

# **Regional Capitals in the WA Settlement Hierarchy**

Briefing Paper 4: Endogenous Growth and Local  
Competitiveness

**PAUL PLUMMER and MATTHEW TONTS**

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**CENTRE FOR REGIONAL DEVELOPMENT  
SCHOOL OF EARTH AND ENVIRONMENT**

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WESTERN AUSTRALIA**

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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. Key Findings

This report provides a detailed examination of the role of broader scale socio-economic processes and place-based competitiveness in accounting for local employment growth for member of the Western Australian Regional Capitals Alliance (WARCA) over the period 2001-2011. This report is the fourth in a series of reports that are intended to enhance understanding of the growth potential and local competitiveness of the members of WARCA both now and into the future. The evidence presented in this report suggests the following regarding recent changes in the prevailing economic structures of localities and local competitiveness:

- Engagement in the global economy and broader socio-economic processes, as reflected in the industry mix, has been important in driving economic growth across WARCA members.
- Nonetheless, local competitiveness is critical in both allowing localities to either overcome an unfavourable mix of industries or 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.
- The qualitatively different experience of the WARCA members in terms the impact of local competitiveness and global engagement on growth potential 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.

## **2. Overview**

In previous reports in this series we have provided evidence indicting that the Western Australian settlement hierarchy is characteristic of a multi-speed patchwork economy. There has been a strong and consistent pattern of employment growth across the State over the 2001-2011 period, although there appears to be a widening gap in terms of job creation: larger localities dominated by mining are forging ahead and smaller settlements are experiencing relative decline. The evidence points towards the growing importance of the regional capitals to the State's economy and to the fact that these localities are experiencing growth dynamics that are quite distinct from both the major metropolitan centre (Perth) and smaller rural localities. Collectively the members of the Western Australian Regional Capitals Alliance (WARCA) made an important contribution of the overall performance of the Western Australian labor market, driving job creation over the past decade. However, when considered in isolation, there is evidence of considerable variability in the ways in which these localities have performed over this period. While it would be tempting to simply point to the role of global demand and macro-economic processes as the main drivers of growth, recent work suggests that a suite of more local processes and characteristics may be critical in accounting for the existence of a multi speed and patchwork economy. This briefing paper focuses on assessing empirically the role of broader scale socio-economic processes and local contingencies in contributing to the performance of Western Australia's regional cities.

## **3. Data Description: Industry Sector Employment**

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 in Western Australia (LGAs) for the census periods 2001, 2006, 2011. The members of the Western Australia Regional Capitals Alliance (WARCA) are Albany, Broome, Bunbury, Kalgoorlie-Boulder, Geraldton, Port Hedland, and Roebourne. Boundaries for all LGAs are according to the ABS 2011 definition.

To calculate a shift-share decomposition of employment growth for each member of WARCA each LGA is disaggregated by industry sector identified the number of persons employed by Australian and New Zealand Standard Industrial Classification (ANZSIC) first digit industry of employment coding <sup>1</sup>. In this report the shift-share decomposition of employment growth for each regional capital (see below) is conducted relative to the total employment in each industrial sector across Western Australia, which defines the reference economy. 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' data as has been done here.

#### **4. Accounting for Economic Structure and Local Competitiveness**

The extent to which the persistence in employment growth between places is the result of broader socio-economic processes or local competitiveness can be explored through a widely used and relatively simple policy tool called shift share analysis. Essentially, shift share is a simple decomposition technique that allows us to answer three questions (The analytical foundations and derivation of the industry mix and local competitiveness components of employment change are presented in Appendix B):

- (1) What is the impact of local economic structure, or industry mix, on growth?
- (2) What is the impact of local competitiveness on growth?
- (3) What is the relative importance of industry mix and local competitiveness in accounting for differential growth rates between localities?

