 58 per cent moved to a capital city. Similarly, of those who left remote regions, 47.7 per cent moved to a capital city. This is counter-intuitive to the idea that people leaving rural areas would prefer to move to a larger centre but not to a capital city, as this would represent a dramatic change in lifestyle and amenity. This result also differs significantly from the research carried out in the 1980s and 1990s which suggested that people leaving rural areas were more likely to move to large centres and other metropolitan areas, termed 'the switching station effect', and not directly to capital cities (Jarvie 1989; McKay and Whitelaw 1978). The results from this current research are consistent with the view that people are moving to cities for job opportunities. The causes of interregional migration will be examined in greater depth later in this chapter.

Table 5.3 Origins and Destinations of Regional Migration, Australia, 1991-1996

		Origin				
		Capital Cities	**Other Metropolitan**	**Coastal**	**Inland**	**Remote**
Destination	**Capital Cities**	0	53.6	47.6	58.0	47.7
	Other Metropolitan	27.5	0	18.7	13.4	9.9
	Coastal	28.6	24.7	0	21.0	21.4
	Inland	34.4	16.0	23.4	0	21.0
	Remote	9.6	5.6	10.4	7.5	0

Source: ABS unpublished Census data.

It is also important to note that of all the people leaving capital cities during the 1991-1996 period, the largest proportion, 34.4 per cent, moved to inland areas. Further, nearly 9.6 per cent moved from a capital city to a remote area. Therefore it is not simply a one-way movement of people moving out of rural areas into cities, as clearly there are people leaving cities and moving to rural areas. Hence the dynamics of migration patterns are quite complex.

Possible reasons for the move from cities to rural areas include the lifestyle choice of a 'tree change' (Salt 2001), and also the possibility of welfare-led migration, where people are moving to areas where living costs, such as housing, are lower than in capital cities and other metropolitan areas (Hugo and Bell 1998; Kijas 2002). Again, these issues and causes will be examined later in this chapter.

Table 5.4 provides the population movements between 1996 and 2001. The trend for the largest proportion of people leaving rural areas (inland and remote) to move into a

capital city has clearly continued. For example, between 1996 and 2001, 57.2 per cent of people leaving inland areas moved into a capital city. This is similar to the proportion of people leaving other metropolitan areas and coastal areas and moving into a capital city.

However, the most recent period differs in terms of where people leaving capital cities migrate. While in the early 1990s, the largest share of people moved to inland regions, between 1996 and 2001, the largest share moved to coastal areas. Over 35 per cent of people who left capital cities moved to the coast, an increase of almost 7 per cent from the earlier time period. A very similar proportion, over 31 per cent, moved inland, and another 6.6 per cent moved to remote areas, with the proportion of people moving from capital cities to rural areas falling in this latter period.

Table 5.4 Origins and Destinations of Regional Migration, Australia, 1996-2001

		Origin				
		Capital Cities	**Other Metropolitan**	**Coastal**	**Inland**	**Remote**
Destination	**Capital Cities**	0	55.4	53.8	57.2	43.2
	Other Metropolitan	26.7	0	29.1	13.3	10.9
	Coastal	35.3	25.6	0	23.8	25.4
	Inland	31.3	14.8	19.0	0	20.5
	Remote	6.6	4.3	6.4	5.7	0

Source: ABS unpublished Census data.

It is clear that some distinctive patterns have emerged from Tables 5.2, 5.3 and 5.4. The net migration data shown in Table 5.2 unequivocally identify that interregional migration is the main cause of the relatively slow population growth rates in rural

Australia. Further, the pace of the net outflows quickened in the second part of the decade. Tables 5.3 and 5.4 identify that by far the largest share of people leaving rural areas went to capital cities, and not other metropolitan or coastal areas. This indicates a complete movement away from the rural lifestyle and amenity. The second largest share of people leaving rural areas went to coastal areas – about one quarter of those moving. Relatively few moved to other metropolitan areas or remote areas.

5.4. Previous Studies

The reasons why people migrate between regional classifications involve economic, social and historical factors, and as such research crosses many disciplines including economics, demography, geography and sociology. Researchers in Australia and overseas have, for many decades, been working with the complex inter-relationships between the factors that lead to interregional migration. Research methods primarily focus on the use of surveys and econometric models to determine causal factors. Much of the theory of interregional migration focuses on pull and push factors, including variables such as relative wages, employment opportunities, industry mix, housing costs, age, education levels and amenity - including service, environmental and cultural amenity (Hugo 2001; Lawson and Dwyer 2002; Lewis 1990; Powell 1985; Tokle and Huffman 1991). However, quantifying the relative importance of particular variables has proven difficult, with studies meeting with limited success.

The following will examine studies that have attempted to identify important determining factors of interregional migration, at the theoretical and data analysis

level, together with the relatively small number of studies that have tried to quantify the relative importance of factors.

5.4.1 Non-Econometric Studies

There is a range of literature that falls under this category. Some is of a theoretical nature, discussing the likely causes of interregional migration without the use of data. Other studies have extracted data from sources including the Census and ABS survey based sample data and documented trends over time. There have also been a number of specific purpose studies examining data relating to particular states or regions.

ABARE conducted a large descriptive small area analysis of population, employment and income trends in non-metropolitan Australia, using Census data from 1986 to 1996 (Garnaut, Connell, Lindsay and Rodriguez 2001). When looking at inland and remote regions, they found that the highest rates of in-migration occurred in Statistical Local Areas (SLAs) surrounded by large urban centres. It was argued that this corresponded with greater employment opportunities due to diversified economies and higher levels of service amenity. They found that employment growth - a possible driver of in-migration - was greatest in areas with a higher level of manufacturing, tourism and other services, and much less so in areas where agriculture and mining assumed a greater share of the industry mix. They attributed employment losses in rural areas in the electricity, gas, water, transport and telecommunication industries as a direct effect of microeconomic reform, while noting that other microeconomic reforms had increased employment. Their data also suggested that service amenity and environmental amenity were significant factors determining regional migration to coastal regions (particularly for older people).

Further, they interpreted the data as providing evidence that people were willing to trade off wage levels and employment opportunities for better amenities.

In an earlier study, ABARE examined the impact of farmers' expenditures on employment and population in rural towns (Rasheed 2000). Using data on expenditure patterns from their *Australian Agricultural and Grazing Industries Survey* (ABARE 1999), it was found that small rural towns remained very dependent on farm expenditure. For example, in towns of less than 1000 people, farm expenditure represented approximately one-third of total expenditure. ABARE suggested that the towns dependent on agriculture were experiencing population declines as the demand for farm goods and services has grown at a slower pace than demand for other services, such as hospitality and tourism. This could then lead to the 'uncoupling' effect put forward by Stayner and Reeve (1990), where small towns become unable to provide the range and quality of goods and services demanded.

A study by the Productivity Commission focused specifically on the effects of microeconomic reform and competition policy on rural and regional Australia (Productivity Commission 1999). This study concluded that the effects of reform varied far more between country regions than within urban areas. It was concluded that early gains from National Competition Policy favoured urban areas, but that country areas would receive benefits in the medium term. The report also suggested that the population changes in country areas were more likely to be due to structural changes brought about by long-term factors such as changing technology, lower commodity prices and changing lifestyles. Powell (1996, 1997) had stronger conclusions as to the effects of microeconomic reform. These studies concluded that

rural regions of Australia have been hit harder by microeconomic reform than metropolitan areas.

Another study by the Productivity Commission (1998) used Census data from 1981 to 1996 to investigate the relationship between industry composition and regional employment growth. Regions were based on the 194 statistical sub-divisions (SSD) used in Censuses, and modified to 114 regions, primarily due to the merging of SSDs in capital cities to form eight capital city 'regions'. They found that regions with large service sectors had the fastest rate of employment growth. However, they estimated that differences in industrial employment share explained less that 40 per cent of the differences in regional employment growth rates. Further, they found no clear link between structural change (using changes in employment share by industry as a proxy for structural change) and regional employment growth. In fact, many combinations of differing rates of structural change and employment growth were found. For example, high structural change was equated with low employment growth and also high employment growth, depending on the region. Other factors, such as geographical and lifestyle amenity, together with location near growing markets, were suggested as important determinants for regional growth.

The idea that rural populations have been affected by deteriorating service provision has been examined by Beal and Ralston (1998) and Beal and Delpachitra (2005). Their studies focused on effects of the closure of bank branches in rural towns, with their findings showing that bank closures resulted in residents travelling to major centres for their financial needs, and while there, conducting their other business. Data from the Reserve Bank of Australia show that the rate of decline in the number

of non-metropolitan bank branches was 9 per cent between 1970 and 1993, rising to almost 14 per cent between 1993 and 1996, with a further decrease of 25.4 per cent between 1996 and 2003. The number of non-bank financial intermediaries fell by almost 19 per cent between 1996 and 2003 (RBA 1996; Beal and Delpachitra 2005). Beal and Ralston (1998) estimated that the closure of the only bank branch in a town initially had dramatic effects on local business sales, with local businesses reporting average monthly falls of around $675 for low-cash handling businesses and $4 475 for high cash handling businesses. However, a subsequent study found that although the effects of branch closures still existed, the growth in alternative delivery channels for financial services, such as the internet and EFTPOS, had reduced the number of trips to other major town centres (Beal and Delpachitra 2005).

Other surveys on the effects of cuts in rural physical and social infrastructure have found similar results in terms of the negative impact on rural localities. A study by Stayner (1997) surveyed towns in rural Victoria and New South Wales, with results highlighting concerns about the downgrading of rural hospital facilities. Kamien (1998) found that this downgrading of hospitals was one of the main reasons that rural doctors left their practices. Surveys conducted by Harrison (1997) found that the downgrading or closure of rural hospital facilities reduced local employment, expenditure and provided serious access difficulties, particularly for the elderly, which, it was argued, were all contributing factors to out-migration.

A recent survey of 85 respondents in two Western Australian rural towns was conducted to determine reasons for why people lived in those localities (Byles-Drage 2005). Over 64 per cent of the sample had migrated from urban areas, while the

remainder had mostly migrated from other rural areas. The most commonly cited reasons for moving included environmental, lifestyle and employment. Other reasons included cheaper property, increased safety, and returning to their town of origin.

There have also been studies that focus on what is commonly termed 'the rural downturn' as an important contributing factor to the perceived decline in the economic well-being of inland and remote areas (Lewis 1990). The 'rural downturn' argument focuses on the role that the agricultural sector plays in the economic fortunes of rural areas, citing factors such as the long-term downward trend in agricultural terms of trade as one cause of falling incomes and employment levels in agriculture. As the agricultural sector normally comprises around 17 per cent of direct employment in inland areas and close to 16 per cent of employment in remote areas (ABS 2001), it is likely that a downturn in the fortunes of the agricultural sector would have substantial direct and even more significant indirect effects on employment, and therefore population. However, as demonstrated in Chapter 4, during the period under examination here, there was no evidence of a downward trend in employment in agriculture. Therefore it is unlikely that the more traditional idea that falls in job opportunities in agriculture explain the dramatic net migration flows seen in Table 5.2. However, this does not exclude the possibility that regions dependent on agriculture may experience slower employment growth rates than regions with a more diversified industrial base, as was found by Lawson and Dwyer (2002). It also does not exclude the possibility that particular towns, perhaps very small towns, may be more affected by structural changes in agriculture, while other rural towns are less affected (Rasheed 2000).

The Senate Employment, Workplace Relations, Small Business and Education References Committee (1999) documented a number of push factors leading to the out-migration from rural localities. The Committee's findings were largely the result of submissions and oral presentations made to the Committee during visits to numerous towns in many states. The impetus for the decline in a town was cited as the shrinking of key economic base industries, such as agriculture, from which other push factors emanated, such as the closure of support industries and the loss of income and employment. As people left the towns, the subsequent withdrawal of government services, such as schooling and health services, was to seen to contribute to a negative income multipliers effect. The lack of physical infrastructure, such as poor roads and insufficient provision of telecommunications, was also seen as discouraging investment in the perceived required industrial diversification.

There have also been a number of studies that have examined the push and pull factors of the relatively high expense of living in the city versus cheaper housing costs in rural areas. For example, Hugo and Bell (1998) documented welfare-led migration, where recipients of transfer payments were found to be moving from metropolitan areas to rural and rural-coastal areas to access cheaper housing. Burnley and Murphy (2002) also found that low-income households had been migrating to the then cheaper localities on the coast.

5.4.2 Econometric Studies

There are very few Australia-wide studies that attempt to quantify factors that affect interregional migration. There have been a number of studies that have investigated regional populations and labour markets within a particular state (Trendle 2004;

Trendle and Shorney 2004), together with some studies that have estimated determinants of specific regional problems, such as regional unemployment differentials (Dockery 2000). However, as indicated, most econometric studies have not incorporated a broad range of interregional migration determinants for the whole of Australia.

A recent study by Lawson and Dwyer (2002) attempted to isolate and quantify factors leading to employment growth in regional Australia. The unit of observation used in this study was Statistical Local Areas (SLAs), with a sample of 637 regions (cities with multiple SLAs were classified as single regions). The data was taken from the ABS Integrated Regional Database, which contains a combination of Census data with administrative data from other government agencies. The period of analysis was from 1986 to 1996. The model was specified using a binomial logit equation, where the dependent variable was the change in employment for each region over the period, and the explanatory variables included industry employment share, industrial diversity, education, proximity to the coast, remoteness, regional population size and state.

Their results suggest that in Australia's regions, out-migration was likely to be due to high unemployment rates, low access to markets, low regional amenity and younger populations. They also tested for the effect of structural change, measured using an index of the change in the industrial composition of employment. They found that regions experiencing relatively little structural change had higher out-migration levels due to the lack of new growth industries. Further, they also found that regions with diversified industrial bases experienced relatively higher population growth rates than

regions that specialised in one main industry, such as agriculture or mining. In terms of in-migration, the results were broadly the reverse of the out-migration factors. Variables in the destination region associated with in-migration included low unemployment, accessibility to amenity, older populations and higher rates of structural change.

While the findings of this study are interesting and add to the quantitative literature in this area, a weakness lies in its use of over 637 separate regions, as this limits the usefulness of the results. For example, it is difficult to make generalised conclusions about whether a different set of factors affect employment growth in rural areas than coastal areas, or metropolitan areas. The lack of regional grouping does not allow for this type of interpretation.

Tokle and Huffman (1991) carried out a large study to estimate demand and supply equations to determine factors leading to the population and labour movements of married couples in rural areas of the United States (US) for 42 states, using least squares estimation. They tested for gender, age, the presence of children, climate (used as a proxy for amenity), the unemployment rate, cost of living, local amenity and the share of employment in services. They found that education levels, the presence of children, relative wages, dominance of the service sector, gender and perceived job opportunities were significant variables. While overseas studies such as this are useful, it is important to note that rural populations in US states are between 1 million and 3.5 million people, which are vastly different in size to the much smaller populations in regions of Australia, with different implications regarding industry mix, alternative job opportunities, service provisions and social and cultural amenity.

Dockery (2000) modelled the geographical mobility of unemployment benefit recipients with a focus on regional differences in housing costs and the opportunity for employment. He used a longitudinal data set of administrative records to model the probability that a recipient of unemployment benefits would relocate within a 12 month period, and used measures of housing costs and employment opportunities in the locality of origin as explanatory variables. His results suggested that people receiving unemployment benefits were less mobile than non-recipients. However, there was evidence that relative housing costs were more important in the decision of regional migration than employment opportunity. Benefit recipients who did move, migrated to areas of lower housing costs where there was often also lower employment opportunities, providing evidence of a 'poverty trap' effect.

