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Diversification of the Hunter Economy – Post BHP

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Diversification of the Hunter Economy - Post BHP

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Diversification of the Hunter Economy – Post BHP

1 ADVANTAGES OF ECONOMIC DIVERSIFICATION

The economic diversity of a region is a key contributor to its long-term economic development and sustainability. There are different ways to measure the degree of economic diversification. However, there is broad agreement that the less concentrated a region's economy is in any given industry sector, and the smaller the contribution of each industry sector to the aggregate production in the region, the more diversified the region.

There are two approaches to measuring the contribution of industry sectors to a region's production. These are through the measurement of *GRP (Gross Regional Product) shares* for each industry sector, and the measurement of *employment shares* for each of these sectors. As GRP data is difficult to reliably obtain for the Hunter Region, employment data is used here, and calculated for each industry sector and for different time periods. Using this measure, economic diversity is defined "in terms of balanced employment across industry classes".[1] For instance, if all employment in a region was concentrated in one sector only, the degree of economic diversification in that economy would be the lowest possible. However, should employment be equally distributed among all industry sectors, a perfect diversity would be obtained.[2] The finding that the degree of economic diversification is positively correlated with the long-term economic development of a region is largely uncontroversial among economists. The risks of insufficient diversification have also been acknowledged for a long time. Some of the benefits from economic diversification include:[3]

- Reduced exposure to negative external shocks (these can be known, unknown, man-made or natural),
- Increased productivity and competiveness,
- Less volatile growth and economic cycles,
- Economic stability and sustainability.

In contrast, high volatility caused by insufficient economic diversification may result in structural unemployment. Some researchers even suggest a negative relationship between diversification and unemployment.[4] Another important finding is that when aiming for increased economic diversity, policy makers may be confronted with a *trade-off* between *growth* and *stability*. While focusing on industry sectors with comparative / competitive advantages enhances growth, diversification in several industry sectors enhances the stability of a region. This issue is re-addressed in the final section.

Although economic diversification is essential for a region's prosperity, it is not the only factor to be considered. For instance, the provision of appropriate regional infrastructure and a focus on education and innovation can be of at least equal importance. Before examining the Hunter Region in greater detail, international examples (Case studies 1 and 2) are employed in order to

a. demonstrate the measurement of economic diversification,

b. show that countries and regions vary significantly regarding the achieved degree of diversity, and

c. give an example of structural changes that might occur in a region.

[1] Attaran, M. (1987): *Industrial diversity and economic performance in US areas*, Annuals of Regional Science 20:44-54.
[2] Lee, S., Seo, J. and Webster, C. (2006): *The decentralising metropolis: Economic diversity and commuting in the US suburbs*, Urban Studies 43: 2325-2549.
[3] cf. e.g. Booz Allen Hamilton (2008), *Economic diversification – The road to economic sustainability*, and Wagner, J., Deller, C. (1998): *Measuring the effects of economic diversity on growth and stability*, Land Economics 74: 541-56.
[4] cf. e.g., Savitz, R. (2010): *The relationship between unemployment and economic diversification*, International Journal of Business Research 3.

CASE STUDY 1: Structural change in post-industrialised urban regions

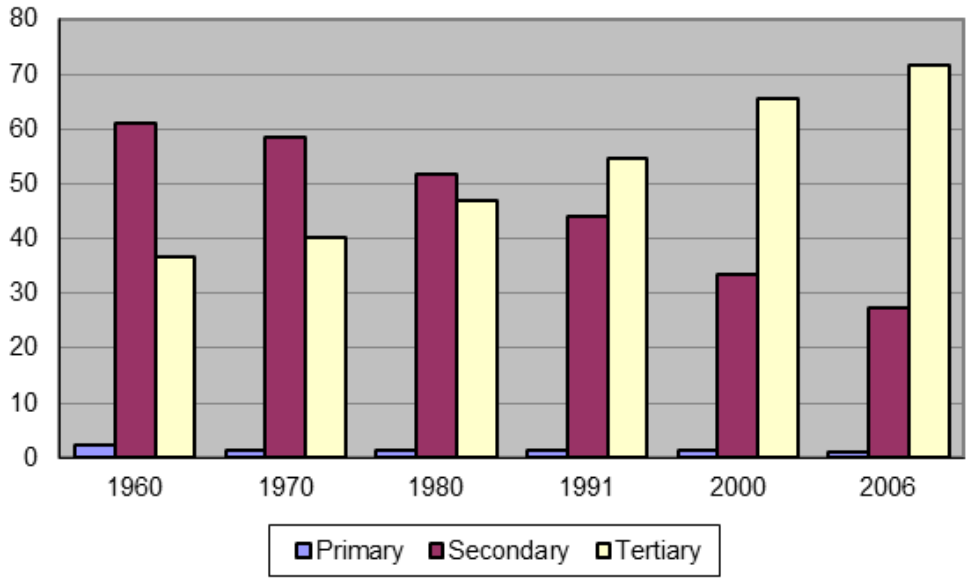
The 'Ruhr area' in Germany

The '*Ruhr area*' in Germany provides an example of structural change undergone by many industrialised regions. In the *Ruhr Area* an accelerated structural change occurred as a result of the 'coal crisis' in the late 1950s. The crisis started unexpectedly with the closure of pits in the *Ruhr Area* in 1958, mainly due to the declining competitiveness of the local coal mines. Seventy-eight pits were lost in ten years and employment in the mining industry declined by more than half from 505,000 in 1960 to 242,000 in 1970. Consequently, structural change occurred and employment in the area was mainly based on the secondary sector until the 1980s. Simultaneously, there was a major restructuring of industry in that area towards communication and information technologies. This continued structural change led to a complete turnaround so that today the Ruhr's economy is mostly based on service and high technology industries.

In 2010 the *Ruhr area* was named the European Capital of Culture, in which the *Zollverein Essen* is a famous location for architecture, creative industries and modern culture.

Zollverein Essen: Part of the UNESCO World Heritage

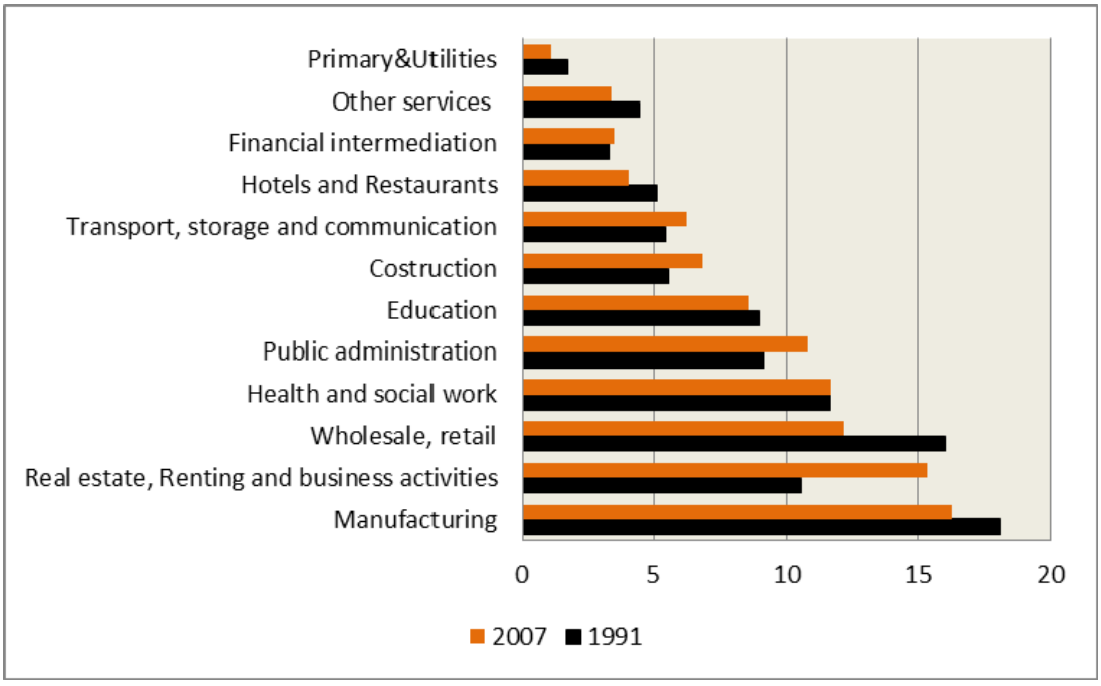
Employment by sectors in the Ruhr area (% of total workforce, 1960 - 2006)



Newcastle upon Tyne and the Tyne and Wear area in the U.K.

