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Garnett, A. (2011) The effect of the resources boom on the Western Australian labour market. In: 40th Annual Australian Conference of Economists, 11 - 13 July, Canberra, Australia.

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# **The Effect of the Resources Boom on the Western Australian Labour Market**

**By**

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## **ABSTRACT**

*Prior to the resources boom of the 2000s, evidence suggests that many regional communities in Australia, including Western Australia, were experiencing lower than average population and employment growth rates, with some towns suffering significant declines. During the 2000s, Australia experienced a rapid and substantial resources boom, fuelled by strong export demand by emerging economies, including China and India. The impacts of this boom were particularly felt in Western Australia, which has the largest share of mining revenue as a proportion of both gross state product and exports. Some states have reported that while mining export earnings have risen due to strong commodity prices, there was less impact on employment and regional development than may have been expected. This paper will investigate the impact of the mining boom on the labour markets and population of Western Australia. Of particular policy relevance are the effects that any changes in population and employment have on the regional and remote communities where much of the mining activities are located.*

**Keywords:** Mining; Labour market; Population; Regional.

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## **1. Introduction**

The minerals and energy boom in Australia in the 2000s contributed significantly to output and employment growth, and to a large growth in commodity export earnings. Western Australia (WA) and Queensland contribute by far the largest proportion of mining output and exports, and therefore felt the effects of the mining boom the most.

The focus here is on the effects on WA, and in particular, its mining regions. The rapid pace of the boom has had major impacts on WA. It has contributed to strong state economic growth and relatively low unemployment rates. However, the accompanying population growth has put increasing strain on economic and social infrastructure and amenities in WA's capital city, Perth, and in certain mining regions where growth has been very rapid. As the minerals boom is anticipated to last for at least another 20-30 years – the length of time specified in some current export contracts – and possibly 50 years, there are important policy implications for how to manage the population growth and how to meet labour market requirements.

## **2. The Mining Boom**

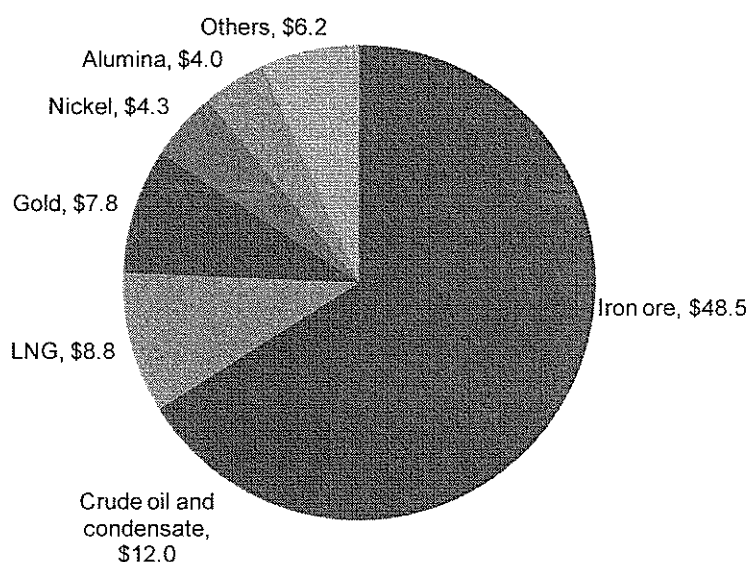
The most recent mining boom in Australia began in the early 2000s, accelerated from 2005 onwards, slowed temporarily during the global financial crisis (GFC) in 2008 and 2009, before resuming at a fast pace in 2010. Much of the growth in mining production has been due to the rapid rise in demand from China and India. The purchase of Australian minerals exports by China rose from 5% of total minerals exports in 2000 to 37% in 2010, and minerals exports to India rose from 1% to 16% over the same period (ABARES 2011).

While the mining sector's contribution to GDP remained at approximately 9% between 2000 and 2010, the contribution to merchandise exports rose significantly, from 45% in 2000 to over 68% in 2010 (ABARE 2005, 2011). Employment in the mining sector also rose substantially, from just below 81 000 in 2000, to over 201 000 by the end of 2010, an increase of almost 150% (ABS 2011b). This compares to average employment growth of just over 26% for all industries over the same period (ABS 2011b). As a proportion of total employment in Australia, employment in mining still remains by far the lowest of all sectors, although it rose from 0.9% to 1.8% over the decade.

WA experienced the largest impact of the mining boom of all states and territories. Between 2000 and 2010 the mining sector in WA averaged an annual growth rate of 15%, with the value of total production at \$92.6 billion in 2010 (DMP 2011d). The contribution of minerals and energy to gross state product grew from 18% in 2000 to over 30% in 2010,

which far exceeds the mining sector's contribution to GDP at the national level – at 9% in 2010 (DMP 2011a; ABS 2011a). Exports of minerals and energy as a proportion of total merchandise exports in WA rose from 70% in 2000 to 91% by 2010 – valued at over \$93 billion (DMP 2011a). WA's contribution to national merchandise exports of minerals and energy is the largest of all states and territories, at 68% in 2010 (DMP 2011a). Figure 1 shows the value of total production of each major minerals and energy industry in WA in 2010. While the value of iron ore is by far the largest, the second largest industry is crude oil and condensate, followed by liquefied natural gas (LNG) and gold.

