

Regional Capitals in the WA Settlement Hierarchy

Briefing Paper 1: Population

PAUL PLUMMER, KIRSTEN MARTINUS and MATTHEW TONTS

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



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Executive Summary

This report provides an overview of the population dynamics of Western Australia over the past decade, situating the members of the Western Australian Regional Capitals Alliance (WARCA) within this broader geographical context. This report is the first 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 suggests the following regarding recent trends in population dynamics:

- (1) The overwhelming and persistent dominance of Perth over the rest of Western Australia.
- (2) Whilst the members of WARCA experienced strong growth over the past decade, they continue to lose ground on Perth.
- (3) There exists considerable diversity of experience between the members of WARCA, with the ranking of these localities changing between the 2001-2006 and 2006-2010 census periods.

Digging deeper into the structure of recent population dynamics, there is evidence:

- (4) Of divergence across the Western Australian settlement hierarchy, with larger settlements forging ahead and smaller settlements falling behind.
- (5) That during the period 2001-2006 Roebourne and Broome grew faster, whilst remaining members grew slower than predicted given their populations in 2001.
- (6) That during the period 2006-2011, Port Hedland and Broome grew faster, whilst other WACRA members grew slower than anticipated.
- (7) Of significant difference in the age-cohort structures of the members of WARCA, reflecting their different positions within the Western Australian patchwork economy.

Evidence on recent trends in population dynamics and structure only scratch the surface of the dynamism that Western Australia has been experiencing over the course of the recent resource boom and global financial crisis. Subsequent reports will explore the broader social and economic drivers of local economic competitiveness and how they impact of the growth potential of WARCA.

1. Overview

As is well known, the last decade has been a period of dynamism for Western Australia encompassing the resource boom and the recent financial crisis. As yet, the ramifications of this in terms of the evolution of the Western Australian urban settlement hierarchy are not well understood. The formation of Western Australian Regional Capitals Alliance (WACRA) is a watershed in engaging with the policy implications of this period of rapid development.

The starting point for engaging in policy debates about the role and future of regional capitals is to understand their position in the State and National settlement hierarchies, and how this is changing. This report focuses primarily on situating the population size and structure of each city within the broader context of Western Australia. Specifically, this briefing paper has three aims:

1. To provide a profile of each of the regional capitals in terms of recent population dynamics.
2. To situate the experience of each regional capital in the context of other members of the Alliance.
3. To position WACRA within the evolving Western Australian settlement hierarchy.

The evidence presented in this briefing paper provides an empirical baseline, describing how the Western Australian population structure has evolved over the past decade and the changing position of each regional capital within the settlement hierarchy. Subsequent briefing papers will focus on labor force and employment dynamics of the regional capitals within the Western Australian experience, setting the scene for the broader settlement hierarchy research context. This initiative, which focuses on the characteristics of the regional capitals and their position within the Western Australian settlement hierarchy, will contribute to understanding the growth potential and local competitiveness of each regional capital.

2. Data Description

This analysis draws on the Australian Bureau of Statistics (ABS) Census of Population and Housing time series profiles which count population based on place of enumeration. The members of the Regional Capitals Alliance are Albany, Broome, Bunbury, Kalgoorlie-Boulder, Geraldton-Greenough¹, Port Hedland, and Roebourne. In this briefing paper the geographical extent of each of the member of WARCA are defined at the LGA level (Local Government Areas)² and compared between census years of 2001, 2006, and 2011.

3. Population Dynamics

This section describes how the population of the regional capitals has changed in terms of their position within the wider Western Australian settlement hierarchy. It finds clear evidence of an overwhelming and persistent disparity between the population of the Perth metropolitan area and the remaining settlements in the State, including the regional capitals. Indeed, although all seven regional cities under examination experienced population growth between 2001 and 2011, the majority demonstrated steady falls in their proportion of population relative to the total State. Only Port Hedland and Roebourne countered this trend.

These observations are described through tables and graphs in the following sections:

- Regional Cities as a percentage of State total population 2001-2011
- Population Growth rate by city and WA 2001-2011
- Regional LGA population total 2001-2011 and change 2001-2006, 2006-2011

¹ Geraldton-Greenough was used because at the time of ABS data collection, the City of Greater Geraldton was not yet in place as the merger with Mullewa had not occurred.

² Clearly, the choice of alternative statistical units might yield different evidence about the performance of the member of WARCA.

3.1 Regional Cities as a percentage of State total population 2001-2011

During the period 2001-2006, the proportion of each regional capital to the total Western Australia population declined (Figure 1). This decline continued for all regional capitals other than Port Hedland and Roebourne, which experienced increases of 0.14 and 0.34 percentage points respectively over 2006-2011. Broome was found to have the most stable population in relation to the State, while Albany, Kalgoorlie-Boulder and Bunbury lost ground. In overall terms, the combined population of the seven regional capitals was relatively stable against the WA regional total for the period 2001-2011, declining only 0.04 percentage points (Table 1). In terms of the proportion of each regional cities population to the whole State, Roebourne and Port Hedland demonstrated increases (5.11 and 1.11 percentage points respectively). With the exception of Broome, whose change of share was close to zero, the average decline of the other cities (Albany, Bunbury, Geraldton-Greenough, Kalgoorlie-Boulder) in relation to the total regional population was 1.5% percentage points (Figure 1).

Figures 2 to 4 put this in the context of WA historic booming growth between 1890 and 2011.

Table 1: Proportion of each regional city population against total population of Western Australia

	2001	2006	2011
Total proportion of regional cities population to WA total population	8.97	8.80	8.93
Percentage of Regional Capitals' Population against regional WA total (%)			
Geraldton-Greenough	18.81	18.71	17.93
Albany	17.80	17.71	16.17
Kalgoorlie-Boulder	17.35	16.72	15.71
Bunbury	17.27	16.84	15.37
Broome	11.14	11.32	10.98
Roebourne	9.62	11.07	14.73
Port Hedland	8.01	7.64	9.12