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<sup>1</sup> Found at <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/2901.0Chapter5802011>

To answer these questions the shift-share technique can be interpreted as follows:

(a) **Employment Growth Differentials:** defined as the difference between the growth rate in a locality and the growth rate in a reference economy, in this case Western Australia

(b) **Industry Mix Effect:** defined as the employment growth in a locality that can be attributed to the mix of faster or slower than average growing industries. We interpret this component as a measure of the way in which broader processes play out differently in places because of the composition of their industrial structure. If a place specialized in industries that are growing relatively rapidly (slowly) in the reference economy then that locality will have a positive (negative) industry mix component.

(c) **Local Competitiveness Effect:** defined as the employment growth in a locality that can be attributed to all factors other than industry mix. This ‘residual’ measures the overall impact of the growth on an industry in a place relative to the growth rate of the same industry in the reference economy. Conventionally, local competitiveness is attributed to an array of processes that are consistent with endogenous growth theory, encompassing innovation and knowledge spillovers, human capital, institutional thickness and social embeddedness (social capital), and cultural capital.

As a corollary, by comparing the relative size of the industry mix effect (b) and local competitiveness effect (c) we can use a shift share decomposition to empirically evaluate the importance of broader scale processes relative to the types of local endogenously generated processes identified by the measure of local competitiveness.



## **5. Shift Share Decomposition by Regional Capital, 2001-2011**

Table 1 shows the shift share decomposition for employment growth in each regional capital for the period 2001-2011. As outlined in our previous briefing report *Regional Capitals in the WA Settlement Hierarchy: Employment Change and Job Creation*, in the 2001-2006 period the regional cities typically lagged behind the State average in terms of job creation. During this period, apart from Albany, Broome and Geraldton, all of the cities had a positive industry mix, which is indicative of relative specialization in high growth industries in the Western Australian context. However, more problematic for all of the cities, except Albany, was the impact of an unfavourable local competitive environment on employment growth. Furthermore, for all of the localities apart from Roebourne the negative impact of the local competitive environment was greater in absolute value than the impact of economic structure (industry mix). In the case of Albany, the positive local competitive environment helped it to overcome a negative economic structure. From these findings, we would draw the conclusion that the relatively poor performance of the regional capitals during this period was the result of the dominance of negative local competitiveness within the regional capitals.

By the 2006-2011 period, circumstances had begun to change quite dramatically. The industry structure of the resource based mining communities of Roebourne, Port Hedland and Kalgoorlie Boulder still retained their relative specialization in the high growth mining sectors, which made a substantive contribution to their economic success during this period. For Port Hedland and Roebourne the presence of a positive economic structure was reinforced by the local competitiveness of these places. In contrast, the dynamism created by Kalgoorlie's specialization in mining was offset by weak local competitiveness, at least relative to the mining industry across Western Australia. By contrast, Albany, Broome, Bunbury and Geraldton-Greenough all had economic structures that tended to work against them. Put differently, these economies tended to specialize in industrial sectors that on average grew slowly in the Western Australian context. However, for some of these places these disadvantages were overcome through increased local competitiveness, with Broome and Geraldton-Greenough both demonstrating strong growth as a result. Local competitiveness was also important in driving

growth in Bunbury and Albany; indeed, more so than their industrial structure. For these localities, slow growth resulting from specialization in low growth industries was reinforced by relatively weak locally competitive environment.