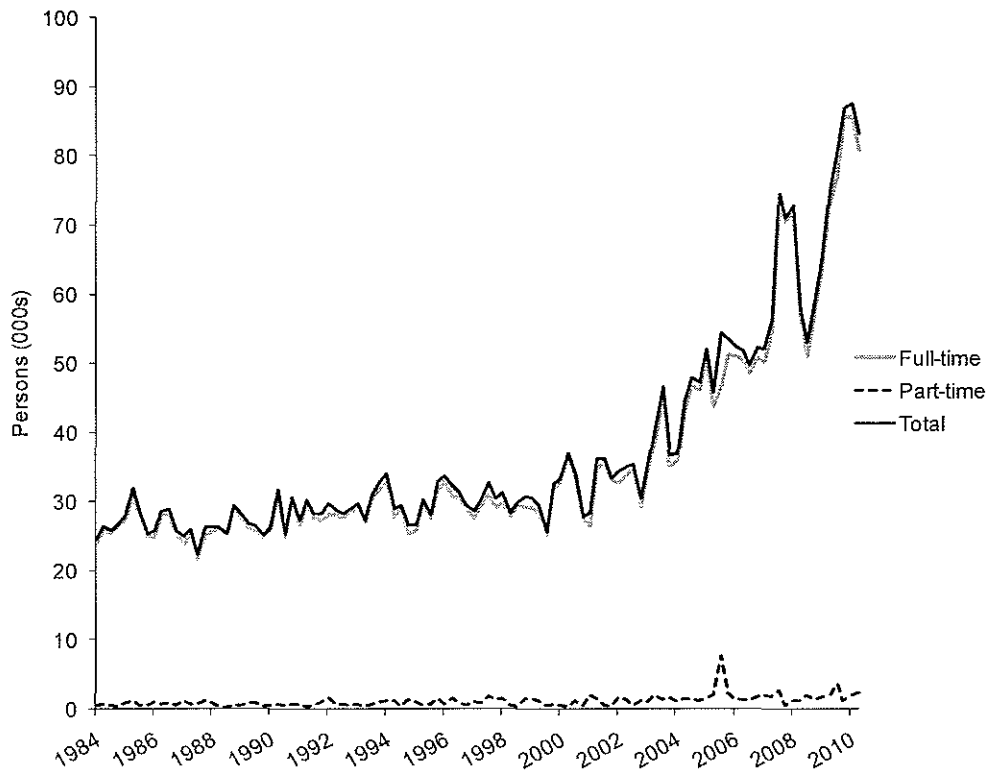
**Figure 1 Value of WA's Mining Commodities, 2010, (\$ billions)**



Source: Department of Mines and Petroleum (2011d).

In terms of employment, the mining sector in WA employed around 7.1% of the state's workforce by early 2011, which compares to 3.6% a decade earlier. This is clearly a significant change in the mix of state employment, and is much larger than the national proportion of around 1.8%. Figure 2 shows that employment in mining was relatively stable throughout the 1980s and 1990s, with the rise of employment beginning in the early 2000s, and accelerating after the mid-2000s. The figure also shows that there is relatively little part-time employment in the mining sector. Interestingly, the impact of the GFC on this sector can be clearly seen with the significant fall in jobs in 2009, followed by the 2010 recovery. As is the case with agriculture and manufacturing, it is important to note that mining employment estimates do not capture all employment involved in the mining sector. For example, any workers employed by contractors who are not mining companies, may not be included.

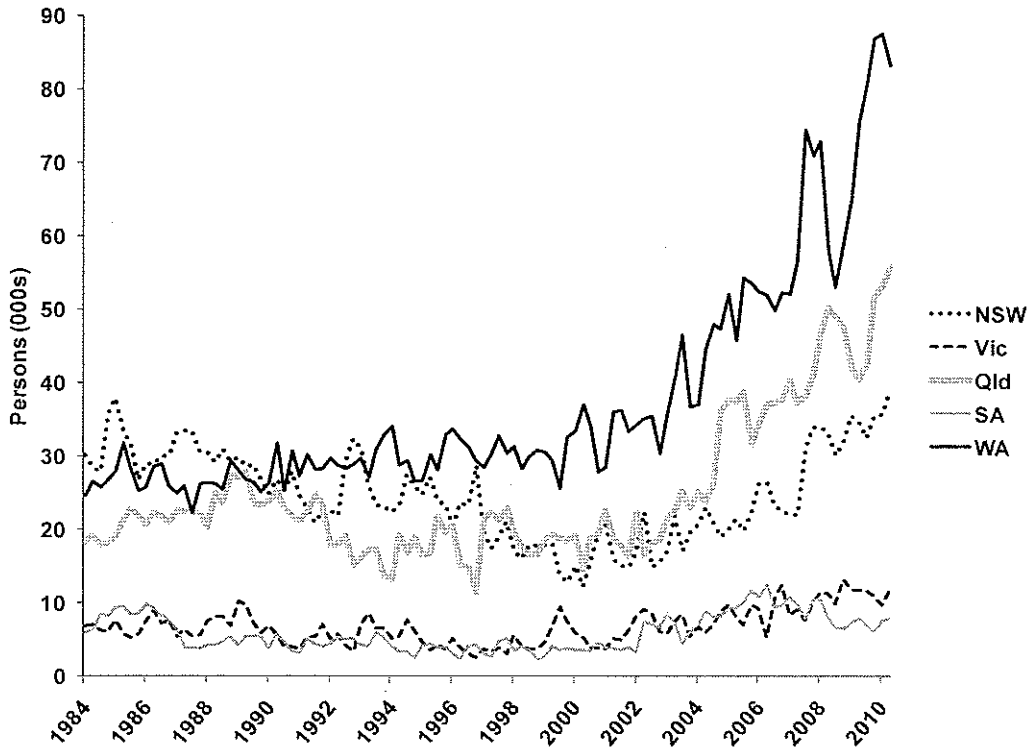
**Figure 2 Employment in the Mining Sector, Western Australia, 1984-2011**



Source: Australian Bureau of Statistics (2011b).

Other states significantly affected by the mining boom are Queensland and New South Wales (NSW), in terms of the large increase in the volume and value of production and exports, and in terms of employment growth. Victoria and South Australia have also experienced an increase in the volume and value of mining production and exports, however this has been to a smaller extent relative to other states, and their growth rates in employment in mining have been far less substantial. Figure 3 shows employment in mining by state, with the enormous growth in mining employment in WA and Queensland clearly evident. (Employment in mining in the Northern Territory (NT) and the Australian Capital Territory (ACT) are too low to show in this figure, and employment in Tasmania actually fell during the most recent boom years.) A recent study of the effect of the mining boom on the South Australian economy found that increased mining activity did not translate into jobs growth in the latter years of the 2000s (Spoehr and Molloy 2011). This has not been the experience of WA.