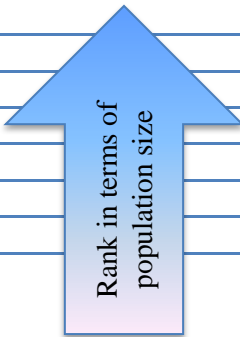


Figure 1: Regional cities as percent of State total population 2001-2011

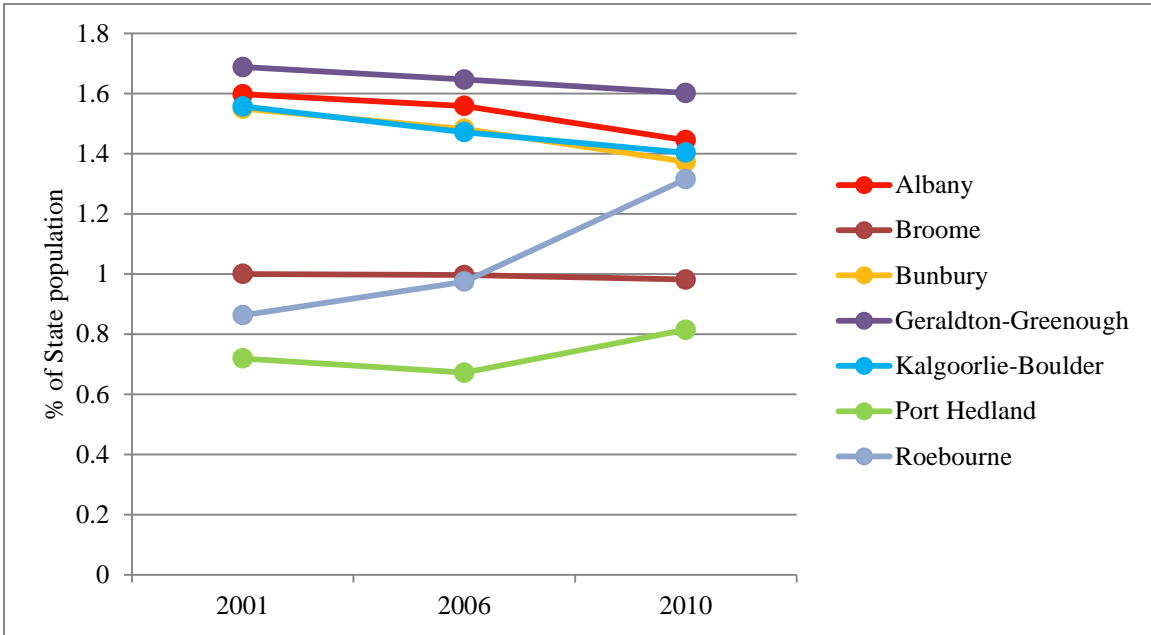


Figure 2: Perth Metropolitan and WA State population 1881-2011

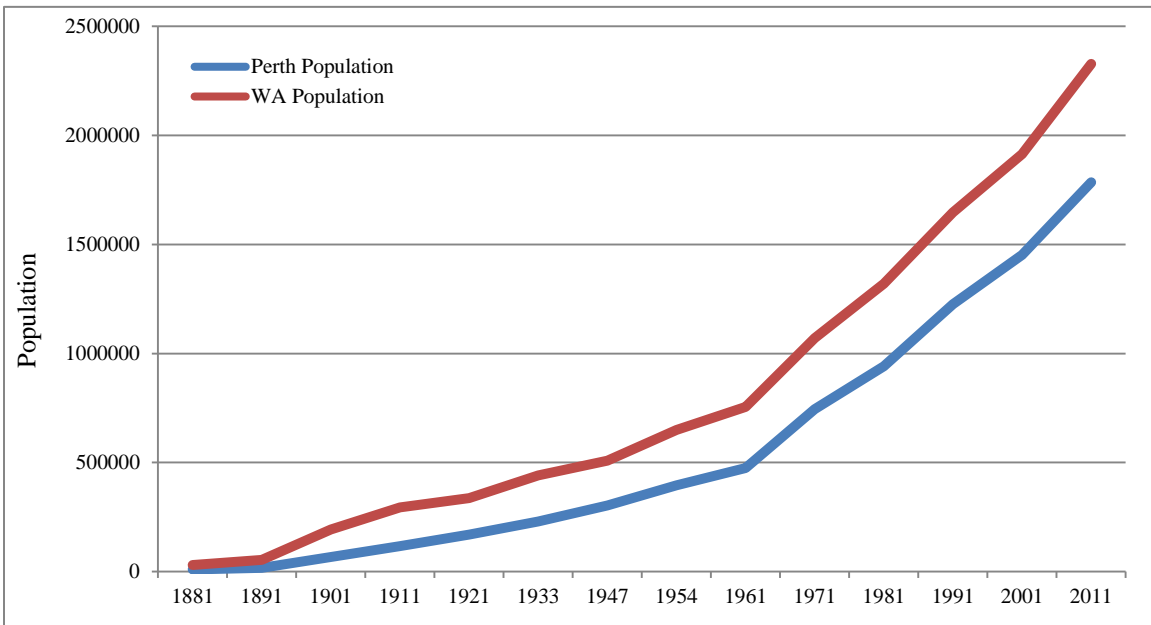


Figure 3: State total population percent change over 10 year intervals 1859-2011

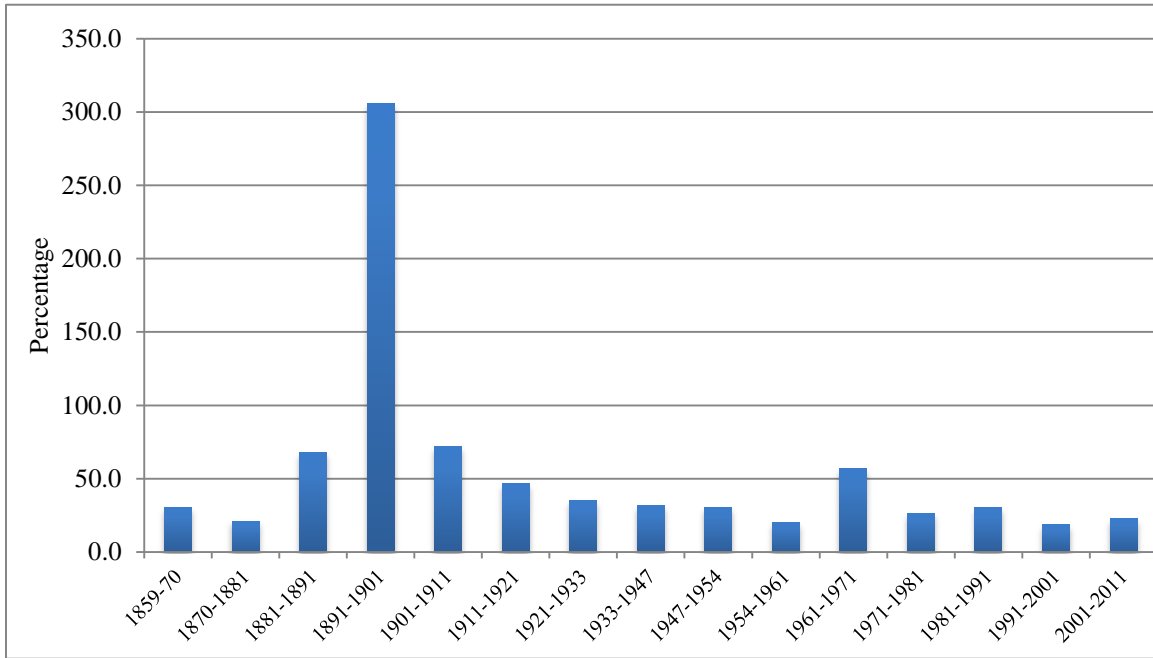
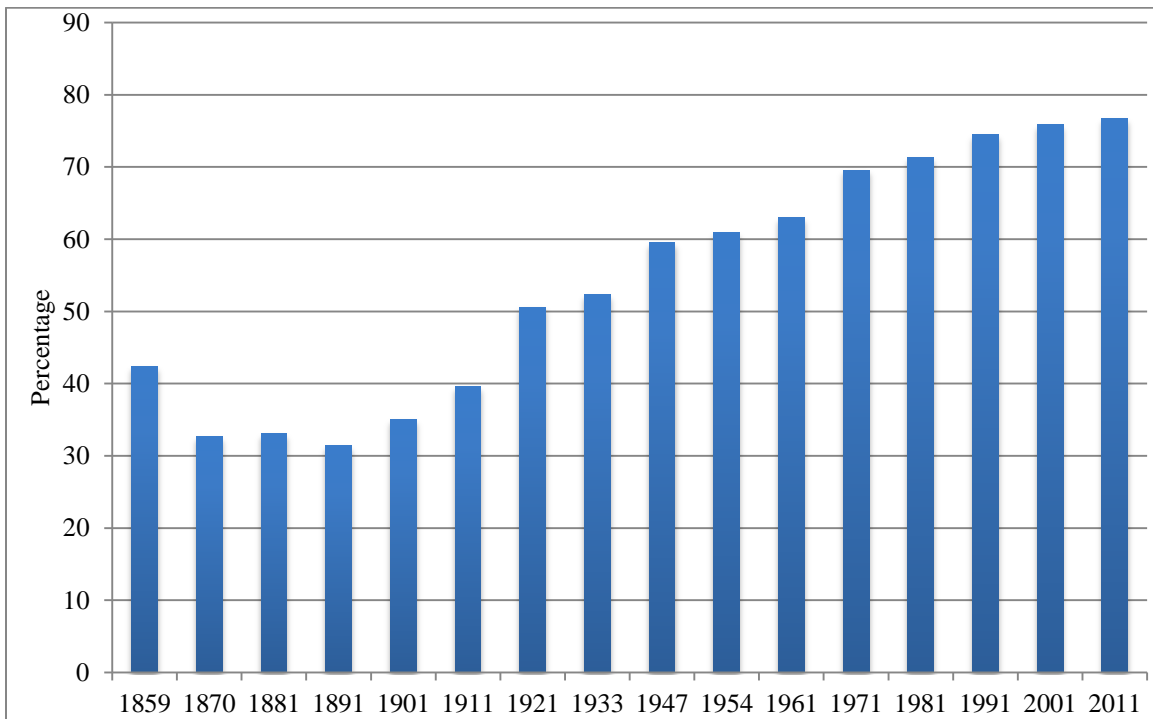


Figure 4: Perth as percent of WA population 1859-2011



3.2 Population growth rate by city and WA 2001-2011

Figure 5 shows the population growth rates for each member of the Alliance, comparing their performance over the two census periods 2001-2006 and 2006-2011. As for Western Australia as a whole, each member of the Alliance experienced higher population growth rates over the census period 2006-2011 than they did over the census period 2001-2006. Within this overall population growth dynamic there is considerable variability in the performance of each of the regional capitals, at least relative to the Western Australian average (Table 2). The population of Broome grew at the same rate as the Western Australian average between 2001-2006 and then more slowly for the period 2006-2011. Geraldton continued to lose ground relative to Western Australia's population, while Albany, Bunbury, and Kalgoorlie experienced slowing growth rates. In contrast, Roebourne experienced a rapid and accelerated relative increase in its share of population over both census periods. Port Hedland experienced the most dramatic change in population dynamics, being the slowest growing capital city between 2001-2006 to become the second fastest growing capital city between 2006-2011.

