

Understanding Local Competitiveness

Briefing Paper 8: Identifying Key and Strategic
Industries, Albany 2001-2011

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& FIONA HASLAM McKENZIE**

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The views expressed and the conclusions reached in this publication are those of the author(s) and not necessarily those of persons consulted.

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1. EXECUTIVE SUMMARY:

Throughout the decade 2001-2011, retail trade was the highest employing industry followed by healthcare and social assistance. Agriculture was the third highest employing industry in 2001 but construction employed more people in both 2006 and 2011. Manufacturing suffered a significant decline in the 2001-2006 period while information and media telecommunications declined in the 2006-2011 period. Although retail was the largest employer there was low growth in the sector.

Throughout the decade, the local Albany economy specialised in agriculture. Financial and Insurance Services, Information and Media Telecommunications, Mining, and Professional, Scientific and Technical Services had consistently low specialisation across all three time periods.

In the **2001-2006 period**, Albany had **comparative advantage** in the following sectors:

- Agriculture
- Administration and support services
- Accommodation and food services
- Construction
- Retail
- Electricity, gas, water & waste services
- Education & training
- Health care & social assistance, and
- Other services and Industries inadequately described/Not stated

In the same period, Albany had **competitive advantage** in the following sectors:

- Retail
- Health care & social assistance
- Construction
- Education & training
- Electricity, gas, water & waste services, and
- Other services

In the **2006-2011 period**, Albany had **comparative advantage** in the following sectors:

- Agriculture

- Accommodation and food services
- Rental, hiring and real estate services
- Construction
- Retail
- Electricity, gas, water & waste services
- Education & training
- Health care & social assistance, and
- Other services

In the same period, Albany had **competitive advantage** in the following sectors:

- Retail
- Health care & social assistance
- Construction
- Education & training
- Agriculture
- Accommodation & food services
- Electricity, gas, water & waste services, and
- Other services

2. The Western Australia Regional Capitals Alliance

This is the latest in a series of reports into the dynamics of competitiveness across the Western Australian settlement system. This research is conducted as part of a strategic collaboration between the *Western Australian Regional Capitals Alliance (WARCA)* and the *Centre for Regional Development* at the *University of Western Australia*. The objectives of this ongoing collaboration are:

- To gain a clear understanding of the opportunities and barriers to regional growth and resilience across Western Australia.
- To facilitate evidence-based policy, indicating specific areas of policy-making that may require revision.

In this report, we explore the local competitiveness of Albany by identifying the key and strategic industries that have driven job creation over the 2001-2011 resource boom. We address two key questions about the dynamics of growth:

- What are the most important industries in Albany in terms of employment and job creation?
- What industries constitute the economic base of the Albany economy?

Using the analysis of this report it is possible to target local economic policy by identifying those industries that are the most important drivers of growth, those that are potentially emerging industries, and those that are most vulnerable.

The information contained in this report is supported by the following documents:

1. UWA/Regional Capitals in the WA Settlement Hierarchy Research:
 - a) Briefing Paper 2 - Employment Change and Job Creation
 - b) Briefing Paper 3 – Employment Diversity and Growth
 - c) Briefing Paper 4 – Endogenous Growth and Local Competitiveness
 - d) Briefing Paper 5 – Identifying Regional Capitals
2. Academic Papers:

Plummer, P., Tonts, M. Martinus, K (2014) “Endogenous Growth, Economic Restructuring and Local Contingency in the Evolution of a Patchwork Economy: Regional Western Australia, 2001-2011” *Journal of Economic and Social Policy* 16(1) 1-31.

3. Planning Documents:

Government of Western Australia (2014) “State Planning Strategy 2050” (<http://www.planning.wa.gov.au/publications/6561.asp>)

3. Job Creation, Economic Diversity and Local Competitiveness

The contemporary Western Australian economy can be characterized by a multi-speed economy, driven by a strong and consistent pattern of job creation. Over the past decade, job creation across industries has not played out evenly across Western Australia. This has resulted in an increasingly ‘patchwork economy’, with larger and more economically diverse economies forging ahead of less resilient smaller settlements. Within this broader context, there is clear evidence that the Regional Capitals are making an increasingly significant contribution to the evolution of employment across the State. In particular, the economic performance of WARCA members relative to the other localities across Western Australia indicates that:

- Engagement in the global economy and broader socio-economic processes have been important in driving economic growth across WARCA members.
- Nonetheless, local competitiveness is critical in both allowing localities to overcome an unfavourable mix of industries or to capitalize on their industry structure.
- The relative importance of local competitiveness and the ways in which localities engage with broader socio-economic processes varies significantly across localities.

Overall, these findings have the following implications for the formation of local economic policy:

- The qualitatively different experience of the WARCA members questions the efficacy of a ‘one size fits all’ policy stance.
- While it is true that local attributes are important in contributing to growth, it is important not to underestimate the importance of external demand in driving development.
- Caution needs to be exercised in focusing excessively on local competitiveness as a means of developing the economies of the regional capitals.

This briefing report is one of series of complementary reports which begin to unpack the growth experience of each WARCA member, exploring the local competitiveness through the propulsive industries (industries/sectors that are identified as the primary drivers of local economic and employment growth) thus driving the local economy.

4. Unpacking the Dynamics of Local Competitiveness

A recently published report by the *Western Australian Department of Regional Development* (2014) focuses on identifying the key drivers of local competitive and comparative advantage across the Western Australian economy. Similarly, the strategic blueprint reports submitted by the *Regional Development Commissions* in 2014 were required to identify those economic activities in which they have a comparative advantage. In this report series we undertake a preliminary investigation of the dynamics of WARCA members, imputing competitiveness and comparative advantage from the underlying industrial structure and ability of these localities to create jobs.

Understanding the Concepts

(A) Local Competitive Advantage: the Ability to Create Jobs Locally

Cities and regions compete with each other for global, national, and local ‘market share’.

Tracking the competitive advantage of a particular regional economy can be imputed, or calculated, from information on local job creation, specifically:

- **SIZE:** The importance of an industry in terms of the number of persons employed in each industry.
- **GROWTH:** The industries growing most rapidly over a particular period of time in terms of their ability to create jobs locally.

For a variety of reasons, industries perform differently in particular locations and, not surprisingly, local and regional economies perform differently to each other. Some of those reasons include natural resources, geographic advantages, access to transport, energy or information networks, local policies and human capital. Human capital brings knowledge, skills and competencies which have a productive value. Housing, education, amenity and services all shape the availability and employability of human capital.

Using the benchmark of the overall performance of the Western Australian economy, it is possible to categorize local industries in terms of **SIZE** and **GROWTH**:

- **FAST GROWING:** relatively large sectors that have exhibited rapid recent growth.
- **RESTRUCTURING:** relatively large sectors that make a significant contribution to the economic base but with little or no growth over the recent past.
- **UNDERDEVELOPED:** low levels of activity in terms of employment and the contribution to the local economy.

(B) Comparative Advantage: Local Economic Specialization and Interregional-Trade Patterns:

Conventionally it is assumed that localities specialize in those activities in which they have a comparative advantage. **Comparative advantage** is the principle that a country, region or locality should specialise in producing and exporting goods in which it has comparative or relative cost advantage over others, and import goods in which it has a cost disadvantage. Factors which may influence comparative advantage are natural resources but also development of technology and human skills, economies of scale and access to advantageous trade opportunities (transport, markets etc).