**Figure 3 Employment in the Mining Sector by State, 1984-2011**



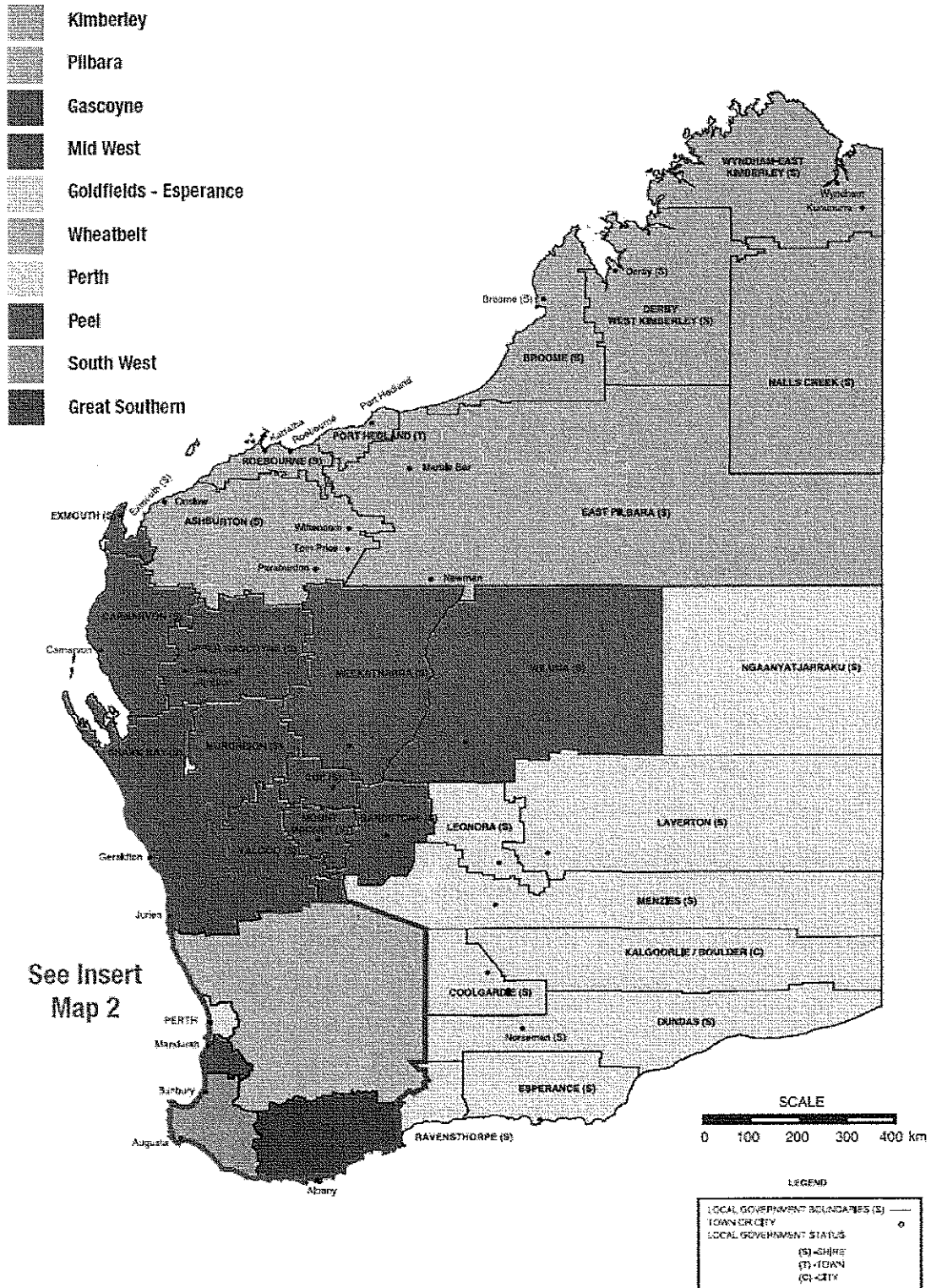
Source: Australian Bureau of Statistics (2011b).

### 3. The Effect on Regional Western Australia

There are a number of different methods that have been used to create spatial regions in Australia for the purpose of population and labour market analysis. A comprehensive study of the relative strengths and weaknesses of many of these can be found in Garnett (2007). Very few methods include a separate classification for coastal regions, which have experienced rapid growth since the mid-1990s, and not all methods have a separate classification for remote regions, which are often distinctly different in many economic, environmental and other characteristics from other inland regional and rural areas. A regional classification system developed by researchers at the Australian Bureau of Agricultural and Resource Economics (ABARE) (now known as the Australian Bureau of Agricultural and Resource Economics and Sciences) is an appropriate method for use in this study as it includes a separate 'coastal' classification, an 'inland' classification and a 'remote' classification (Garnaut, Connell, Lindsay and Rodriguez 2001; Garnett and Lewis 2007). Much of WA's mining activity is carried out in areas classified as remote using this method. In addition, the statistical division boundaries used by the ABS are useful in this analysis, as

the Pilbara statistical division contains a significant proportion of the mining activity in WA. Figure 4 shows the statistical division boundaries for WA (DMP 2011c, p.40).