During the Industrial Revolution in the 19th-century, Newcastle upon Tyne and the Tyne and Wear area in the U.K. played an important role in coal mining and manufacturing. However, the dominance of heavy industries declined in the second half of the 20th century. By 1998 jobs in mining and quarrying had been reduced to 200 workers in Tyne and Wear ─ a decline of approximately 90 per cent from 1991. At the same time, Tyne and Wear experienced a shift in employment shares to the secondary sector. Employment in manufacturing grew by approximately 7per cent in the region between 1991 and 1998, compared to a 2 per cent decline in Great Britain as a whole. In contrast, the Finance and Business Services sector was heavily underrepresented. The situation changed, however, in the more recent period between 2003 and 2007. Due to the structural change towards the tertiary sector, the employment share in manufacturing fell by approximately 10 per cent and Tyne and Wear played a less important but still significant role in manufacturing. In contrast to the 90's, the fastest growing industries in the service based sector were *financial intermediation*, and *real estate, renting and business activities* at that time. Like the Ruhr area, the Tyne and Wear area is a prime example of structural change from the primary and secondary sectors towards the tertiary sector. Both examples illustrate the potential, and some challenges, for the Hunter Region. The example of the Ruhr area shows the transition from an economy mainly reliant on the primary and secondary sectors towards an economy based on the service sector. For the Tyne and Wear Region the shift in employment share towards the tertiary sector is shown in greater detail in the chart below. An interesting finding is that manufacturing remained the largest industry by employment share in the Tyne and Wear City Region until 2007.

Employment Change (% of total workforce) in Tyne and Wear County and the Newcastle City Region

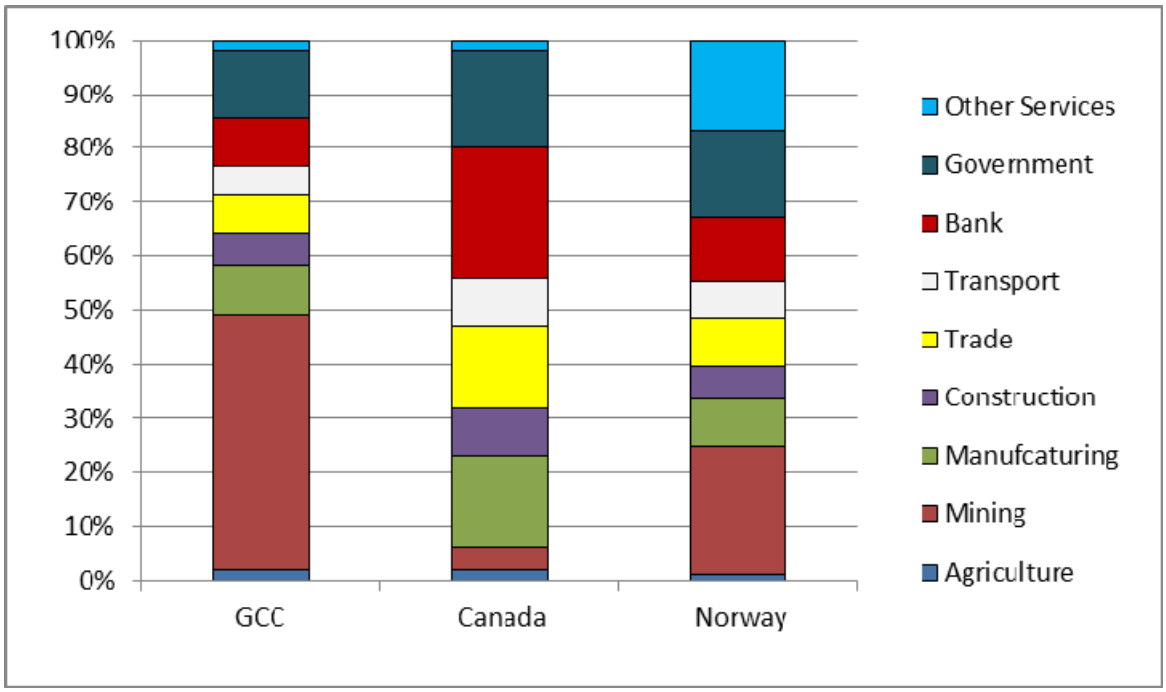


Source: Tyne and Wear Research and Information (2010)

CASE STUDY 2: Economic diversity – International examples

The figure below shows three economic regions with different degrees of economic diversification. Firstly the poorly diversified Gulf Cooperation Council (GCC) and, in contrast, the well diversified states of Canada and Norway. Poor economic diversification in the GCC is evident from the graph below. It is characterised by the relatively large contribution of the mining sector (in this case oil), and the relatively small contribution of all other sectors to GCC's GDP. In contrast, in Canada and Norway the contribution of all industry sectors to these nations' GDP is almost equally distributed. An interesting aspect of this comparison is that, although both the GCC and Norway are particularly rich in oil, only Norway managed to diversify well. In contrast, the GCC relies heavily on oil, and may therefore be more vulnerable to future shocks, such as a price decline in the major traded commodity. It is, however, evident from Norway's example that being rich in a certain resource like oil need not necessarily be accompanied by a lack of economic diversification. Rather, policy makers working in regions that are rich in a particular natural resource must be encouraged to be especially conscious to diversify well.

GDP by economic sectors in 2005 for the Gulf Cooperation Council (GCC), Canada, and Norway (2005, % of total GDP)



Source: Booz Allen Hamilton (2008).
GCC: Gulf Cooperation Council (Qatar, Abu Dhabi, Kuwait, KSA, Oman, UAE, Bahrain, Dubai)

May not total 100% due to rounding

2 THE HUNTER REGION BETWEEN 1950 AND 1970

Dominance of primary and secondary industries

As in many other regions, the Hunter experienced high population and employment growth, as well as low unemployment rates during the post war period. There was a significant shift from the primary to the secondary sector. Income generated by the primary sector peaked in 1952. In this time period, the Hunter economy was of major importance to New South Wales and Australia. This was mainly due to the Region's significant contribution to the State's and country's production in a few key industries in the primary and secondary sectors, as detailed below. It is clear therefore that the economy was less diversified than today.