Figure 5: Population growth rate by region and WA 2001-2011

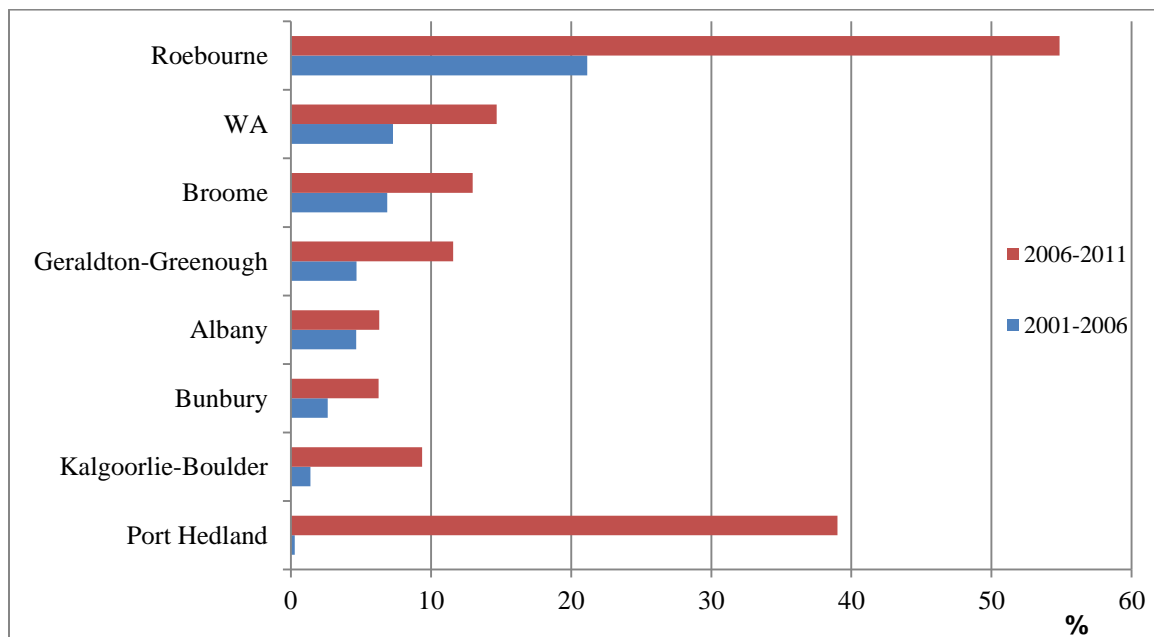


Table 2: Population growth rates relative to WA (%)

	2001-2006	2006-2010
Roebourne	13.84	40.16
WA	0	0
Broome	-0.40	-1.71
Geraldton-Greenough	-2.61	-3.12
Albany	-2.62	-8.38
Bunbury	-4.67	-8.43
Kalgoorlie-Boulder	-5.89	-5.32
Port Hedland	-7.01	24.31

3.3 Regional LGA population total 2001-2011 and change 2001-2006, 2006-2011

Figure 6 and Figure 7 show the position of the regional capitals in the WA settlement hierarchy in terms of their population levels in 2006 and 2011 and the associated population growth (put differently, Figure 6 represents the proportional difference between the two bars for each LGA). Figure 6 is a stark reminder of the overwhelming dominance of the Perth metropolitan area compared to regional Western Australia, at least in terms of population. The primacy of Perth likely represents the net outcome of the cumulative attractiveness and centralizing tendencies of Perth for business and labour, relative to the regions, including the cities in WACRA.

Outside of the Perth metropolitan area, the cities of the Alliance ranked in the top 11 most populated of all LGAs in Western Australia, with Geraldton-Greenough, Albany, Bunbury and Kalgoorlie-Boulder assuming the top four positions. Roebourne, Broome and Port Hedland were respectively ranked seventh, ninth and eleventh. Population totals in the top 40 most populated cities increased between 2006 and 2011. Rankings also remained relatively stable through the State, with regions adjacent to Perth overtaking members of the regional Alliance in terms of total population (Serpentine-Jarrahdale overtook Broome, and Murray overtook Port Hedland).

In contrast, Figure 7 shows that there is considerable mixing in the rank ordering of population growth rates across LGAs between the two census periods. This is reflected in a comparatively low rank order correlation of 0.62³. Those members of the Regional Capitals Alliance that experienced below the WA rate of population growth have seen a mixing in their rank ordering within the settlement hierarchy in 2006-2011 (Table 3). Whilst Broome had the highest rate of growth in population over both periods, Albany and Bunbury exhibited a decrease. Geraldton and Kalgoorlie demonstrated an increase relative to the other Alliance members. With the exception of Roebourne, the population of the Alliance cities grew at a slower rate than WA taken as whole for the period 2001-2006. This relative decrease in population growth rates was replicated in the 2006-2011 census period, excluding Port Hedland which experienced a dramatic reversal of fortunes from the slowest rate of population growth to an above WA growth rate. This represented a relative increase in population of 5,206 persons.

Table 3: Comparative rank ordering of All LGAs in Western Australia

	Growth rate (%) 2001-2006	Growth rate (%) 2006-2011	Rank 2001-2006	Rank 2006-2011
Albany	0.068	0.089	20	33
Broome	0.072	0.169	18	10
Bunbury	0.040	0.106	30	30
Geraldton-Greenough	0.067	0.117	21	24
Kalgoorlie-Boulder	0.023	0.087	37	36
Port Hedland	0.003	0.156	46	13
Roebourne	0.159	0.114	6	25

³ A rank order statistic is computed by ranking of growth rates for each LGA in each census period and then calculating the strength of the relationship between the rankings between the two periods.

Figure 6: Regional LGA population totals 2011 and 2006 ('000s)