5.5 The Model

As discussed above, there have been very few quantitative studies that enable generalisations to be made about leading causes of differences in population and labour market growth across Australia. While Lawson and Dwyer (2002) estimated factors affecting employment growth at the Australia-wide level, this was not carried out at a regional grouping level. Other studies have been carried out for particular states or regions within states, but not at the nation-wide level.

This present study aims to fill this gap in the research and to provide a quantitative economic model that determines principal variables affecting population changes in different regional groupings at the Australia-wide level. The focus of the modelling is on rural Australia, in line with the purpose of this whole research project. This study

will also provide an up-to-date analysis, covering the period 1991 to 2001, during which, as has been demonstrated in previous chapters, the positive rural population growth trends of the 1980s have been reversed. As was analysed earlier in this chapter, regional population changes between 1991 and 2001 are largely explained by interregional migration, therefore the results from this model will be interpreted as factors affecting interregional migration.

Further, this study is unique in that it uses the ABARE method of classifying regional groupings, for as has been argued in Chapter 2, this provides a more homogenous grouping of areas than other methods of broad regional classifications. It also separates coastal areas from other groupings, which this study has argued is essential given the significant population changes experienced in coastal areas in Australia during the 1990s.

Three separate models will be constructed for the three regional classifications identified as approximating rural Australia – a model for inland regions, a model for remote regions, and a model for coastal regions. The unit of observation is Statistical Local Area (SLA), and the data are sourced from the ABS *Census of Population and Housing* for the years 1991, 1996 and 2001. The data was sourced from CData91, CData96 and CDATA2001 (ABS 1993; 1998; 2003d). The models for each of the three regional classifications are estimated for the two sub-periods 1991-1996 and 1996-2001. The dependent variable is the percentage change in population of an SLA in a particular regional classification from one Census period to another. As discussed earlier in this chapter, there are a range of views regarding factors affecting

interregional migration. The explanatory variables used in this research are explained below.

5.5.1 Variables

The dependent variable in the model for each regional grouping is the percentage change in the population of each SLA in the grouping from one Census period to the next. The explanatory variables for each region used are age, median household income of the region, average unemployment rate in the region, industry mix, as determined by the proportion of people employed in the industry, occupation, educational attainment, gender and State or Territory. These will be discussed further below. The choice of these variables is consistent with theories and previous studies of interregional migration, as reviewed earlier in this chapter. The explanatory variables are measured at their levels at the start of each census period. For example, when modelling the period 1996 to 2001, the dependent variable measures the population change during that period as a proportion of the 1996 population, and the explanatory variables are measured at their 1996 levels.

The unemployment rate used is the average rate of unemployment in each SLA at the beginning of the period modelled. The influence of the unemployment rate on migration is likely to be mixed. In areas where unemployment is high, it might be expected that net migration would be negative. That is, people seeking to maximise economic opportunity and well-being would be less likely to migrate to areas that have relatively higher rates of unemployment. However, it is also possible that many people may not be able to afford to leave a region with high unemployment, as the costs of moving may be too high. Alternatively, as discussed in Section 5.4, relatively

higher rates of unemployment have been associated with both out-migration by the unemployed and welfare-led in-migration. Therefore it is not clear if the unemployment variable will be significant and/or whether it will be positively or negatively signed.

The household income variable is the median average household income level in each SLA. It is anticipated that there would be less regional population out-migration the higher the level of household income. It is also likely that regions with relative higher incomes could experience higher rates of population growth as people would be attracted to areas with higher wages and incomes if they are perceive that they are more likely themselves to be able to earn higher incomes. Also, higher income areas may be associated with better services and facilities which would attract in-migration.

The inclusion of variables for employment by industry aims to determine if regions with a greater reliance on agriculture, for example, are likely to experience lower levels of population growth than regions with a greater reliance on service-based industries. It is measured as the proportion of each SLAs labour force employed in agriculture, mining, manufacturing, services, construction, government, education and health. As the variables are non-continuous, it is necessary to omit one category to enable estimation. Here the utilities category has been omitted, as this does not hinder testing whether primary industries or services are significant factors. Some previous studies have concluded that in regions where primary industries are responsible for a large proportion of economic activity, that population growth is less than regions dominated by service industries (Lawson and Dwyer 2002; Productivity Commission 1999). However, as modelled in Chapter 4, there was an upward trend in employment

growth in agriculture in rural Australia during the period of examination, so it is unclear what the expected sign on the industry variables will be. The inclusion of employment by industry will also enable conclusions to be drawn with respect to any effects that a more diversified industrial base may have on regional population growth rates.

Earlier studies have indicated that younger populations tend to be more mobile, together with some movement of people of retirement age. Alston (2002) and Kirstein and Bandranaike (2004) found that there has been a continuing out-migration of younger people referred to as the 'rural youth drain'. Lawson and Dwyer found that in-migration was associated with older populations (2002). This study has included the proportion of the population in nine age categories to test for the effect of age on population growth. As the data for age is not continuous, one category must be omitted to enable estimation. The 25-34 year old category has been omitted, so as to enable discussion of the effects of children and young people at the age of pursuing further education or starting careers on regional population, while still enabling discussion of the older age groups and retirees.

Variables have been included for occupational mix. These are the proportion of people in the workforce in each occupation. The category of intermediate clerical, sales and services has been omitted, as this then leaves in categories most likely to measure higher skill levels, such as professionals and managers, and categories most likely to measure the lower skilled, such as elementary clerical and unskilled labourers. Some previous studies have found that regions with higher skill levels tend to have less out-migration than regions with lower skill levels (Lawson and Dwyer

2002; Trendle 2004). However, there is no overall consensus in the literature as to whether higher skill levels are associated with inward or outward migration.

Education levels are measured by variables for three levels of post-school education: TAFE certificate level, the diploma and advanced diploma level, and the bachelor degree or higher level. The data measure the proportion of people in an SLA by their highest qualification achieved. The omitted category is those whose highest educational qualification is a higher school certificate or lower. Therefore the model will be able to measure the effect of higher levels of education on population change. Education, in addition to occupation, is also a measure of skills, which in the context of attracting in-migration, can be used as an indicator of the availability of specialised services (Trendle 2004). Therefore, localities characterised with higher skill levels may be associated with higher rates of population growth.

A gender variable has been included in this study in order to determine whether regions with a greater proportion of males relative to females are associated with differences in population growth rates. The variable included here is the proportion of males in the population of each SLA. It has already been shown, both here, (see Chapter 3) and in other studies (Alston 2002) that a gender imbalance does exist and appears to be growing worse over time. This study seeks to determine whether this affects migration patterns.

Lawson and Dwyer (2002) and the Productivity Commission (1999) found evidence that regions within Western Australia and Queensland were more likely to grow relative to other states, therefore dummy variables are included here for state or

territory. During the period under examination in this current study, population growth has been greatest in the states of Queensland and Western Australia (ABS 1993, 1998, 2003d). The omitted category varies depending on which regional classification is being modelled. For example, the Australian Capital Territory does not have coastal regions, and Tasmania has no remote regions.

5.5.2 Variable Definitions

The variables are listed below, with the required omitted category for multiple category variables indicated.

- The unit of measurement is the Statistical Local Area (SLA)
- pop = regional population percentage change from one Census to the next
- ur = the unemployment rate of a particular region
- the age distribution measured by the percentage of the population in the categories
  - age 0-9
  - age 10-14
  - age 15-19
  - age 20-24
  - age 25-34 (omitted category)
  - age 35-44
  - age 45-54
  - age 55-64
  - age 65+
- medianhhy = average median household income of a region
- industry mix, specifically, the percentage of the regional workforce employed in:

- agriculture (agric)
- mining (mining)
- manufacturing (manuf)
- utilities (omitted category)
- services (services)
- construction (construct)
- government (gov)
- education (educ)
- health (health)

- occupational distribution, specifically the percentage of the regional workforce who are:
  - managers and administrators (manage)
  - professional (prof)
  - associate professional (aprof)
  - trade persons (trades)
  - advanced clerical (aclerk)
  - intermediate clerical, sales and service workers (omitted category)
  - elementary clerical (eclerk)
  - intermediate production (iprod)
  - labourers (labour)
- gender = gender measured by the proportion of the population which is male (females the omitted category)
- education, specifically the proportion of the population holding as their highest educational qualification
  - a university degree (uni) – bachelor degree or higher

- diploma/advanced diploma (dip) – undergraduate diplomas, advanced diplomas or associate degrees with completion of year 12 or equivalent as the entry level
- certificate (cert) – TAFE certificate levels I, II, III or IV including trade certificates
- high school certificate or lower (omitted category)

- A dummy variable equal to one or zero is included for each state and territory. The omitted category varies depending on the particular regional classification. For instance, the ACT does not have a coast, and Tasmania has no remote areas.

The model is specified for each of the three regional classifications - coastal, inland and remote - for the two time periods 1991-1996 and 1996-2001. It takes the general form as follows:

$$pop_i = \alpha + ß1ur_i + ß2age^{0\text{-}9}{}_i + ß3age^{10\text{-}14}{}_i + ß4age^{15\text{-}19}{}_i + ß5age^{20\text{-}24}{}_i + ß6age^{35\text{-}44}{}_i + ß7age^{45\text{-}54}{}_i + ß8age^{55\text{-}64}{}_i + ß9age^{65+}{}_i + ß10medianhhy_i + ß11agric_i + ß12mining_i + ß13manuf_i + ß14services_i + ß15constuct + ß16gov_i + ß17educ_i + ß18health_i + ß19manage_i + ß20prof_i + ß21aprof_i + ß22trades_i + ß23aclerk_i + ß24eclerk_i + ß25iprod_i + ß26labour_i + ß27gender_i + ß28state^x{}_i + ß29uni_i + ß30dip_i + ß31cert_i + \mu_i$$

where μ_i is a random error term following the usual classical linear regression assumptions.

(5.1)

5.6 Results

The model was estimated for each region (SLA) of the three regional classifications most likely to measure rural Australia using the ABARE method of regional classification – the inland, remote and coastal classifications. As discussed in Chapter

2, there are many coastal regions that no longer possess the characteristics normally associated with rural Australia. However, as also discussed, some coastal regions are still characterised by features associated with rural areas, therefore, for completeness, the coastal category will be included in this analysis. The method of estimation used is ordinary least squares. Results for non-continuous variables are interpreted relative to the omitted category.

5.6.1 Coastal Regions

Table 5.5 shows the estimates for coastal regions between the Census periods 1991-1996 and 1996-2001. The Breusch-Pagan test for heteroscedasticity does not indicate the presence of heteroscedasticity in the equation for the 1991-1996 period, but does show some evidence of heteroscedasticity in the equation for 1996-2001. The adjusted R^2 is 0.53 for the 1991-1996 equation and 0.6 for the 1996-2001 period, which is considered a good fit for cross-section modelling. (It is noted that the adjusted R^2 could be inflated in the latter equation due to possible heteroscedasticity).

The results show that in the periods 1991-1996 and in 1996-2001, the unemployment rate was not an important factor in determining which coastal regions experienced above average growth in population. It may still be that the unemployed move to the coastal regions, but higher than average unemployment levels are not associated with above average population growth.

For the 1991-1996 period, coastal regions with a high proportion of 20-24 year olds experienced below average population growth. During the 1996 to 2001 period,

above average growth was associated with the middle aged and older age groups, namely 35-44, 45-54 and over 65 years of age.

Regions with income levels greater than the median income were associated with greater than average population growth between 1991 and 1996. While the coefficient was still positive for the 1996-2001 period, this was not statistically significant.

Industry mix does not seem to be very important in explaining movements to coastal regions, with the exception of construction, which is related to above average growth in population over the 1996-2001 period. Construction was also significant at the 10 per cent level in the 1991-1996 period. The direction of causation here is somewhat ambiguous as it could be that greater population growth leads to growth in employment in the construction industry.

There is evidence that regions with above average proportions of people in highly skilled occupations are associated with below average population growth in the 1991-1996 period. In particular, managers, administrators and professionals were associated with below average growth, together with intermediate production workers. In the 1996-2001 period, the coefficients for these variables remained negative, but only intermediate production was significant during this time period.

Of all the states and territories, Victoria appears to have had less population growth in coastal regions between 1991 and 1996, as does New South Wales between 1996 and 2001. Western Australia is associated with above average population growth in

coastal regions between 1996 and 2001. These results are consistent with the switch in population from New South Wales and Victoria to Western Australia and Queensland that occurred in the 1990s (Productivity Commission 1999).

Higher levels of educational attainment do not appear to be significant determinants of coastal population growth rates. The university degree, diploma and certificate variables were not statistically significant in either time period. The proportion of males is also not related to population growth rates in coastal regions, with the gender variable statistically insignificant during both periods.

Table 5.5 Estimated Coefficients, Coastal Regions, 1991-1996 and 1996-2001

Variable	1991-1996			1996-2001		
	Coeff.	**St. error**	**t**	**Coeff.**	**St. error**	**t**
ur	0.0972	0.3022	0.32	0.0735	0.2206	0.33
age 0-9	-0.0573	0.9351	0.06	1.6075*	0.8873	1.81*
age 10-14	0.5242	0.8815	0.59	0.8527	0.6845	1.25
age 15-19	-0.6442	0.8656	0.74	0.8430	0.6970	1.21
age 20-24	-2.1680	1.2126	1.79*	1.3576	1.1193	1.21
age 35-44	-1.0648	0.8226	1.29	1.4094	0.7499	1.88*
age 45-54	-0.4161	0.7691	0.54	1.7730	0.6244	2.84**
age 55-64	-0.2452	0.7758	0.32	1.1545	0.7182	1.61
age 65+	-0.4878	0.5814	0.84	0.9429	0.5047	1.87*
medianhhy	0.0292	0.0126	2.31**	0.0119	0.0096	1.23
agric	0.2737	0.3194	0.86	0.1497	0.2515	0.60
mining	-0.4002	0.2666	1.50	-0.1472	0.2125	0.69
manuf	0.1070	0.2679	0.40	0.1461	0.2147	0.68
services	0.2115	0.3272	0.65	0.4285	0.2623	1.63
construct	0.8300	0.5780	1.44*	1.3404	0.4158	3.22**
gov	-0.0224	0.3301	0.07	0.2297	0.2685	0.86
educ	0.2270	0.4503	0.49	-0.0633	0.3613	0.18
health	0.0596	0.3975	0.15	0.1998	0.3095	0.65
manage	-0.8748	0.5096	1.72*	-0.0869	0.4083	0.21
prof	-2.0012	0.7677	2.61**	-0.7133	0.5529	1.29
aprof	-0.2699	0.6668	0.40	-0.1112	0.5274	0.21
trades	-0.3119	0.6335	0.49	-0.1907	0.4868	0.39
aclerk	-0.2898	1.0498	0.28	-0.4029	0.7866	0.51
eclerk	-0.6838	0.8661	0.79	-0.2140	0.6774	0.32

Table 5.5 Estimated Coefficients, Coastal Regions, continued

Variable	1991-1996			1996-2001		
	Coeff.	**St. error**	**t**	**Coeff.**	**St. error**	**t**
iprod	-1.1394	0.5348	2.13**	-0.7419	0.4163	1.78*
labour	-0.4297	0.4774	0.90	0.0740	0.3642	0.19
gender	-0.3823	0.4212	0.91	-0.3396	0.3190	1.06
NSW	-1.2644	2.4237	0.52	-4.8323	1.9760	2.45**
Vic	-5.6753	2.6880	2.11**	-0.4549	2.0857	0.22
Qld	3.0007	2.7174	1.10	2.3776	1.8978	1.25
SA	-1.4826	2.3785	0.62	0.2286	1.9773	0.12
WA	0.8924	2.2270	0.40	4.7860	1.8388	2.60**
uni	0.5780	0.3637	1.59	-0.0932	0.2731	0.34
dip	0.7664	0.4735	1.62	0.4776	0.3810	1.25
cert	-0.1057	0.2065	0.51	0.2016	0.1786	1.13
constant	87.5911	70.0993	1.25	-116.7066	60.70	1.92
Adjusted R^2	0.53			0.60		
$\chi^2(35)$	31.20			48.57*		
No. of obs.	137			137		

t is the absolute value of the t statistic

St. error is the absolute value of the standard error

χ^2 is the relevant test statistic for heteroscedasticity

* significant at 10 per cent level

** significant at 5 per cent level

5.6.2 Inland Regions

Table 5.6 shows the estimates for inland regions between the Census periods 1991-1996 and 1996-2001. There is no significant heteroscedasticity indicated in the models for either time period. The adjusted R^2 is 0.34 for the 1991-1996 period and 0.38 for the 1996-2001 period.