**Table 1 Shift Share Decomposition by Regional City, 2001-2011**

Local Government Area	Employment Growth Rate ( $g_r$ )	Difference ( $A_r$ )	Industry Mix ( $IM_r$ )	Local Competitiveness ( $LC_r$ )
<i>2001-2006</i>				
Albany	0.1430	0.0113	-0.0156	0.0270
Broome	0.0526	-0.0790	-0.0035	-0.0756
Bunbury	0.0968	-0.0348	0.0091	-0.0439
Geraldton-Greenough	0.1148	-0.0168	-0.0051	-0.0118
Kalgoorlie-Boulder	0.0179	-0.113	0.0542	-0.1680
Port Hedland	-0.0884	-0.2201	0.0603	-0.2803
Roebourne	0.1646	0.0329	0.0582	-0.0252
<i>2006-2011</i>				
Albany	0.0669	-0.1104	-0.0333	-0.0771
Broome	0.1651	-0.0122	-0.0148	0.0026
Bunbury	0.0629	-0.1144	-0.0049	-0.1096
Geraldton-Greenough	0.1941	0.0169	-0.0031	0.0200
Kalgoorlie-Boulder	0.1061	-0.0712	0.1011	-0.1723
Port Hedland	0.6953	0.5180	0.0939	0.4242
Roebourne	0.6844	0.5071	0.1177	0.3894

## **6. Industry Sector Shift Share Patterns, 2001-2011**

Shift share decomposition by regional cities provides an aggregated and summative picture of the impact of economic structure and local competitiveness on economic performance. However, it is possible to use the technique to dig a bit deeper into the sources of regional differentiation by exploring the relative importance of each industrial sector in accounting for employment growth. Figures 1 and 2 show these patterns and enable the identification of sectors that contribute most to both the industry mix and local competitive components of change (see appendix A for the industrial classification mnemonic employed in this paper).

Taking Figures 1 and 2 together, it is evident that there is a complex and differentiated pattern of industry mix and local competitiveness components of growth across the regional cities. Put differently, inspection of the components of change across the localities indicates that the sources of employment growth are significantly different between places, both in terms of industry mix and local competitiveness. Nevertheless, it is possible to distinguish between the resource based mining and petroleum communities (Kalgoorlie-Boulder, Port Hedland and Roebourne), and the remainder of the cities, all of which have more diversified economies. As might be expected, in the case of the resource-based economies, the mining (MIN) component of industry mix was critical in both 2001-2006 and 2006-2011, providing an overall positive effect on job creation. In Roebourne this was reinforced by the competitiveness of the local economic environment, whereas in the 2001-06 period both Port Hedland and Kalgoorlie-Boulder were constrained by local competitive issues in the mining sector. We would speculate that this may reflect the former's engagement in the petroleum industry, while the latter are both linked to mineral commodities. By 2006-2011, the situation appears to have changed dramatically: Port Hedland improved its local competitiveness, Roebourne's advantage had been largely lost, while Kalgoorlie-Boulder continued to lag behind its competitors in Western Australia. In Port Hedland and Roebourne, the other sector performing extremely well on local competitiveness for 2006-2011 was construction (CON), perhaps reflecting the numerous new resource projects in the pipeline at that time. This raises issues about the knock-on effect of inter-industry linkages

on the overall rate of employment growth, an issues is difficult to handle within the context of a shift-share framework and required more comprehensive modeling methodologies.

The non-mining localities present a far more complex and diverse picture, with a broader set of industrial sectors contributing to the impact of both industry mix and local competitiveness on local economic performance. Indeed, there appears to be little in common regarding the overall pattern across the non-mining regional capitals. In Albany, the overall industry mix component was dominated by the negative impact of mining (MIN) and agriculture, forestry, and fishing (AGR) in both periods, and construction (CON) in 2006-2011. Outside of these, industry mix had minimal impact on growth. More significant was the impact of local competitive effects. For the 2001-2006 period, local competitiveness contributed to growth in agriculture, forestry and fishing, and this more than offset the negative impact of economic structure in this sector. Other sectors to perform well as a result of competitive effects included the local manufacturing (MAN) and retail (RET) sectors. By the 2006-2011 period, what is particularly problematic for Albany is that almost across the board its sectors performed relatively poorly in terms of competitiveness. That is, whatever positive local competitiveness existed appears to have disappears, to be replaced by negative local economic environments. Furthermore, industry mix is now working against this locality through its impact on accommodation and food services (AAF) and construction (CONS), with very few positive impacts elsewhere in the local economy.