Production during the 60's and 70's

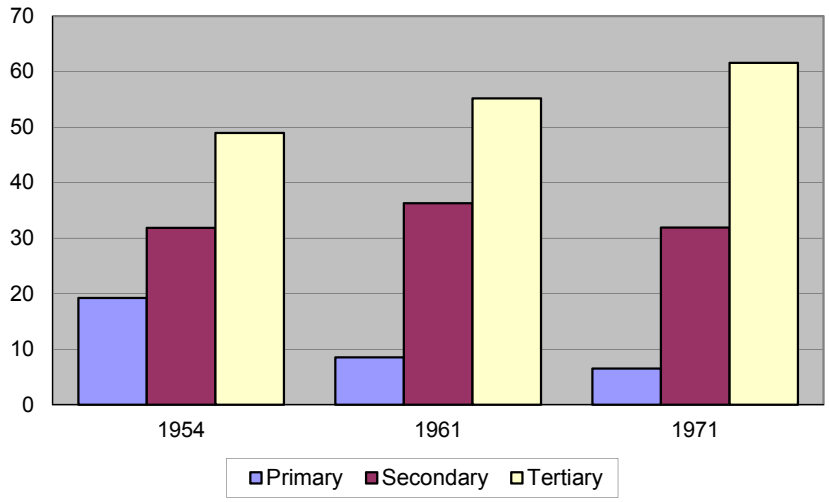
- *Coal*: Approximately 60% of NSW production, and 40% of Australian production in the 1960s,
- *Steel*: 1.3 million tonnes of ingot steel produced in1960,
- *Shipping*: Newcastle was Australia's largest export port by tonnages,
- *Electricity*: 80% of total requirements of NSW supplied by 1970,
- *Milk*: 30% of the requirements of the NSW milk board supplied,
- *Wool*: 20% of the NSW clip was sold at Newcastle.

Source: HVRF

The Region's dominant role in production in the primary and secondary sectors was also apparent in the distribution of the Region's workforce as shown in Figure 1. At that time, there was also a trend towards increasing employment shares in the tertiary sector, in both Australia and the Lower Hunter.

However, the increase in employment share in the tertiary sector was stronger nationwide than in the Hunter Region. Between 1954 and 1961 the secondary sector employment share increased even further in the Hunter. This meant that the secondary sector was *over-represented* and the tertiary sector *under-represented* in the Hunter Region compared to Australia.

Figure 1: Change in workforce by sectors in the Lower Hunter (% of total workforce)



Source: Hunter Valley Research Foundation (HVRF); Australian Bureau of Statistics (ABS)
Refers to the city of Newcastle, Lake Macquarie, Port Stephens, Maitland and Cessnock

The role of BHP in the Hunter

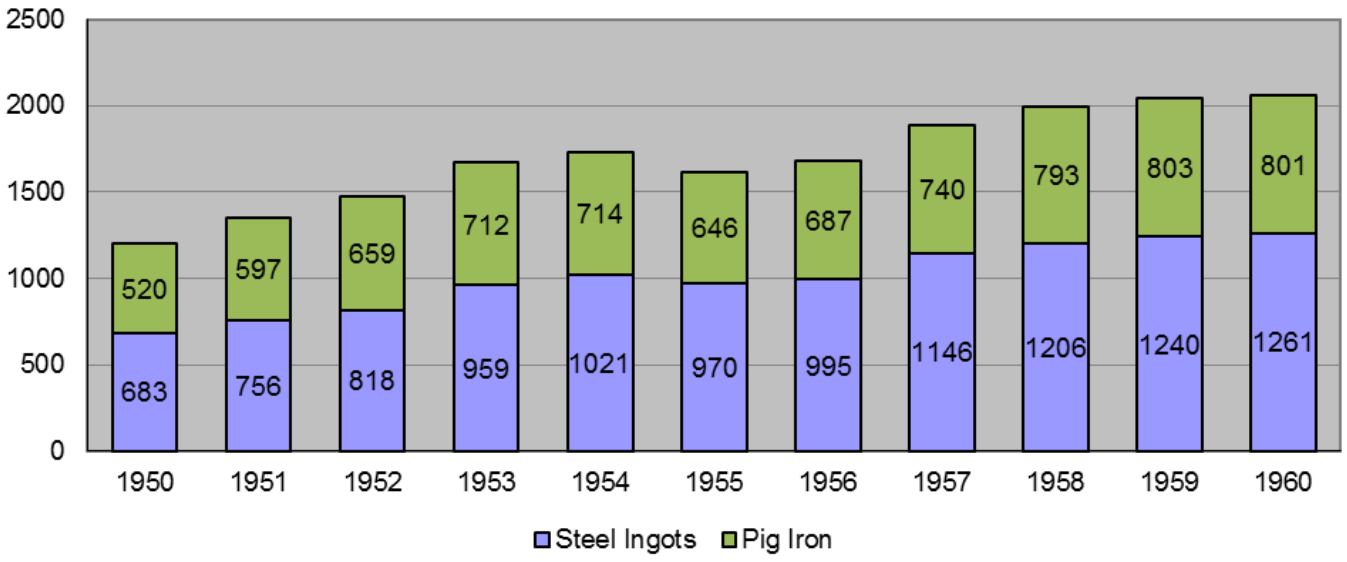
The developments at the BHP plant are an example of the growth of the secondary sector during the 50's and 60's. Figure 2 illustrates the increasing importance of BHP's Newcastle operations for the Hunter Region. The output of steel ingots reached approximately 1.3 million tonnes in 1960. Marketable iron and steel products were railway material, rods for wire drawing, steel for tubemaking, tinplate, hot rolled strip and merchant.

In 1960 BHP was the largest single employer in the Commonwealth with the exception of the public sector. It employed 37,800 people, with about 12,000 of them in the Newcastle steel works alone.

Workers at an Open Hearth Furnace pre 1960, BHP Billiton Archives

Source: History of Newcastle Steelworks, BHP Billiton

Figure 2: Production of Pig Iron and Steel ingots from BHP in the Newcastle works (1950-1960, '000 Tonnes)



Source: HVRF

3 THE HUNTER REGION BETWEEN 1970 AND 1995

The economic climate in the Hunter

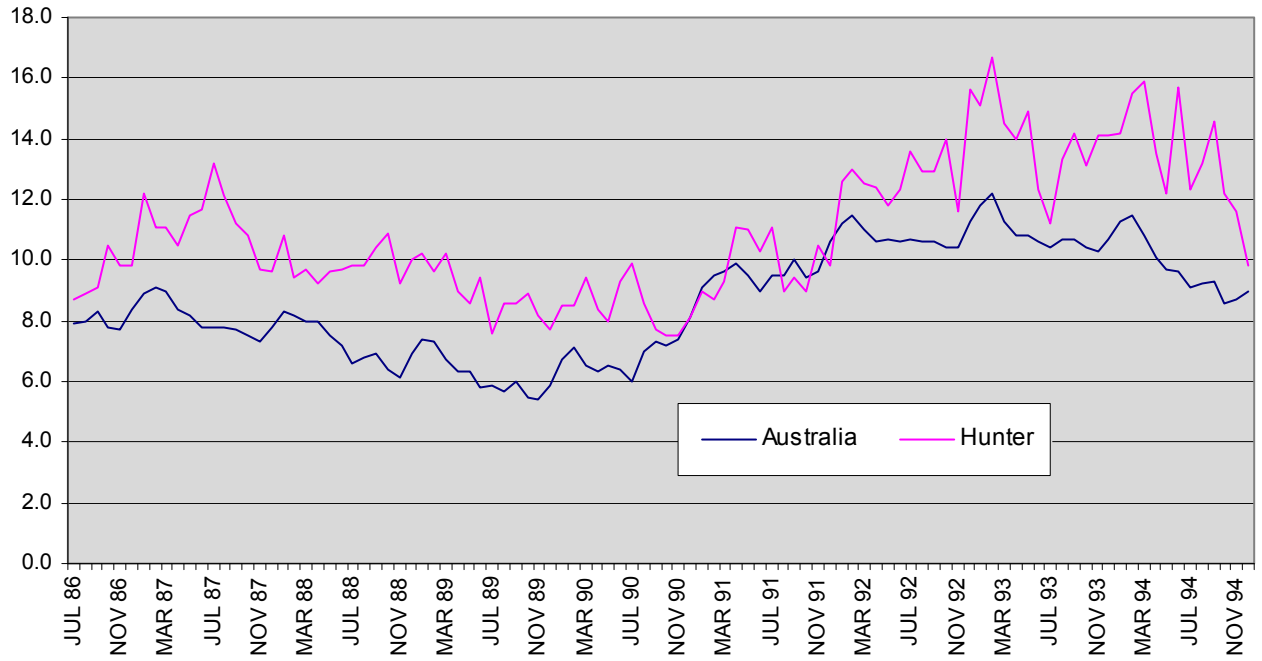
Although the unemployment rate is a lagging indicator of the economic climate, it is still a measure which reflects the health of an economy. From 1970 on, the unemployment rate rose significantly in the Hunter – from only 1.7% in 1971 to 5.7% in 1981. In the 70's, manufacturing was still highly protected and tariffs quite high. This changed from the 70's onwards, which may have led to a temporary rise in the unemployment rate.