A comparative advantage provides the opportunity to sell goods or services at a lower price than the competitors and thus realise positive margins.

Trade theory assumes that localities specialize in those activities in which they have a comparative advantage. The comparative advantage of the City of Albany economy is imputed using information on:

- **SPECIALIZATION:** The importance of an industry in terms of the degree to which the local economy specializes in that economic activity.
- **ECONOMIC BASE:** A measure of the degree to which economic activity and employment is related to servicing local demand as against servicing demand external to the region.

Determining the pattern of local economic SPECIALIZATION using location quotients identifies the industries that drive and underpin the local economy (see technical appendix). Location quotients (LQ) measure the concentration of an industry or economic activity in a particular location, compared to the State or nation overall. It therefore identifies the specialisation(s) of a particular place or region in relation to the bigger jurisdiction. Put differently, location quotients also indicate the proportion of people employed in an industry in a locality relative to the proportion of people employed in that industry in the larger, reference or benchmark economy (for example, the State economy or that of the nation overall), in this instance Western Australia. If a particular industry's share of regional employment is greater than that industry's share of State employment, i.e. the location quotient is greater than one, (or unity), then the locality is assumed to specialize in that economic activity.

For example, if ten per cent of a region's workforce is employed in agriculture, but only eight per cent of the overall State population is employed in agriculture then the LQ is $(.10/.08)$ 1.25 meaning that agriculture is twelve and half times more concentrated in that region than for the State overall. A LQ greater than one suggests that the particular industry outputs are exported and hence bring income to the region.

Since local economic data on trade flows does not exist, location quotients have also been widely used to infer regional trade patterns:

- **BASIC Sector:** The greater the location quotient above one (or unity), the larger the economy's net sectoral exports from that sector (i.e. the greater the proportion or share of the local economy of a particular industry, and therefore exports from that region).
- **Non-BASIC Sector:** The greater the location quotient below unity (or one), the larger the economy's net sectoral imports from that sector (i.e. the proportion or share of the local

economy of a particular industry is less than the overall State proportion, and therefore imports into that region).

- NEUTRAL Sector: For a location quotient of unity, (or one), the economy is neither a net exporter nor a net importer for that sector.

The level of ECONOMIC BASE in a local economy can be calculated by aggregating export oriented employment across all industries in which the locality is specializing in terms of employment (see technical appendix). A region with a healthy economic base is likely to be one that specializes in industries with **high LQ and high employment**.

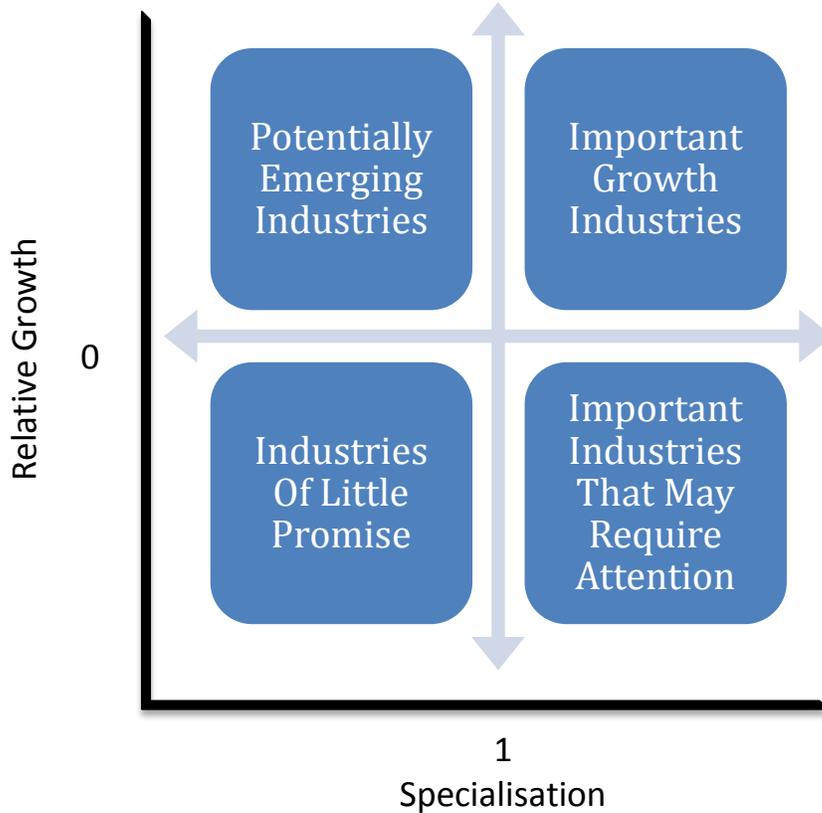
(C) Classifying Industrial Activities

Combining the information on an economy's ability to create jobs locally and identifying the patterns of specialization and inter-regional trade within sectors of the economy, it is possible to classify industries in terms of their growth potential and comparative advantage. Figure 1 classifies the economic structure of a local economy with relative growth measured on the vertical axis and relative specialization measured on the horizontal axis:

- IMPORTANT GROWTH INDUSTRIES: characterized by above average employment growth, relative economic specialization, and export orientation.
- IMPORTANT INDUSTRIES THAT MAY REQUIRE ATTENTION: characterized by below average employment growth, relative economic specialization, and export orientation.
- POTENTIAL EMERGENT INDUSTRIES: characterized by above average employment growth, but currently oriented towards servicing local demand.
- INDUSTRIES OF LITTLE PROMISE: characterized by below average employment growth and currently oriented towards servicing local demand.

The potential significance of each industry in terms of size is represented by the corresponding size of the graduated circle representing the industry on the graph.

Figure 1: Classification of Industrial Activities in a Locality



5. Data Description: Employment by Industrial Classification

This report uses Australian Bureau of Statistics (ABS) Census of Population and Housing time series profiles, which count the number of persons in each industry of employment (based on place of enumeration) for all 138 local government areas (LGAs) in Western Australia for the census periods 2001, 2006, 2011. The members of the *Western Australia Regional Capitals Alliance (WARCA)*: Albany, Broome, Greater Bunbury¹, Kalgoorlie-Boulder, City of Greater Geraldton, Port Hedland, and City of Karratha. Boundaries for all LGAs are according to the ABS 2011 definition. To identify the key and strategic industries for each member of WARCA, employment is disaggregated by industrial sector, as defined by the Australian and New Zealand Standard Industrial Classification (ANZSIC) industry coding². It should be noted that one limitation widely reported by regional local governments is the likely undercount of employees by the ABS. This arises out of the difficulty in capturing fly-in/fly-out workers and other temporary residents. There is no immediate means of overcoming this data limitation, except to use ‘place of enumeration’ (in other words, the place where the census participant actually filled out the census form, as opposed to their place of usual residence, which may or may not be different on the particular night of the census), data as has been done here.

¹ Greater Bunbury is an amalgamation of the LGAs of Bunbury, Capel, Dardanup, and Harvey.