In the period 1991-1996, the unemployment rate in inland regions was associated with below average population growth rates. This was the period when unemployment was more serious in Australia, with the results indicating that above average regional unemployment rates were associated with either out-migration or lower than average levels of in-migration. There was no evidence of the same relationship over the period 1996-2001, which corresponds to a time with falling unemployment rates in all regional groupings throughout Australia. That is, when the job market became more buoyant, there is no evidence of a relationship between unemployment rates and population growth rates.

The age distribution was not a significant determinant of population movements in inland regions in the earlier part of the decade. However, in the 1996 to 2001 period, regions with a high proportion of children in the age range of 10-14 years experienced population growth rates below the average for inland regions in general. During the same period, above average increases in population were associated with regions with a higher proportion of people aged between 45-54 years.

Over the period 1996-2001, regions with high median household income levels experienced rates of population growth above average population growth. This was not a significant factor during the 1996 to 2001 period.

Diverse industry mix appears to be an important factor for population growth over both time periods. Above average employment levels in the manufacturing and service sectors were strongly associated with above average population growth rates in both time periods. The mining sector was significant at the 10 per cent level and also associated with above average population growth rates, but only in the 1991-1996 period. Interestingly, in the 1996 to 2001 period, regions with a high dependence on the agricultural sector were associated with above average population growth relative to inland regions in general. The variable for the construction industry was also significant in the latter time period, and was related to above average population growth rates.

Occupational status appears to have been important in both periods, with higher occupational status consistently associated with below average population growth. For example, during the 1996-2001 period, a high proportion of managers and administrators, professionals, associate professionals, and trades people in the workforce were all associated with below average population growth rates. All of the aforementioned occupations, with the exception of associate professionals, were also significant during the 1991-1996 time period. However, elementary clerical, intermediate production and labourers were also significant and were associated with below average population growth rates.

As with coastal regions, the distribution of educational qualifications is not a significant factor in determining regional population growth rates in either period. Gender also does not appear to have been an important factor in either period.

Queensland and Western Australia were associated with higher than average growth in the period 1996-2001, which accords with population movements between states during those years (Lawson and Dwyer 2002).

Table 5.6 Estimated Coefficients, Inland Regions, 1991-1996 and 1996-2001

Variable	1991-1996			1996-2001		
	Coeff.	**St.**	**t**	**Coeff.**	**St. error**	**t**
ur	-0.3847	0.1432	2.69**	0.0586	0.1389	0.42
age 0-9	0.2227	0.4116	0.54	0.5294	0.4151	1.28
age 10-14	0.2173	0.3529	0.62	-0.8155	0.3298	2.47**
age 15-19	0.0911	0.3413	0.27	-0.0397	0.3225	0.12
age 20-24	-0.6301	0.4720	1.33	-0.6569	0.4688	1.40
age 35-44	-0.1819	0.3510	0.52	0.2730	0.3519	0.78
age 45-54	0.0185	0.3083	0.06	0.5495	0.3200	1.72*
age 55-64	0.2237	0.3839	0.58	0.3912	0.3615	1.08
age 65+	-0.3454	0.2534	1.36	-0.0815	0.2592	0.31
medianhhy	0.0018	0.0051	0.35	0.0109	0.0051	2.15**
agric	0.0815	0.1551	0.53	0.3301	0.1602	2.06**
mining	0.2577	0.1368	1.88*	0.1668	0.1382	1.21
manuf	0.3736	0.1315	2.84**	0.5354	0.1321	4.05**
services	0.4234	0.1616	2.62**	0.5724	0.1614	3.55**
construct	0.3445	0.2754	1.25	0.5720	0.2600	2.20**
gov	0.0995	0.1738	0.57	0.0174	0.1675	1.04
educ	-0.1199	0.2510	0.48	0.4196	0.2480	1.69
health	-0.0902	0.1987	0.45	0.0908	0.2000	0.45
manage	-0.4369	0.2367	1.85*	-0.5936	0.2283	2.60**
prof	-0.4001	0.3487	1.15	-0.8269	0.3271	2.53**
aprof	-0.9461	0.3170	2.98**	-1.0521	0.2788	3.77**
trades	-0.8073	0.2545	3.17**	-0.6845	0.2388	2.87**
aclerk	-0.6057	0.4669	1.30	0.4640	0.4863	0.95
eclerk	-0.9869	0.3634	2.72**	-0.4780	0.3253	1.47

Table 5.6 Estimated Coefficients, Inland Regions, continued

Variable	1991-1996			1996-2001		
	Coeff.	**St. error**	**t**	**Coeff.**	**St. error**	**t**
iprod	-0.7131	0.2445	2.92**	-0.4893	0.2456	1.99**
labour	-0.4458	0.2326	1.92*	-0.5458	0.2269	2.40**
gender	0.1499	0.2205	0.68	0.0049	0.2112	0.02
NSW	-3.3839	2.5153	1.35	1.7924	2.1172	0.85
Vic	-3.5905	2.4625	1.46	3.3089	2.0792	1.59
Qld	-1.4116	2.6330	0.54	4.3627	2.2101	1.97*
SA	-2.3731	2.5727	0.92	3.2818	2.2154	1.48
WA	-2.0448	2.5541	0.80	4.1920	2.1745	1.93*
uni	0.2391	0.1644	1.45	0.1677	0.1582	1.06
dip	0.0255	0.2046	0.12	0.2126	0.2163	0.98
cert	0.1801	0.1261	1.43	-0.0264	0.1210	0.22
constant	27.2069	33.8810	0.80	-9.0726	30.7518	0.30
Adj R^2	0.34			0.38		
$\chi^2(35)$	28.29			43.91		
No. of obs.	289			289		

t is the absolute value of the t statistic

St. error is the absolute value of the standard error

χ^2 is the relevant test statistic for heteroscedasticity

* significant at 10 per cent level

** significant at 5 per cent level

5.6.3 Remote Regions

Table 5.7 shows the estimates for remote regions between the Census periods 1991-1996 and 1996-2001. There is no significant heteroscedasticity in the equations for either time period. However, for the period 1991-1996 the model is somewhat disappointing in its explanatory power, with few significant coefficients.

During the 1991-1996 period, remote regions with a greater than average proportion of 35-44 year olds were associated with below average population growth rates. Between 1996 and 2001, 15-19 year olds were associated with above average population growth rates in remote regions.

Industry mix does not appear to have been very important in determining population growth, with only construction, at the 10 per cent level of significance, being associated with above average population growth during the 1991-1996 period.

Between 1996 and 2001 there is evidence that higher skill levels were associated with below average population growth rates, with the managers and administrators variable significant at the 5 per cent level. This has been a consistent finding with all the regional groupings modelled here. Elementary clerks were also significant and associated with below average population growth during this period.

Interestingly, it is only in remote regions that the gender variable becomes significant. Between 1991 and 1996 there is some evidence that gender mix was important, with a high percentage of males associated with below average population growth rates.

Table 5.7 Estimated Coefficients, Remote Regions, 1991-1996 and 1996-2001

Variable	1991-1996			1996-2001		
	Coeff.	**St. error**	**t**	**Coeff.**	**St. error**	**t**
ur	0.1983	0.3686	0.54	-0.1153	0.3297	0.35
age 0-9	0.0132	0.8028	0.02	0.9150	0.7950	1.15
age 10-14	0.1652	0.9427	0.18	-1.0587	0.9456	1.12
age 15-19	-0.6290	1.0179	0.62	2.1256	1.0368	2.05**
age 20-24	-1.2264	1.0252	1.20	-1.3357	1.0106	1.32
age 35-44	-1.7507	0.7456	2.35**	-0.2488	0.7558	0.33
age 45-54	-0.3050	0.8309	0.37	0.3609	0.8191	0.44
age 55-64	-0.7001	0.7032	1.00	0.8004	0.6687	1.20
age 65+	-0.7758	0.6178	1.26	0.0489	0.6174	0.08
medianhhy	-0.0047	0.0090	0.52	0.0093	0.0097	0.96
agric	-0.4659	0.3223	1.45	0.4367	0.3227	1.35
mining	-0.2658	0.2699	0.99	-0.0308	0.2651	0.12
manuf	-0.5068	0.3735	1.36	-0.1477	0.4863	0.30
services	-0.1119	0.2852	0.39	0.1961	0.2737	0.72
construct	0.9198	0.4974	1.85*	0.3360	0.4470	0.75
gov	-0.1651	0.2948	0.56	0.2056	0.2936	0.70
educ	-0.7499	0.8028	0.93	-0.4727	0.7448	0.63
health	-0.2676	0.3006	0.89	0.4693	0.2963	1.58
manage	-0.0070	0.5395	0.01	-1.0297	0.5057	2.04**
prof	-0.7319	0.7422	0.99	-0.2525	0.7370	0.34
aprof	-0.3046	0.6623	0.46	-0.2566	0.6664	0.39
trades	-0.5915	0.5793	1.02	-0.9568	05435	1.76*
aclerk	-0.7327	1.2272	0.60	1.1350	1.3629	0.83
eclerk	1.0887	0.9812	1.11	-1.8802	0.8877	2.12**

Table 5.7 Estimated Coefficients, Remote Regions, continued

Variable	1991-1996			1996-2001		
	Coeff.	**St. error**	**t**	**Coeff.**	**St. error**	**t**
iprod	-0.3593	0.6102	0.59	-0.2780	0.5728	0.49
labour	-0.2121	0.4779	0.44	-0.5555	0.4252	1.31
gender	-0.7840	0.4492	1.75*	-0.0545	0.4036	0.13
NSW	-6.4777	7.2960	0.89	-5.0520	7.939	0.64
Vic	-16.3745	16.8502	0.97	10.0333	19.335	0.52
Qld	-6.2146	7.0452	0.88	2.0289	7.3159	0.28
SA	-4.6107	6.7243	0.69	4.1103	7.2694	0.57
WA	-1.1963	7.1709	0.17	0.4383	7.6792	0.06
NT	-1.1575	7.6874	0.15	-4.0791	8.0660	0.51
uni	-0.2236	0.5554	0.40	-0.2359	0.5412	0.44
dip	-0.4233	0.6750	0.63	-0.3341	0.6441	0.52
cert	-0.0096	0.3292	0.03	0.2202	0.3373	0.65
constant	143.9834	64.4309	2.23	15.0310	60.4181	0.25
Adj R^2	0.18			0.26		
$\chi^2(36)$	42.66			36.55		
No. of obs.	118			118		

t is the absolute value of the t statistic

St. error is the absolute value of the standard error

χ^2 is the relevant test statistic for heteroscedasticity

* significant at 10 per cent level

** significant at 5 per cent level

5.7 Discussion of Results

The intent of the three models was to determine which variables were associated with population growth, relative to the average, for each regional grouping during the two Census periods 1991-1996 and 1996-2001. While there are some variables that are consistently similarly related to population changes in the different regional groupings, there are some results which differ, which substantiates the hypothesised differences between coastal and rural areas put forward in this research. The results for each regional classification in the context of previous studies, economic theory and likely explanations for the current findings, are discussed below.

5.7.1 Coastal Regions

As analysed in Section 5.2, above average population growth is most likely due to positive net interregional migration, and not to rising birth rates, falling death rates or rising international migration. The results here suggest that older populations, higher median household incomes, a higher proportion of skilled occupations and being located in Western Australia are all related to above average regional population growth.

The above average growth association with older people lends support to the idea that coastal regions are increasingly attractive to older workers and retirees. Age was not significant in the first half of the 1990s, but was strongly significant in the second half of the decade.

According to economic theory, individuals will migrate if the returns from migration exceed the costs and they believe that they will be 'better off' as a result of moving.

There was a significant relationship between positive net migration and higher levels of household income. This may mean that people perceive that if they move to an area which has higher median income levels, that they themselves may have higher incomes. Alternatively, or in addition, higher income areas tend to be associated with a wider range and better quality of services. Therefore, again, a move to a higher income area may be a rational decision that makes the in-migrants 'better-off'.

The results also show that in general where there is a higher proportion of more highly skilled workers, there is a below average rate of population growth. This finding differs from the results from the earlier studies discussed above (Lawson and Dwyer 2002; Trendle 2004), which found that higher skills were associated with in-migration. The results here suggest that there is not as great a movement into or out of coastal regions among professional people as for others.

It is also clear that above average growth is associated with coastal regions in Western Australia during the 1996-2001 period. This is consistent with higher migration rates to Western Australia relative to other states, and the findings of the Productivity Commission (1999) and Lawson and Dwyer (2002).

The lack of significance of unemployment rates suggests that reasons of employment opportunity or the risk of unemployment are not foremost in the decision to migrate to or leave coastal regions. This is consistent with the data in Chapter 3 which revealed that coastal regions had high rates of population growth at the same time as the highest rate of unemployment of all the regional groupings. It could be that the unemployed move to coastal regions to enjoy better amenity (such as environmental

and lifestyle amenity) available in coastal regions while they are unemployed. Similarly, unemployed people may not be leaving coastal regions. Further, the existence of unemployment appears not to have deterred employed people from moving into coastal regions.

The insignificance of the industry variables also suggests that the industry mix is not important in the decision to move to or from coastal regions. This is an important result, as other studies have found that a more diverse industry base is associated with population and employment growth for regions in general (Lawson and Dwyer 2002). However, this present study created a separate grouping for coastal regions, which many previous studies did not. Therefore the results indicate that the factors affecting population change in coastal regions are different than for other regional classifications, and it is necessary to include coastal regions in a separate classification from other rural areas.

5.7.2 Inland Regions

For inland regions, the results of this study suggest a number of economic factors are important in determining population growth rates. Significant variables include the rate of unemployment, industry mix, occupation mix, income levels, age and state.

During the 1991-1996 period, regional unemployment was strongly associated with below average rates of population growth. As discussed earlier in this chapter, there have been differing views and theories regarding the relationship between unemployment and migration. It was shown above that unemployment rates were not

significant in the decision to migrate to coastal areas. This was clearly not the case for inland regions.