Consideration of monthly unemployment rates, which are available for the Hunter from 1986, reveal that the unemployment rate was both higher and more volatile in the Hunter than in the nation. This is shown in Figure 3. However, the high volatility of the unemployment rate in the Hunter may be partly due to the smaller sample size.

Between 1986 and 1990 – a time of further tariff reductions, labour market and financial deregulation, the floating of the Australian Dollar, and increased international trade – the unemployment rate fell in both Australia and the Hunter Region, but it still remained higher in the Hunter.

During the recession in the early 1990s and in the following years, the unemployment rate rose, with job losses being more severe in the Hunter Region, and unemployment peaking at 16.7% in February 1993. Part of the reason for the relatively worse economic situation in the Hunter during that period lay in the past, in that between 1950 and 1970 employment shares were significantly higher in the secondary sector and lower in the tertiary sector. A lack of skills among people who lost jobs in the primary and secondary sectors, and who were not able to find work in the growing tertiary sector, can to some degree explain the worse economic development.

Figure 3: Unemployment rate (monthly) in the Hunter Region and Australia - (1986-1994)



Source: ABS, HVRF

Shift in employment share towards the tertiary sector

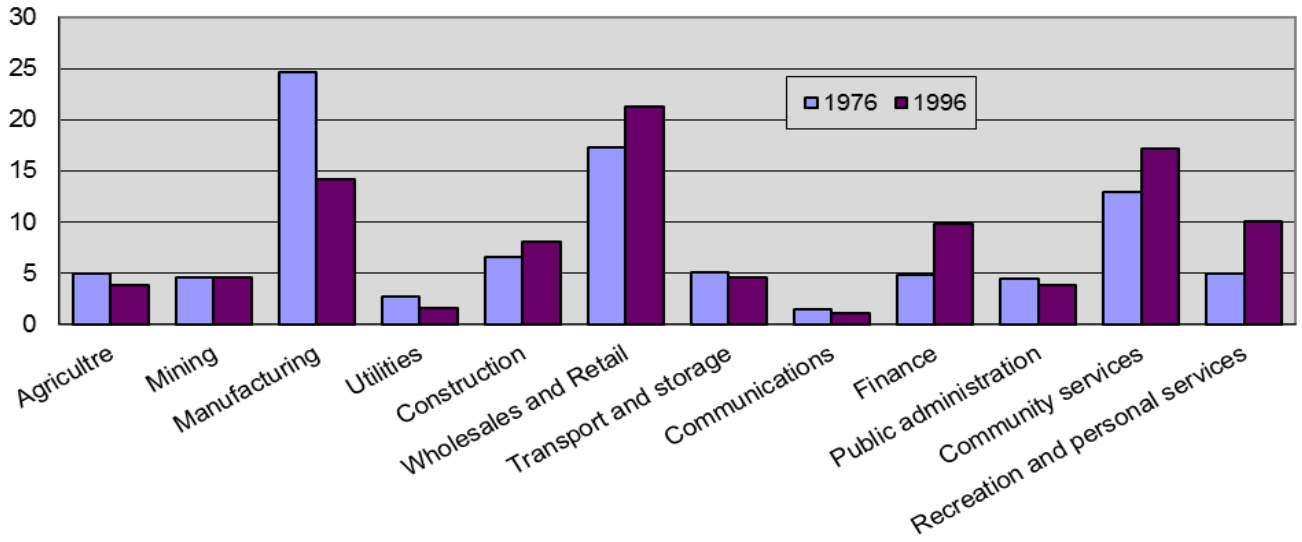
In contrast to the period between 1950 and 1970, which was characterised by a shift of employment to the secondary sector, the period between 1970 and 1995 can be mainly characterised by a shift from the secondary towards the tertiary sector. The drop in employment share in the secondary sector in the Hunter from 24.6% in 1976 to only 14.1% in 1996 represents the decline in the proportion of jobs in *Manufacturing* shown in Figure 4.

This percentage drop also captures the job losses at the BHP Newcastle plant at that time. Growth at the plant had continued until approximately 1975, when the plant achieved record results, with over two million tonnes of output. However, the plant was not able to build on the past years' success. By the 1980s, many coke ovens, blast furnaces, brick plant and brass foundries were closed, and between 1981 and 1985 more than 5,000 jobs were lost.

The decline in jobs in the secondary sector was accompanied by growth in the tertiary sector. Employment share in the already large industries *Wholesales and Retail* and *Community services* rose. However, employment share also increased in previously weak industries. For instance it doubled in the *Finance* and *Recreation and personal services* industries. This development, together with the loss of employment share in previously large industries such as *Manufacturing*, contributed to an increased diversification of the Hunter economy.

Moreover, it is important to note that, although employment share remained higher in the secondary sector and lower in the tertiary sector during this period in the Hunter compared to Australia, the *shift* towards the tertiary sector was *relatively stronger in the Hunter Region*. This shift, and the consequently increased diversification, provided a driving force for the economic recovery in the Hunter in the following period (1995-2010). The next section will focus on both the improving economic diversification and economic climate in this period.

Figure 4: Change in the industrial structure of the Hunter Region labour force, 1976-1996 (% of total labour force)



Source: HVRF, ABS

4 THE HUNTER REGION BETWEEN 1995 AND 2010

The closure of the BHP Steelworks

One of the most significant events which occurred in the Hunter Region in the period between 1995 and 2010 was the closure of BHP Steelworks in 1999 (rod production remained). This had been announced two years in advance. By the time of the actual closure, the direct and indirect job losses were expected to total 4,500. However, employment at BHP started to decline a long time before (as described in the previous section).

In 1998 an online survey of the business community, and members of the Hunter community, was undertaken to examine the perceived likely effect of the BHP closure. The majority of people who took part in the survey were fearful of potential negative impacts of the BHP closure, especially of the effect on the Hunter economy, with the perception of business representatives being the least negative. The results of the survey are shown in Figure 5.

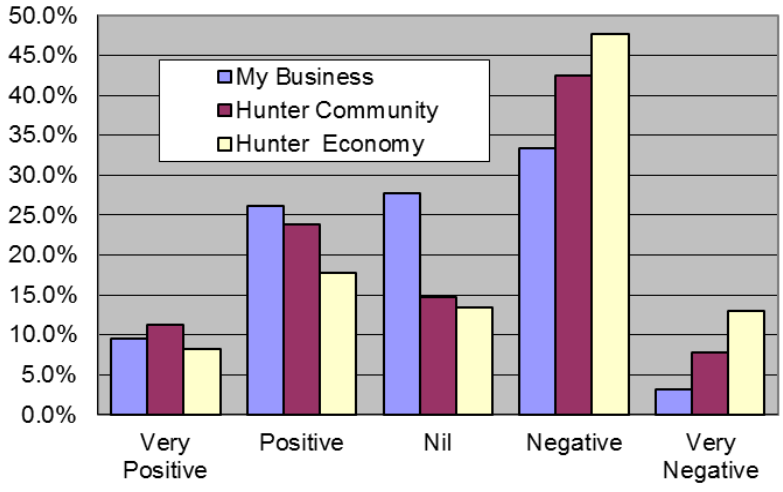
Improving economic situation

Despite the fears of the community, the labour market did not confirm the pessimistic view. Between 1995 and 2010, the unemployment rate fell more rapidly in the Hunter than Australia as a whole, and was lower than the nationwide figure in 2010 (Figure 6). One key factor contributing to the strong improvement in the economic climate in the Hunter during recent years has been the painful, but unavoidable, structural changes made in the past. These structural changes included significant job cuts in manufacturing (e.g. in the BHP plant), accompanied by a strong shift in employment share towards the tertiary sector. This led to the achievement of an advanced stage of economic diversification.