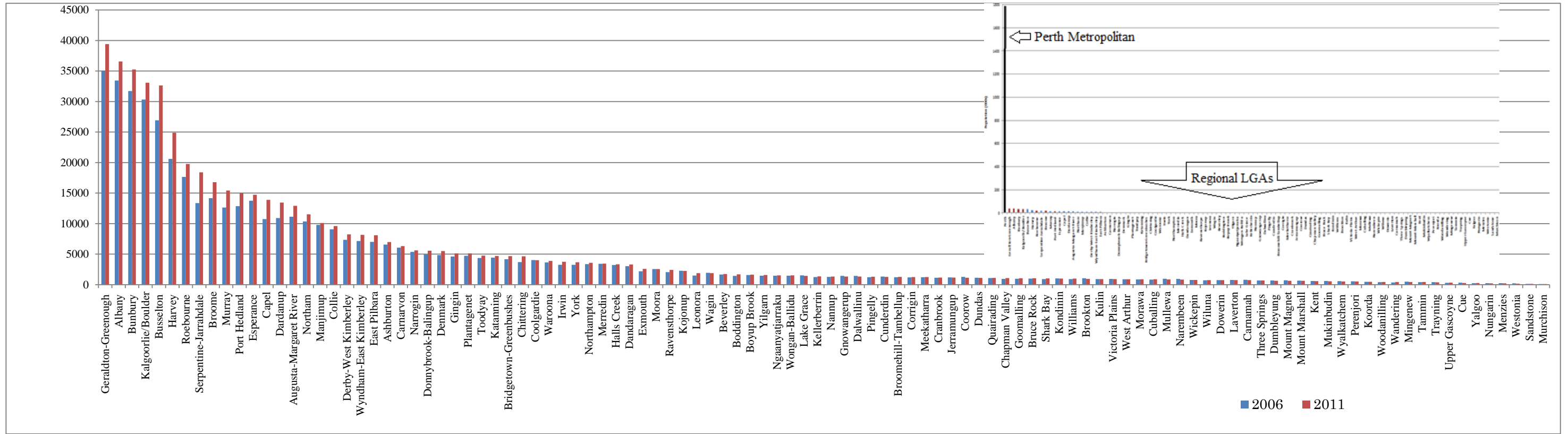
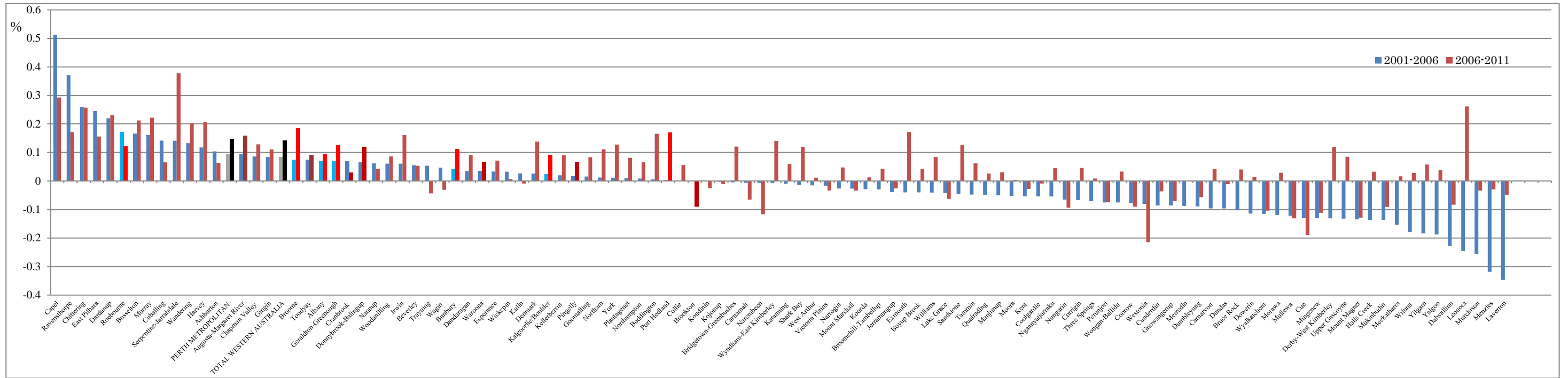


Figure 7: Population growth rate (%) 2001-2006 and 2006-2011



4. Structure of Settlement Dynamics

In this section, we dig a little deeper into the structure of settlement dynamics, comparing the population growth rates across the Western Australian settlement hierarchy for the census periods 2001-2006 and 2006-2011 focusing on the performance of the Alliance cities. Within the context that there is evidence of considerable variability in the performance across the regional capitals, collectively WACRA has outperformed the average population growth rate across Western Australia.

Figure 8: Comparative growth rate across WA, 2001-2006, 2006-2011

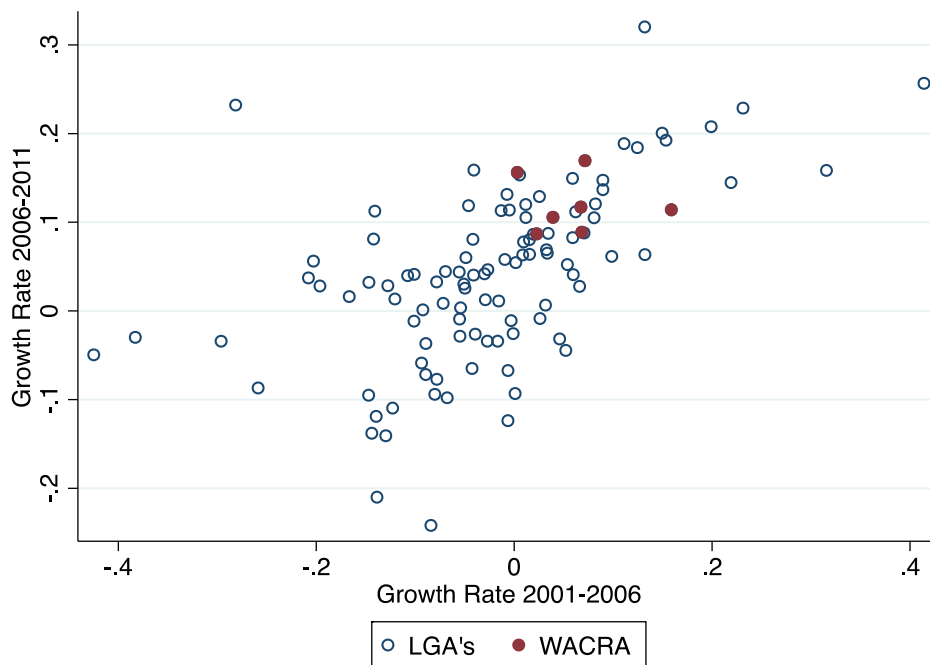


Figure 8 shows that overall there is a positive relationship between the growth rates for the period 2001-2006 and 2006-2011, although there is clearly considerable variability around this overall positive association. That is, across Western Australia those LGAs that experienced growth in the earlier period also grew in the subsequent period. Similarly, those LGAs that declined in the census period 2001-2006 also declined in the period 2006-2011. However, there is also evidence that a large number of LGAs experienced negative growth in the period 2001-2006 but positive growth in the period

2006-2011. Within this overall distribution of LGA growth rates, the cities in the Alliance all grew positively in both periods.

Figure 9: Comparative growth rate across WACRA, 2001-2006, 2006-2011



Figure 9 drills into the distribution of growth, focusing on the relative performance of the regional capitals. This is a more concise way of representing the data in the rank order plots. Essentially, this shows the diversity of performance across the cities in the regional Alliance, both within and between each census period.

One of the growing concerns in regional settlement planning is to understand changes in population distribution, as well as how that distribution might change in response to any social and economic ‘shocks’ that disrupt the existing developmental path of the settlement system. Put differently, evidence on the extent to which the population distribution of Western Australia is either converging or diverging answers two interrelated questions:

- (1) Are smaller settlements catching up with larger settlements, or conversely, are larger settlements forging ahead of smaller places in terms of population size?

(2) In the event that the resource boom turns to bust, for example, what will be the likely impact on the distribution of population across Western Australia?

Convergence in the case of Western Australia would simply mean that the difference between the largest centres and the smallest centres is narrowing. This would be because because the growth of the largest LGAs (i.e., those in Perth) is slower than those located in regional, rural or remote areas. Conversely, 'divergence' means the opposite, a situation where large LGAs grow more rapidly than smaller ones. A process of convergence might be regarded as optimal in regional development terms, as it provides a more even Western Australian population distribution, taking pressure off the metropolitan area and contributing to regional development.

A simple way to explore whether population levels in Western Australian LGAs constituting are converging or diverging is to plot the growth rate of each LGA over a period of time against its level in an initial time period. If LGAs are converging, with smaller places 'catching-up' up to larger place in terms of population size, then we would expect to observe a downward sloping (negative) relationship between growth rates and initial levels. That is, smaller places have higher growth rates and larger places have lower growth rates. Conversely, if there is divergence across the settlement hierarchy then we would expect to observe an upward (positive) sloped relationship. Figure 10 plots this relationship for the two census periods, including the linear predicted value for each relationship. For both periods the graphs show that Western Australia has experienced a divergence in growth rates across the settlement hierarchy, with a similar rate of divergence between 2001-2006 and 2006-2011. Thus, there is a growing gap between the high growth of large settlements and the slow growth of smaller settlements.