The finding of the presence of welfare-led migration, and a positive correlation between in-migration and higher relative unemployment rates (Dockery 2002; Hugo 2002) is also not supported in this model of inland regions during the earlier time period. The findings of this model support the view that individuals will not seek to supply their labour to areas where they perceive the probability of unemployment to be higher. Over the earlier part of the 1990s unemployment was a much more serious problem than in the later period, and therefore, would have had a more significant impact on location choice. By the latter period, unemployment rates nationally and in all regional classifications were falling. The lack of significance of the unemployment rate in the latter period supports the view that unemployment became a less important determining factor in the decision to migrate.

In another contrast with coastal regions, the age variables were generally not significant for inland regions. One exception was with 10-14 year olds, where this age group was associated with lower than average population growth rates in the 1996-2001 period. The possible explanation, which is supported by the literature, is the decision by families to leave rural areas when their children reach high school age, due to a perceived or actual lack of educational facilities at the high school level (Harrison 1997; Rural and Regional Services and Development Committee 2006). The only other significant age group (at the 10 per cent level only) was the 45-54 year olds, which were associated with above average population growth.

As with the model for coastal regions, higher household income was associated with above average population growth, supporting the view that people are motivated to live in areas where their incomes could be higher. Income may also be a proxy for the level and availability of services and amenities. That is, areas with higher incomes are usually characterised by better services, which creates a positive externality effect for others moving into those areas.

Many of the industry variables are significant in inland regions (again in contrast with coastal regions). In both time periods, higher proportions of people employed in the manufacturing and service industries was strongly associated with above average population growth rates. This result substantiates the findings of earlier studies, which found that regions with a diverse industrial base were less likely to experience falls in population growth rates than regions which have a greater reliance on one industry, such as agriculture or mining (Productivity Commission 1998; Lawson and Dwyer 2002).

However, importantly, the model here also demonstrates that for the second half of the decade, a high proportion of people working in agriculture was associated with above average population growth. This supports the view that rural population decline, or below average growth, cannot be explained primarily by the structural changes that have occurred in the agricultural sector. Other studies have frequently cited factors such as the declining numbers of agricultural establishments, the removal of tariff protection or changes in technology as leading to declines in employment in agriculture, with subsequent flow-on declines in labour demand in other sectors (ABARE 1997; Garnaut, Connell, Lindsay and Rodriguez 2001; Productivity

Commission 2005). As demonstrated in Chapter 4, structural adjustment does not appear to have reduced employment in agriculture over the time period modelled here.

Higher skill levels are generally strongly associated with below average population growth rates in both time periods. This suggests that inland regions are not attractive to the more highly skilled, with fewer amenities and less career support. It is well documented that there is a difficulty in both attracting skilled workers to rural areas and in keeping them there (Department of Health and Ageing 2000; Field 2002; Harrison 1997; Kamien 1998; Sharplin 2002).

In the 1996-2001 period, Queensland and Western Australia were both associated (at the 10 per cent level of significance) with above average population growth rates in inland areas.

5.7.3 Remote Regions

As a whole, remote regions experienced an exodus of people, but it is difficult to model why any particular region is suffering more than others. As discussed in the previous section, there were very few variables with significant coefficients in the model for remote regions. This indicates that many of the variables that traditionally explain interregional migration did not apply to remote areas during this period.

This may be explained in part by the fact that remote areas have a high proportion of Indigenous people, and the factors affecting the migration of Indigenous people are complex (Biddle and Hunter 2005). While the factors differ between remote

Indigenous communities, they relate to a mix of government policies, the origins of church mission establishments, social and community cohesiveness, decisions by elders, constraints on their opportunities for social and economic participation, and historical and cultural connection to specific land areas (Taylor 2006). Indigenous Australians have demonstrated a low propensity to migrate in search of employment relative to non-Indigenous labour, and may have a lower likelihood to migrate for children's formal education (Taylor and Stanley 2005).

Remote regions also contain non-Indigenous people in the agricultural sector who are less mobile due to their ownership or lease of very large cattle stations. Modelling population change and migration in remote regions is also complicated by mining sites, the opening or closure of which depend on exploration levels, commodity prices and legal requirements, and is further complicated by varying fly-in/fly-out practices.

However, the results from the model do show that below average population growth is associated with a high proportion of teenagers, prime age workers, professional workers and gender.

As with inland regions, the presence of teenagers was associated with a lower than average population growth rate in the 1996-2001 period, which is suggestive of outward migration for schooling or employment opportunities. In the earlier time period, 35-44 year olds were also associated with slower population growth rates.

The findings that higher skilled people were again associated with below average population growth supports the arguments regarding the effect of the lack of amenity and career support in rural and remote Australia.

It is only in the model for remote regions that gender becomes a significant variable. Males were associated with lower than average population growth rates in the 1991-1996 period, at a 10 per cent level of significance. Therefore this provides evidence that a gender imbalance does affect population growth and interregional migration in remote areas.

5.8 Conclusion

This chapter has sought to identify the major population movements in and out of rural Australia over the decade 1991 to 2001. It has shown that many rural regions have experienced a significant level of negative net-migration during this period, while coastal areas, other metropolitan areas and capital cities have experienced positive net migration. Between 1991 and 1996, inland regional classification experienced negative net migration equivalent to 1.9 per cent of the population, which increased to 2.4 per cent in the 1996 to 2001 period. For the remote classification, net migration was -6.2 per cent of the population between 1991 and 1996, rising to -7.6 per cent between 1996 and 2001. This is in contrast with positive net migration in the capital cities, other metropolitan and coastal classifications. Together with the very low population growth rates shown in Chapter 3, this demonstrates that the population and labour force growth experienced in rural Australia in the 1970s and 1980s, termed the 'rural turnaround' has been reversed between 1991 and 2001. Although Census data beyond 2001 is not yet available, it is likely that rural areas have continued to

experience low population growth rates and relatively higher outward migration levels since 2001, due to the effects of the 2003 and 2006 nationwide droughts (see Chapter 4, Figure 4.1).

There have been only a limited number of quantitative studies carried out at the Australian-wide level that have modelled the determinants of population change at the regional level. Further, previous attempts have not always treated coastal regions as separate from other rural areas. This study has used the most recent Census data available to model inland, remote and coastal regions, to identify the characteristics that have affected population change over the 1991 to 2001 period.

The results suggest that the factors determining growth in coastal regions differ from the factors influencing rural population growth in inland and remote areas. The results also suggest that the decision to migrate to coastal regions (or not to leave) largely relate to income levels, age and occupation.

The results for inland regions contradict the findings of previous studies, which attributed slow population growth to the presence of agriculture as a relatively dominant industry. This study found that a strong agriculture base was positively related to regional growth. This is consistent with the observed increase in agricultural employment since the recovery of the interest rate induced recession in 1990. However, the droughts of 2003 and 2006 have since reversed this growth. The results also suggest that a more diversified industrial base was associated with above average population growth – a finding that is consistent with other studies. Other

significant factors included the unemployment rate, age, income levels, occupation and state.

The results also suggested that many of the factors that determine population change and interregional migration in remote regions are not easily explained by standard migration theory. However, some variables did have explanatory significance, including age, occupation and gender.

The next chapter will examine the policy considerations and implications that follow on from the findings of the previous four chapters. Given that rural Australia continues to be characterised by differing labour market characteristics and trends than urban areas, and has experienced a significant reversal in population and labour force trends since 1991, an examination of policy has renewed importance.

CHAPTER 6 RURAL LABOUR MARKET POLICY

6.1 Introduction

It is argued here, and in much of the research into rural and regional labour markets, that rural labour markets have different characteristics and policy issues than metropolitan labour markets. Such differences must be established to provide justification for the need for specific government policies for rural labour markets in particular. If such differences are not established and accepted, then there would clearly not be the need for a separate set of policies for rural Australia.

Chapters 3, 4 and 5 have demonstrated the significant differences between rural labour markets and their metropolitan counterparts. Rural regions relative to urban regions are characterised by:

- significantly lower employment growth rates
- a far greater proportion of self-employed
- lower labour force participation rates
- a significantly greater proportion or people employed in primary industries
- ageing of the population at a greater rate
- significant exodus of youth from the labour market
- chronic skills shortages, including general practitioners, medical specialists, nurses, school teachers, veterinarians, information and technology specialists and tradespersons
- significant shortages in seasonal labour
- lower levels of formal education, particularly beyond year 10 at high school
- much lower population growth rates

- high levels of net outward migration

It is clear that rural regions in Australia have been, and continue to be, distinguished by very different population and labour market characteristics than those features which characterise more urbanised areas. Therefore, if it is accepted that governments are responsible for the provision of education, health care, transport, infrastructure, and a range of other services, this implies that economic and social policy specific to rural areas is required in order to address the differing set of issues and problems apparent in rural labour markets and economies.

6.2 Measurement Issues

If it is recognised that there is an important role for government policy in regions of Australia, it is vitally important that this policy is based upon reliable research and data. There is a continuing problem in that there is no consistently recognised definition or method of classification as to what constitutes whether a region is rural, remote, coastal or some other regional classification. Instead, there are a number of methods used in Australia to create spatial regions for population and labour market analysis, for government policy and administrative purposes. Regions in Australia have been defined by the population size, industrial base, the degree of remoteness and access to services, or some combination of these factors. To enable informative and useful analysis, the best regional classifications are those that group areas such that they are more homogenous in terms of economic, geographic, service amenity, and possibly environmental amenity, social and cultural characteristics. As discussed in Chapter 2, the final choice usually depends on the purpose of the research or use of the data, and on the cost and availability of data.

Chapter 2 identified at least fourteen different methods of classifying regions or localities in Australia. These include the Rural, Remote and Metropolitan Areas (RRMA) classification; the Griffith Service Access Frame (GSAF); the Accessibility/Remoteness Index of Australia (ARIA); ARIA Plus; ARIA Plus Plus; STATE ARIA Plus; the Australian Bureau of Statistics (ABS) Section of State Structure; the ABS Remoteness Structure; the Productivity Commission classification; the Zonal Tax Rebate Scheme method; the classification of remoteness contained in Fringe Benefits Tax (FBT) legislation; the Department of Employment and Workplace Relations (DEWR) Small Area Labour Market classification used by the Job Network; the Australian Classification of Local Governments (ACLG); and the Australian Bureau of Agricultural and Resource Economics (ABARE) regional classification. For sound policy it would be useful if some consensus could be reached between government agencies on regional classifications.

A related problem common in research is that much of the data are collected for administrative purposes, such as Medicare and taxation rebates. This differs from data collected for research purposes such as regional data collected by ABS for the analysis of population and employment. A common outcome is that administrative and research data do not match up. It is suggested here that administrative data could be coded which would then enable it to be matched up with other research classifications. There is a role for an organisation, such as the ABS, to design a coding framework which would allow the data to be used for their original purpose, such as administration, as well as for research purposes.

6.3 Employment and Unemployment

A well functioning labour market requires adjustments, perhaps frequent, to changes in supply and demand. Failure to adjust can manifest itself in several ways, the most obvious one being persistent unemployment. Another manifestation may be persistent shortages of labour resulting in output at below potential levels. A related problem may be periodic shortages of labour, for instance due to the seasonal nature of demand and supply for rural labour. Therefore an analysis of the efficiency of labour market adjustment would start with the evidence on employment and unemployment.

6.3.1 Unemployment

There is no evidence of significant differences in unemployment rates between capital cities and rural localities at an aggregate level. As seen from Chapter 3, Table 3.7, the unemployment rates in inland and remote regions have been similar to, and sometimes lower than, the rate of unemployment in capital cities. For example, in capital cities, the rate of unemployment was 11.2 per cent in 1991, 8.5 per cent in 1996 and 5.9 per cent in 2001. This is very similar to the rates for inland regions of 11 per cent, 9 per cent and 5.9 per cent for the same years. It is other metropolitan areas and coastal areas that have experienced significantly higher unemployment rates relative to other regional classifications.

This is not to conclude that some individual rural regions do not have above average unemployment. There is also the probability that unemployment rates, particularly in remote regions, have been masked to some extent by the Community Development Employment Projects **(**CDEP) scheme for Indigenous Australians (as will be

discussed in more detail later in this chapter). It may also be that some of the unemployed move out of rural regions to coastal or more urbanised areas under the perception that job opportunities are greater there, and perhaps to enjoy better services and lifestyle while they are unemployed. However, the evidence does not show any general failure of rural labour markets in terms of relative unemployment levels. Based on the relatively low average rates of unemployment in the broad categories of rural regions used in this study, there does not appear to be a systematic problem of excess supply of labour in rural areas.

6.3.2 Employment Growth

The rates of employment growth in rural labour markets are far below those in urban labour markets. Between 1991 and 1996, employment growth in capital cities was 8 per cent and for other metropolitan areas was 14 per cent. Between 1996 and 2001, employment growth for capital cities was 9.4 per cent and for other metropolitan areas was 11.2 per cent (see Chapter 3, Table 3.6). This compares to 2 per cent growth for inland regions and 4.4 per cent growth in remote regions between 1991 and 1996, and 5.9 per cent and 2.3 per cent growth, respectively, between 1996 and 2001. Therefore, labour demand has risen less in rural areas than for the rest of Australia. Given the similar unemployment rates, this implies that the labour supply grew in rural areas at a slower rate than the rest of Australia. This is consistent with the net population movements from rural regions to the rest of Australia, as demonstrated in Chapter 5.

As shown in Chapter 3, employment growth in Australia as a whole has been slower in primary industries relative to service industries. As rural areas have a far greater

proportion of employment in primary industries relative to more urbanised areas, the slower overall employment growth in rural Australia is not unexpected. The positive net outward migration from rural areas that has occurred since 1991 is also an important contributing factor to the relatively slow growth in labour demand and hence employment growth rates. This is because population size is the biggest determinant of the demand for services and hence employment in this sector.

A range of studies and surveys have demonstrated that as people leave a region, there are significant flow-on effects which cause local businesses and government services to decline, along with employment in those industries (see Chapters 4 and 5). Further, rural regions affected by the 2002/03 and 2006/07 drought are likely to have experienced even slower employment growth rates together with further outward migration. The linkages between the agricultural sector and other rural industries, together with the multiplier estimates examined in Chapter 4, support the conclusion that the serious droughts of the 2000s are likely to have led to reduced demand for rural products and services, and therefore declines in industry and employment growth in those areas.

6.3.3 Participation Rates

Not only has below average population growth contributed to reduced labour supply, rural regions have also been experiencing lower participation rates than capital cities. Given that rural populations are ageing at a faster rate than their metropolitan counterparts, it is likely that participation rates will continue to fall, or at least not rise, at a rate as great as other areas. Participation rates in remote regions are below the rates in other rural areas. For example, in 2001, the labour force participation rate in

inland regions was, on average, 71.5 per cent, while in remote regions it was 69.6 per cent (ABS 2003d).

Falling participation rates in Australia are projected to have serious implications for the future labour supply and may well be a constraint on economic growth, and this will be even more so for rural Australia (Productivity Commission 2005a). Already, severe labour shortages are evident in rural regions (see next section). Government policies to increase participation rates in rural areas encompass national policies such as the favourable treatment of superannuation benefits and the requirement that particular single parents work part-time.

A related issue is the lack of availability of child care in some rural areas (Ley 2005; Morda, Kapsalakis and Clyde 1999). As the average birth rate is higher in rural regions than urban areas (2.2 children per woman in rural areas compared to 1.7 children per woman in capital cities), child care availability is likely to have an impact on female participation rates in rural areas. The lack of childcare facilities in some regions could be because of the inability of parents to pay the full cost, in which case there is a policy case for government funding. However, a more serious issue in rural areas may be the lack of skilled labour, since child care workers must have appropriated training and accreditation. This suggests a role for government in providing training. It is not clear with the available data which of these is the most serious problem.