Shift in employment share towards a diversified economy

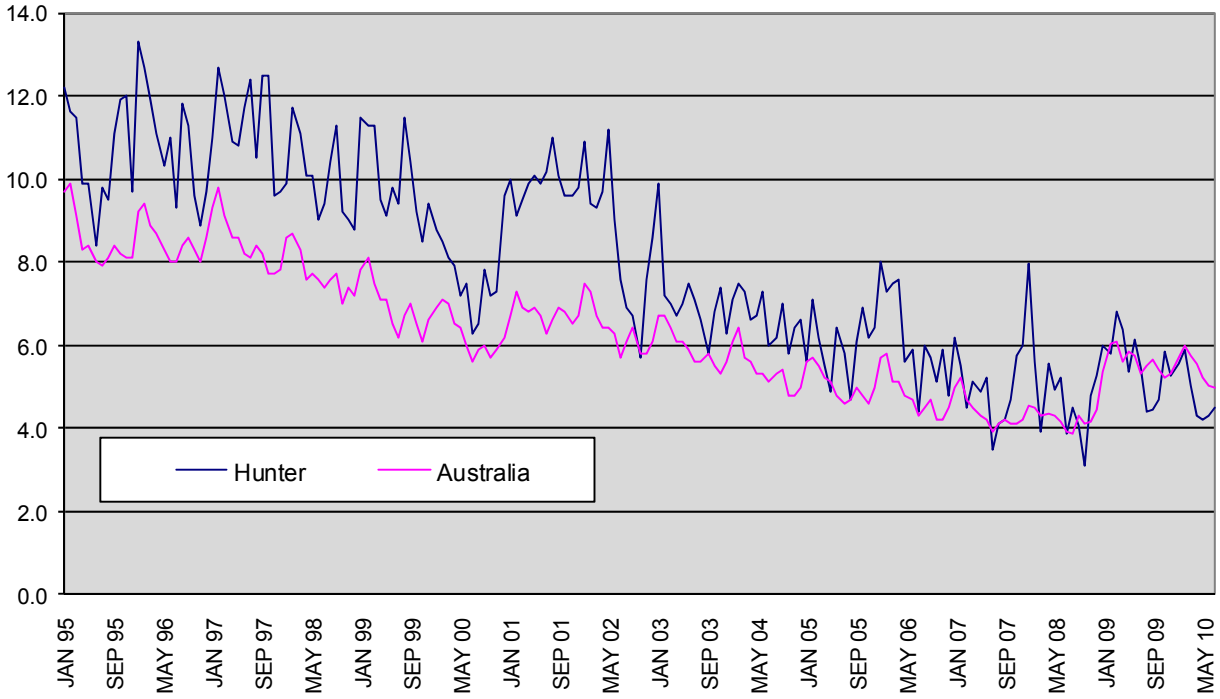
Significant gains in employment have been achieved in the *Health care & social assistance* industry (plus 19,000), which is the largest industry in the Hunter by employment share today. Employment also grew in *Construction* (plus 14,500), *Education & training* (plus 10,700), and *Professional, scientific & technical services* (plus 9,200) over the past 15 years. The relevant shifts in employment shares are shown in Figure 7.

Figure 5: Perceived effect of the BHP closure on the business owners, the Hunter Community, and the Hunter economy



Source: HVRF; 126 business community representatives and 231 members of the Hunter community answered on the Hunter Pulse online survey in 1998

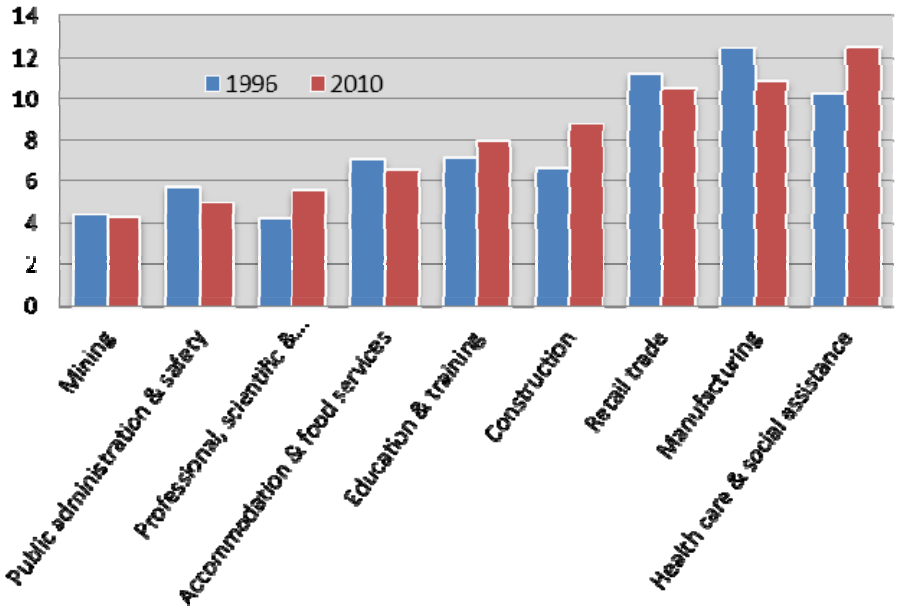
Figure 6: Unemployment rate (monthly) in the Hunter Region and Australia - (1995-2010)