² Found at <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/2901.0Chapter5802011>

6. The Structure and Dynamics of Local Job Creation: Albany

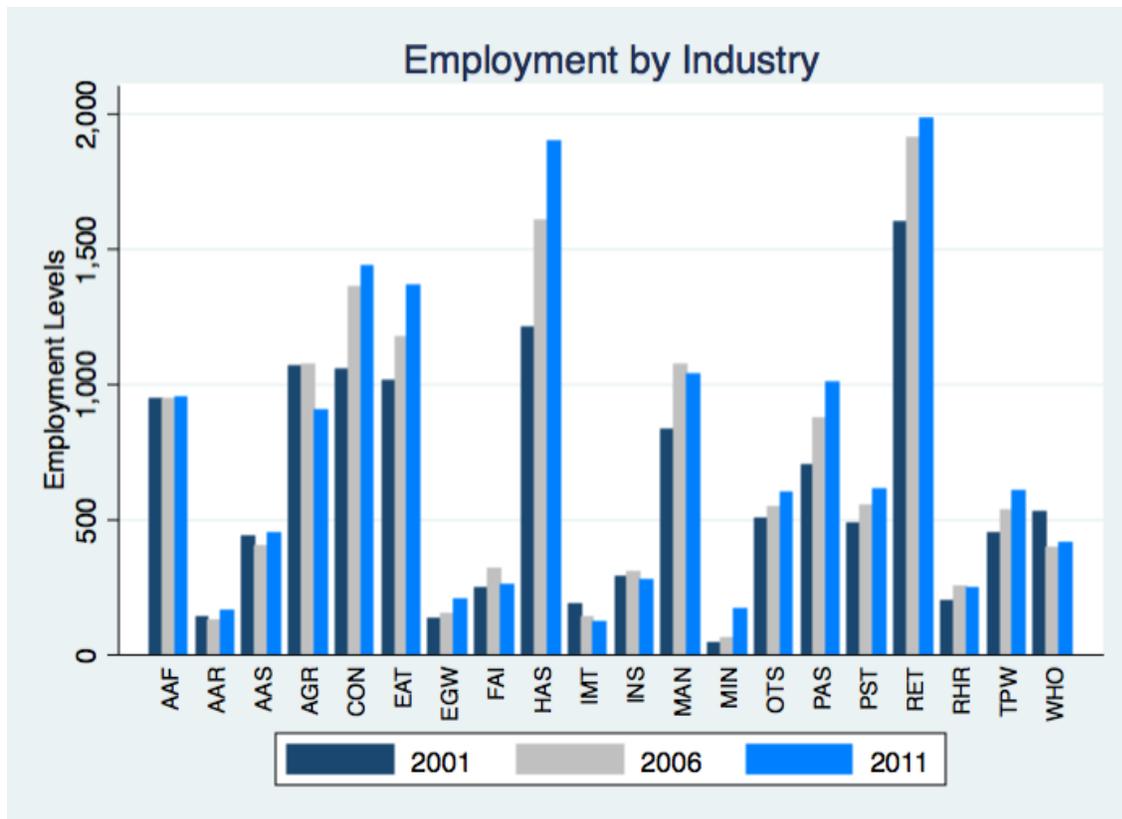
(a) Local Competitive Advantage: the Ability to Create Jobs Locally

SIZE of an industry is important, in terms of the number of persons employed in each industry in the locality.

Figure 2 summarizes the distribution of employment across Albany's industrial sectors for 2001, 2006, and 2011.

- In 2001, the highest employing industries were retail trade (1598 people, 13.2% total employment), healthcare and social assistance (1208 people, 10% of total employment), and agriculture (1067 people, 8.8% of total employment).
- In 2006, retail trade remained the highest employing industry, employing 1911 people (13.8%) followed, again, by healthcare and social assistance (1606 people, 11.6%). The third highest employing industry was construction, employing 1358 (9.8%).
- These three industries remained the highest employee industries for 2011, with retail trade employing 1982 people (13.5%), healthcare and social assistance employing 1900 people (12.9%) and construction employing 1437 people (9.8%).

Figure 2: Albany employment by industry for 2001, 2006 and 2011.



- GROWTH: the fastest growing industries in terms of their ability to create jobs locally

Figure 3 summarized job creation by industrial sector for Albany relative to the average growth of the same sector across the Western Australian economy:

- Over the 2001-2006 period, the fastest growing industry in Albany, relative to Western Australian growth rates, was wholesale trade.
- During that same time period, the industry experiencing the greatest negative growth was manufacturing.
- From 2006 to 2011, wholesale trade experienced the largest positive growth (discounting 'inadequately described/not stated').
- Over the same time period information and media telecommunications experienced the greatest relative decline.

Figure 3: Growth rates of Albany industries relative to Western Australian growth rates.