In addition to lower participation rates in rural areas, specific policies are required to address a more generalised problem of labour shortages. This is examined in the following section.

6.4 Skills Shortages

It has been well documented that rural regions have experienced skill shortages for many years (see Chapter 3). In the late 1990s and 2000s, skill shortages have also become a serious policy issue affecting the whole economy. Government reports investigating the nation-wide skill shortage have, until recently, been generally non-spatial in nature (Department of Employment Workplace Relations and Small Business 1999), and policies such as skills-targeted immigration, and the National Skills Shortages Strategy (Department of Education, Science and Training 2004), are generally addressing Australia as a whole. A Commonwealth Government 2007 inquiry into rural skills shortages has acknowledged the importance of geographical factors with regard to nature of skills shortages in Australia (House of Representatives Standing Committee on Agriculture, Fisheries and Forestry 2007).

The National Farmers' Federation has reported that following the 2002/03 drought, which resulted in the loss of approximately 100 000 jobs, that only 30 000 of these jobs have been recovered, with a large number of agricultural employees leaving the industry and not returning (National Farmers' Federation 2005). The shortage of skills has been affecting rural regions for many decades, and the shortages in some professions are more acute than in metropolitan areas. Thus, specific policies are required to address this problem. This is evidenced by shortages of medical practitioners, nurses, school teachers, veterinarians, information, communications and

technology professionals and traditional trades (Bureau of Transport and Regional Economics 2006; Department of Education, Science and Training 2004; Department of Health and Ageing 2000; Field 2002; McKenzie 2004; Sharplin 2002).

This shortage has become worse with the minerals boom in Australia, which began in 2004. Wages offered by mining companies are significantly higher than in many other industries, attracting both seasonal and permanent labour from agricultural localities (Harris 2005). Some rural and remote regions have also been unable to fill middle management positions such as head stockmen, foremen and overseer positions, with the shortages compounded by existing managers moving to the mining industry (Harris 2005).

6.4.1 Addressing the Skills Shortage

There is a range of approaches to the problem of how rural skill shortages should be addressed. One approach follows the argument that it represents a mismatch between the skills required and the skills available. The Commonwealth Government stated that in the five year period from 1999 to 2004, it approached skills shortages in non-metropolitan Australia on an industry by industry basis (Department of Education, Science and Training 2004). This approach involves increased and improved education and training within rural areas to address the problem. As shown in Chapter 3, rural education at all levels increased significantly between 1991 and 2001. Further, there have been and are a number of education programs specifically targeting rural education. For example, state governments provide extensive distance education networks for remote areas. These are accompanied by fly-in/fly-out visits

from secondary school teachers, which is also a two-way arrangement, with students visiting the distance education centres in capital cities.

The improvement in telecommunications has greatly increased student access to on-line materials and real time on-line discussion with school teachers. State governments have provided communication centres, such as Telecentres in Western Australia, from which access to computer and internet facilities are available. A large number of rural towns also have Commonwealth Rural Transaction Centres (RTC) which provide financial, postal, telecommunication, internet, library, printing, secretarial, taxation, Medicare, Centrelink and other government services. The establishment of RTCs were part of the Telstra (Further Dilution of Public Ownership) Act 1999, in which $70 million from the sale of the formerly government owned telecommunications company was spent providing improved services in rural Australia (Department of Transport and Regional Services 2007b). Larger rural towns have increased access to Technical and Further Education (TAFE) and university studies with an increase in the number of regional campuses. There are also a range of apprenticeship schemes provided by Commonwealth and state governments.

One of the shortcomings related to the above schemes is the lack of evaluation of their effectiveness. Clearly it can be difficult to determine the efficacy of government policies and schemes given the simultaneous changes in other factors affecting the decision of skilled workers to stay, leave or migrate to rural areas. However, there is a distinct lack of research attempting to evaluate the outcomes of government

intervention policy in rural areas (Bureau of Transport and Regional Economics 2003). This issue will be examined in further detail later in this chapter.

6.4.2 National Skills Shortage Policy

In 2004 the Commonwealth Government also announced its *National Skills Shortages Strategy,* (Department of Education, Science and Training 2004), which recognised the more general nature of skills shortages, rather than examining it on an industry by industry basis. The regional component of this strategy is being piloted in particular regional areas to:

- "profile existing and potential industries in a region;
- identify common factors and solutions to skills issues;
- engage relevant national, state and local industry and training bodies;
- identify skills and training needs; and
- pilot practical strategies that could be used in other regions" (Department of Education, Science and Training 2004).

However, a focus on education and training, while an essential component of a broader policy approach, does not prevent educated youth or qualified people from leaving rural areas to further their careers in metropolitan areas. A number of studies have focused on the particular issue of retaining rural youth, who have been exiting rural regions more rapidly than other age groups (Hillman and Rothman 2007; Kirstein and Bandranaike 2004). For instance, the Australian Council for Education Research conducted a longitudinal survey tracking the movements of 5112 non-metropolitan students who were in year nine of high school in 1995, through to where they were living in 2004 (Hillman and Rothman 2007). It was found that 26 per cent

of these students were living in metropolitan areas in 2004, and 36 per cent had lived for at least one year in a major city between 1998 and 2004. The people most likely to stay in metropolitan areas after schooling were those who had studies full time at TAFE or at university. There does not yet appear to be any real success in slowing down the exodus of youth from rural areas (Alston 2002), and it is difficult to provide sufficient incentives for younger people to remain in their local rural communities. The approach of seeking to retain youth is likely to be related to building up rural communities, to enable improved services and amenity to exist.

Further, given that rural unemployment levels are lower than many other regions, together with the nature of the unemployment, it is also not likely that labour shortages will be solved by education and training of the existing population alone. In a National Farmers' Federation report it was suggested that the long-term nature of local unemployment, together with the refusal by some farmers to hire and train unemployed people due to "people only working a day and not coming back" means that this is not likely to be a significant source of potential labour sufficient to meet the extent of the skills shortage (National Farmers' Federation, 2005, p.67). A study by the Australian National Training Authority (2004) also recognised that education and training will not be sufficient to address skill shortages.

Another study based on survey data also found that farmers were reluctant to take on unemployed people (Mares 2005). As an example, in the surveys conducted, one horticulturalist stated that he was sent 14 people from an employment agency in Wollongong, and claimed that none lasted beyond lunchtime of the first day (Mares

2005). There was also concern that reluctant workers may spoil fruit or damage machinery in order to be dismissed.

There are other policies specific to rural Australia, such as the 2006 Commonwealth Government offer of $5 000 to previously unemployed people who are willing to locate to non-metropolitan areas to work (Peatling 2006). While this may help reduce the disincentive effects of relocation costs, it would seem that such measures would have minimal impact on the overall severity of rural skill shortages and the positive outward migration that is being experienced.

Other researchers have focused on a regional development approach, arguing that the development of services, amenities and businesses in rural townships would then contribute to attracting and retaining skilled workers (Regional Business Development Analysis Panel 2003). Under this approach, it is believed that "kick-starting" rural businesses will lead to flow-on effects to other industries, and will lead to net inward migration, including skilled workers (Regional Business Development Analysis Panel 2003). There is evidence that local shire councils also hold this view, and have attempted to diversify regional economies through supporting new industries such as tourism (McKenzie 2004). However, given the nation-wide skill shortage facing Australia in the 2000s, together with the very significant population moves out of rural areas to coastal and other metropolitan areas, it seems unlikely that the promotion of local businesses and regional growth will be sufficient to retain and attract the necessary skills.

The use of targeted immigration was mentioned above as a national policy initiative to meet the skills shortage in Australia. This policy is applied differently in rural areas of Australia where finding skilled labour in some professions would be extremely difficult or even impossible without migration from overseas. Australia's permanent migration scheme has four streams – skilled, family, humanitarian and business. To enter under the skilled stream, migrants must reach a certain number of points - currently 120 - based on a set of criteria such as occupation (with work experience requirements), age, and language ability. Occupation is the area where the largest number of points can be earned (up to 60 points), and migrants must be under 45 years of age. As mentioned above, these criteria are 'loosened' if skilled migrants are willing to work in non-metropolitan areas. Since July 2004, migrants willing to live for a minimum of two years in a "regional or low growth" area are only required to reach 100 points (Jones 2006). To address specific occupational skill shortages, other criteria have also been adopted. For example, many overseas medical practitioners working in rural or remote regions of Australia have temporary registration and have not yet had their medical skills assessed in Australia (Kamien and Cameron 2006).

Overseas trained doctors make up 35 per cent of general practitioners in rural and remote regions, therefore clearly there is an important role for targeted migration in meeting rural skill shortages (Kamien and Cameron 2006). While rural towns may be less attractive to Australian doctors, as evidenced by the shortages, for many overseas doctors, the income and lifestyle may be very attractive compared to that in their own country. Further, doctors receive a virtually guaranteed income through the Medicare Rebate Scheme. The administrative rules governing migration, together with the

government control of Medicare provider numbers - without which it is almost impossible to practice - means that the government has a fairly effective policy tool to influence the location of migrant doctors.

There are also a range of grants and subsidies available for rural doctors and pharmacists. As discussed in Chapter 3, these include programs which provide start-up funds and travel subsidies for training courses to newly arrived and existing GP workforce in rural areas; the Bonded Medical Places scheme which pays tertiary education fees of medical students if they contract to work in rural areas upon qualifying; and the HECS Reimbursement Scheme which refunds 20 per cent of a graduate's HECS debt for every year of training undertaken or service provided in designated rural or remote area (Department of Treasury 2004).

In recognition that general practitioners in rural areas usually have to provide a wider range of services than their urban counterparts, the *Training for Rural and Remote Procedural GPs Program* provides up to $15 000 to assist them in undertaking training in areas including emergency procedures, operations and obstetrics (Medicare Australia 2006b). Pharmacists are also encouraged to service rural towns via the Rural Pharmacy Maintenance Allowance Program, which makes payments on a monthly basis (Medicare Australia 2006a). A fly-in/fly-out policy is also in place to encourage medical specialists to service rural towns, which is part of the Medical Specialist Outreach Assistance Program (Kamien and Cameron 2006).

6.5 Seasonal Labour Shortages

The agricultural sector is characterised by seasonality in production and therefore experiences seasonality in the demand for labour. As agriculture remains the second largest industry (after services) in many rural regions, seasonality is a distinguishing feature. The agricultural sector is also generally subject to a far greater degree of uncertainty than many other industries, with output levels subject to climatic effects such as drought or floods. The effects of seasonality flow on to manufacturing and service industries such as transport, food processing (such as milling, freezing and canning) and the purchase of inputs such as fertiliser and fuel. Seasonality in agriculture is a far more common problem in rural labour markets than in capital cities and other metropolitan areas. Seasonality does occur in urban labour markets, in industries such as tourism and retail, but cities generally have a ready pool of young people, such as students in the school/university holiday season. Many rural labour markets do not have such a large pool of part-time workers during the peak seasonal labour periods.

6.5.1 Reasons for Seasonal Labour Shortages

Seasonal demand for labour is greatest between November and April (harvesting and fruit-picking season) in many regions, as evidenced in the ABS's quarterly *Labour Force* survey data (ABS 2006a). However, seasonality is also present in most months in different regions due to the diverse nature of agriculture in Australia. Rural regions rely on casual labour to meet the peak labour demand needs. An increase in the demand for casual labour is increasing in part due to rising output and productivity levels, as shown in Chapter 4.

It has further been argued that the demand for casual labour has been increasing following the fall in the number of family-owned agricultural establishments (Productivity Commission 2005c). As shown in Chapter 4 (Figure 4.3) the number of agricultural establishments has fallen considerably since the 1960s, with the pace of the decline increasing after the 1989/90 interest rate recession, which was soon followed by a drought. Between 1988 (prior to the recession) and 2004, the number of agricultural establishments fell by 38 000, or close to 23 per cent. In earlier years, family members could be called upon to meet seasonal labour requirements. However, with fewer agricultural establishments, there is a reduced pool of family labour to draw on. Over the same period, the average number of unpaid family workers fell from 8 750 to less than 3 000, a reduction of 66 per cent (ABS 2006a), although this very large fall includes the effect of the 2002/03 drought, which would have exacerbated the decline.

Another contributing factor to the fall in the number of unpaid family helpers is the rise in participation in paid off-farm employment. As discussed in Chapter 4, between 1990 and 2004, the number of farms owners/operators and/or spouses generating income off-farm rose from 35 per cent to 45 per cent of farms (ABARE 2006). Of those farms earning income from off-farm sources, this income usually made up for more than half of their total farm family income. Further, given that out-migration in rural areas is rising (Chapter 5) and rural populations are ageing faster than metropolitan areas (Chapter 3), it is likely that the problem of labour shortages will worsen.

The National Farmers' Federation (2006) has documented that many growers have been unable to complete their harvest due to labour shortages and that they have been prevented from expanding their operations. If expansion and new investment is prevented due to labour shortages, this clearly also has macroeconomic consequences in terms output, economic growth and export earnings. The National Farmers' Federation Labour Shortage Action Plan (2005) concluded that:

> "Seasonal influences and their impact on labour demands in agriculture will always be a significant problem. It is clear that seasonal labour shortages are a consequence of both the failure of employers to effectively link up with and attract prospective employees, as well as the absence of prospective employees all together." (National Farmers' Federation 2005).

In their submission to the Senate inquiry into Pacific region contract labour, the National Farmers' Federation stated that:

> "there is a labour shortage affecting the agricultural industry to such an extent that it is and will in the future constrain Australian farmers' ability to achieve their productive potential." (National Farmers' Federation, 2006).

Seasonal labour shortages are most apparent in the relatively more labour intensive industries such as horticulture. In 2004, the Queensland Fruit and Vegetable Association estimated that up to 10 per cent of their crops, valued at $900 million, could not be harvested due to labour shortages (Mares 2005). Major Australian fruit grower and manufacturer SPC-Ardmona stated that they have been forced to leave fruit on the trees due to labour shortages since the early 2000s (Colman and Korporaal

2005). Banana plantation growers in Queensland have also reported that up to one third of their crops cannot be picked due to labour shortages (Gerard 2006; McKechnie 2007). There are many other documented cases of millions of dollars of fruit and vegetables left unharvested due to labour shortages in rural Australia (Mares 2005).

6.5.2 Policy to Address Seasonal Labour Shortages

The labour shortage in the agricultural sector has become a serious policy issue. In 2005, the Commonwealth Government made changes to working holiday visa conditions in recognition of the growing problem. Prior to 2005, people aged between 18 and 30 years who were citizens of countries with reciprocal working holiday arrangements could apply for the Working Holiday Maker Program (WHM) which would enable them to stay in Australia for a maximum period of 12 months. Under the WHM visas, people could work up to three months with any one employer. In 2004, 95 750 WHM visas were issued, 35 061 to United Kingdom citizens (Australian Visa Bureau 2005).

These arrangements have since been changed to specifically address rural labour shortages. From 1 November 2005, working holiday makers who work in non-metropolitan areas for three months, full time, doing seasonal work such as fruit picking, general crop maintenance, and pruning, can apply for a second WHM visa (Department of Immigration and Multicultural and Indigenous Affairs 2005).