Figure 4 Statistical Divisions, Western Australia

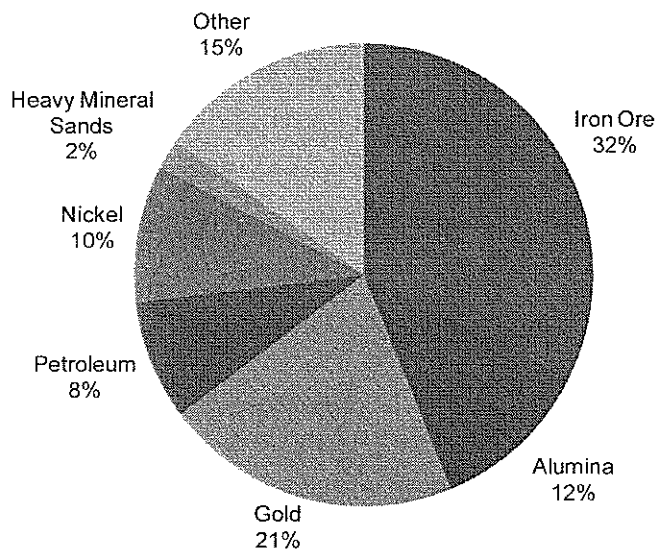


Source: Department of Mines and Petroleum (2011c).

The Pilbara region was responsible for 53% of the total value of production of minerals and energy in WA in 2010 (DMP 2011c). The next highest contributor was the Goldfields-Esperance region, at 9%, followed by Peel 6% and the Mid West, at 3%. Commonwealth offshore petroleum comprised 20% of the value production.

A large proportion of the Pilbara, particularly where much of the mining activity is located, is classified as remote using the ABARE method. The Pilbara region produces the largest proportion WA's iron ore, which comprises over half of the value of total minerals and energy in WA. Production of iron ore in WA rose by over 150% between 2000 and 2010. China alone bought 40% of WA's commodity exports and 69% of WA's iron ore in 2010. The iron ore industry is also the largest single employer of labour in the mining sector, at 32% in 2010, as seen in Figure 5. This is followed by gold, at 21% and alumina, at 12%.

**Figure 5 Employment by Mining Industry, WA, 2010**



Source: Department of Mines and Petroleum (2011d).

Given the significant growth in the volume and value of mining output in WA in the 2000s, and the rise in employment from 2003 onwards, as seen earlier in Figure 3, it is important to determine the impact on towns, such as those in the Pilbara region. Possible benefits include reduced unemployment rates, and the flow-on effects of population and labour market growth to local enterprises. There may also be costs such as strains on local infrastructure, housing and social amenities. Further, as extensive mining activity in WA is anticipated to continue for decades, it is important to establish the impact on inland and remote regions.



#### 4. Regional Population and Employment Changes

The most recent Census of Population and Housing showed that in WA around 74% of the population live in capital cities (ABS 2006). This is then followed by coastal areas, at approximately 12%, some of which are satellite cities. Inland regions comprise 5.5% of the population and remote regions around 7.5%.

To understand population changes and movements within regions in the state, it is important to examine *net* migration. Table 1 shows net migration in absolute numbers and as a proportion of each region's population, between 2001 and 2006, both at the state level and at the national level. These data were obtained from the ABS by observing the post-code addresses and regions of residents in the previous Census and comparing these with their region of address in the following Census. The movement to coastal areas in WA is very clear, with net migration between the two time periods of 5.4% of the coastal population. As WA does not have a regional classification of 'other metropolitan' this makes comparisons with the national average difficult. However, some coastal regions in WA have similar characteristics to satellite cities characterised as 'other metropolitan' at the national level. Therefore it is likely that the movement into larger non-capital city metropolitan areas and coastal areas at the state level is similar to the national experience.

**Table 1: Net Migration, Western Australia and Australia, 2001-2006**

Region	Western Australia		Australia	
	Persons	Percentage of population	Persons	Percentage of population
Capital Cities	3 843	0.3	-90 218	-0.8
Other Metropolitan	na	na	53 629	3.1
Coastal	10 559	5.4	67 280	2.9
Inland	-3 253	-3.5	-2 518	-0.1
Remote	-7 362	-7.0	-28 173	-6.4

Source: Australian Bureau of Statistics, unpublished data.

Of more direct relevance here is that inland and remote areas of WA experienced negative net migration between 2001 and 2006, which exceeds the negative net migration from these regions at the national level. For example, in remote areas, 7 362 more people left than moved into the areas, which represented a net loss of 7% of the population in

remote areas. This outflow of people can in part be explained by the severe droughts experienced in agricultural regions in 2002 and 2003. The majority of people who left inland and remote regions moved directly to capital cities, which is what occurred at the national level (Garnett and Lewis 2007). In addition to the drought, these movements have been found to be due to factors including the lack of services in rural and remote regions, including health, education and financial services (Garnett and Lewis 2007).

Western Australia as a whole was the recipient of net positive, but relatively small, interstate migration between 2001 and 2006. This can be seen in Table 2, which shows net migration to WA from other states and territories. The largest source of net migration was from NSW, with almost 5 000 more people moving to WA from NSW than moving from WA to NSW. This was followed by South Australia. While not shown in the table, of those who left NSW and migrated to WA between 2001 and 2006, almost 10% went to remote areas, 3% went to inland areas, 10% to coastal areas, with the majority - 77% - moving to Perth. Of those from South Australia, over 17% moved to remote areas, around 5% went to inland areas, around 14% to coastal areas and 64% to Perth.

**Table 2: Net Migration, WA, 2001-2006**

<b>State or Territory</b>	<b>Persons</b>
New South Wales	4 960
Victoria	-108
Queensland	-4 185
South Australia	1 166
Tasmania	-182
Northern Territory	413
Australian Capital Territory	-255
Other territories	266
<b>Total Net Migration</b>	<b>2075</b>

Source: Australian Bureau of Statistics, unpublished data.

As we saw in Table 1, there was a significant movement of people out of remote regions between 2001 and 2006. Table 3 shows the internal migration between regions, which identifies which regions people moved into. The *columns* show where people are moving *from*, while the rows show where they are moving *to*. For example, from Table 3, of all those people who left remote areas between 2001 and 2006, 63.4 per cent moved to Perth, and of those who left inland areas, 50.3 per cent moved to Perth. Importantly, the table shows that the movements into inland and remote areas are dominated by people

leaving the capital city. Of those who left Perth, 27% moved to remote areas - 12 372 people. This compares to a national average of 6% of people who left capital cities moving to remote areas for the same time period (Garnett and Lewis 2007). This is a large difference, and is likely in part to be attributable to the commencement of the mining boom in WA, although this difficult to determine.