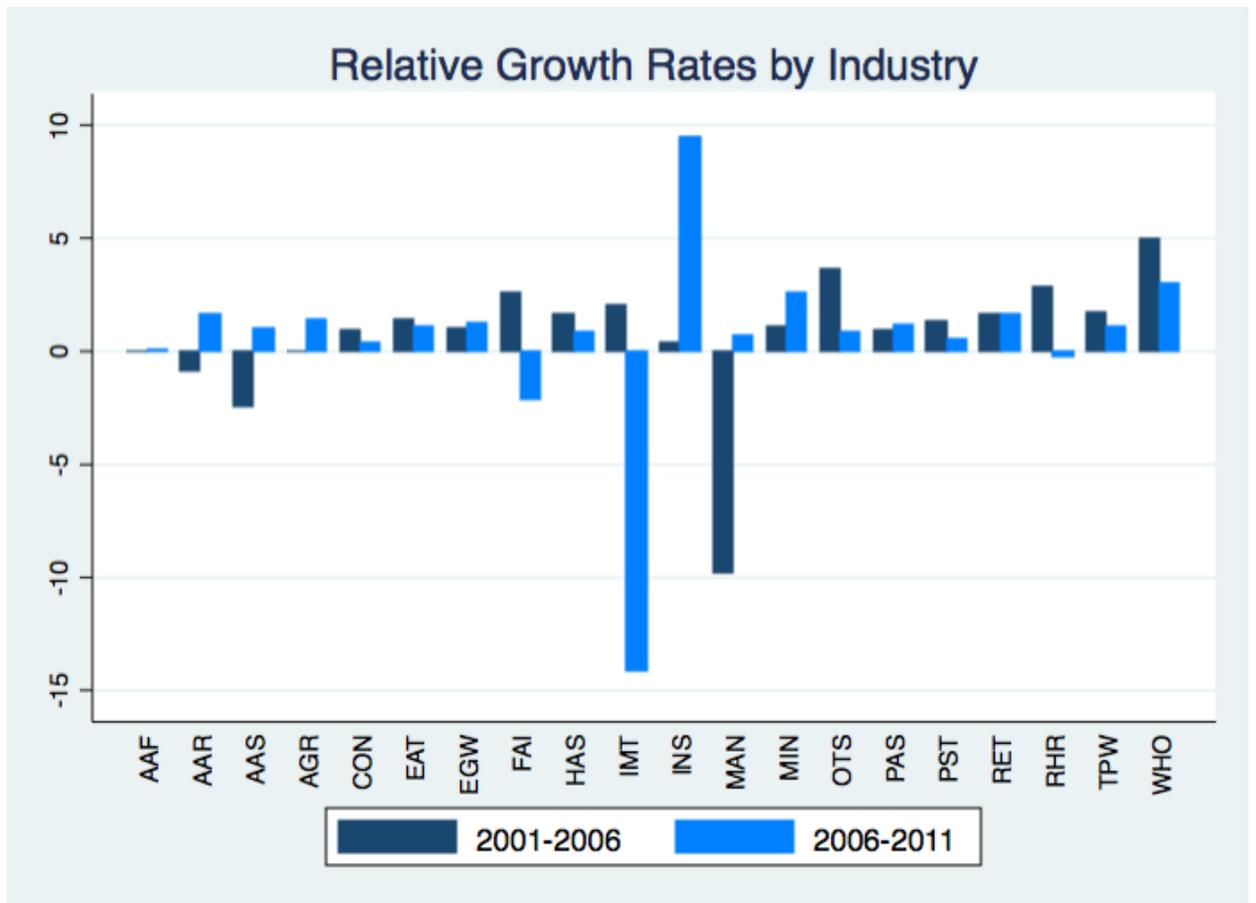
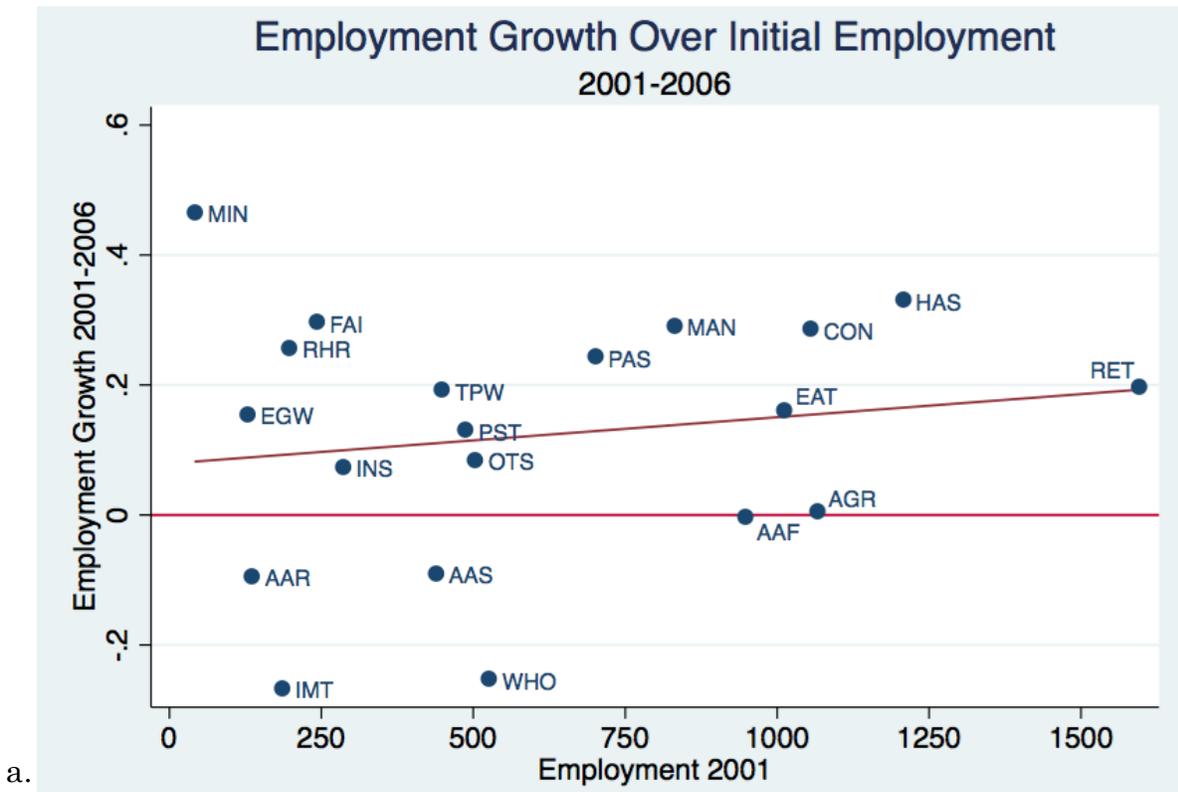


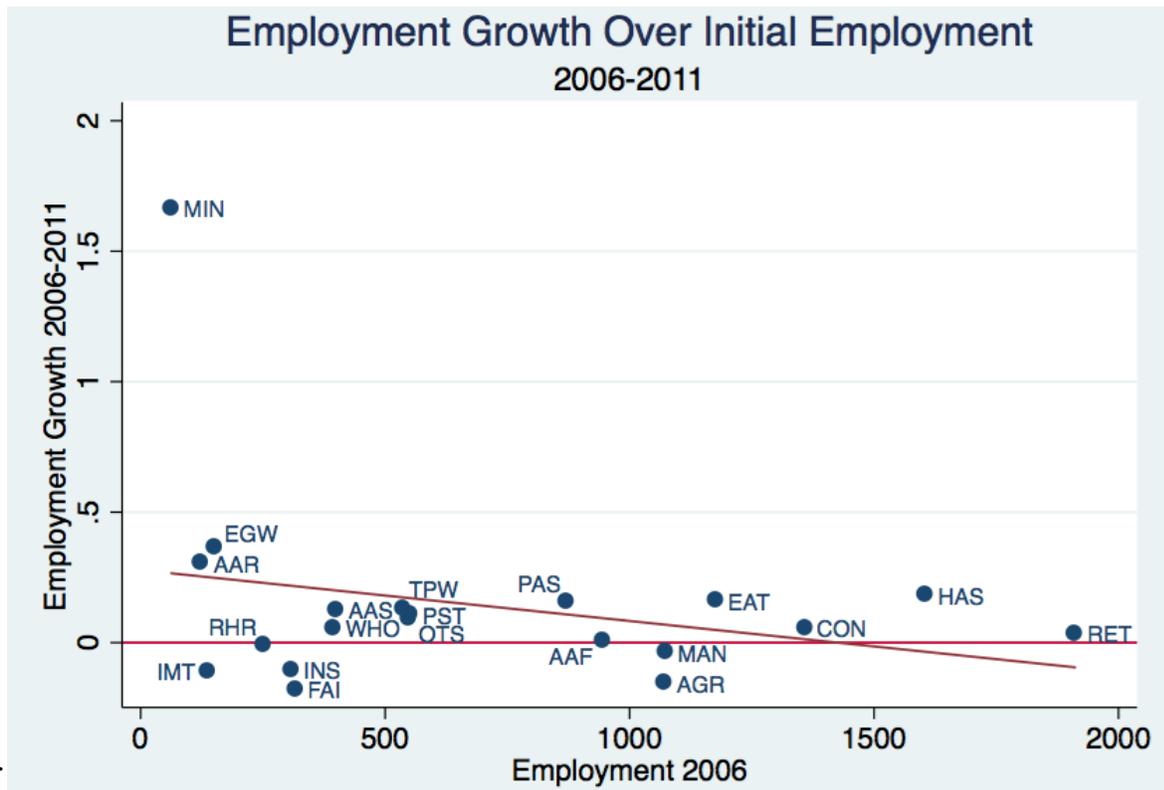
Figure 4 shows the overall pattern of competitive advantage for Albany in terms of the relationship between absolute employment growth rates and the size of each industrial sector.

- From 2001 to 2006, industries with higher levels of initial employment experienced, on average, higher employment growth. However, some industries with low levels of initial employment also experienced high levels of growth.
- Mining³ experienced the highest level of growth, but had relatively low initial employment.
- Over the same time period, retail had the largest level of employment, but experienced average growth,
- Information and media telecommunications and wholesale trade had the lowest levels of growth and relatively low levels of employment.