Changes to visa conditions will have some impact on the supply of seasonal labour. However given the early stages of this policy change, it is yet to be determined

whether this policy will be sufficient to meet the extent of the shortage, which was exacerbated after 2004 due to workers leaving the agricultural sector to take advantage of the relatively higher wages in the mining industry resulting from the minerals boom. Potential pools of labour include the existing unemployed, the travelling retirees known as the 'grey nomads', holiday workers, and the possible use of seasonal off-shore labour.

As discussed earlier, using the current pool of unemployed is not likely to meet the seasonal labour shortages, nor does it offer permanent employment for the unemployed. Under regulations governing the payment of the unemployment benefit, if a person receiving the benefit refuses an offer of a job extending further than twelve weeks, that person can have their benefit denied. This is sometimes referred to as the 'breaching rule'. The difficulty with many agricultural jobs such as fruit picking, for instance, is that the work often does not extend to twelve consecutive weeks or more with one employer. Therefore people receiving unemployment benefits can refuse these jobs without breaching their requirements for receipt of benefits.

There is an additional disincentive for unemployed people to accept seasonal work. If a person works for less than the required twelve week period and then cannot find employment, government benefits are not accessible until after another ten week of unemployment (National Farmers' Federation 2005). Further, the size of the payment from the government to Job Network agencies for matching unemployed people to jobs is based in part on the number of hours and length of the employment contract. The financial incentives to place people into jobs become worthwhile if the person is employed for more than twelve weeks. Therefore the current system would be

expected to act as a disincentive for Job Network agencies to place unemployed people in seasonal agricultural employment.

It is important to note here that the apparent shortage of low skilled labour contrasts with estimates of the 'real' level of unemployment in Australia, of between 500 000 and 1.7 million people, or between 5 per cent and 17 per cent (Lewis 2002). It has been argued that the number of people who could work, but currently do not, is up to three times that of the measured unemployed. These estimates include people receiving sole parents or disability pensions, who could, with changes to the social security system and changes to the rigidity of the minimum wage requirements, become part of the potential workforce (Lewis 2002).

The increasing number of retirees – the 'grey nomads' who participate in seasonal work while travelling around Australia, has proven to be a valuable source of seasonal labour. The grey nomads predominantly comprise of a husband and wife who travel around Australia for periods of months or years at a time, taking on casual work to supplement their income from the aged pension. However, the number of hours the retirees are willing to work per week is usually relatively low as retirees are travelling to enjoy leisure time rather than work. Further, retirees tend to keep the hours that they work below the level that would cause their pensions to be reduced (Mares 2005).

The use of seasonal offshore labour began to attract more serious investigation in the 2000s. Some researchers, together with the Commonwealth Government, have been investigating the possibility of seasonal guest workers from the Pacific Islands, such

as the Solomon Islands, Vanuatu, Fiji and Tonga (Senate Employment, Workplace Relations and Education References Committee 2006). A major report from the World Bank (2006) was largely in support of the use of guest workers to meet local seasonal labour shortages. The report stated that the gains in global welfare from the liberalisation of the movement of people could be even greater than the gains from any future trade liberalisation. Many of the Pacific Island economies have high population growth rates, with high youth unemployment and poverty. Empirical analysis of the effects on migrant source countries have found that remittances have had a positive impact on the alleviation of poverty, have increased savings and are associated with higher levels of secondary education (World Bank 2006). Australia is currently one of the very few developed economies who do not have a seasonal guest worker program of this type.

However, there are some important economic issues to consider, along with some potential problems. There is the question as to whether remittances could have the effect of impeding modernisation or the development of governance in a similar way to untied foreign aid or a windfall gain. The World Bank (2006) argues that this is not likely to become a significant problem as remittances are relatively small and widely dispersed, and that remittances are sent directly to the workers and their families, avoiding government departments and the potential involvement in corruption. Therefore the risk of remittances hindering economic growth potential appear minimal.

Financial exchange inflows have the potential to lead to inflation and exchange rate appreciation, reducing international competitiveness. While this could be an issue

with large inflows of foreign capital or foreign aid, it is less likely to be a problem associated with remittances from working overseas. As discussed above, the remittance amounts are usually relatively small and less likely to have an impact in exchange rates, although Fiji has reported some effect of remittances on their exchange rate (World Bank 2006).

Another possible effect from remittances is the effect on household labour supply. Increased household income due to the inflow of remittances could lead to households choosing more leisure instead of work. Householders may also raise their reservation wage or choose to leave the labour force. Whether this creates a problem for the sending country is debatable. Given the very high rates of unemployment in many Pacific economies, reduced labour force participation resulting from higher incomes due to the receipt of remittances would not be expected to contribute to labour shortages or reduced spending locally. In fact, there is evidence showing that remittances lead to reduced child labour and increased rates of child participation in education (World Bank 2006).

Much of the research examining whether Australia should adopt the 'Pacific Solution' with respect to meeting seasonal labour shortages in agriculture has focussed on the model adopted by Canada. Canada has experienced seasonal labour shortages and has had a policy of seasonal migration since 1966 (Mares 2005). The Canadian Seasonal Agricultural Workers Program (CSAWP) brought in 18 000 workers in 2005, for an average of four months each year, primarily from the Caribbean and Mexico. Studies have shown that the seasonal workers and their families have improved nutrition, health and housing, significantly greater expenditure on children's education, (up to

35 per cent higher) and an older school leaving age (Griffith 2004; Russell 2004; Verduzco and Lozano 2004).

A major policy issue is the incidence of illegal migration among seasonal workers. In Britain, it was estimated between 4 per cent and 10 per cent of those admitted under the *Seasonal Agricultural Workers Scheme* become illegal immigrants (Immigration and Nationality Directorate Home Office 2002). In Canada, this issue is met by withholding partial payment of wages until workers return to their own country, by selecting workers with families, and by offering re-employment in future years.

Experience from overseas indicates that if a similar scheme were used in Australia, protection of migrant workers from exploitation would be a major issue. Problems which have occurred in other countries, such as overcrowded and substandard accommodation, inadequate training and safety standards and extended working hours have been well documented (United Food and Commercial Workers Union 2005). In order for an Australian seasonal migrant worker program to avoid these problems, offshore workers would need to be covered by the *Occupational Health and Safety (Commonwealth Employment) Act* (1991) (this is not the case in Ontario, Canada). An independent board of appeal might be necessary to ensure that grievances by migrant workers could be addressed. Regular inspection of accommodation standards and working conditions might be required.

Further, as discussed in Section 6.4 above, medical services in rural areas are already limited and suffering from a shortage of skilled people. The addition of offshore workers for months at a time would no doubt exacerbate this problem. Other issues

such as coverage by and contribution to Medicare and superannuation benefits would also require detailed examination. Political and social acceptance of migrant workers would also require evidence that no local labour was available, and that alternative policies (such as the change to holiday worker visas discussed above) had been fully explored. Language and cultural barriers would also need to be addressed, together with potential problems and isolation from local communities due to integration difficulties.

Given the expense and extensive policy development required, it is likely that the seasonal labour shortages in Australia would need to grow considerably before a national policy of overseas seasonal labour would be adopted. The National Farmers' Federation, along with major horticultural companies strongly support a trial of offshore labour (National Farmers' Federation 2006). However, the 2006 Senate inquiry into the possibility of using seasonal labour from the Pacific islands has recommended that no policy of this type be developed in Australia in the immediate future (Senate Standing Committee on Employment, Workplace Relations and Education 2006). It was argued that the political instability and regional security issues in the Pacific Island regions, the potential for the exploitation of foreign workers in terms of wages and conditions, together with the current political climate surrounding the Work Choices legislation, indicated that 2007 was not the time to introduce an offshore migrant labour scheme. However, the likely growth in labour shortages (demonstrated in Chapters 3 and 5 here) was acknowledged, with the recommendation that the issue of migrant seasonal labour be reconsidered in the future (Senate Standing Committee on Employment, Workplace Relations and Education 2006).

Therefore it is likely that seasonal labour shortages in Australia will remain in the foreseeable future. The shortage is likely to become worse due to labour shortages in other areas of the economy, the relatively higher wages in the mining industry due to the minerals boom, and the continuing increase in off-farm work carried out by family members. With the inevitable end of the 2006 drought and the resulting increase in labour demand, this issue could be of greater significant than it currently is.

6.6 Labour Market Programs

Labour market programs are designed to provide training, skills development, education, facilitate job search, and improve work habits and the motivation to work, in order to assist the long term unemployed into employment. More specifically, programs in Australia have consisted of training programs, wage subsidies, brokered employment programs and assistance with job search. All of these functions are now carried out under the Job Network arrangements whereby service providers determine the level of assistance required for individual job seekers. At the broader economic level, it is commonly argued that labour market programs can help to expand the supply of labour to meet growth in aggregate demand without putting upward pressure on wages (O'Loughlin 2001). At the microeconomic level, it is argued that labour market programs are necessary to reduce the mismatch between job vacancies and the labour market characteristics of the unemployed.

A study carried out based on longitudinal data between 1994 and 1997 tracked 6 000 working age people across Australia, and estimated the impact of participation in a labour market program on the rate of exit from a period of unemployment (Stromback

and Dockery 2000). The results showed that participation in a labour market program resulted in people leaving a spell of unemployment to work at twice the rate of non-participants. The most effective programs, in descending order, were found to be wage subsidies, brokered employment programs, job search assistance and training programs. Although the impact of training programs was the lowest of all programs, the effects were still estimated to be sizable (Stromback and Dockery 2000).

None of these programs are specifically aimed at rural labour market programs, nor have they been evaluated specifically with respect to their impacts on rural employment or unemployment.

There is clearly a mismatch between skills demanded and the skills supplied in rural areas of Australia, with simultaneous unemployment and significant labour shortages in many occupations. In addition, the much slower employment growth rate in rural areas relative to urban areas supports the view that there needs to be labour market programs specific to rural regions.

Labour market indicators show that Indigenous Australians have a much higher unemployment rate than other Australians, almost four times higher, with participation rates more than 10 per cent lower (Altman and Daly 1992; Hunter 2002). Indigenous populations have a higher concentration in rural and remote regions. Therefore a major component of rural labour market programs has been focused on Indigenous unemployment.

6.6.1 Community Development Employment Project

The Community Development Employment Project (CDEP) scheme has been a major Commonwealth Government employment program for Indigenous Australians since 1977. It originally began as a pilot program in response to the large uptake of unemployment benefits by Indigenous people in remote communities. The CDEP is a type of work-for-the-dole scheme, which has reduced measured unemployment rates and increased participation rates. Instead of individuals receiving unemployment benefits directly, the benefit is paid to the community, and individuals receive the benefit from the community in return for undertaking some form of work or training. By 1985, 38 Indigenous communities with 4000 participants had joined the scheme, with a budget of $27 million. In 2000/01 the scheme had 35 400 participants in over 200 communities (Hunter 2002). The scheme had its greatest impact in rural and remote regions. It is responsible for less than five per cent of Indigenous employment in capital cities, but accounted for over 55 per cent of Indigenous employment in rural or remote regions (Hunter 2002).

The CDEP has been criticised for not creating 'real' jobs, and for hiding the true levels of unemployment and labour force participation (Hunter 2002). The requirements for receiving payments under the CDEP were not particularly strict, and may have created another form of welfare dependence, without addressing the issues of education and skill levels among Indigenous communities. It has been argued that the CDEP also increased vulnerability to changes in government policy. This has been shown to be true, with the scheme significantly downgraded in July 2007. The main change is that the CDEP will no longer operate in towns where official

unemployment rates are below seven per cent. Instead, unemployed Indigenous people will join the mainstream Job Network employment program.

Possible effects from the abolition of the CDEP in certain towns will be higher measured unemployment in rural regions, and of course, greater demands on local Job Network programs. It is also possible that some people may leave rural and remote regions and move to metropolitan areas in the belief that employment prospects may be better there.

6.6.2 Regional Partnerships

As discussed above and demonstrated in Chapter 3, employment growth rates in rural regions since the 1990s have been significantly lower than in metropolitan areas. For example, between 1991 and 1996, average employment growth in regions classified as rural was 2 per cent, and rising to 5.9 per cent between 1996 and 2001. In remote rural regions the corresponding employment growth rates were 4.4 per cent and 2.3 per cent respectively. This is in contrast to localities classified as other metropolitan, which between 1991 and 1996 experienced average an employment growth rate of 14 per cent, and between 1996 and 2001, employment growth of 11.2 per cent. The corresponding rates for capital cities were 8 per cent and 9.4 per cent respectively. Therefore if policy makers support the existence or growth of rural localities, then specific policy to stimulate employment growth rates in rural areas is warranted.

The main policy umbrella for promoting employment growth and economic development in rural areas is the Commonwealth Government funded *Regional Partnerships* policy, which began in 2003 (Department of Transport and Regional

Services 2007a). *Regional Partnerships* comprises a number of pre-existing schemes including the *Regional Assistance* program. This is largely a means by which rural businesses and organisations can apply for seed funding for business investment or community projects that are likely to increase economic growth and the rate of jobs creation in rural areas. There are 56 Area Consultative Committees throughout Australia to help applicants develop their project proposals, which can be made at any time. The *Regional Assistance* program is intended to be a partnership between the Commonwealth Government and the applicants, with applicants and any other project partners expected to make a financial contribution to the project. Other specific purpose programs include:

- the Rural Medical Infrastructure Fund, which provides funds to small rural towns to assist in the establishment of 'walk-in-walk-out' medical centres, which are intended to help attract general practitioners.
- funding for the establishment of Rural Transactions Centres (see section 6.4.1).
- the Textile, Clothing and Footwear (TCF) Community Assistance fund, which is designed to help structural adjustment resulting from the reduction of tariff protection in rural towns with a large dependence on the TCF.
- Regional Solutions, and a range of adjustment packages for industries that have been affected by microeconomic reform policies such as deregulation and the removal of tariff protection. (Department of Transport and Regional Services 2007a).

A more specific policy to increase training include the Commonwealth Government funded subsidies available for employers who hire trainees or offer apprenticeships,

Australia-wide, with an additional $1000 given if the employer is in a regional area with an identified skill shortage (Bureau of Transport and Regional Economics 2006).

6.6.3 Program Evaluation

It is important that intervention policies such as those outlined in this section are subject to on-going monitoring and are evaluated in terms of their effectiveness, particularly given the often large amounts of public expenditure involved. Establishing the counterfactual, that is, labour market performance had the programs not been in place, is often difficult, and is made more complicated by the simultaneous influences of other policy changes and exogenous events. A major report into government regional intervention policy by the Bureau of Transport and Regional Economics (2003) concluded that factors including the cumulative effects of many differing policies over time, together with macroeconomic influences and the diversity that exists between many regions in Australia made effective policy evaluation complex and difficult. The report also concluded that there is a general paucity of evaluation. Therefore it is necessary that the aims and expectations of labour market programs in rural regions be clearly established, a system of monitoring outcomes be established, and a structure for periodic policy evaluation be established,

Another issue to note, is that a major potential problem with schemes such as those outlined in this section, are that they are often open to abuse by vested interest groups seeking to use public money for private gain. While the *Regional Partnerships* program does not allow applications from individuals, lobby groups, political organisations or government departments, this does not guarantee that groups with vested interests to not abuse the program. There is also, as with many policies, the

potential for abuse by politicians wishing to gain favour with voters in rural areas by funding development projects.