Figure 10: Regional convergence/divergence, comparison 2001-2006, 2006-2011

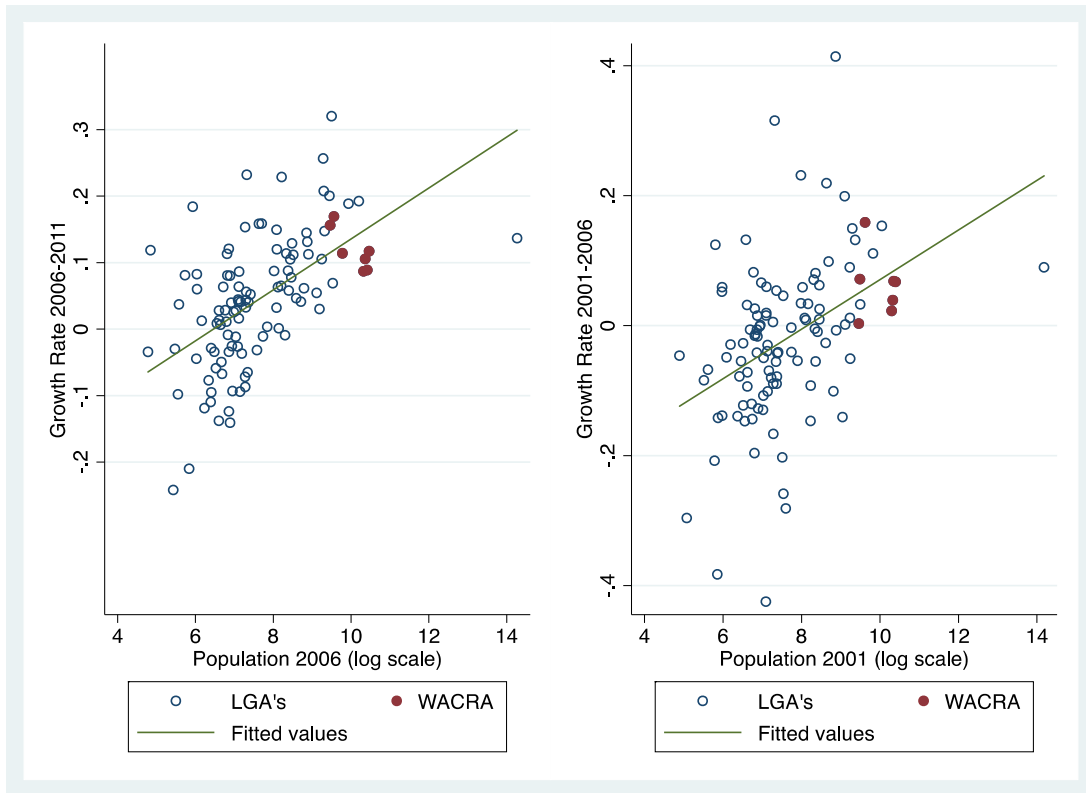
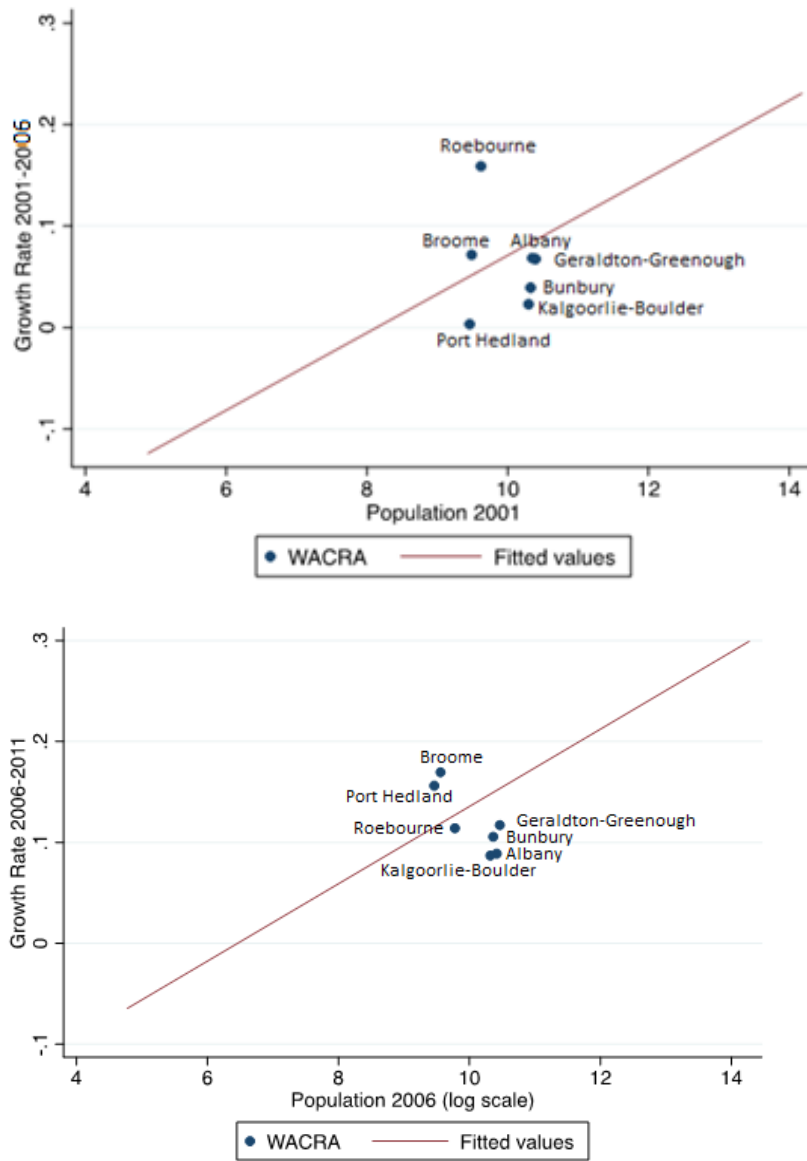


Figure 11 focuses on the regional capitals, over the census period 2001-2006, Roebourne and Broome grew faster than would have been predicted from initial population levels in 2001 whilst Albany, Geraldton, Kalgoorlie, Bunbury and Port Hedland grew slower than predicted from their initial population levels. In 2006-2011, Broome and Port Hedland grew faster than predicted by their initial population levels in 2006, whilst the remaining regional capitals grew slower than predicted from initial 2006 levels.

Figure 11: Comparative growth rate, WACRA, 2001-2006, 2006-2011



5. Disaggregating Population by Age-Cohort

This section disaggregates the regional population rate of change by age-cohort to identify differences between population structures. Typically, changes in age-cohort structures are the net result of new migration and the natural increase in local population. Overall, despite broadly similar changes for the Alliance cities between cohorts across the census period 2001-2006, Roebourne and Port Hedland experienced substantively different changes in their age-cohort structures to the other Alliance cities between the 2006-2011 census period.

These observations are described in the graphs in the following sections:

- Age structure (%) 2011
- Population rate of change by age cohort 2001-2011

4.1 Age structure (%) 2011

Figure 12 compares the population age structure for each of the capital cities to the age structure for Western Australia. The evidence indicates that there are only relatively minor differences between the population structures of each of the Alliance member cities and that of Western Australia. However, those differences that do exist can be broadly divided into three groups. First, Albany, Bunbury and Broome whose older populations are perhaps reflective of sea-change trends. Second, Geraldton-Greenough whose trends match those of Western Australian in the 35 and over, except for the larger 0-19 and smaller 20-34 age cohorts, perhaps indicating larger families. Third, Kalgoorlie-Boulder, Port Hedland and Roebourne whose large working populations most likely reflect the transient nature of those individuals that are connected into the resource sector.