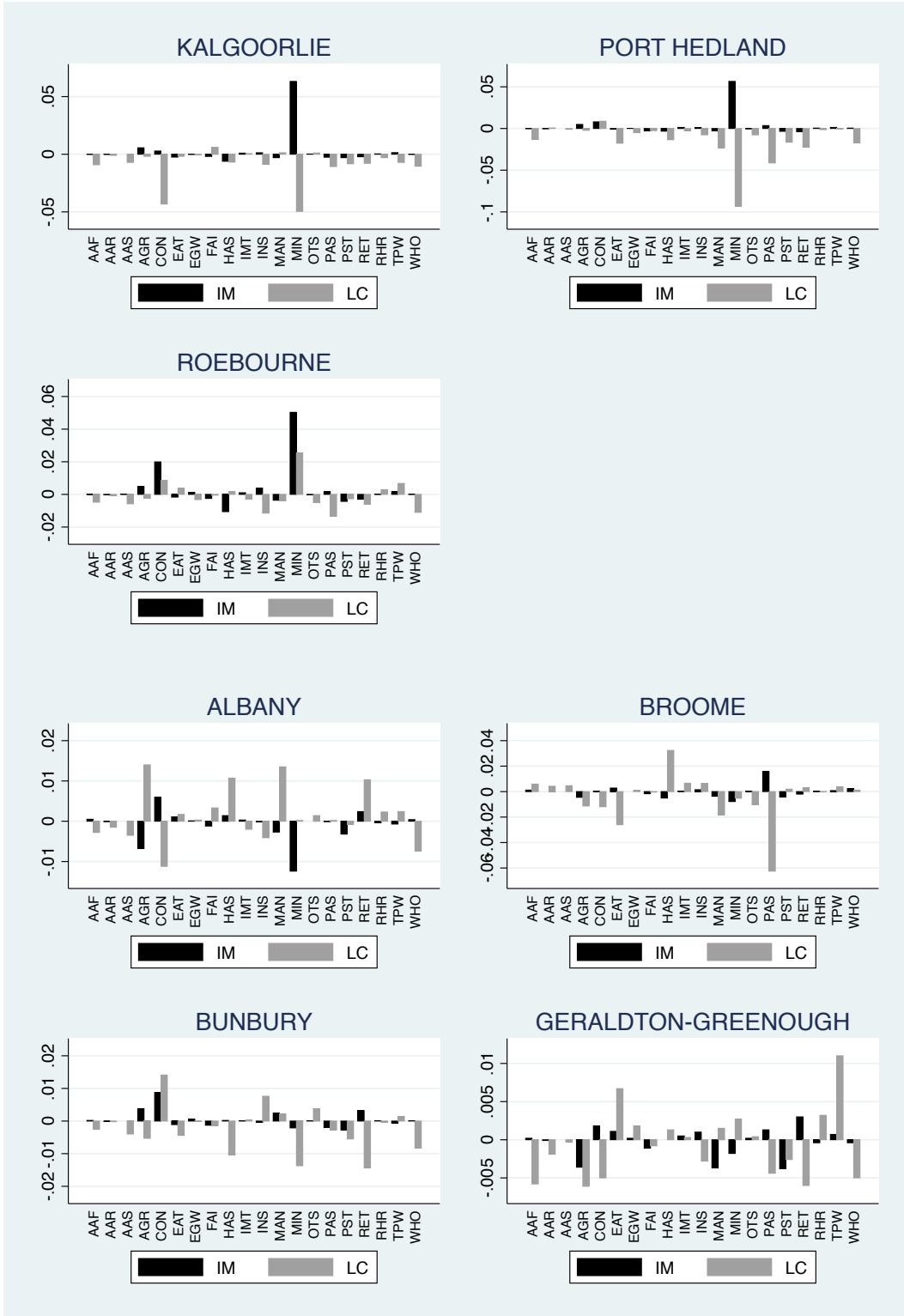
Although the impact of each industrial sector appears to be different between Albany and the port city of Bunbury, the data tell us a similar story of relative decline in local competitiveness. In the period 2001-2006, only a small number of sectors grew as a result of local competitiveness, including construction (CONS) and retailing (RET). By the 2006-2011 period, all sectors with the exception of manufacturing (MAN) recorded a negative effect for local competitiveness. In addition, between 2001 and 2006, industry mix had relatively little impact in most sectors, although by the 2006 to 2011 period a small advantage was evident for construction (CONS) and a negative effect for mining (MIN).