**Table 3: Migration: From and To Regions, WA, 2001-2006, per cent**

		From			
		Capital City	Coastal	Inland	Remote
To	Capital City	-	66.6	50.3	63.4
	Coastal	49.9	-	36.8	25.3
	Inland	23.1	18.7	-	11.3
	Remote	27.0	14.6	12.9	-

Source: Australian Bureau of Statistics, unpublished data.

Given that the mining boom in WA began in the early 2000s, it is clear from Table 1 that any migration into inland and remote regions was not enough to offset the exodus. However, specific areas within the remote classification, such as the Pilbara region, appear to have experienced positive net migration, as population growth rates were in excess of the average rate for the remote WA region classification (ABS 2006; ABS 2001). Further, the movement of people from Perth to remote areas, as shown in Table 3, supports this conclusion. Following the 2011 Census, it will be of interest to see if the data show a reduction in the migration out of remote areas in WA between 2006 and 2011, as this was the period when the mining boom accelerated. It is likely that the fortunes of those living in inland and remote areas will continue to be mixed, with growth in some mining areas, and continued reductions in areas dominated by agriculture.

For post-censal years, population growth rates are estimated by the ABS by statistical local area and local government area. These are estimates based on a number of factors including births, deaths, Medicare records and school enrolments. The ABS acknowledges that these have an 'inherent inaccuracy' due to the absence of migration data, particularly for small areas (ABS 2010a). However, these data may be useful in determining population growth trends in larger areas, and enable some analysis of population movements since the 2006 Census. In Perth, and for the state as a whole, the ABS estimated that between 2004 and 2009 – the time when the minerals and energy boom was at a peak in WA – the population growth rate is estimated to have been around 13% (ABS

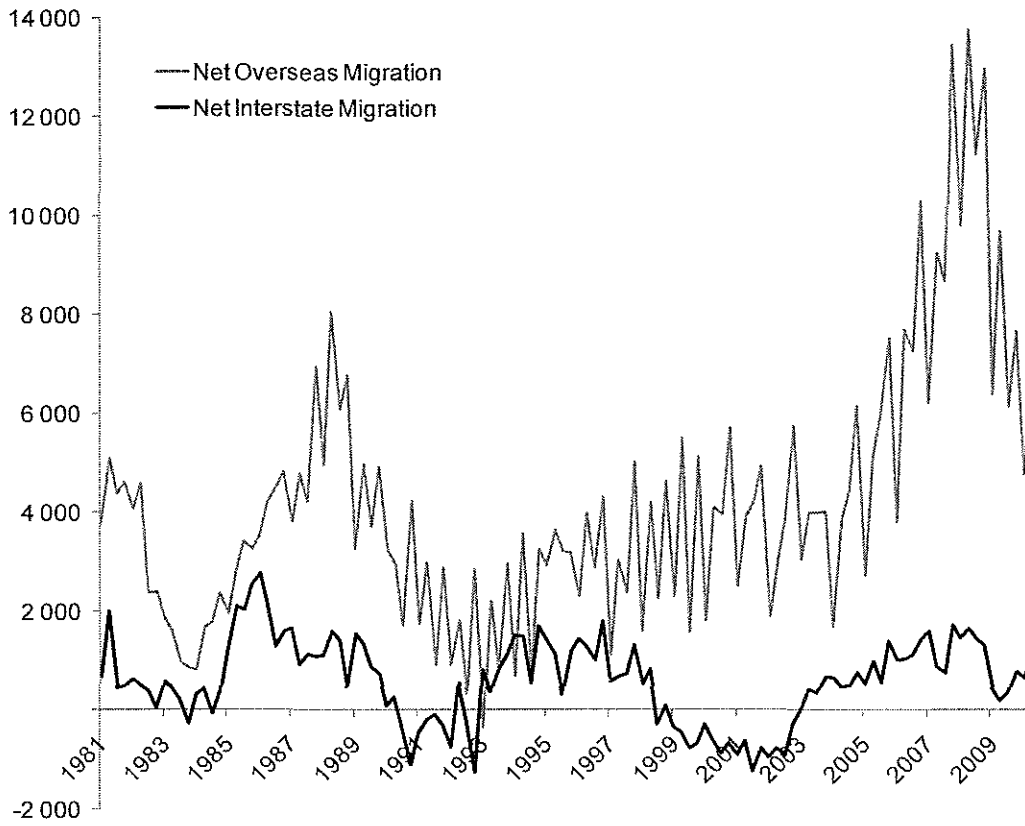
2010a). This is almost double the population growth rate of 5 years earlier, of 7%. In the Pilbara region, the ABS estimated that between 2004 and 2009, the region experienced a population growth rate of over 18%. For the Goldfields/Esperance region – the second largest in terms of the value of mining output – the population growth rate is estimated to have been around 9%. All other regions were either about the same or lower than the state average, with the exception of the Kimberley region, with an estimated growth rate of approximately 15% (ABS 2010a).

The population growth rate in WA between 2004 and 2009 was significantly higher than other states and territories, with the exception of Queensland and the NT, which experienced population growth rates of around 13% and 12% respectively. For NSW, the population growth rate for the period was 6%, Victoria 9%, South Australia 5%, Tasmania 4%, the ACT 8%, and the rate for Australia as a whole was 9% (ABS 2010b).

The relatively high population growth rates in WA are largely due to a rapid rise in overseas migration, rather than from interstate migration. From the early 1990s until 2007, the Australian economy experienced a period of continual economic growth, and by the mid 2000s, labour and skills shortages were occurring in many industries. Migrant intakes moved to very high levels between 2006 and 2009. In addition, interstate migration to WA also rose, particularly from the mid-2000s onwards. Figure 6 shows the trends in net interstate and net overseas migration for WA from 1981 to 2010. This figure clearly shows the rapid rise in overseas migration from around 2005 onwards. The net overseas migration rate in WA as a proportion of total population growth during the second half of the 2000s was the highest of all states (ABS 2009b).