Source: ABS, HVRF

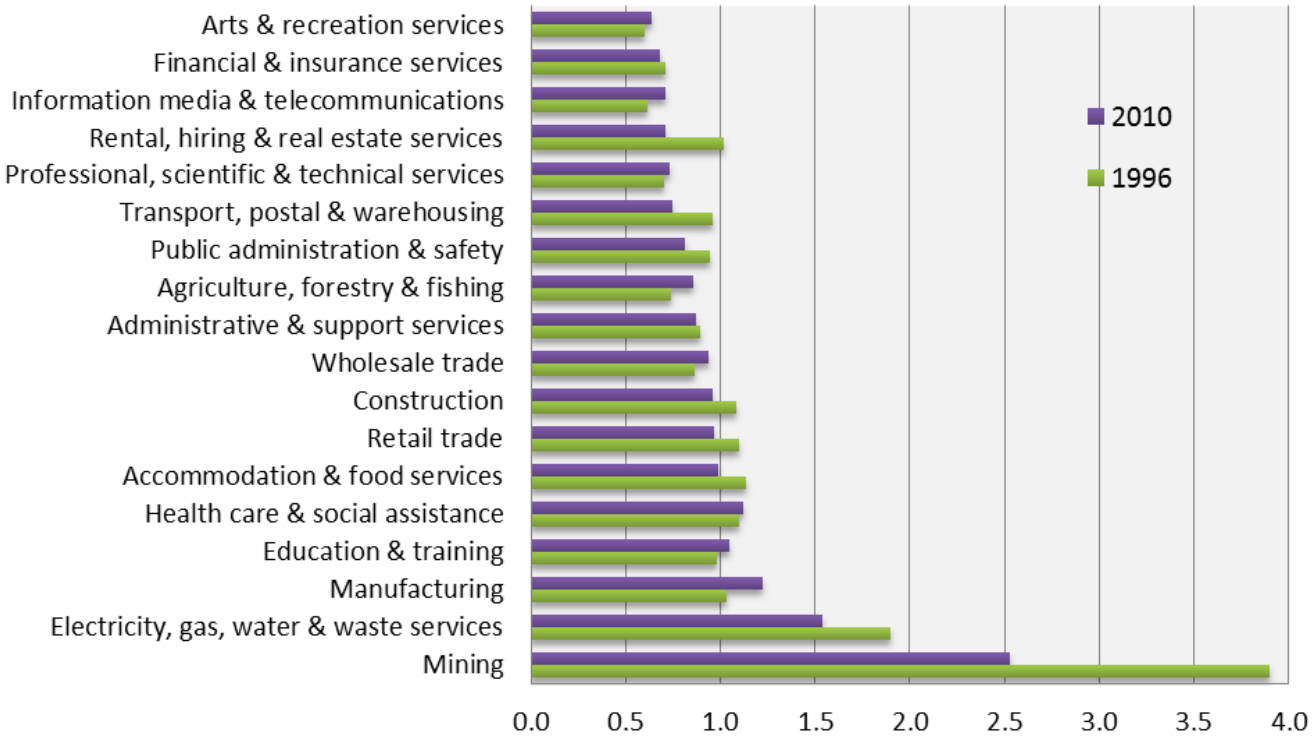
However, simply using employment shares of industry sectors, does not allow a measurement of the degree of economic diversification in the Region compared to other regions. Therefore, in order to measure employment shares in the Hunter compared to Australia, the *location quotient* is introduced into the analysis as a measure of *relative* economic diversity. Economic analysis using location quotients shows that employment shares of industry sectors in the Hunter became increasingly similar to the nationwide shares.

Figure 7: Shifts in employment shares (% of total workforce) in the nine biggest industry sectors in the Hunter



Source: ABS, Monthly Labour Force Survey; an average of quaterly data is used for 2010

Figure 8: Location quotients (Hunter against Australia)



Source: ABS, Monthly Labour Force Survey; an average of quarterly data is used for the year 2010

The *location quotient* is the fraction of the Hunter's employment in a given industry divided by the fraction of Australia's employment in the same industry and in the same year. For instance, a location quotient of 1 would mean that employment shares are the same for the Hunter and Australia

There was a clear trend in the 18 industry sectors for previously high location quotients to fall and vice versa. For instance, it can be gathered from Figure 8 that the Region's relative high employment share in *Mining* declined compared to other Regions. The employment share in that industry was 3.9 times higher in the Hunter compared to Australia in 1996, and was only 2.53 times higher in 2010. In contrast, employment shares in the *Manufacturing*, *Health care & social assistance*, and *Education & training* industries increased relative to the national share. Between 2007 und 2010 approximately 10,000 jobs have been created in *Manufacturing* in the Hunter. This can to some degree be associated with local efforts to generate employment and to stimulate investment in local industries, e.g. through the 'Hunter Advantage Fund' or 'HunterNet' – a network of over 150 manufacturing firms in the Hunter Region. Although the employment share fell in this industry, the decline was worse in other Australian regions. This becomes clear from Figures 7 and 8. While the employment share in manufacturing in the Hunter was still pretty much in line with the nationwide share in 1996, it outperformed the nationwide share by the factor 1.22 (22%) in 2010.

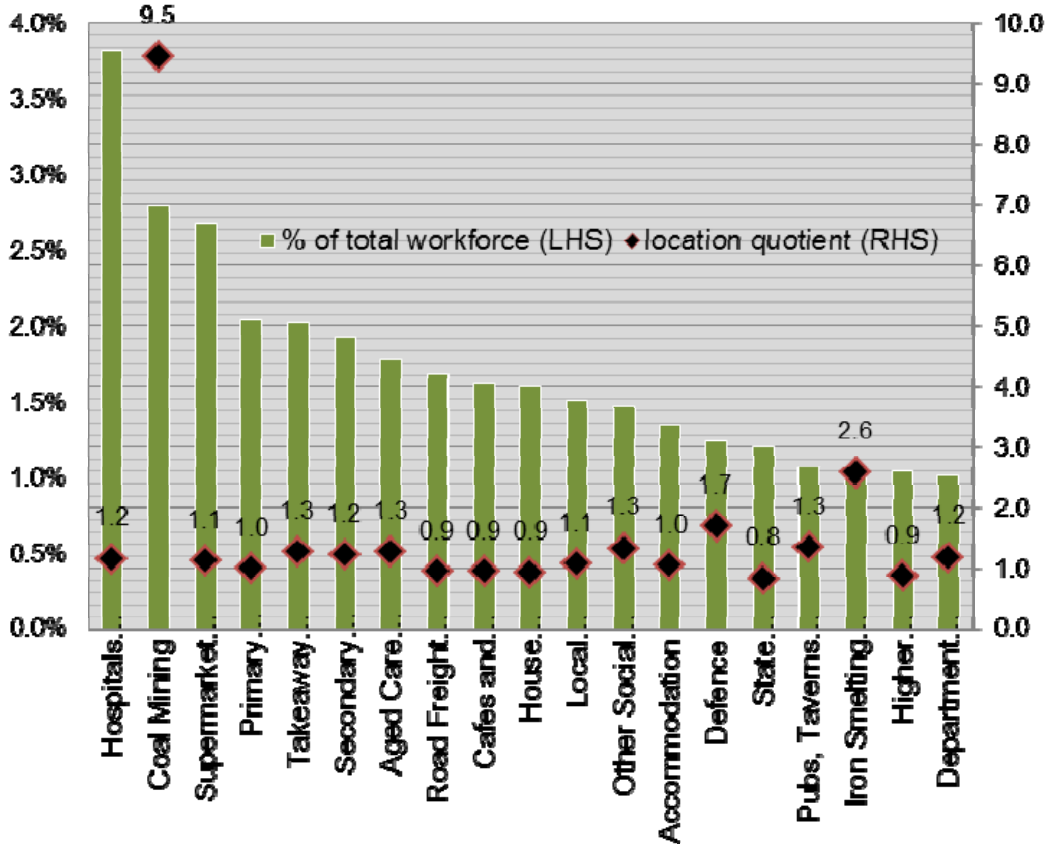
When the more detailed *ANZSIC 2006 Full Classification* (including 720 groups and classes) of industry sectors is employed, it is possible to work out a more detailed list of the most important 'industries' in the Hunter Region. The largest by employment numbers in 2006 were:

- *Hospitals (except Psychiatric Hospitals)* (9,464)
- *Coal Mining* (6,910)
- *Supermarket and Grocery Stores* (6,644)

- *Primary Education* (5,049)
- *Takeaway Food Services* (5,009)
- *Secondary Education* (4,766)
- *Aged Care Residential Services* (4,395)
- *Road Freight Transport* (4,171)
- *Cafes and Restaurants* (4,009)
- *House Construction* (3,966)
- *Local Government Administration* (3,747)
- *Other Social Assistance Services* (3,626)
- *Accommodation* (3,340)
- *Defence* (3,061)
- *State Government Administration* (2,960)
- *Pubs, Taverns and Bars* (2,639)
- *Iron Smelting and Steel Manufacturing* (2,634)
- *Higher Education* (2,578)
- *Department Stores* (2,496).