In the case of Geraldton-Greenough, the city recorded positive effects for competitiveness in education and training (EAT), mining (MIN), transport and wholesaling (TWH) for the 2001-2006 period. During the same period, the city's industry mix had a more limited affect, and recording small positive effects for construction (CONS), education and training (EAT), and retailing (RET). By 2006-2011, industry mix recorded negatives for professional, scientific and technical services (PST), with relatively little effect for any other sector. In terms of competitiveness, construction (CONS), public administration and safety (PAS), and transport and wholesaling (TWH) were positive, while mining (MIN) was clearly a lagging sector.

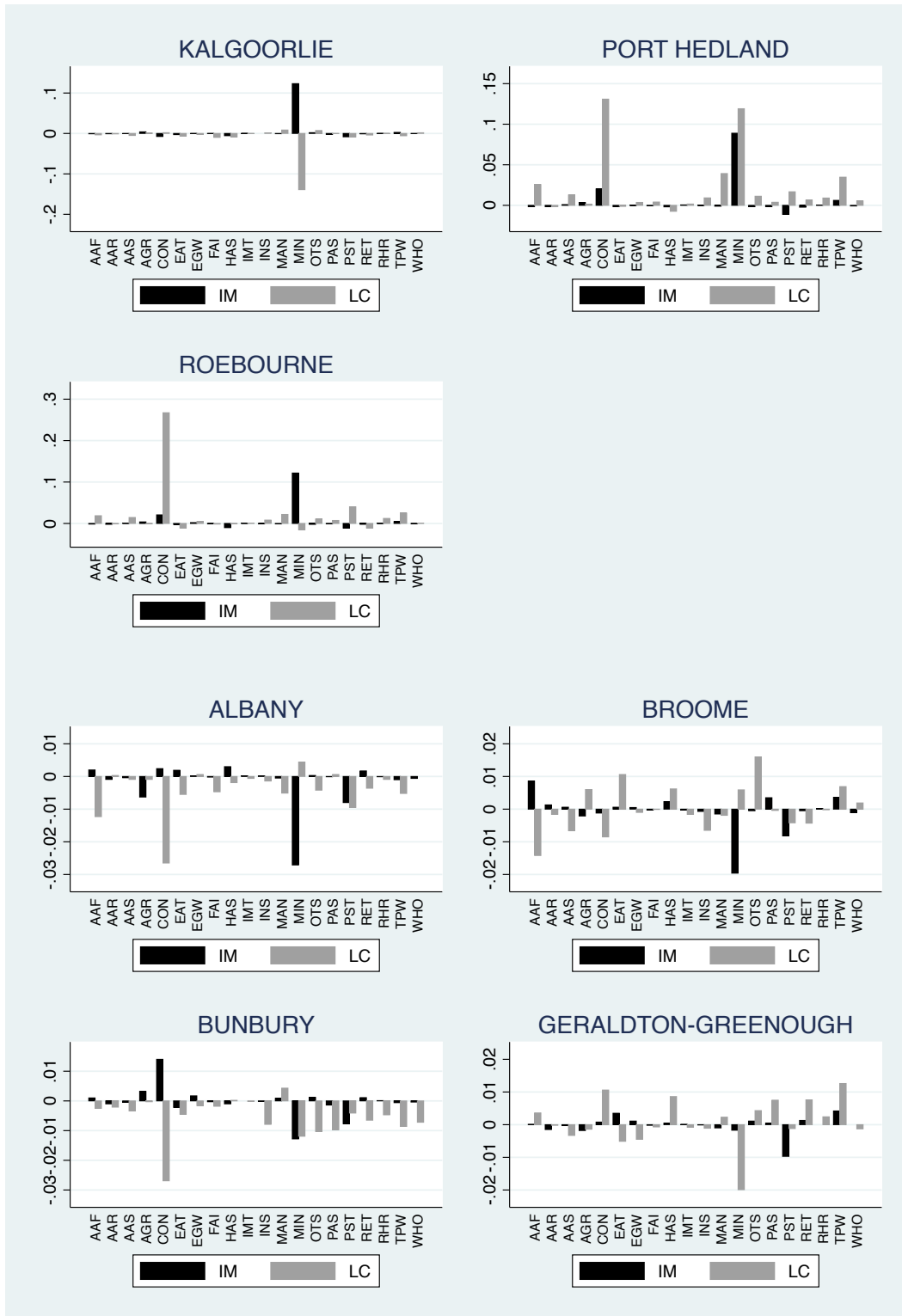
The remote Kimberly town of Broome had an industry mix in which no sector stood out as being a major contributor to growth or decline for the period 2001-2006. In terms of competitiveness for this period, only health care and social assistance (HAS) had a significant positive effect, while Public Administration was negative. By 2006-2011, industry mix was important for accommodation and food services (AFS), but negative for mining. For competitive effects, accommodation and food services (AFS) performed poorly, while a number of the services sectors recorded higher levels of competitiveness.