Figure 12: Age structure (%) 2011

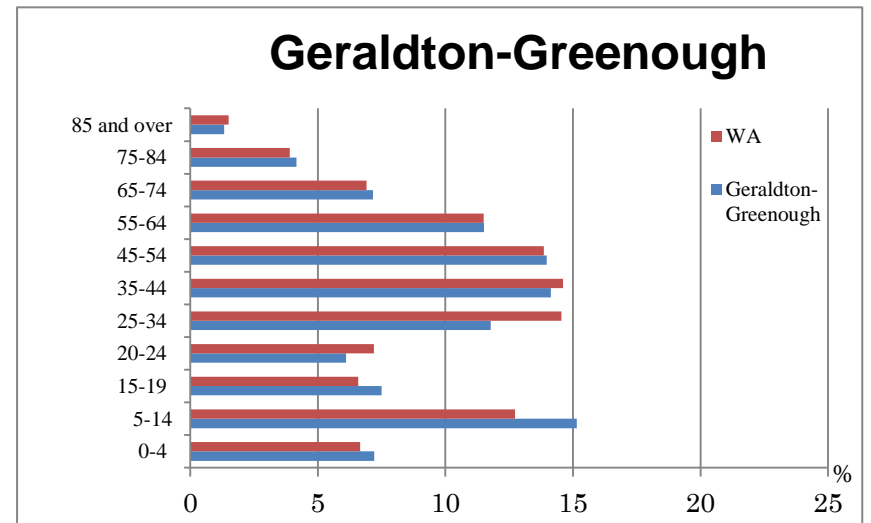
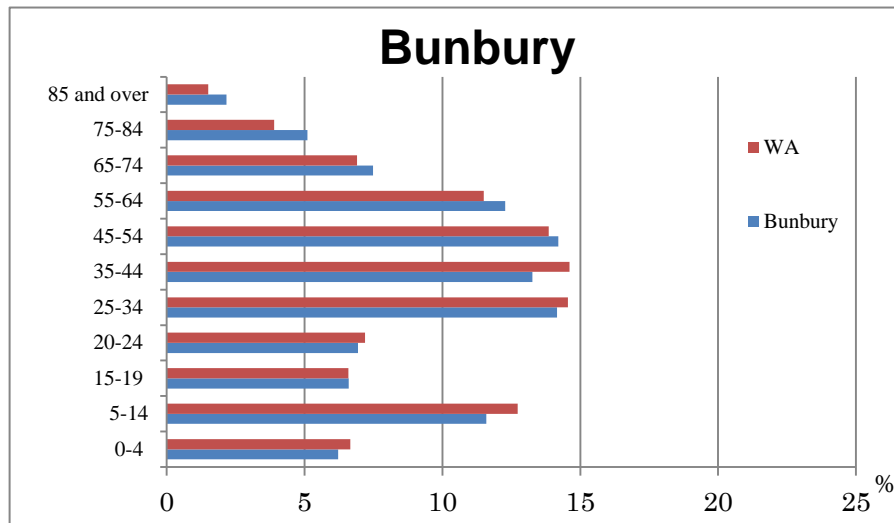
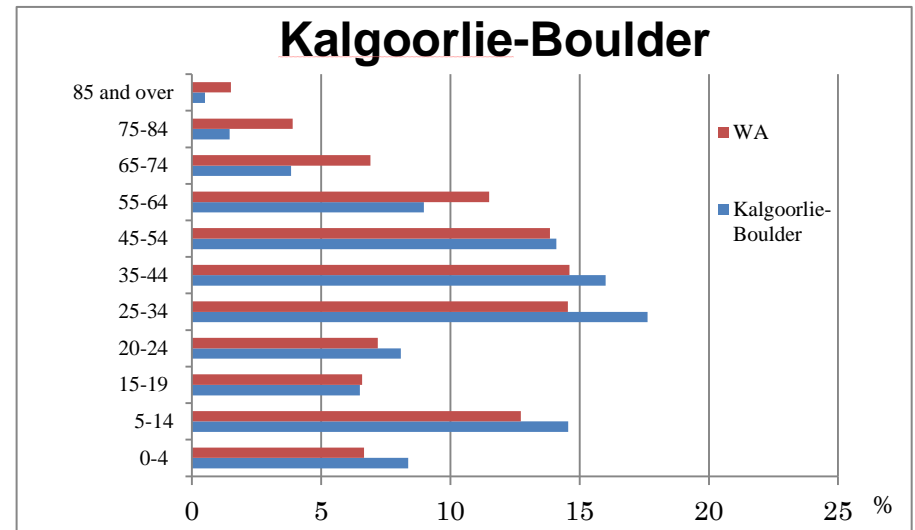
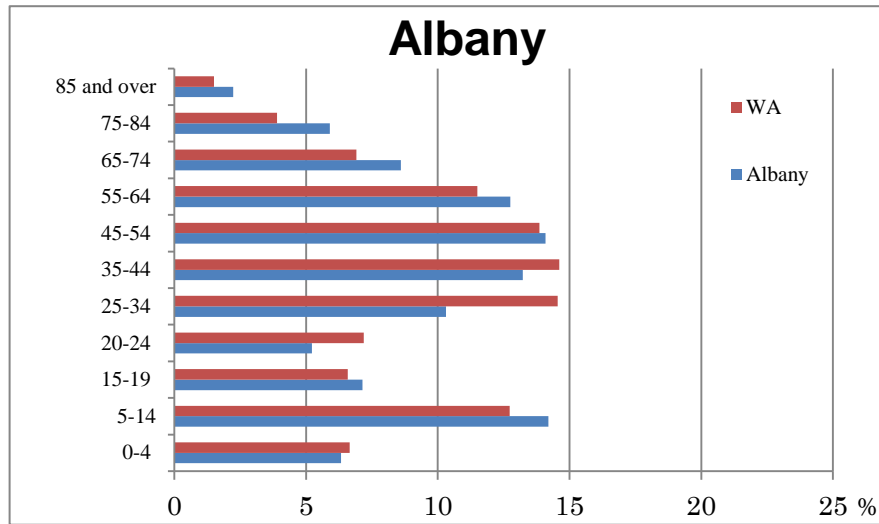
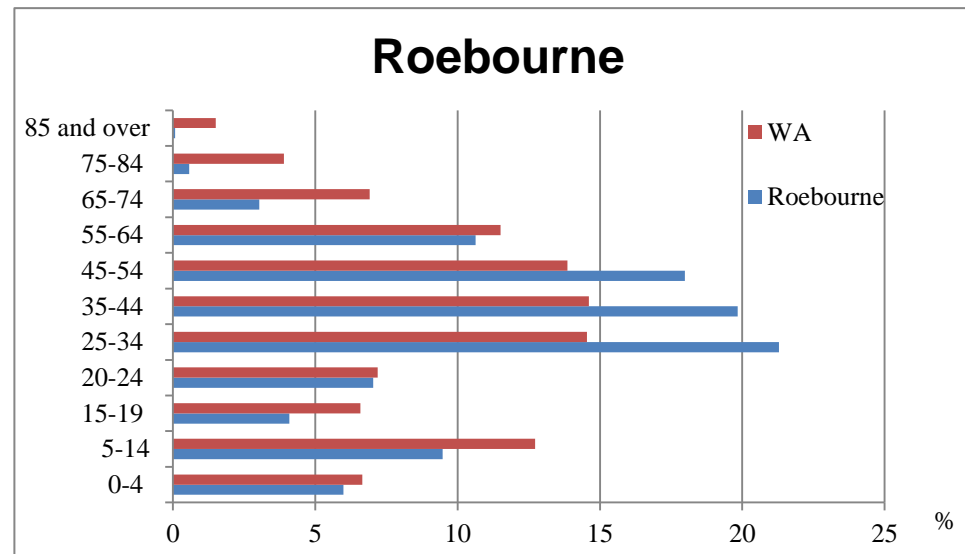
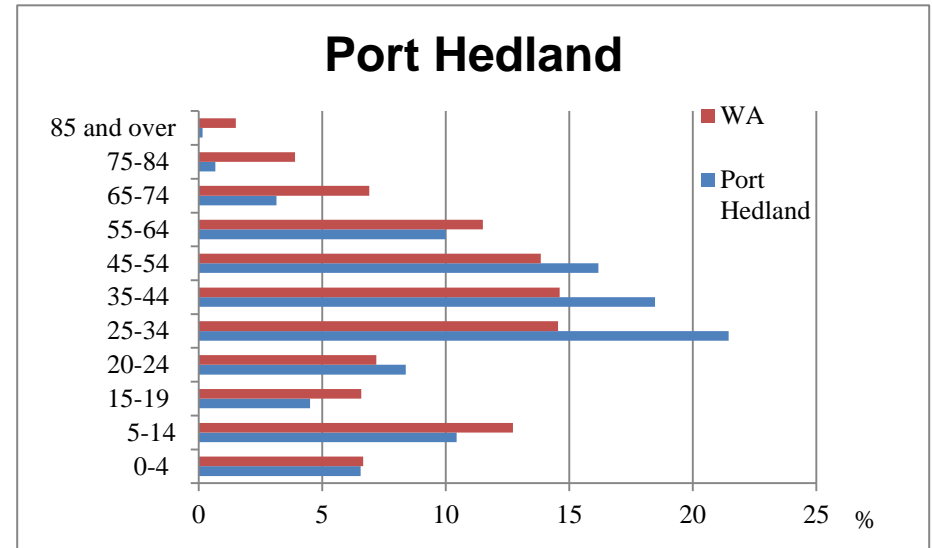
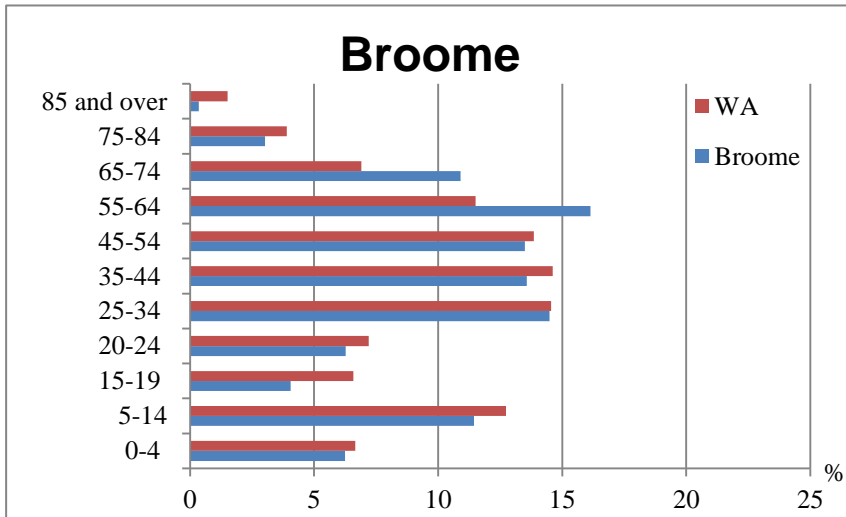