Figure 5: Employment growth rate, relative to initial size of employment for (a) 2001-2006 and (b) 2006-2011. (Note the different employment growth scales)



³ Even though there is no local mining industry, there are people living in Albany who are employed in the mining industry and commute (FLY-IN/FLY-OUT or DRIVE-In/DRIVE-OUT) to their work elsewhere in the State.



b.

- From 2006-2011, industries with a higher level of employment experienced, on average, lower employment growth. However, this may be influenced by a very high level of growth in the mining sector, which has a very low level of initial employment.
- Retail had the highest level of employment, but experienced very little growth.

Interpreting Figure 4(a) and (b).

The steady red line at zero signifies the growth threshold. i.e. those industry sectors below that red line have not grown in the intercensal period. It follows then that those sectors above the line have grown. As explained above, of those sectors which grew, those which employed the largest number of people (moving across the horizontal axis), tended to grow less fast than the smaller industry sectors, as shown by the red line moving downward. The good news for Albany is that in the most recent intercensal period (2006-2011) the difference in growth rates between the bigger industry sectors and smaller sectors narrowed suggesting that employment growth increased overall. Of concern, in the 2006-2011 period there were more sectors on, or above the red static line (no growth, or reduction).

As noted above, between 2006-2011, industries with a higher level of employment experienced, on average, lower employment growth. This means that some of the smaller industries in Albany grew more rapidly, catching up with larger and, hence, previously more important industries. This is not unusual and not necessarily something to cause alarm. For example, if an industry of five components grows by 20 per cent the increase in one component, but if a larger industry of 50

components grows by only 10 per cent the increase is five components, five times greater than the smaller company's net growth.

Ability to Create Jobs Locally

FAST GROWING industries were ones that were growing faster at the local scale than at the state scale and which had a greater proportion of local employment than proportion of that industry at the state level.

RESTRUCTURING INDUSTRIES are ones that have a greater proportion of local employment than proportion of that industry at the state level, but grew at lower rates at the local scale than at the state scale.

UNDERDEVELOPED INDUSTRIES are those that have a lower proportion of local employment than at the state level.

- FAST GROWING: relatively large sectors that have exhibited rapid recent growth
- RESTRUCTURING: relatively large, little or no growth over the recent past – relatively large proportion of the economic base
- UNDERDEVELOPED: low levels of activity.

Overall, there has been employment growth in Albany but compared to other regional capitals and the Western Australian economy overall, it has not had spectacular employment growth.

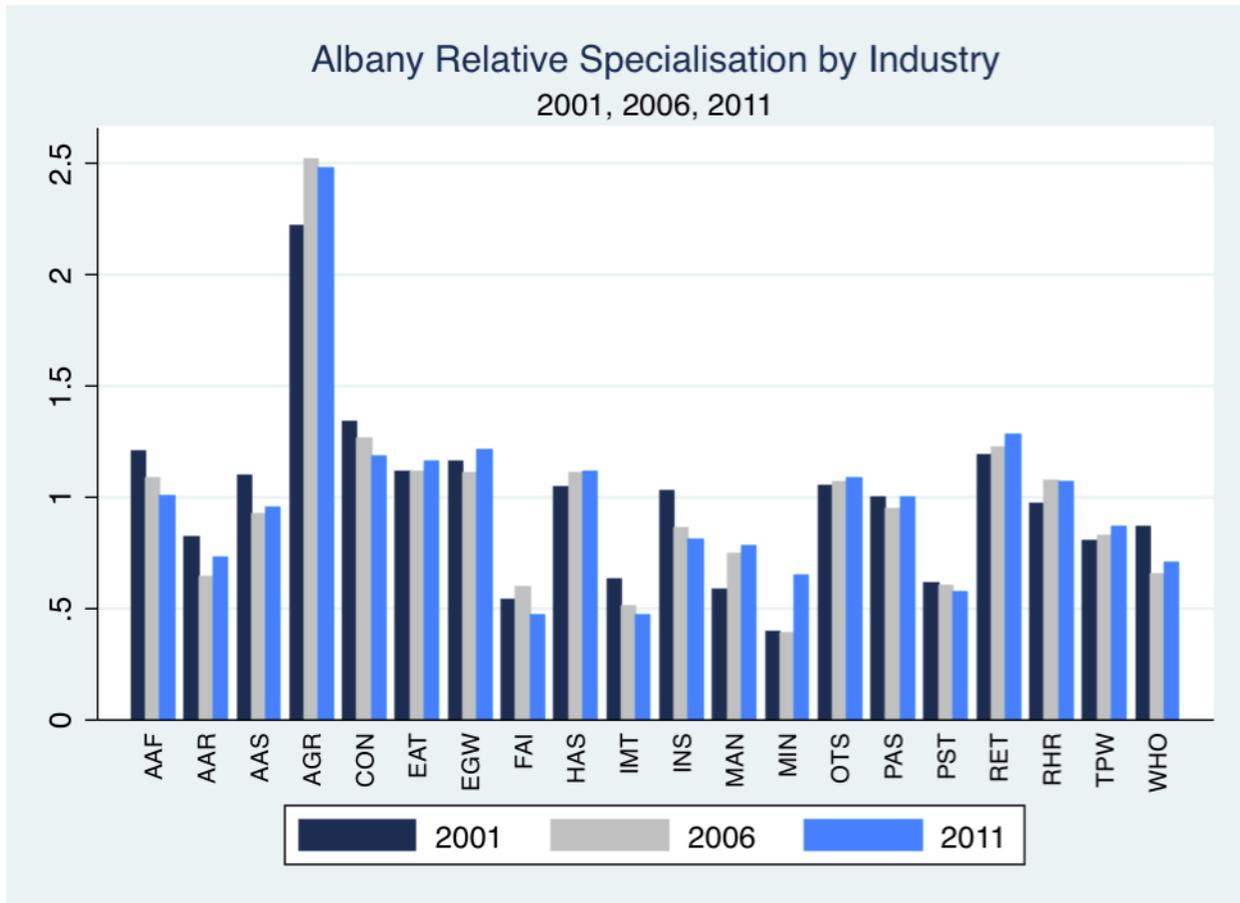
(b) Local Economic Specialization and Interregional-Trade Patterns:

- SPECIALISATION: the importance of an industry in terms of the degree to which the local economy specializes in that economic activity.

Figure 6 shows the local specialisation of each industry, based on local levels of employment relative to state levels of employment. Values greater than one demonstrate local specialisation in that industry.

- For 2001, 2006 and 2011 the local economy was specialised in agriculture.
- Financial and Insurance Services, Information and Media Telecommunications, Mining, and Professional, Scientific and Technical Services had consistently low specialisation across all three time periods.

Figure 6: The specialisation of each industry by employment, relative to levels of employment in Western Australia.



- **ECONOMIC BASE:** a measure of the degree to which economic activity and employment in a region is related to servicing local demand as against servicing demand external to the region.