The reduction in 2009 and 2010 reflects the federal government's policy of reducing Australia's overall migration intake following the GFC. The political gain behind this policy has been at the expense of the skilled workforce required by the fast growing economies of WA, Queensland and the NT. As will be discussed later, this policy is likely to impose restraints on the economic growth rate of WA, and in particular, has led to calls from the mining sector to allow a large increase in skilled migration. Interestingly, Figure 6 also shows that net interstate migration follows a cyclical pattern, which closely follows the economic growth rates of WA.

**Figure 6 Net Interstate and Net Overseas Migration, Western Australia, 1981 - 2010**



Source: Australian Bureau of Statistics (2010b).

## 5. The Impact of the Mining Boom on Regional WA

Earlier sections have clearly shown the significant and relatively sudden impact that the mining boom of the 2000s has had on WA in terms of exports growth, employment growth – in particular the rising importance of employment in mining – and population growth. Some remote areas, such as the Pilbara region, have been particularly affected. While state revenue from royalties has risen, employment growth has been strong, and exports are very strong, the impact on the mining regions themselves has been of mixed fortunes. Local businesses benefit from increased sales due to population growth, and also from the large increase in fly-in/fly-out (FIFO) and drive-in/drive-out (DIDO) workers. In towns where housing prices and rental prices have risen, investors and local councils have also made financial gains. However, with the rapid rise in the number mining workers and associated service providers, some towns have experienced chronic housing shortages, huge increases in housing rental prices, and strains on local service and social infrastructure. In addition, while populations have grown, so has the use of FIFO workers, who do not directly pay rates, but do use local resources. Further, local businesses do not benefit as much from

FIFO workers as they do from an increase in the residential population, due to income leakages, as much of FIFO worker income is spent in their home metropolitan areas, such as Perth.

The lack of available and/or affordable housing, either for purchase or for rent, is a growing problem in the Pilbara region. This has important implications for not only the mining sector, but for other sectors, including the public sector. Government programs to attract teachers, nurses, doctors, chemists, and other professional staff to these areas, together with apprenticeship programs, face the additional burden of the lack of housing. Table 4 shows the median rental rates for the capital cities and two large mining regions in WA for the 2011 March quarter, the percentage annual change between 2010 and 2011, and the 5-year change between 2006 and 2011.

**Table 4: Cities and Regional Centres – Rental Rates**

	Median rent, houses, \$ March 2011	Annual change, %	5-year change, %
<b>Sydney</b>	450	2.3	28.6
<b>Melbourne</b>	360	2.9	41.2
<b>Brisbane</b>	370	2.8	37.0
<b>Adelaide</b>	330	3.1	34.7
<b>Perth</b>	395	3.9	58.0
<b>Hobart</b>	340	3.0	na
<b>Darwin</b>	520	0.0	44.4
<b>Canberra</b>	500	6.4	37.0
<b>Pilbara</b>	<b>1 650</b>	<b>17.9</b>	<b>288.2</b>
<b>South West</b>	320	6.7	45.5
<b>National</b>	355	2.7	46.2

Source: Rpdata.com (2011).

From Table 4, there is no doubt of the strain on the Pilbara region from the mining boom. For example, the enormous growth rate in rental prices between 2006 to 2011 of over 288% compares with the growth rate in another important WA mining region – the South West, which has not experienced such rapid growth in the mining sector. The national average is 46.2%, with Perth experiencing the highest growth in median rental prices of all capital cities of 58% over the past five years. Median rents in the Pilbara of \$1 650 can be paid by some mining employees, but are largely prohibitive to other mining employees, workers in mining service industries such as caterers, and definitely prohibitive to many in

the service sector such as school teachers, nurses and other public and private sector service providers.

The issue of relative wage differentials of those living and working in mining regions has been cited as contributing to upward pressure on other prices, including the purchasing price of houses, services of tradespeople and some retail prices (The Age 2011). The average price for a 3-bedroom house in Karratha – the regional centre of the Pilbara – is approximately \$700 000 and around \$1 000 000 for a 4-bedroom house (Realestate.com.au, 2011).

The response from the mining sector to high rental and real estate prices has been to increase FIFO and DIDO programs. In 2008, FIFO employees in the Pilbara were approximately 5 000 people, or 34% of the workforce. By 2010, FIFO employees in the Pilbara were approximately 15 000 people, comprising 49% of the workforce. By 2015 it is estimated that FIFO employees will increase to 27 000, comprising almost 60% of the workforce (RITC 2010). While FIFO reduces to some degree the problem of housing shortages, it does not solve the issue of the already high rents and house prices. Further, the head offices of many mining companies are based in Perth, where mining employment has grown considerably, and these increases labour force and population has put upward pressure on the rental housing market in Perth, as seen in Table 4, and also on real estate prices.

The increase in skilled migrants in recent years, many of whom are based in Perth and are employed as FIFO workers, has also put pressure on Perth infrastructure, including water supplies, electricity and roads, on education and medical services and facilities, and on the domestic airport. With expected continued higher than average growth rates of population and the labour force expected over the next decade, additional demand for facilities and services will greatly increase the need for further planning and public expenditure. In an interesting decision on the use of federal *regional* infrastructure funds, in May 2011, the federal government chose to spend more than half of WA's regional funding allocation on improvements and expansions to the arterial roads surrounding the Perth domestic airport, specifically to support the increase in FIFO workers travelling to mining regions. The airport has already been expanded by its private owners, with a new terminal for charter and regional services under construction. The decision to use regional funds in Perth was seen by members of the state government and regional groups as detrimental to regional mining areas, who instead argue that regional funds should be spent in the regional areas to support the development of infrastructure and amenities (ABC 2011).