6.7 Education and Training

Since the 1990s, there is evidence showing that the gap between rural and urban education levels has been increasing, more so at tertiary levels (see Chapter 3). While education levels increased between 1991 and 2001 in both urban and rural regions, the rate of growth in rural areas has been lower that metropolitan regions. Chapter 3 also demonstrated that the gap between urban and rural education participation and qualifications at all levels remains substantial.

It is important to note that such differences can in part be explained by patterns of demand, and in particular, differences in industry mix. A significantly larger proportion of total employment in rural areas is accounted for by the agricultural sector, which does not generally require workers with relatively high levels of formal qualifications. The exception to this are the farm owners and managers, who require a range of technical and business skills appropriate to running an enterprise, as well as specific knowledge of agricultural science. In addition, the levels of formal education among Indigenous people are lower than the non-Indigenous, which contributes to the rural/urban educational gap. However, other possible reasons for the lower levels of educational attainment in rural areas have policy implications. These factors include distance from educational institutions, transport availability, living away from home expenses, seasonal labour commitments to family farms and possibly social and family background (Mageean 1993; Scott 1993).

Lower levels of educational attainment are likely to affect long-term unemployment levels, which continue to be a problem in rural areas. Further, as demonstrated earlier, shortages of skilled labour is more severe in rural areas relative to urban areas. The existence of unemployment and labour shortages clearly indicates a mismatch between the type of labour supplied and the labour demanded. Therefore there are reasons to support specific education and training policies for rural regions. Further, there are clearly fewer education and training institutions and opportunities in rural areas relative to urban areas.

For individuals, the best indicator of labour market status, particularly unemployment, is the level of education attained. The relationship between unemployment and educational attainment has also become more important over time (Lewis 2002). There is general agreement that staying in school until year 12 significantly reduces the probability of unemployment (Lewis 2002). Research shows that labour market programs are usually relatively ineffective or costly as a means of overcoming the effects resulting from dropping out of school and under performance at school, suggesting that the biggest payoffs result from early intervention to boost cognitive skills, social skills and basic literacy and numeracy skills (O'Loughlin 2001).

However, some researchers hold the view that increasing post-school education and training in a broad manner will not specifically address skill shortages or reduce long term unemployment. Supplying additional training that is publicly funded for people who may not stay and work in particular industries or regions will not assist the problem of rural skill shortages. According to this argument, it would be more effective to encourage training to be carried out by industry and business in the form

of apprenticeships and other on-the-job training (Shah and Burke 2003). However, since such training is general in nature rather than specific, there is the risk that people, once trained, may go to other employers in other areas (Norris, Kelly and Giles 2005). It is a well known tenet in labour economics that general training will not be paid for by employers since they cannot capture the returns to the costs of such training. This risk discourages employers from providing broad skill bases to their employees, which is consistent with the decline of internal labour markets in Australian firms (Briggs and Kitay 2000). This provides a rationale for government funding of education and training.

In terms of formal school education, a major study identified many difficulties facing small rural schools in implementing the national Vocational Education and Training (VET) policy, which is intended to link school learning with local industry needs, and with other training institutions such as the Technical and Further Education (TAFE) colleges (National Centre for Vocational and Education Research 2001). Problems with implementing VET policy in rural areas included:

- lack of professional development of staff
- the centralised nature of the school curriculum, which does not always meet the requirements of rural localities
- shortages of qualified school teachers
- limited number and lack of occupations for job placements in local communities
- insufficient resources and funding
- unavailability or high cost of transport to training centres.

It is most likely that given the severe shortage of school teachers in rural areas of Australia, that the success of programs such as VET will continue to be constrained. While there are some documented cases of VET success in rural localities, which have included adults enrolling in VET courses, there is an additional problem of lower schooling retention rates to year 12 (students aged 17) in rural areas relative to urban areas (Kilpatrick, Bell and Kilpatrick 2001). There is also the unavoidable conclusion, documented earlier in this chapter, that to date, a relatively large proportion of those who have achieved higher levels of education and training leave rural areas for larger centres and capital cities.

6.8 Internal Migration

Census data show that since 1991, rural populations in Australia have been experiencing significantly lower population growth rates than the growth rates of capital cities, other metropolitan areas and coastal regions. This represents a change in direction from the rural turnaround of the 1970s and 1980s. Chapter 5 investigated whether the slow population growth rates were due to falling birth rates, rising mortality rates, lower rates of international immigration and/or increased outward interregional migration rates. An examination of the data in Chapter 5 revealed that the fall in rural population growth rates was due to changes in the patterns of interregional migration. For instance, net migration as a proportion of the population in rural regions in the inland classification was -1.9 per cent between 1991 and 1996, rising to -2.4 per cent between 1996 and 2001. For remote rural regions, average net migration rates were -6.2 per cent and -7.6 per cent over the same time periods. In contrast, net migration rates for capital cities remained constant at close to 0 per cent, with regions classified as other metropolitan experiencing positive average net

migration rates of 5.6 per cent between 1991 and 1996 and 4.3 per cent between 1996 and 2001.

Chapter 5 showed that the largest proportion of people leaving rural areas were moving into capital cities and not other metropolitan or coastal regions. These results are consistent with the view that people are leaving rural areas and moving to areas where jobs growth and therefore job opportunities are greater. Therefore migration could be seen as evidence of the normal workings of flexible labour markets. Theory also suggests that people exit regions with high unemployment and move to regions with lower unemployment rates.

The results for rural regions contradict the findings of previous studies, which attributed slow population growth to the presence of agriculture as a relatively dominant industry. This study found that a strong agriculture base was positively related to regional growth. This is consistent with the observed increase in agricultural employment since the recovery of the interest rate induced recession in 1990. The results also suggest that a more diversified industrial base was associated with above average population growth – a finding that is consistent with other studies. The rate of unemployment was associated with lower rates of population growth (higher rates of outward migration) during the 1991 to 1996 period, but was not a significant determinant in the 1996 to 2001 period. Other significant factors included the unemployment rate, age, income levels, occupation and state.

Econometric modelling for rural regions in Queensland also found that unemployment was not a significant determinant of outward migration during the 1996 to 2001 period (Trendle 2004).

An important question that must be raised is whether the declining population growth rates and net outward migration from rural areas should be addressed with government policy. That is, does the net migration result from some form of market failure and/or government failure in rural regions? If so, then government policy to attempt to stem outward migration rates is warranted. If not, then it could be argued that in a free market with freedom of economic choices, rational economic decision makers have chosen to leave rural areas, and therefore intervention is not necessary, or may even reduce welfare.

6.8.1 Government Services and Policy Reforms

It is well known and documented that the provision of public goods, merit goods and other government services in rural areas is not as extensive as in metropolitan areas. A major study by the Bureau of Transport and Regional Economics (2003) clearly identified that rural regions continue to experience reduced access to services and difficulties in retaining skilled professionals relative to metropolitan areas. Studies discussed in Chapter 5 have documented public policy decisions to downgrade rural hospital facilities, the incidence of school closures and the poor quality of physical infrastructure such as roads and communications (Kamien 1998; Harrison 1997; Senate Employment, Workplace Relations, Small Business and Education References Committee 1999; Stayner 1997). This is in part due to the cost of supplying relatively

small, and sometimes declining, populations with goods and services which often have high set-up costs and higher per unit costs due to excess capacity.

Clearly the question of government provision of goods and services involves causality. Is the growing outward migration from rural areas due to external push factors such as droughts and changes in terms of trade, together with pull factors such lifestyle choices associated with moves to coastal and urban areas? Or do the push factors include declining levels of education, health provision and infrastructure, which have led to reduced rural job opportunities, reduced business activity in the private sector, and a downward spiral of population which is followed by further reductions in government goods and services?

It has also been argued that microeconomic reform and competition policy, including the reduction in trade protection, (see Section 6.9 below) has led to economic restructuring that has led to falls in employment in some industries (Productivity Commission 2001). The studies cited in this section and in Chapter 5 suggest that factors such as droughts, commodity prices and lifestyle choices are causal in rural outward migration. However the studies have also provided evidence that there has been government rationalisation in service provision, that microeconomic reform policies have negatively affected some regions more than others and that the problem of retaining skilled professionals has made it difficult for some government services to be maintained. According to Prime Minister John Howard:

> "It is the obligation of governments to pursue agendas of economic change and reform because they are beneficial to the overall community. But it is also the obligation of governments, where people are hurt through no fault

> of their own as a consequence of economic change and reform, … to give a bit of assistance to those people." (Howard 2000).

Levels of provision also depend on the extent to which Commonwealth, state and territory governments act on the principle of horizontal equity inherent in the federal structure of governance in Australia. The constitutional principle is that the Australian population should be provided with a similar level of goods and services regardless of state or territory, with intergovernmental transfers carried out by the Commonwealth Government to improve horizontal equity (Lewis, Garnett, Hawtrey and Treadgold 2006). This principle could be extended to encompass access to some level of public provision of goods and services that does not depend on location within a state or territory. If this principle is adhered to, rural regions should have access to some minimum level of health care, education and infrastructure.

Results from survey based research (see Chapter 5 for further details) have identified that lack of adequate schooling and medical facilities are among the most commonly cited reasons why people choose to leave rural areas (Alston 2002; Kamien 1998; Workplace Relations, Small Business and Education References Committee 1999). Economic restructuring, such as the removal of trade protection and the deregulation of marketing authorities, which has led to the reduction in size of some rural industries in some regions, has also been a causal factor in outward migration (Productivity Commission 1999, 2001).

Therefore these results suggest that the decision to leave rural areas is not simply one based on well functioning markets, but in part results from a failure of the government

to sufficiently correct for market failure in terms of adequate provision of goods and services, and is the result of government policy. In this context of market failure, government failure and the impacts of government policy reforms, a change in the current levels of provision of goods and services could reduce rural outward migration rates, and arguably is required to redress the impacts of government policy on some rural regions.

6.8.2 Negative Externalities

In addition to the question as to whether market failure, government failure or economic policy reform have caused outward migration from rural areas, is whether or not this outward migration leads to externalities in the destination regions. Between 1991 and 1996, more than 50 per cent of people leaving rural regions moved to capital cities, with coastal regions being the second most common destination, with over 20 per cent of people who left inland and remote rural areas moving to coastal regions (Table 5.4). Between 1996 and 2001, the pattern was similar, but with a slight increase in the percentage of people moving to coastal areas – rising to almost 25 per cent.

The policy implications of this relate to the effects that in-migration could have on existing levels of resources in the destination region. For example, positive net migration could strain the current levels of government provided goods and services in the destination regions. This is particularly so for infrastructure such as water, sewage, electricity, gas and telecommunications. It is also likely that in-migration would put upward pressure on real estate and rental prices. Therefore there may be negative external costs imposed on the destination regions that may not have been

fully factored into the decisions regarding the provision of goods and services to rural regions.

Research on the impacts of overseas immigration on Australian cities substantiates the principle argued here, that an influx of migration to metropolitan areas, whether it be from overseas, or from rural regions, strains infrastructure in the destination cities. For example, in 2003 the Premier of New South Wales, Bob Carr, stated that Sydney could no longer cope with the arrival of 1000 immigrants per week, with great strain being placed on housing, water, land, transport and health services (Gebhardt 2003). In 2001, 81 per cent of overseas born Australians lived in capital cities, with the majority of the balance living in other metropolitan areas (ABS 2004). Overseas experience with immigration to major cities has been similar. Canada, the United Kingdom (UK), Germany and Holland, have all experienced the same issue of new immigrants predominantly settling in capital cities. For example, in Canada in 2000, 78 per cent of immigrants settled in Vancouver, Toronto or Montreal. In the UK in 2000, 85 per cent of asylum seekers had settled in London (Gebhardt 2003).

It has been suggested that immigration policy in Australia should provide genuine incentives for new immigrants to settle in regional and rural areas, which would reduce the pressure on capital cities and also address the slow population growth rates or population declines in rural regions (Gebhardt 2003). These incentives could include financial incentives, (as already exists for general practitioners), but would also need to include pull factors such as the sufficient provision of government goods and services, social and cultural infrastructure and improved communication facilities. Some recommendations are more specific and include the adoption of a policy of a 45

per cent share of all new migration to live in non-metropolitan regions and the introduction of a regional points bonus for immigrants willing to live in non-metropolitan areas (Withers and Powell 2003).

Net migration inflows also impact on the prices of land and housing. For example, it was estimated that in 2003, 50 per cent of household growth in Sydney was due to net overseas migration (Limb 2003). Therefore any costing of the effects of migration to metropolitan areas, whether the source of the migration is from overseas or from rural Australia, needs to consider the impact on the demand for real estate and rental accommodation.

Clearly the above is analogous to the likely effects of rural migration to metropolitan areas that has this current research has documented. Therefore policy on rural labour markets and population should consider the cost of outward rural migration on infrastructure and housing in destination regions, and the subsequent effects on the cost of living for existing residents. The extra costs incurred by existing residents could provide the basis for justifying transfers of funds from urban to rural communities in order to reduce the outward migration from rural Australia.

6.8.3 Current Rural Policy

An examination of policy for rural regions suggests that since the 1980s, the focus has been shifting toward the encouragement and support of local government, business and community initiatives to develop and/or diversify local industry in an attempt to slow down or turn around net outward migration (Alston 2002; Bureau of Transport and Regional Economics 2003; Tonts 1996). This differs from the general policy

approaches from the 1950s to the early 1980s. Australia, like many other developed countries, followed a policy of heavy protectionism from the 1950s through to the 1970s, which primarily reduced the efficiency and competitiveness of the manufacturing industry. The agricultural sector also had schemes such as price floors on wheat and wool, and protection for the sugar industry. There was also an attempt at population decentralisation by the Commonwealth Government in the early 1970s. Significant microeconomic reform, including the dismantling of protection, took hold in the 1980s, and gained pace in the 1990s. The reforms included freeing up international trade, floating of the Australian dollar, deregulation of the financial sector, deregulation of the labour market, the partial dismantling of the award system for the determination of wages and working conditions, and the privatisation of many government business enterprises.

Microeconomic reform has been accompanied by direct intervention via specific adjustment financial packages for the industries most affected. Policy for rural regions in the 1990s and 2000s has been one of continued specific economic adjustment packages and specific subsidies for the effects of flood or drought. Policy in the 2000s has also begun to address the problem of land degradation from salinity, together with water shortages due to over-irrigation and drought. However generally, the main focus of policy during the 1990s and 2000s has been on the development of local enterprises and the transfer of much of the responsibility for rural economic development to local governments and other local organisations.

The Commonwealth Government's *Regional Partnerships* scheme (see earlier) makes funding available upon successful application for a large range of local rural

development initiatives. This scheme is designed to stimulate local investment and business activity from with regions, which often includes industrial diversification. The focus of this scheme is one of moving away from centralised direction and moving toward developmental responsibility to local governments and regional authorities. A study carried out in Western Australia showed that some towns in the 1990s were able to reverse their population declines. However there was also evidence that showed that the general pattern of decline has been continuing (Tonts 1996). The outcomes of the current *Regional Partnerships* scheme will not be known until sufficient time has passed to measure the effects.

In addition to government policies to address slowing or declining populations, some rural towns have responded to the economic restructuring carried out by private firms, by starting up their own provision of services. For example, throughout the 1990s, major banks in Australia closed a large number of rural branches. Between 1993 and 1996, there was a reduction in the number of non-metropolitan bank branches of 14 per cent, and between 1996 and 2003, there was a further decrease of 25.4 per cent (RBA 1996; Beal and Delpachitra 2005). It was estimated that initial effects of the closure of the only bank branch in a town had significant financial effects on local business sales, with local businesses reporting average monthly falls of around $675 for low-cash handling businesses and $4 475 for high cash handling businesses (Beal and Ralston 1998).