Figure 12: Age-sex structure (%) 2011 (continued)



Whereas Albany and Bunbury exhibit a large percentage in all older cohorts (55 and above), Broome has comparatively more only in the 55-74 age cohort and fewer in age cohorts likely to require access greater aged care (75 and over). These cities have a lower proportion in the younger age cohort (20-44). Kalgoorlie-Boulder and Port Hedland are characterised by larger populations in the core working aged cohort (20-54) compared to Western Australia, similarly Roebourne with a high proportion between years 25-54. Though Albany, Bunbury, Geraldton-Greenough and Broome display less in the 20-44 working population cohort compared to Western Australia, only Albany and Geraldton-Greenough have significantly more in child dependent cohorts. Of the Kalgoorlie-Boulder, Roebourne and Port Hedland group, only Kalgoorlie displays a higher number of children (0-19) compared to WA indicating more family-oriented settlement patterns.

4.2 Population rate of change by age cohort 2001-2011

Figure 13 and 14 displays population change by age cohort between 2001-2011 comparing two different groups of member cities to Western Australia, where each graph contains at least one city from either the ‘sea-change’ or ‘large working population’ groups noted in section 4.1. Western Australia demonstrated higher rate of change in the 0-55 age group during 2006-2011 than 2001-2006, this rate of increase fell slightly in the above 55 cohort. All cities loosely followed the broad changes between these periods, except for Port Hedland and Roebourne. These cities showed sharp jumps in the rate of change of the 20-55 cohort, this sudden increase in working population is most likely to be the result of strong economic growth occurring in these cities.

Of the remaining cities, Broome and Geraldton-Greenough displayed similar dynamics to Western Australia with the decline in the rate of increase occurring slightly earlier from 45 years in Broome and later from 75 years in Geraldton-Greenough. Broome’s sharp rise in the rate of change of people after 65 years points to its fast aging population. Kalgoorlie-Boulder, Albany and Bunbury experienced fluctuations in the rate of growth between each age cohort, with a higher rate of change in 0-14, working age (19-44),

65-74, 85 and over categories than in the 15-19, 45-64 and 75-84 age cohorts. Albany and Kalgoorlie-Boulder were the only two cities to continue experiencing negative growth rates in the 2006-2011 period in the younger cohorts and 25-44 age group. Albany appeared particularly vulnerable to the aging population process.

Figure 15 and 16 displays these same findings comparing all member cities against WA in each of the 2001-2006 and 2006-2011 periods. Roebourne showed this highest rate of change across all age cohorts during the 2001-2006 period, except for the 65-84 age cohort which was dominated by Albany. There was a progressively higher rate of change in the older populations for most cities until around 84 years, after which there was a sharp decline in population change, with negative growth in Port Hedland, Albany and Kalgoorlie-Boulder from 75 years onwards. Again, Roebourne defied this wider trend, demonstrating high rate of increase in the working population with sharp declines in 0-4 and 65-74 age groups. The majority of Alliance cities suffered negative or close to zero growth in the younger cohorts (except for Roebourne); this was consistent with WA State growth patterns in the 0-19 and 25-34 age groups, though contrary to the slight State increasing rate of change in the 20-24 group.

During the 2006-2011 period, Port Hedland and Roebourne demonstrated an extraordinary increasing rate of change in labourforce (15-64 year olds). They were the only cities to experience an increasing negative growth rate in the older cohorts. Albany and Bunbury were the only cities to demonstrate increasing negative growth in the 15-24 age bracket. The declining and increasing rate of change in the respective younger and older populations of Albany, Bunbury and Geraldton-Greenough revealed the aging population of these towns. Broome appeared to be countering these aging effects with increasing in the rate of change of 5-14 year olds; this was in opposition to the trends in the other Alliance cities and wider State.

Figure 13: Population rate of change by age cohort 2001-2011

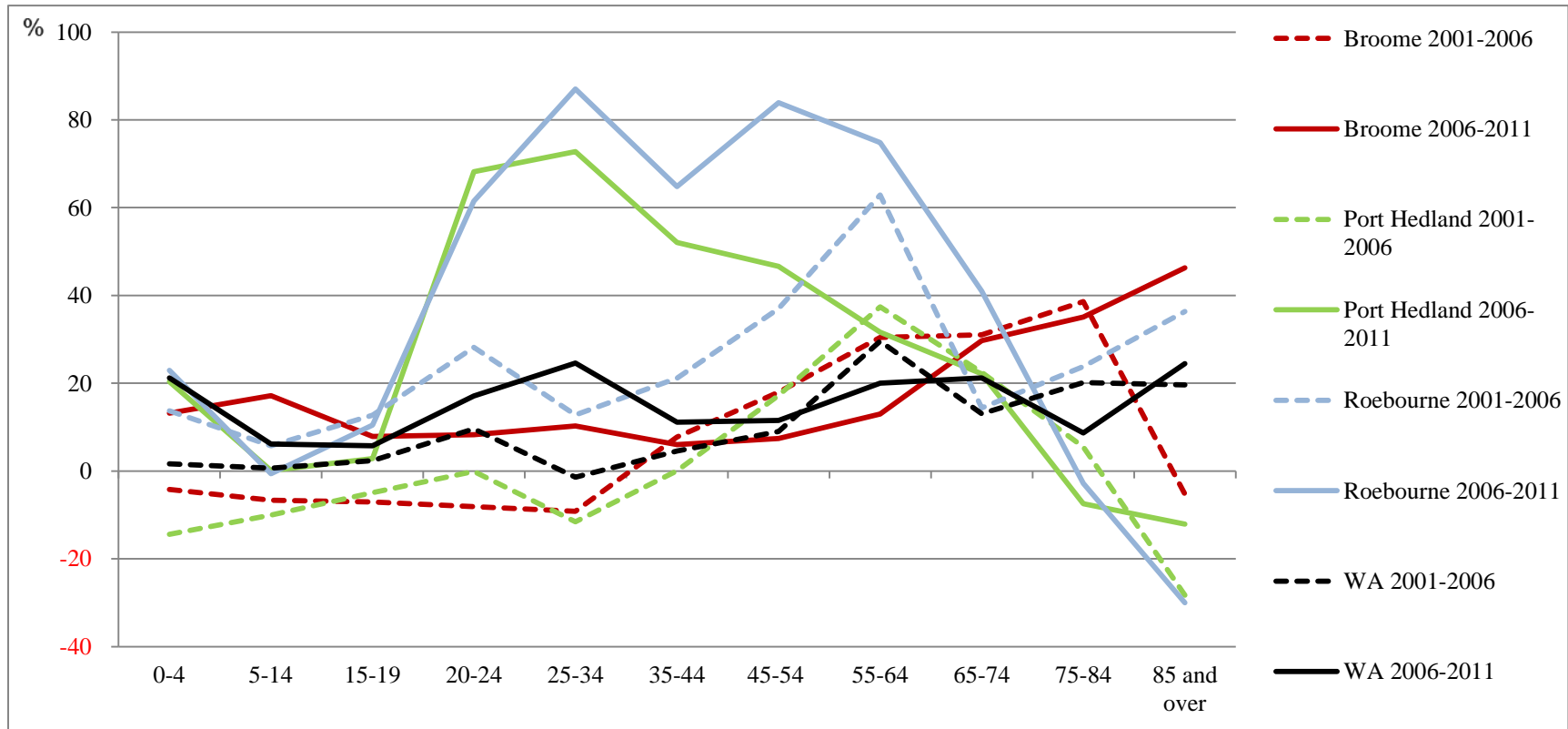


Figure 14: Population rate of change by age cohort 2001-2011(continued)