In order to examine the relative employment shares in these large industries in the Hunter, Australian employment shares are used as a benchmark. Figure 9 shows the employment shares and the respective relative employment shares (i.e. the location quotients). Employment shares were significantly higher in *Coal Mining* (9.45) and *Iron Smelting and Steel Manufacturing* (2.58) in the Hunter. *Defence* (1.7) was also relatively strong. This is partly due to the presence of the Singleton Army Camp and the Williamtown RAAF Base in the Region. Although high, employment shares in the other groups and classes correspond, more or less, with nationwide shares. The respective location quotients are closer to one (0.8 - 1.3). The same method can be used to detect industries with relatively *low* employment shares in the Hunter, and relatively *high* shares nationwide. These include (location quotients in brackets): *Banking* (0.49), *Central Government Administration* (0.62), *Computer System Design and Related Services* (0.46) and *Legal Services* (0.75).

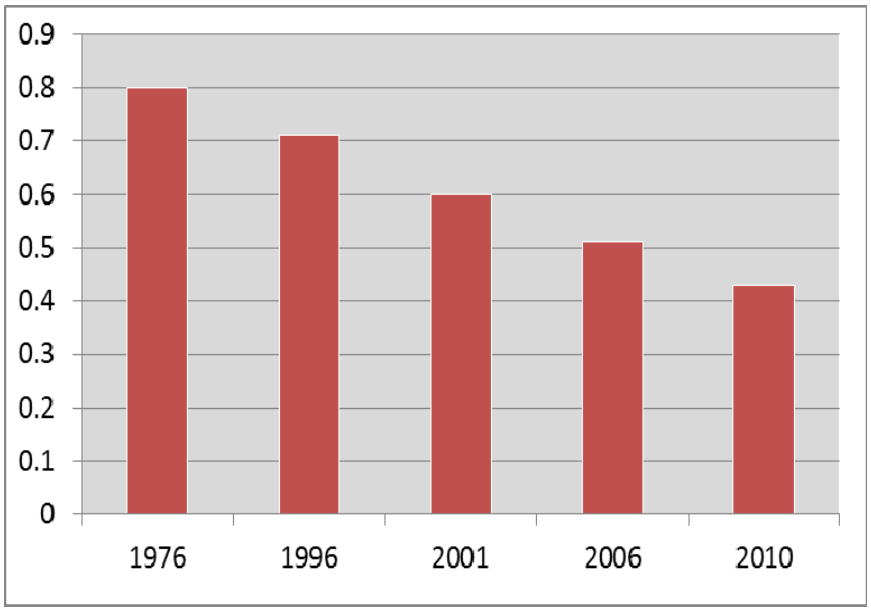
Figure 9: Major sectors in the Hunter in 2006 and respective location quotients



Source: HVRF, ABS (ANZSIC 2006 Full Classification)

The Region's increasing diversification in the last 15 years is made clearer when the variability of the location quotients between industry sectors is observed. It is evident from Figure 10 that the range of location quotients becomes significantly narrower across industry sectors over time. Accordingly, on average, the difference in employment shares between the Hunter and Australia decreased over time.

Figure 10: Increasing economic diversity in the Hunter Region



Source: ABS, HVRF
As a measure of variability of the location quotients of industry sectors for a given year, the *standard deviation* has been used. Note: In 1976 the economy was split into 13 instead of 18 industry sectors

The structural change in the Region and the increasing employment in some industries, for instance in *Health care & social assistance* and *Education & training*, contributed to both a higher degree of diversification and a declining unemployment rate in the Hunter (Figure 6). Compared to past periods, the economy is a lot more diversified today and, therefore less vulnerable to future shocks and economic cycles. However, despite a higher degree of diversification, employment in certain heavy industries in the Hunter (mainly mineral and related industries) remains relatively high. This is mainly due to the strong global, and especially Asian, demand for commodities, and coal in particular.

The appropriate policy mix to promote balance between growth and stability of a region is an open question in research, and is discussed in the next section.

5 THE HUNTER REGION 2011 AND BEYOND

Future risks and challenges for the Region

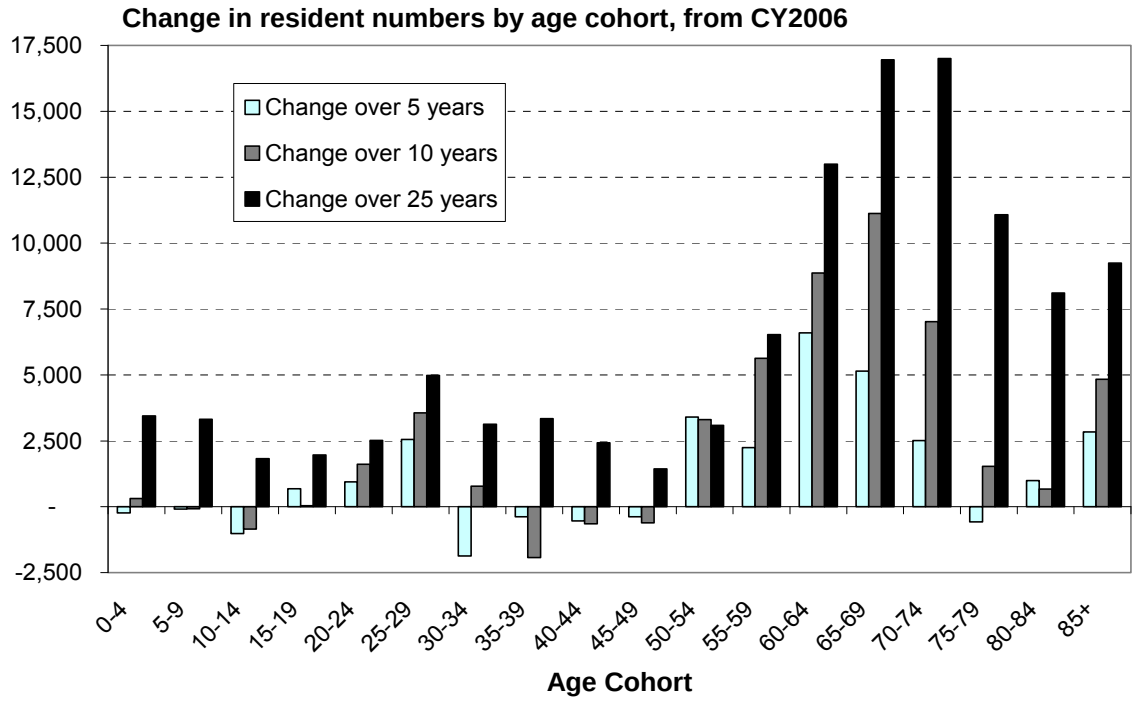
Risks for continued economic development in the Hunter may arise from *known* and *unknown sources*, and can be *man-made* or *natural*. Although natural disasters can have a severe negative impact on the economy, they will not be discussed further here. Some potential man-made risk factors for the Hunter include:

- Intensified Asian competition for manufacturing and other low-skilled industries,
- Eventual mine closures,
- Price changes in main traded commodities (e.g. carbon costs due to a transition to a low carbon economy, or a collapse in mineral demand),
- Technological obsolescence.

Further risks may arise from *contagion effects*, i.e. the spill over of the poor development of one economic sector to other sectors of the economy. However, contagion is most likely in concentrated, poorly diversified economies and therefore less likely in the Hunter economy.

Another major challenge for the Hunter Region arises from an emerging shortage of a skilled workforce, which is already an issue today. Given the demographic change shown in Figure 11, this may become an even more severe challenge in the future.

Figure 11: Challenge of an ageing population, Hunter Region



Source: HVRF, ABS

The changing composition of the population also means rising service demands of an ageing population. Thanks to the growing importance of the *Health Care & social assistance* industry that has been identified in the Hunter, the Region is able to meet some of this demand. However, challenges arising from the demand of an ageing population need to be analysed in detail, and additional measures need to be implemented to avoid negative consequences, such as excessive financial burdens on the working population.