## 6. Policy implications

The shortage of skilled labour has been frequently highlighted as a major constraint by mining companies throughout WA. The Chamber of Minerals and Energy of WA (CME) has estimated a strong increase in the demand for labour from 2011 to 2015 due to new projects commencing their construction phase (CME 2011). The construction phase requires about 10 times the number of workers as the subsequent operation phase, and in particular, require tradespeople in metals, electrical and engineering. Projects worth almost \$30 billion are already under construction, another \$70 billion are committed to, with a total of more than \$250 billion estimated for development or expansion (RITC 2010; Moore 2011). Skills shortages, rather than labour shortages, have been identified, as the industry can attract semi-skilled or unskilled employees from other industries due to the mining sector's ability to offer relatively higher wages. The demand for labour during the construction phase is expected to peak in 2012, with an estimated increase in the demand for labour of 27 000 people, mostly for the Pilbara region (CME 2011). The demand for labour is forecast to then taper off after 2015 when the new projects enter their operational phase. This means that some of the increase in demand for skilled labour will be only temporary.

Based on current workforce participation rates, ABS population forecasts, and Australian Treasury forecasts of increased economic growth rates for Australia in general, a shortage in the supply of skilled workers in WA is likely to occur. Training sufficient local apprentices is not probable in the short term, given the shortage of tradespeople that already exist in many inland and remote regions of Australia (Lewis and Corliss 2010). Significant increases in education and training, such as the *National Workforce Development Fund* – which has the aim of creating 130 000 new training places from 2011 to 2015 – if successful, will assist in providing longer term solutions to skills shortages. However, it is not evident that the target number of places is achievable.

Supposing extra skilled labour was available, there are other important factors which prevent the movement of labour to these regions. These include housing shortages, lack of amenities in remote communities and high rental costs in mining areas, all of which reduce the likelihood that trainees will move into these regions. Numerous programs that already exist, which offer large incentives to teachers, doctors, nurses, chemists and other professionals to move to, or migrate to, regional and remote areas, have met with very limited (or no) success in many regions (Garnett 2007).

Some further interstate migration is likely, however overseas migration is the most probable source of skilled labour in the near future. Given that the construction phase requires larger numbers of short-term labour, temporary migration appears to be required to



meet the skills shortages. As was seen in Figure 5, WA already significantly increased net overseas migration during the latter half of the 2000s. In the 2011 Federal Budget, it was announced that the quota of skilled immigrants into Australia would be increased by up to 16 000 for 2011/12 under the Regional Sponsored Migration Scheme, and for the first time, permanent visas for regional areas can be specifically allocated (Department of Immigration and Citizenship 2011). However, this increase is for the whole of regional Australia, and given the estimates from WA industry groups discussed earlier, will not be sufficient to fill skilled labour shortages. Further, the Regional Sponsored Migration Scheme requires that migrants live in regional areas, which may not be possible due to the housing shortages and high rental costs. Migrants under this scheme cannot live in a metropolitan area and fly-in/fly-out to work. The cut-back in immigration announced by the federal government during the GFC was politically popular, with support from both major political parties. However, overseas skilled migration programs will need to be expanded to reduce constraints on economic growth in mining and in other sectors.

Other policy implications of the current rapid mining boom for the mining regions are complex. As discussed earlier, there has been significant residential population growth in the Pilbara and Esperance-Goldfields regions at rates in excess of Perth and other regions. In addition, mining companies have greatly expanded their FIFO programs, particularly to the Pilbara. In the past, mining companies used a 'township model' where housing and infrastructure was largely provided by the mining companies, and labour was supplied by residential workforces (RITC 2010). Some of these towns continued after the mining activities slowed or ceased and were supported by local government shires, while other towns shrank or virtually ceased to exist. The Olympic Dam minerals site in South Australia was the last site where a residential mining town was built by a mining company, which was in the mid-1980s. The model used by mining companies in the 1990s and 2000s, particularly in the iron-ore industry, has been one of providing temporary village accommodation for an increasing number of FIFO workers. This is not particular to Australia, as the practice of using FIFO workers in remote regions has been adopted in many other countries (RITC 2010).

Reasons put forward for this change in models include the high costs of building and managing new towns, longer administrative time taken to approve new town construction, the large costs of town closure once mining operations close, cheaper air travel, advances in communication, and a preference for metropolitan living over remote living (Storey 2001).

Therefore this leaves a number of difficult policy decisions. Local councils, businesses and residents of towns in growth mining areas consistently argue for increased spending on economic and social infrastructure in their towns, not only to deal with the

strains currently occurring due to population increases, but to promote continued regional prosperity in the future. It has been argued that if large expenditures to improve services and amenities occur, more people will chose to move to these regions, rather than fly-in/fly-out, which can put stress on workers and their families (Planning WA 2011). As mining companies no longer invest in these towns as they did in past decades, it remains a decision for state, territory and federal governments. In the case of the Pilbara region, population growth has been rapid in recent years, and the region requires more land released for housing, and substantial funding to meet the infrastructure and service needs of the current population and industry there. However, as is always the case with these decisions, if governments do decide to expand some remote mining towns, the question remains as to which towns do not receive additional funding. Further, many inland and remote regions in WA and throughout Australia, including those dominated by agriculture, suffer from a lack of infrastructure, services and amenities, and would ask that additional funding and facilities be provided for them also.

Other unknown issues include how many years the mining boom will continue, as much of the growth in demand is dependent on the continued economic growth and development of China and India. If growth in the emerging economies slows, as has already been seen with the temporary effect of the GFC, the mining boom will slow or end. Even if the mining boom continues for the expected number of decades, it will end sometime, and therefore the question remains whether towns based on mining can expand their economic base enough to continue to prosper after the boom is over.

There is also the important issue of the pressure that the current rapid rates of population growth, and the likely continued rapid population growth, has on Perth and other major WA metropolitan areas. If the development of remote towns encouraged increased settlement there, this would reduce the pressure on city infrastructure and services. This policy issue incorporates the relatively higher cost of provision of infrastructure and services in remote areas than in metropolitan areas. It also clearly involves whether or not workers and families prefer to live in cities and fly-in/fly-out, and in particular, whether migrants – the main source of the increased skilled labour – prefer to live in cities or in remote areas.