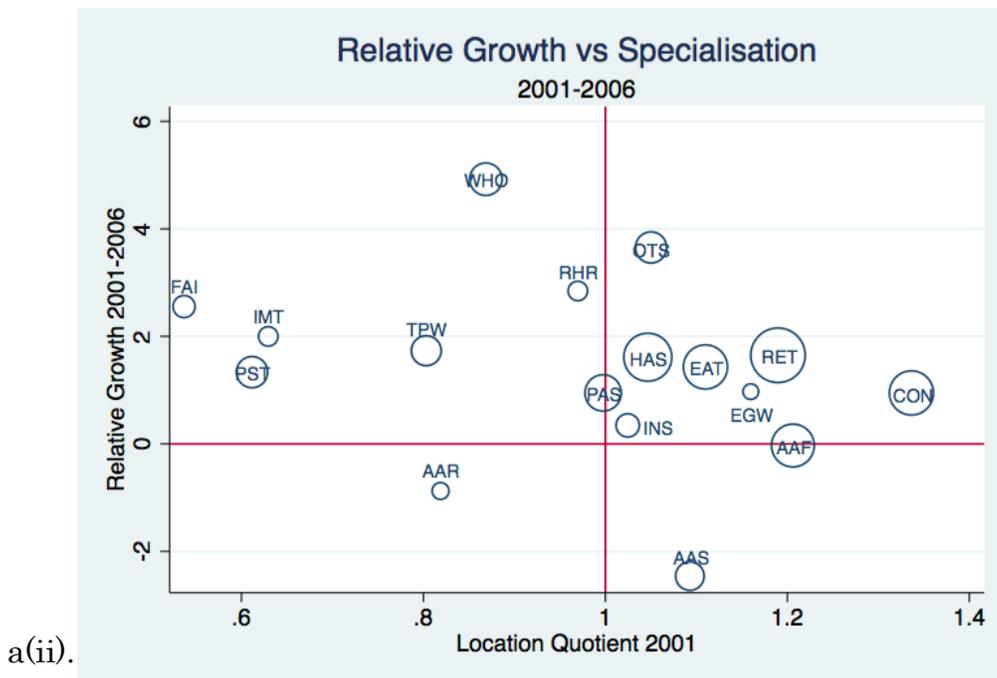
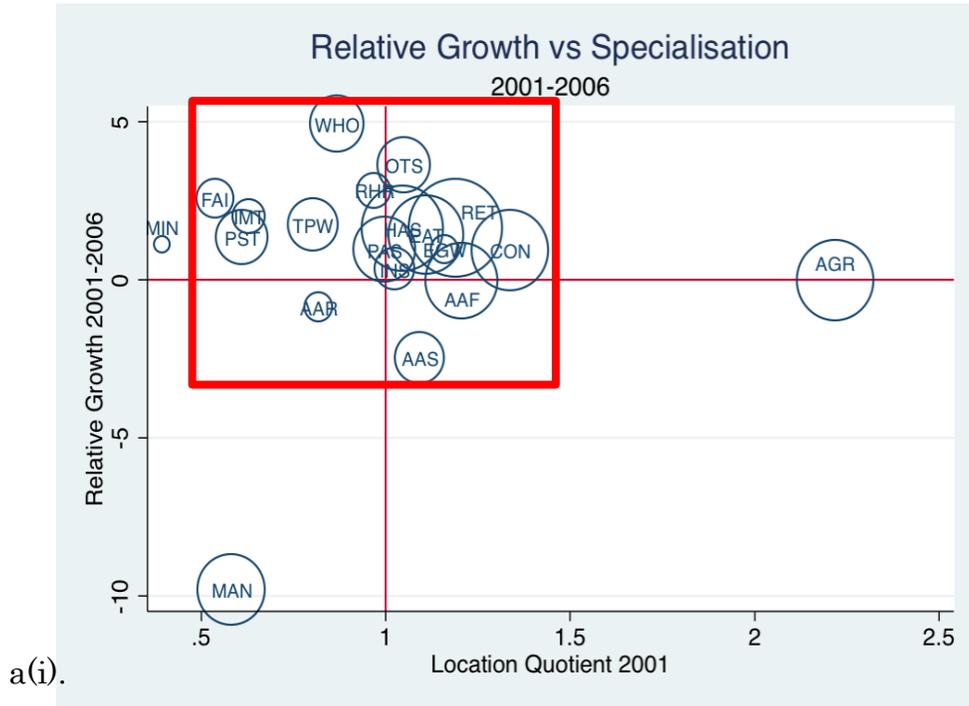
(c) Classifying Industrial Activities

Combining the information on an economy’s ability to create jobs locally and the sectoral patterns of specialisation, it is possible to classify industries in terms of their growth potential and comparative advantage. Figure 6 and Figure 7 classify the economic structure of the Broome economy into **IMPORTANT GROWTH INDUSTRIES**, **IMPORTANT INDUSTRIES THAT MAY REQUIRE ATTENTION**, **POTENTIAL EMERGENT INDUSTRIES** and **INDUSTRIES OF LITTLE PROMISE**.

- The Albany economy is not particularly diverse with two sectors showing strong growth (retail and health and social assistance).
- Agriculture is important, especially by comparison to the Western Australian economy but it had negligible growth, particularly in the 2006-2011 period.
- The remaining industry sectors were clustered relatively close together.

Figure 7 examines the relative growth of industry based on the level of specialisation. The data portrayed in Figure 7a(ii) and Figure 7b(ii) is that of the data shown in Figure 7a(i) and Figure 7b(i) respectively but in greater detail.

Figure 7: The relative growth of the industry based on level of local specialization for (a) 2001-2006 and (b) 2006-2011. The size of the circle demonstrates the proportion of that industry to total employment.