Despite their difference, taken together Broome and Geraldton paint a similar and brighter picture than either Albany or Bunbury. Over the 2001-2006 period, both local economies displayed a strong pattern of overall negative local competitiveness which has been largely reversed in the 2006-2011 period. In the case of Geraldton, the dynamism and diversity of the local economic environment was sufficient to dominate the impact of its industry mix.

**Figure 2: Industry Sector Shift-Share Patterns, 2001-2006**



**Figure 3 Industry Sector Shift-Share Patterns, 2006-2011**



## **7. Implications for Regional Policy**

From a regional development policy perspective, the key theme to emerge from the report is the increasing importance of local competitiveness, and that this has the potential to have a significant impact on the growth dynamics of WARCA members. Moreover, the findings demonstrate that competitiveness plays out differently by sector and locality, suggesting the need for not just broad place-based policy interventions but also strategies that are specific to individual sectors and places. As a corollary, this suggests that the State government's interest and pro-active engagement in regional development policy aiming at improving the competitiveness and resilience of both places and industries is well founded. Nonetheless, the findings in this report point to some of the challenges facing regional policymakers and practitioners. Broader economic structures, as reflected in the 'industry mix' component of the preceding analysis, are difficult to influence at the regional scale, since they are a product of longstanding path dependent processes and often influenced by macro-economic conditions. This is not to say that structure, and structural adjustment should be ignored, but that it presents a limitation for regional policy and points to the need for local/regional engagement with wider policy processes. More direct influence can be asserted over local competitiveness. This can be facilitated through improvements in local economic conditions, including the quality of infrastructure, technological innovation, improving social capital, enhancing local environmental or urban amenity, reducing regulatory imposts and creating conducive planning regimes. Accordingly, it is critical to understand the local economic landscape, institutional structures, and social characteristics, and how these in turn shape competitiveness. Moreover, this needs to be understood for each major or emerging industry sector.