## References

- Australian Broadcasting Commission (ABC) (2011), 'Perth to benefit from regional funds', *ABC News*, at [www.abc.net.au](http://www.abc.net.au), 31 May 2011.
- Australian Bureau of Agricultural and Resource Economics (ABARE) (2005), *Australian Commodities – Statistical Tables*, March, at [www.abares.gov.au](http://www.abares.gov.au), viewed 31 March 2011.
- Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) (2011), *Australian Commodities – Statistical Tables*, March, [www.abares.gov.au](http://www.abares.gov.au), viewed 31 March 2011.
- Australian Bureau of Statistics (2010b), *Australian Demographic Statistics*, Time Series Workbook, Cat. No. 3101.0 at [www.abs.gov.au](http://www.abs.gov.au), viewed 9 June 2011.
- Australian Bureau of Statistics (2011a), *Australian National Accounts: State Accounts, 2009-10*, Table 6, Time Series Workbook, Cat. No. 5220.0 at [www.abs.gov.au](http://www.abs.gov.au), viewed 31 May 2011.
- Australian Bureau of Statistics (2001), *Census of Population and Housing*, Commonwealth of Australia.
- Australian Bureau of Statistics (2006), *Census of Population and Housing*, Commonwealth of Australia.
- Australian Bureau of Statistics (2011b), *Labour Force, Australia, Detailed, Quarterly*, February, Cat. No. 6291.0.55.003, at [www.abs.gov.au](http://www.abs.gov.au), viewed 23 May 2011.
- Australian Bureau of Statistics (2010a), *Population by Age and Sex, Regions of Australia, 2009*, Cat. No.3235.0, at [www.abs.gov.au](http://www.abs.gov.au), viewed 5 June 2011.
- Australian Housing and Urban Research Institute (AHURI) (2009), *Housing Market Dynamics in Resource Boom Towns*, Final Report No. 135, July.
- Australian Housing and Urban Research Institute (AHURI) (2010), *The drivers of supply and demand in Australia's rural and regional centres*, AHURI Positioning Paper No 128, May.
- Chamber of Minerals and Energy of Western Australia (CME) (2011), *State Growth Outlook*, April, at [www.cmewa.com](http://www.cmewa.com), viewed 9 June 2011.
- Department of Mines and Petroleum (DMP) (2011a), 'Quick Resource Facts', Government of Western Australia, at [www.dmp.wa.gov.au](http://www.dmp.wa.gov.au), viewed 31 March 2011.
- Department of Mines and Petroleum (DMP) (2011b), 'Regional Local Area Resources Data, 2010', *Resources Data Files*, Government of Western Australia, at [www.dmp.wa.gov.au](http://www.dmp.wa.gov.au), viewed 31 May, 2011.
- Department of Mines and Petroleum (DMP) (2011c), *Western Australian Mineral and Petroleum Statistics Digest*, Government of Western Australia, at [www.dmp.wa.gov.au](http://www.dmp.wa.gov.au), viewed 3 June 2011.

- Department of Mines and Petroleum (DMP) (2011d), 'Western Australian Resources Industry Reaches New Heights', *Latest Statistics Release*, Government of Western Australia, at [www.dmp.wa.gov.au](http://www.dmp.wa.gov.au), viewed 29 May 2011.
- Garnaut, J., Connell, P., Lindsay, R. and Rodriguez, V. (2001), *Country Australia: Influences on Employment and Population Growth*, ABARE Research Report 01.1, Canberra, Australia.
- Garnett, A. M. (2007), *Employment and Population Adjustment in Rural Australia*, unpublished PhD thesis, The University of Canberra, ACT, Australia.
- Garnett, A. M. and Lewis, P.E.T. (2007), 'Population and Employment Changes in Regional Australia', *Economic Papers*, March, The Economic Society of Australia, Vol. 26, No. 1, pp.29-43.
- Lewis, P. and Corliss, M. (2010), *Where Tradies Work: A Regional Analysis of the Labour Market for Tradespeople*, Research Report, August, National Centre for Education and Vocational Research, Canberra.
- Moore, N., Minister for Mines and Petroleum (2011), 'Western Australia's resources industry earning(s) soar past \$90 billion', Ministerial Media Statement, Wednesday 30 March, at [www.mediastatements.wa.gov.au](http://www.mediastatements.wa.gov.au), viewed 10 June 2011.
- Planning Western Australia (Planning WA) (2011), *Pilbara: Planning and Infrastructure Framework – draft*, February, Government of Western Australia, at [www.planning.wa.gov.au](http://www.planning.wa.gov.au), viewed 7 June 2011.
- Realestate.com.au (2011), 'Houses for Sale in Karratha', at [www.realestate.com.au](http://www.realestate.com.au), viewed 31 May 2011.
- Resources Industry Training Council (RITC) (2010), *Western Australian Mining Industry: Workforce Development Plan*, Perth, Western Australia, at [www.ritcwa.com.au](http://www.ritcwa.com.au), viewed 26 May 2011.
- Rpdata.com (2011), *Rental Review*, March quarter, at [www.rpdata.com](http://www.rpdata.com), viewed 31 May 2011.
- Spoehr, J. and Molloy, S. (2011), *Mining employment in SA – exploration and exports boom but what about jobs?*, Australian Institute for Social Research, The University of Adelaide.
- Story, K. (2001), 'Fly-In/Fly-Out and Fly-Over: Mining and Regional Development in Western Australia', *Australian Geographer*, Vol. 32, No. 2, pp.133-148, cited in Resources Industry Training Council (RITC) (2010), *Western Australian Mining Industry: Workforce Development Plan*, Perth, Western Australia, at [www.ritcwa.com.au](http://www.ritcwa.com.au), viewed 26 May 2011.
- The Age (2011), 'The boom's frontline: where the high wages are', 20 May, at [www.theage.com.au](http://www.theage.com.au), viewed 31 May 2011.