Maintaining the achieved diversification and comparative / competitive advantages of the Region

Historical developments described in the previous sections suggest that the diversification of the local economy is a key factor contributing to positive economic development, and it also will remain a major factor in the future. Structural change is a continuous process, rather than a historical event. Therefore, policy makers should ensure that there is continuous improvement in the economic diversification in the Region.

For example, like Norway discussed in case study 2, the Hunter Region is rich in natural resources (e.g. coal). Despite being a much smaller economic area, the Region has achieved considerable progress in its economic diversification. However, it is also clear from the analysis in the previous section that some industry sectors are still under-represented in the Hunter.

While continuous efforts are required to advance economic diversification, specialisation of industries within the regional economy, based on competitive and comparative advantages (mainly in mineral and related industries), will remain imperative for growth and employment in the Region. This, however, implies that policy makers may be confronted with a *trade-off* between policy measures that promote economic diversification and specialisation, i.e. between the goals of *stability* and *growth* of the Region. Research suggests that the simultaneous pursuit of growth and stability is not necessarily contradictory:

- Short-run policy can be more growth orientated by specialising in selected growth industries. Some of the current areas of specialisation in the Hunter are[5] *building societies, aluminium smelting, coal mining, explosive manufacturing, iron and steel forging, mining and construction machinery manufacturing, poultry farming (meat), horse farming* and *fossil fuel electricity generation*.

- Diversification policies should be the long-run envelope of the Region's short-run efforts.

Generating growth from existing and planned infrastructure – some illustrative examples

Both the Hunter Region's existing infrastructure and its planned infrastructure projects are essential to put the regional economy on course for long-term growth and sustainable economic development. In order to achieve these goals, it is imperative to provide appropriate infrastructure goods and services that enable economic diversification. Thanks to its existing and future stock of infrastructure, the Region is well placed. However, in order to push the Region's output further ahead, additional investment in appropriate infrastructure is required. In general, infrastructure investments contribute to increasing output by increasing the productivity of the workforce and invested capital. Economic theory also posits that investments in infrastructure goods and services contribute to attracting (foreign) direct investments and businesses. Some illustrative examples of the positive impacts of the Region's infrastructure are:

- The *National Broadband Network (NBN)* may help to reduce the persistent competitive advantage companies and residents of major cities (e.g. Sydney or Melbourne) have, due to faster and cheaper internet access. Although the NBN will help increase the productivity of the private sector nationwide, productivity gains may be higher in regional areas like the Hunter.

- Research by the HVRF emphasises increasing output and employment generated by both current operations and future development projects at the *Newcastle Port*. Development of the port is likely to continue due to a strong global (especially Asian) demand for domestic commodities (e.g. coal). In addition, the port's role for the tourism industry may continue to increase as cruise ships visit Newcastle as part of their itinerary.

- The proposed *High-speed Rail (HSR)* system is likely to have a positive impact on output. With travel times reduced by approximately half, long distance commuters will be better off, and a broader choice of employment opportunities will arise for residents.

- A significant infrastructure project in the Region is the scheduled *Hunter Expressway* between the F3 Freeway near Seahampton and the New England Highway west of Branxton. The project will significantly reduce travel times between Newcastle and Branxton.

- The *Newcastle University City campus project* is expected to be positive for both the Newcastle city centre and the Hunter Region as a whole. In general, investments in education infrastructure and goods and services which increase the productivity of the workforce have a high impact on output.

Further investments in the knowledge and educational sectors necessary

Because of their high productivity-enhancing impacts, additional investments in education infrastructure should be considered. This is all the more important as, due to the structural profile of the Region, the level of advanced education has been substantially below that of the State (Figure 12).

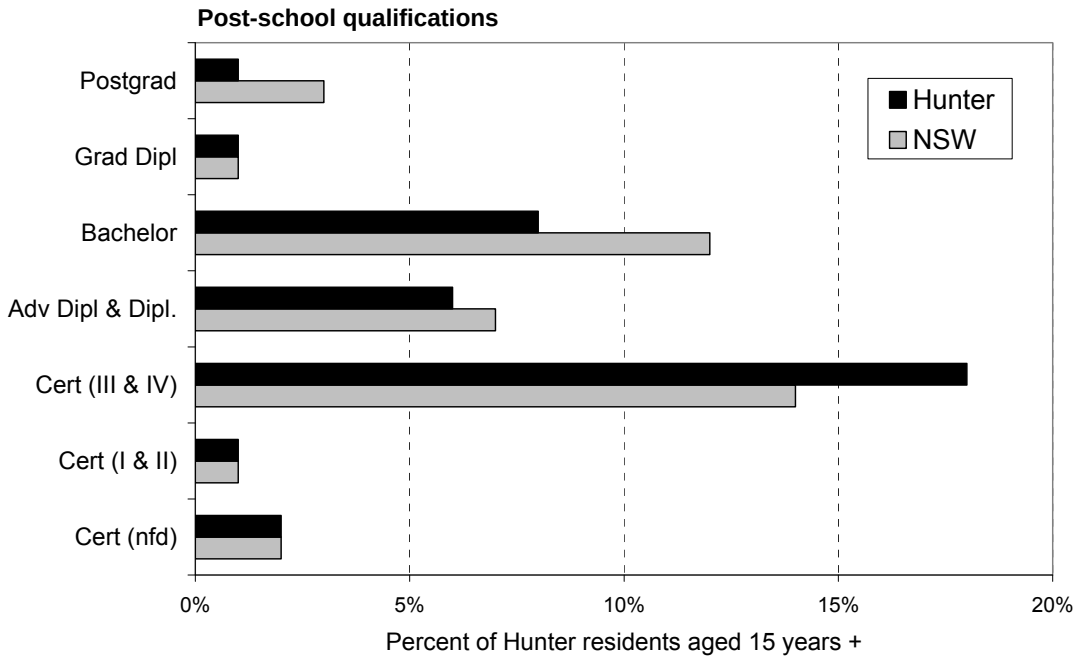
[5] For these sectors the location quotient (*ANZSIC 2006 - Full Classification*) is found to exceed 5.

As future markets are likely to require a well-educated and highly skilled workforce, augmenting the education sector through additional investments will prove fruitful for meeting the demands of industry, which will contribute to a strong and sustainable regional economy. Given the time lags inherent in increasing human capital, investments in schools, educational institutions and universities need to be made today, in order to have a highly skilled workforce available for the unknown future demands of the Region's economy.

The importance of further improving the education levels of the local workforce for positive economic development must not be under-estimated. In this respect, both absolute and relative employment growth in the *education and training* industry in the Hunter compared to Australia deserve emphasis (Figures 7 and 8). Future risks and negative economic developments, like those described in section three, can be reduced by augmenting 'knowledge based industries', and having a well-educated and highly skilled workforce. In addition, a well-diversified economy – one that is based on a broader range of industry sectors – helps to mitigate extreme, negative employment impacts resulting from worsening economic conditions. Now, when the economy in the Hunter is strong, is the best time to advance to the next stage of economic diversification.

This occurs most effectively if considerable investments are made in appropriate infrastructure sectors, some of which have been identified above. In addition, measures aimed at strengthening relatively weak industry sectors in the Hunter (e.g. *Arts & recreation services, Financial & insurance services, Information media & telecommunications*) will help the Hunter Region to achieve the goal of increasing economic diversification further. This increases the probability that the Hunter economy will be well placed to minimise the impacts of future risk factors and unforeseeable structural changes.

Figure 12: Regional underperformance in advanced education, 2006



Source: HVRF, ABS Census of Population and Housing (2006)