## 8. APPENDIX A: ANZAC INDUSTRIAL CLASSIFICATION

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

## 9. Appendix B: Shift-Share Decomposition

For each census period,  $t$ , let the regional economy be sub-divided into  $r$  localities ( $r = 1, \dots, R$ ) defined in terms of Local Government Areas (LGAs) across Western Australia. The economic activity in each locality is measured in terms of the number of persons employed ( $E$ ) disaggregated by industrial sector  $i$ , where the locality has  $i=1, \dots, N$  industrial sectors. Accordingly, the number of persons employed in industrial sector  $i$  in locality  $r$  at time  $t$  is  $E_{ir}^t$  and the growth rate in employment between period  $t$  and period  $t-1$  in region  $r$ , industrial sector  $i$  is defined as:

$$g_{ir} = \frac{E_{ir}^t}{E_{ir}^{t-1}} - 1 \quad (1)$$

And, repeating the definition of the local growth rate in locality  $r$ :

$$g_r^t = \frac{\sum_{i=1}^N E_{ir}^t}{\sum_{i=1}^N E_{ir}^{t-1}} - 1 = \sum_{i=1}^N \theta_{ir}^{t-1} g_{ir}^t \quad (2)$$

Where  $\theta_{ir}^{t-1} = \frac{E_{ir}^{t-1}}{\sum_{i=1}^N E_{ir}^{t-1}}$  is the regional share of employment in industry  $i$ , region  $r$ .

Similarly, the growth rate in industry  $i$  across the reference economy is:

$$g_i = \frac{\sum_r E_{ir}^t}{\sum_r E_{ir}^{t-1}} - 1 \quad (3)$$

And, the growth rate in a reference economy is:

$$g_N^t = \sum_i \lambda_i^{t-1} g_i^t \quad (4)$$

Where  $\lambda_i^{t-1} = \frac{E_i^{t-1}}{\sum_{i=1}^N E_i^{t-1}}$  is the share of employment in industry  $i$  in the reference economy, in this

instance Western Australia.

The aim of shift-share decomposition is to account for differential growth rates between local and reference economy ( $A_r$ ), which can be expressed as follows:

$$A_r^t = g_r^t - g_n^t = \sum_{i=1}^N \theta_{ir}^{t-1} g_{ir}^t - \sum_{i=1}^N \lambda_i^{t-1} g_i^t \quad (5)$$

Accordingly, employment differentials depend on the local ( $\theta_{ir}^t$ ) and reference economy ( $\lambda_i^t$ ) sectoral weightings (shares) and the industry growth rates in the local and reference economy respectively. We define industry mix by weighting the industry growth rate in the reference economy by the difference between the share of employment in that industry in the local economy compared to the share of employment in the same industry in the reference economy:

$$IM_r^t = \frac{\sum_{i=1}^N E_{ir}^{t-1} g_i^t}{\sum_{i=1}^N E_{ir}^{t-1}} - \sum_{i=1}^N \lambda_i^{t-1} g_i^t = \sum_{i=1}^N (\theta_{ir}^{t-1} - \lambda_i^{t-1}) g_i^t \quad (6)$$

A local economy will have a favourable industry mix if it is relatively specialized in industries that are growing rapidly in the reference economy. To maintain the balance of the accounting identity in equation (5), the local competitiveness effect ( $LC_r$ ) is defined as the difference between the local and reference economy growth rate in industry  $i$  weighted by the local share of employment in that industry:

$$LC_r^t = \sum_{i=1}^N \theta_{ir}^{t-1} (g_{ir}^{t-1} - g_i^{t-1}) \quad (7)$$

Combining equations (5), (6) and (7) gives the shift-share decomposition:

$$g_r^t - g_n^t = \sum_{i=1}^N (\theta_{ir}^{t-1} - \lambda_{ir}^{t-1}) g_i^t + \sum_{i=1}^N \theta_{ir}^t (g_{ir}^{t-1} - g_i^{t-1}) \quad (8)$$

The technique has been criticized for its lack of theoretical foundations, methodological problems associated with defining a local competitive effect that is independent of economic structure, and the sensitivity of results to the scale of aggregation, both sectorally and geographically. Set against these limitations, shift share analysis is a simple technique to employ that has relatively modest data requirements: typically, a significant issue in regional or locality based empirical research.