In response, there has been the significant growth in community-established banks, with rural towns raising the required capital funding base, and setting up branches as part of the Bendigo Bank network. The establishment of alternative delivery channels

for financial services, such as the internet and EFTPOS, also reduced the effects of bank branch closures on local business sales (Beal and Delpachitra 2005).

The other main area of focus of current policy has been on vocational training and education, and encouraging training partnerships between local industry and educational institutions (Bureau of Transport and Regional Economics 2003). As discussed earlier in this chapter, many rural regions are experiencing severe shortages of skilled professionals, together with lower levels of formal education that metropolitan areas. The expansion of Vocational Education and Training (VET), which links formal schooling with local industry needs and with Technical and Further Education (TAFE) colleges is seen as by the Government as an essential part of the development and enhancement of the skills base in rural regions (Bureau of Transport and Regional Economics 2003). However, as discussed in section 6.7, the success of VET has been hindered, ironically, by a lack of professional development of staff and a shortage of qualified school teachers (National Centre for Vocational and Education Research 2001).

The success of the current policy focus for the development of rural regions will in part depend on whether sufficient infrastructure, such as transport and communications, and services, such as education and health, can be provided by state and Commonwealth governments. Developing human capital to promote jobs growth and fill skill shortages faces the challenges outlined above, together with the reducing the exodus of the more educated to urban areas.

6.9 Microeconomic Reform

Microeconomic reform has been a national policy adopted in Australia since the late 1980s, encompassing market deregulation, privatisation or corporatisation of government business enterprises, the reduction or elimination of subsidies to some industries and the opening of markets to international competition. A National Competition Policy was adopted as part of the overall microeconomic reform policy, with the aim of developing more competitive, efficient and open markets. To this end, the *Competition Policy Reform Act* of 1995 was passed in Parliament, which formalised the agreement between Commonwealth, state and territory governments. Overall, the increases in productivity and competitiveness have been positive, with very significant productivity increases in industries including telecommunications, electricity, gas, transport, manufacturing and agriculture (Productivity Commission 2005b).

6.9.1 Trade Liberalisation

Many aspects of microeconomic reform are likely to have impacted significantly on rural regions. Trade liberalisation has meant that the Australian agricultural sector competes largely unprotected on international markets dominated by output produced by the highly protected countries of the European Union, the United States and Japan. While this has led to productivity and efficiency gains in Australia's agricultural sector, as it endeavours to maintain its sales on world markets, many agricultural establishments, particularly the smaller ones, have been sold to larger operators with lower cost structures due to economies of scale. The removal of agricultural protection is likely to be a contributing factor to the substantial fall in the number of agricultural establishments since 1990 - a fall of almost 28 400 between 1990 and

2004 (ABARE 2005). Such changes would have almost certainly contributed to outward migration from some regions. However, as demonstrated in Chapter 4, increases in productivity and output levels have contributed to the demand for agricultural labour increasing between 1984 and 2002. Further, the removal of tariff protection on the formerly heavily protected manufacturing sector has led to significant falls in the prices of machinery and equipment used by the agricultural and mining sectors.

Therefore while trade liberalisation has had a major impact on rural industry, agriculture in particular, it is not clear whether the net effect on population growth is negative, neutral or positive.

6.9.2 Deregulation of Marketing Authorities

The deregulation of statutory marketing authorities has also affected agricultural producers. Prior to deregulation, most agricultural products were marketed by a state government statutory bodies, which in effect, gave producers some level of monopoly power. Under the *Competition Policy Reform Act (1995)* statutory marketing authorities were deemed anti-competitive. After deregulation, the domestic prices received by agricultural producers fell and subsequent industry restructure occurred. For example, when the dairy industry was deregulated in 2000, many smaller producers could no longer compete, and a subsequent $1.8 billion dairy adjustment package was established. While efficiency gains from deregulation were apparent in the form of lower prices for many agricultural products, the structural adjustment and subsequent changes in the number of industry participants would have impacted the populations of particular rural regions. Research has shown that regions with

significant milk-cattle and dairy processing industries have been most affected (Productivity Commission 1999).

6.9.3 Infrastructure Reform

The Productivity Commission produced a major study which focused specifically on the effects that microeconomic reform and competition policy had on rural and regional Australia (Productivity Commission 1999). Results from the study indicated that early gains from National Competition Policy favoured urban areas, but that rural areas would receive benefits in the medium term. It also highlighted that rationalisation in the provision of infrastructure and utilities in rural areas had led to structural change and job reductions in some regions. Historically, government regional and rural development policies have included subsidies for the provision of major infrastructure such as roads, irrigation networks, telecommunications and electricity networks. However, under National Competition Policy, the provision of infrastructure has been reformed, requiring cost recovery, higher prices and the reduction in subsidisation (Productivity Commission 1999).

The medium to long-term benefits from the reforms cited by the report include increases in productivity and output and increased international competitiveness, which would ultimately stimulate jobs growth. The report also suggested that the population changes in rural areas were more likely due to structural changes brought about by long-term factors such as changing technology, lower commodity prices and changing lifestyles.

6.9.4 Net Effects of Microeconomic Reform

There is little doubt that the reduction in tariff protection and the opening of agricultural markets has impacted on rural Australia. Further, the deregulation of statutory marketing authorities has to some extent reduced the monopoly power of sellers and led to lower prices and economic restructuring. Government reform to public sector owned enterprises, such as electricity and gas, and policy changes in relation to the subsidisation of infrastructure provision are also likely to have disproportionately affected rural areas relative to urban areas. The net effect of microeconomic reform is difficult to measure. In the long run it seems likely that improvements in efficiency, productivity and output levels may benefit many regions in Australia. With respect to rural regions, it seems likely that the costs and benefits have been and will continue to be unevenly spread. This will depend on the industry mix within each region, with some regions benefiting from lower agricultural and manufacturing prices, and more efficient service provision, with other bearing a substantial proportion of economic restructuring and job loss.

6.10 Conclusion

The question that must always be asked when considering government intervention in a market economy is why does the government need to intervene. If it is demonstrated the intervention is required, then it must the appropriate means of intervention must be determined. The overall benefits and costs of policies must then be clearly identified and assessed, together with transparency in funding allocations.

Earlier chapters have clearly demonstrated that the labour market characteristics and economic problems facing rural labour markets are different from metropolitan areas.

Therefore if government intervention is required, specific policies are necessary for rural Australia. This chapter has argued that market failure, such as labour shortages, skill shortages and externalities, imply that government intervention is required. Government failure, including the withdrawal of basic services and infrastructure, which once heavily subsidised, is also a common feature in much of rural Australia. In addition, there is a strong equity argument for provision of government assistance for people in particular need, such as Indigenous Australians, who are found in greater proportions in rural communities than in the rest of Australia.

The current gamut of policies specific to rural Australia has been examined in this chapter. These include employment and unemployment, skills shortages, labour market programs; internal migration; Indigenous issues; education and training; and the impact of microeconomic reform. Some would appear to have been more successful than others. However, a thorough assessment of these policies is hindered considerably by a lack of suitable evaluation which would normally be expected of government programs

It is important to establish the incidence of the costs and benefits, that is, who actually bears the costs or receives the benefits of policy programs. For example, when Australia's largest telecommunications provider, Telstra, was nationally owned, rural areas received cross-subsidies for infrastructure and service provision. However, the costs of this policy were not transparent. Following the full privatisation of Telstra in 2006, the Commonwealth Government will now be directly subsidising the cost of telecommunications to rural areas, therefore the costs will become clearer.

Further, as discussed above, sensible policy can only work in the context of policy evaluation. To date there has been little evaluation of the cost of rural intervention programs, especially the administration costs. This is an area that must be addressed given the policy implications of the significant changes and challenges facing rural Australia discussed in this chapter.

CHAPTER 7 SUMMARY AND CONCLUSION

Rural regions in Australia continue to comprise a significant proportion of the Australian population, with approximately 27 per cent of Australia's population living outside capital cities and other metropolitan areas. During the 1970s and 1980s, a number of economic studies examined rural labour markets, identifying their characterising features and outlining specific issues which distinguished rural labour markets from their metropolitan counterparts. However, since the 1980s, there has been relatively little economic analysis of rural labour markets in Australia.

In the late 1990s and the 2000s, public comment and political debate have relied on mostly anecdotal evidence that rural Australia is experiencing important and substantive changes in its population and workforce. Issues such as extremely low population growth rates and declining rural townships have been contrasted with opposing viewpoints such as the 'Sea Change' and 'Tree Change' arguments, which suggest that people are leaving metropolitan areas and moving into rural areas.

There has also been a common view expressed in public discussion and in research in non-economic disciplines that structural changes and misfortunes experienced by the agricultural sector are responsible for declining populations in rural localities. In addition, there have been significant structural and policy changes since the 1980s that have impacted on rural Australia. These include the trade liberalisation and globalisation, deregulation, declining numbers of agricultural establishments, advances in technology, increases in productivity and changes in the levels of public

and private provision of goods and services. In recent years Australia has also experienced severe labour shortages in almost every area of the economy.

Such significant structural changes, together with the focus of public and political discussion, clearly demonstrate the need for economic research into rural labour markets since the 1980s in order to establish a sound basis for economic and policy analysis. The aim of this thesis has been to provide this required research by analysing and modelling rural labour markets in the 1990s and 2000s, and by demonstrating that rural labour markets are different from metropolitan labour markets, facing a different set of issues and problems, and thereby requiring different economic policy responses. In doing so, the importance of defining and quantifying regions has also been addressed by this thesis. Analysis here has shown that in Australian research there is far from a consensus as to how to define and measure rural Australia, even though rural regions are the focus of a wide range of funding and policy initiatives.

The following sections outline the major findings of the research carried out in this thesis.

7.1 Distinguishing Features of Rural Labour Markets

The research in this thesis has demonstrated that many characteristics of labour markets in rural areas are different from Australia as a whole. As shown in this thesis, these differences include population and employment growth rates, labour force participation rates, the age profile of the labour force and education and skill levels. The evidence provided has shown that rural labour markets have lower population and

employment growth, lower participation rates, an older age profile and lower educational attainment levels. However, since the 1990s, there has been no significant differences in terms of unemployment rates.

There have also been significant changes in the composition of rural labour markets over time. There has been an increase in female participation rates between 1991 and 2001, which was a continuation of the trend in the 1980s. This occurred in all regional classifications throughout Australia. Nationally, the numbers holding post-compulsory educational qualifications increased significantly during the 1990s. However, in rural Australia, they continue to be at levels that are lower than urban areas, and the disparity is widening at the bachelor degree and higher degree levels. Further, the Australia-wide phenomenon of an ageing population is more extreme in rural Australia.

Industry mix in rural Australia has changed between 1991 and 2001, with a relative decline in the contribution to employment by the agricultural sector. However, the role of agriculture remains very important in rural regions, particular given its flow-on and multiplier effects.

Therefore, the picture of rural Australia is one in which the population and employment growth rates were very low between 1991 and 2001. This is a significant change from the late 1970s and 1980s, and clearly indicates that structural change is occurring. Rural Australia continues to differ from other regions in terms of industry mix, education levels, change in the age distribution and the composition of the labour

market. The nature and implications of these differences were examined in subsequent chapters of the thesis.

7.2 The Role of Agriculture

Rural labour markets continue to be characterised by a differing industry mix to metropolitan labour markets, in particular, with respect to the reliance on agricultural industries. Direct employment in agriculture fell continually from 1950 until around 1980, which likely reflects technological change, and a movement of formerly on-farm jobs to off-farm jobs. Since 1980, employment in agriculture has generally trended upwards until the drought of 2002/03 which, with the drought of 2006, has had dramatic effects on output and employment in agriculture.

The estimated economic models of the demand for total labour and for hired labour, accord with economic theory. An increase in wages was found to lead to a fall in the demand for labour, particularly hired labour, and output is positively related to labour demand. Further, the finding that structural and technological change has led to an increase in the demand for hired labour over the estimated period is a reversal of the findings of earlier studies, and provides an explanation for the observed trend increase in employment in agriculture.

The findings defy the popular notion that employment in the agricultural sector is shrinking. While it cannot be concluded that particular towns within particular regions have not been affected by misfortunes in agriculture, it also cannot be concluded that the agricultural sector is responsible for trend declines in population

and employment in rural Australia. Clearly, however, shocks such as those induced by droughts have had major impacts.

There is growing concern over the general shortages of agricultural labour, and in particular, shortages that arise from the seasonal nature of agricultural production. While part of this shortage can be related to a general shortage of labour associated with a buoyant Australian economy, there are also factors specific to rural labour markets. These factors include outward migration of young workers, the reduction of inward migration to rural areas, difficulties in matching the unemployed to the available jobs and the loss of labour due to the minerals boom.

7.3 Interregional Migration

This thesis demonstrates that the 'rural turnaround' of the late 1970s and 1980s is at an end. In those years there was a substantial movement of people from metropolitan areas to rural regions, and in non-metropolitan population and employment growth rates exceed that of metropolitan areas. During and since the 1990s, population and employment growth rates have generally been much lower in rural regions than metropolitan regions. Further, the thesis demonstrates that rural regions as a whole have experienced outward migration that has been in excess of inward migration since 1991.

A model was developed and estimated using the most recent Census data available for inland, remote and coastal regions, to identify the characteristics that have affected population change over the 1991 to 2001 period. The results suggest that the factors determining growth in coastal regions differ from the factors influencing population

growth in inland and remote areas. The results also suggest that the decision to migrate to coastal regions (or not to leave) largely relate to income levels, age and occupation.

The results for inland regions contradict the findings of previous studies, which attributed slow population growth to the presence of agriculture as a relatively dominant industry. This study found that a strong agriculture base was positively related to regional growth. This is consistent with the observed increase in agricultural employment since the recovery of the interest rate induced recession in 1990 – although the droughts of 2003 and 2006 have since reversed this growth. Consistent with other studies, the model suggests that a more diversified industrial base is associated with above average population growth.

7.4 Policy Issues

Rural labour markets give rise to specific issues and problems, meaning economic policy needs to be specifically tailored to rural regions.

The existence of labour shortages, skill shortages, lower educational levels, the ageing of the population, high levels of outward migration, particularly of youth, together with the externalities resulting from outward migration provide the basis for government intervention. There is also an argument on the grounds of equity for the provision of government assistance for people in particular need, such as Indigenous Australians. The activities of government, including microeconomic reform and the withdrawal of basic services and infrastructure, which were once heavily subsidised,

have also had an impact on much of rural Australia. This thesis has shown that these problems have arisen or have continued to exist during the 1990s and 2000s.

There is a range of current government programs aimed at the problems facing rural Australia. However, it is difficult to assess the success of these programs in the absence of appropriate evaluation. This is clearly a matter which needs to be addressed. However, the persistence of problems in rural regions suggests that these programs have been insufficient to address the severity and extent of the issues facing rural Australia.

7.5 Conclusion

This thesis has sought to provide a comprehensive analysis of rural labour markets and population in Australia since the 1980s. It has also provided an analysis of the extent to which the characteristics of rural Australia have been changing over time and the reasons for these changes. The methodology used involved standard economic theory applied to a range of data from various sources. Theory, data analysis and econometric modelling have been combined to analyse developments in rural population and labour markets. This is intended to address the paucity of economic research in this area and to provide a much needed sound basis for policy analysis.

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