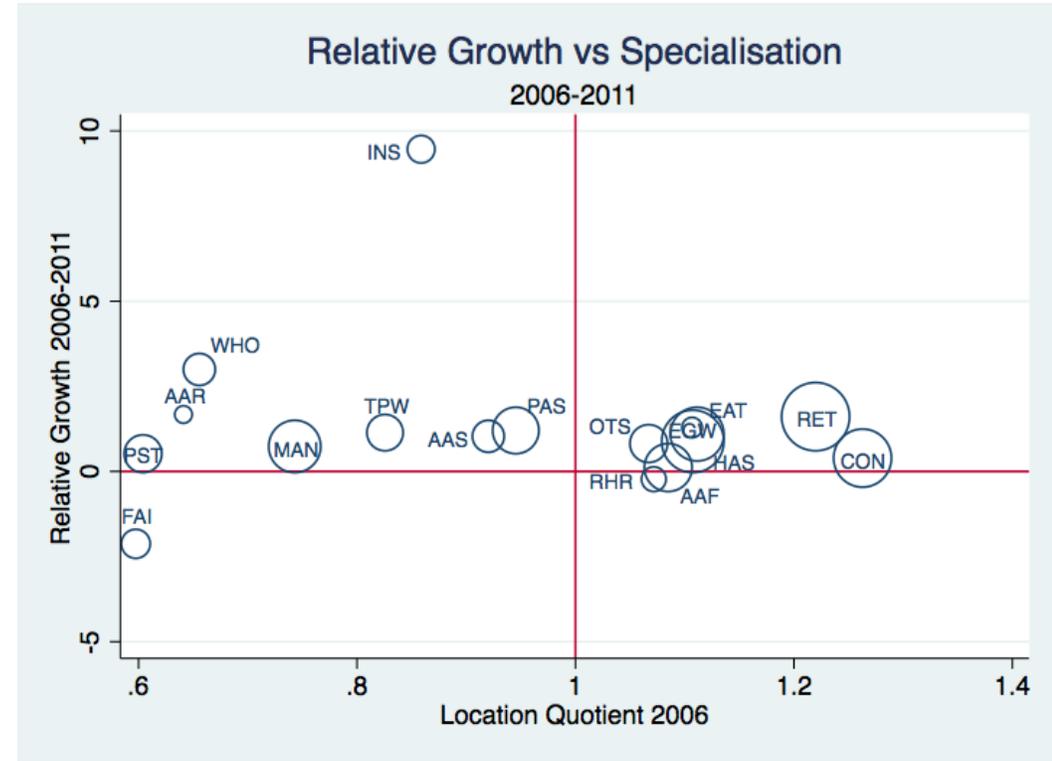
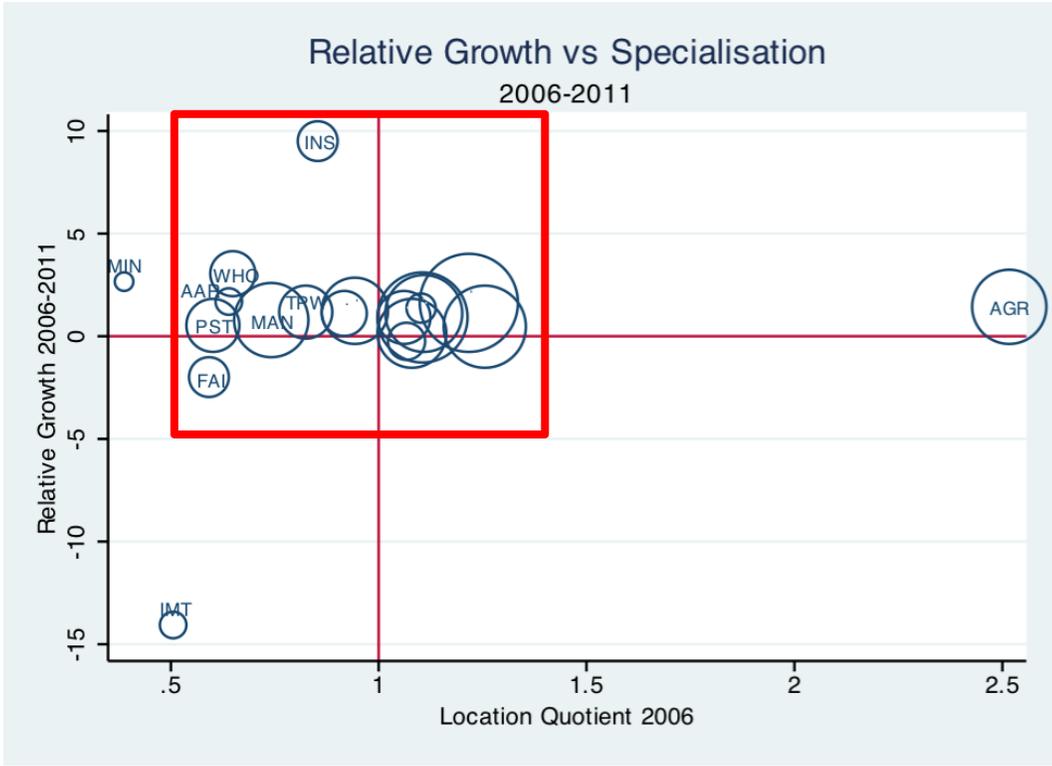
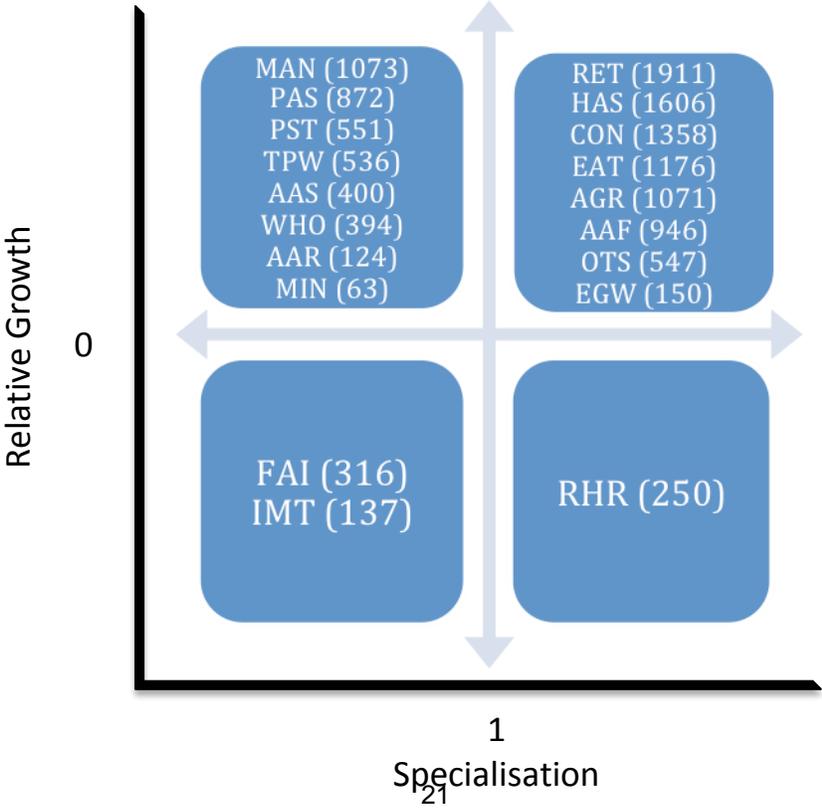
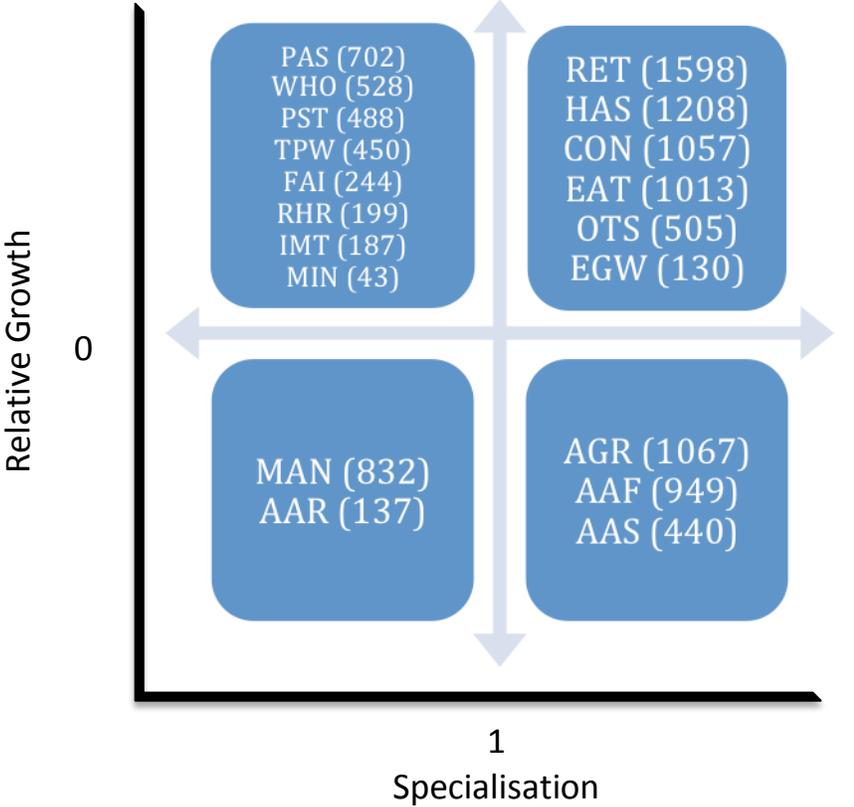


Figure 8: Classification of industries based on their specialisation and relative growth for (a) 2001-2006 and (b) 2006-2011. Within each category, industries are ranked based on their level of employment (shown in brackets).



- **IMPORTANT GROWTH INDUSTRIES:** characterized by above average employment growth and relative economic specialization.
- **IMPORTANT INDUSTRIES THAT MAY REQUIRE ATTENTION:** characterized by below average employment growth, relative economic specialization, and export orientation.
- **POTENTIAL EMERGENT INDUSTRIES:** characterized by above average employment growth, but currently oriented towards servicing local demand.
- **INDUSTRIES OF LITTLE PROMISE:** characterized by below average employment growth and currently oriented towards servicing local demand.

Figure 8 indicates that in the 2001-2006 period, manufacturing and arts and recreation services showed poor relative growth and limited specialisation in Albany and were therefore designated **INDUSTRIES OF LITTLE PROMISE** while retail, health care and social assistance, construction, education and training, other services and electricity, gas, water and waste services were the **IMPORTANT GROWTH INDUSTRIES** (through relative growth and specialisation).

In the 2006-2011 period, two additional industry sectors, Agriculture, fishing and forestry, and accommodation and foodservices, had grown and were designated **IMPORTANT GROWTH INDUSTRIES**. The **INDUSTRIES OF LITTLE PROMISE** changed to financial and insurance services and information media and communication while manufacturing and arts and recreation services had increased their relative employment to be **POTENTIAL EMERGENT INDUSTRIES**.

7. Implications for Local Economic Policy

Competitive and comparative advantage are technically two separate, independent concepts which measure economic performance. However, when viewed together they have the potential to measure:

- multiple factors in the economy of a particular place;
- the relationship of a particular locality with other localities nearby ('neighbours');
- the interdependence between industries; and
- the performance of that economy with other local economies.

The degree of economic integration is also an important factor and this underpins the robustness of the Western Australian state economy. Consequently, in regional Western Australia, the links each regional capital has with its 'neighbours' can be important depending upon the relative location or proximity of a regional capital and/or the remoteness of the 'neighbours'. The strength of the direct and indirect impacts of a regional economy on its neighbours and also the direction and flows of the impacts are important to understand and this is best described as 'connectivity'. The links and connectivity also indicate accessibility. Factors which influence accessibility are numerous, including: transport networks, social capital, commodities, labour force, infrastructure and services.

Understanding the links, flows, connectivity and accessibility provide the necessary information to explain how competitive and comparative advantage and industry specialisation of a local economy will impact on neighbouring economies and the strategic positioning of regional capitals in the Western Australian economy overall.

The dynamics and drivers of local competitiveness and comparative advantage shape a regional economy's responsiveness to externalities and help explain the underlying forces triggering 'catch-up', 'falling behind' and 'forging ahead'. They also assist in forecasting economic impacts including:

- the direct and indirect effect of investing in regional capitals,
- the influence of local investment beyond the regional capitals, and
- the potential for diffusion of external shocks across the economic system.

Future research, through the Western Australian Regional Model (WARM) will explore the degree of connectivity and economic integration between Albany and its neighbours and Albany and the Western Australian economy overall. Specifically, this research will address the question of measuring the dependence between Albany and its neighbours: investment in Albany has a flow on effect on its neighbours.

8. APPENDIX A: ANZSIC INDUSTRIAL CLASSIFICATION

ANZSIC Classification	Mnemonic
Accommodation & food services	AAF
Arts & recreation services	AAR
Administrative & support services	AAS
Agriculture, forestry & fishing	AGR
Construction	CON
Education & training	EAT
Electricity, gas, water & waste services	EGW
Financial & insurance services	FAI
Health care & social assistance	HAS
Information media & telecommunications	IMT
Inadequately described/Not stated	INS
Manufacturing	MAN
Mining	MIN
Other services	OTS
Public administration & safety	PAS
Professional, scientific & technical services	PST
Retail trade	RET
Rental, hiring & real estate services	RHR
Transport, postal & warehousing	TPW
Wholesale trade	WHO

9. TECHNICAL APPENDIX:

(1) *Relative Growth Rates:*

Let $E_{ir,t}$ define the number of persons employed in industry i in region r at time t . It follows that the local growth rate g_{ir} can be defined as:

$$g_r = \frac{E_{ir,t+1}}{E_{ir,t}} - 1$$

Similarly, the average growth rate across the benchmark economy, in this instance Western Australia, g_{iWA} , can be defined as:

$$g_{iWA} = \frac{E_{iWA,t+1}}{E_{iWA,t}} - 1$$

It follows that the relative local economic performance, A_{ir} , in terms of job creation is defined as:

$$A_{ir} = g_{ir} - g_{iWA}$$

If $A_{ir} > 0$ then industry i in region r is performing better than the same industry in the benchmark economy. Conversely, if $A_{ir} < 0$ then industry i in region r is performing worst than in the benchmark economy.

(2) *Local Specialization and the Economic Base:*

Conventionally, basic sector employment is assumed to include Agriculture, Mining, Tourism, State/Federal Government and manufacturing (partially) whereas non-basic economic activities include retailing, commercial banking, local government, local public schools, services. However, this rule-of-thumb can be augmented with a more objective measure of local specialization, the location quotient. An employment location quotient (LQ_{ir}) is used to define the relative specialization of an industry i in a region r relative to the employment in the same industry in a benchmark economy:

$$LQ_{ir} = \frac{E_{ir}/E_r}{E_{iWA}/E_{WA}}$$

Where, E_{iWA} is the level of employment in industry i , in the benchmark economy and E_{WA} is the total employment in the benchmark economy, in this instance Western Australia.

Where local economic data on trade flows does not exist regional trade patterns need to be imputed from measures of local economic structure. Specifically, it is assumed that the patterns of trade can be imputed from the patterns of industrial specialization. In general,

- (a) the greater is the LQ_{ir} above unity, the larger will be there regions net sectoral exports
- (b) the greater is the LQ_{ir} below unity, the larger will be the regions net sectoral imports
- (c) for an LQ_{ir} of unity, the region is neither a net exporter nor a net importer.

From which it is possible to calculate the level of base sector employment in a local economy:

$$E_{ir}^B = (1 - 1/LQ_{ir})E_{ir} = \left(\frac{E_{ir}}{E_{iWA}} - \frac{E_r}{E_{WA}} \right) E_{iWA} \quad \forall LQ_{ir} > 1$$

The first term on the right hand side of this equation can be considered as a proxy for the local economy's share of the total production, or quantity supplied, of the products of industry i for the base economy WA. Similarly, the second term can be considered a proxy for the region's share of the 'base' economy's consumption, or quantity demanded. If the difference is positive (ie a $LQ_{ir} > 1$) then the local economy produces a greater share of the 'base' economy's production than it consumes and the excess is assumed to be exported. As a corollary, this equation can be used to calculate net export employment, that is the local economic base by aggregating across all industries, $E_r^B = \sum_{i=1}^n E_{ir}^B$.

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