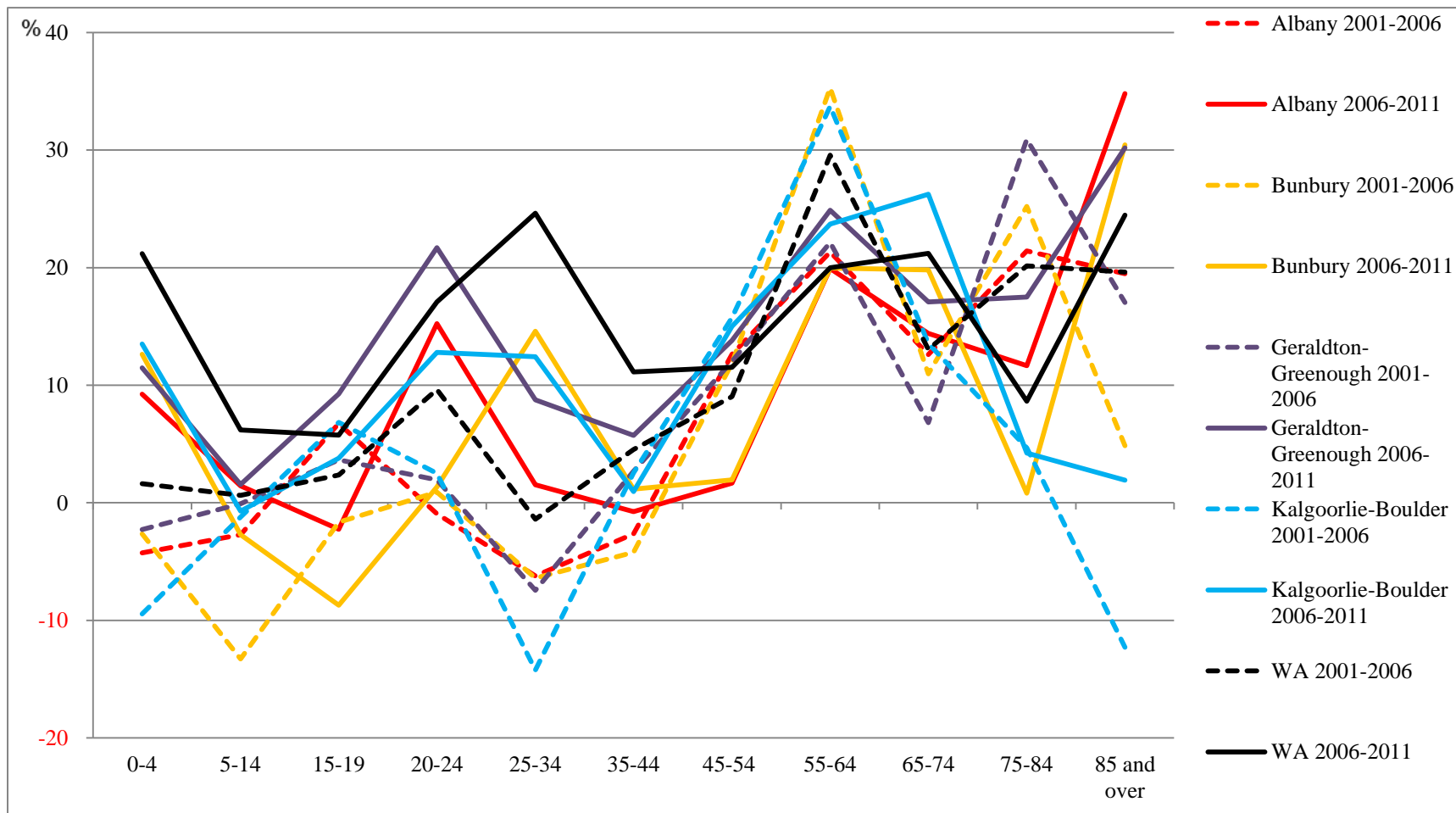


Figure 15: Population rate of change by age cohort 2001-2006

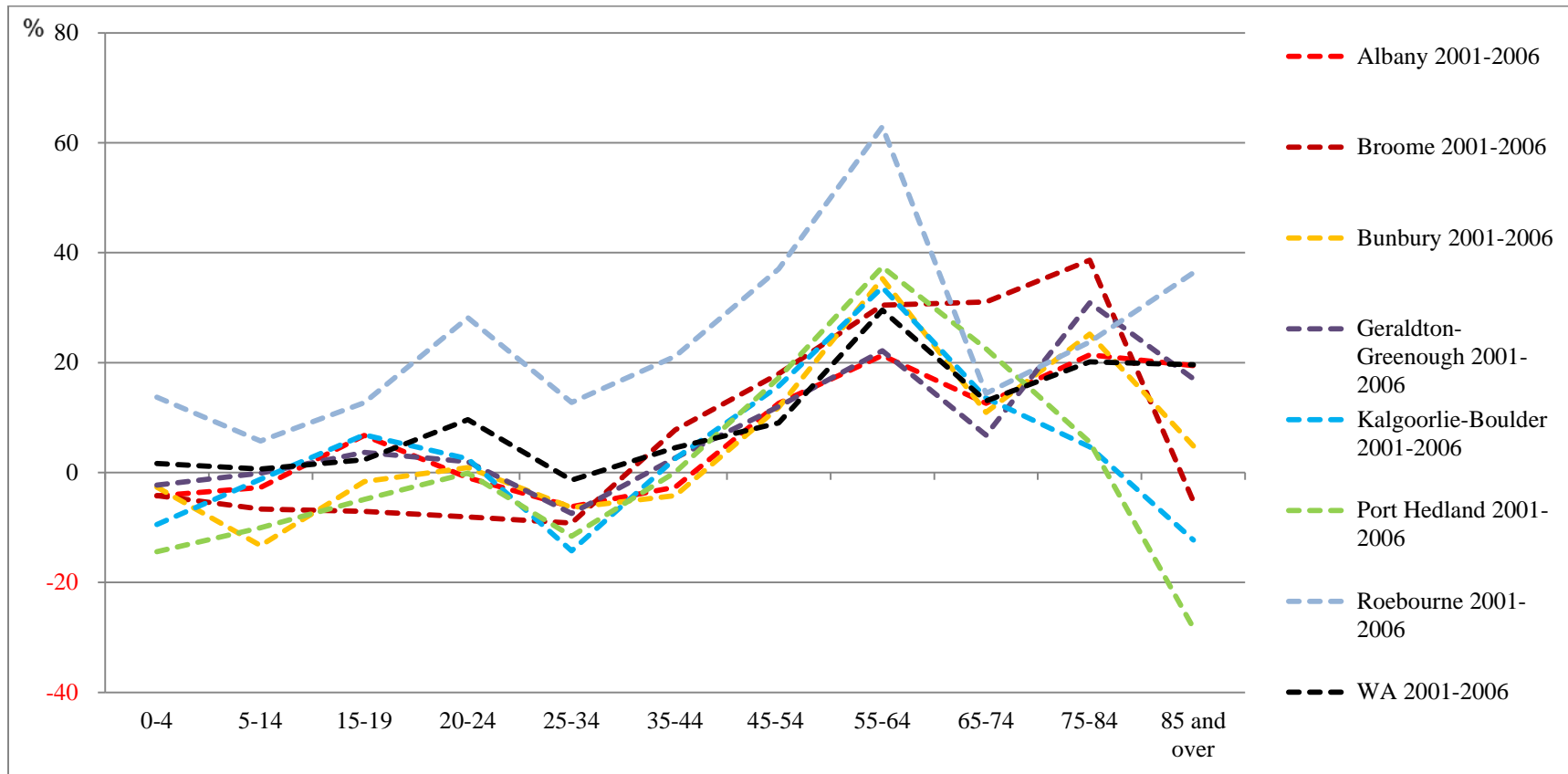
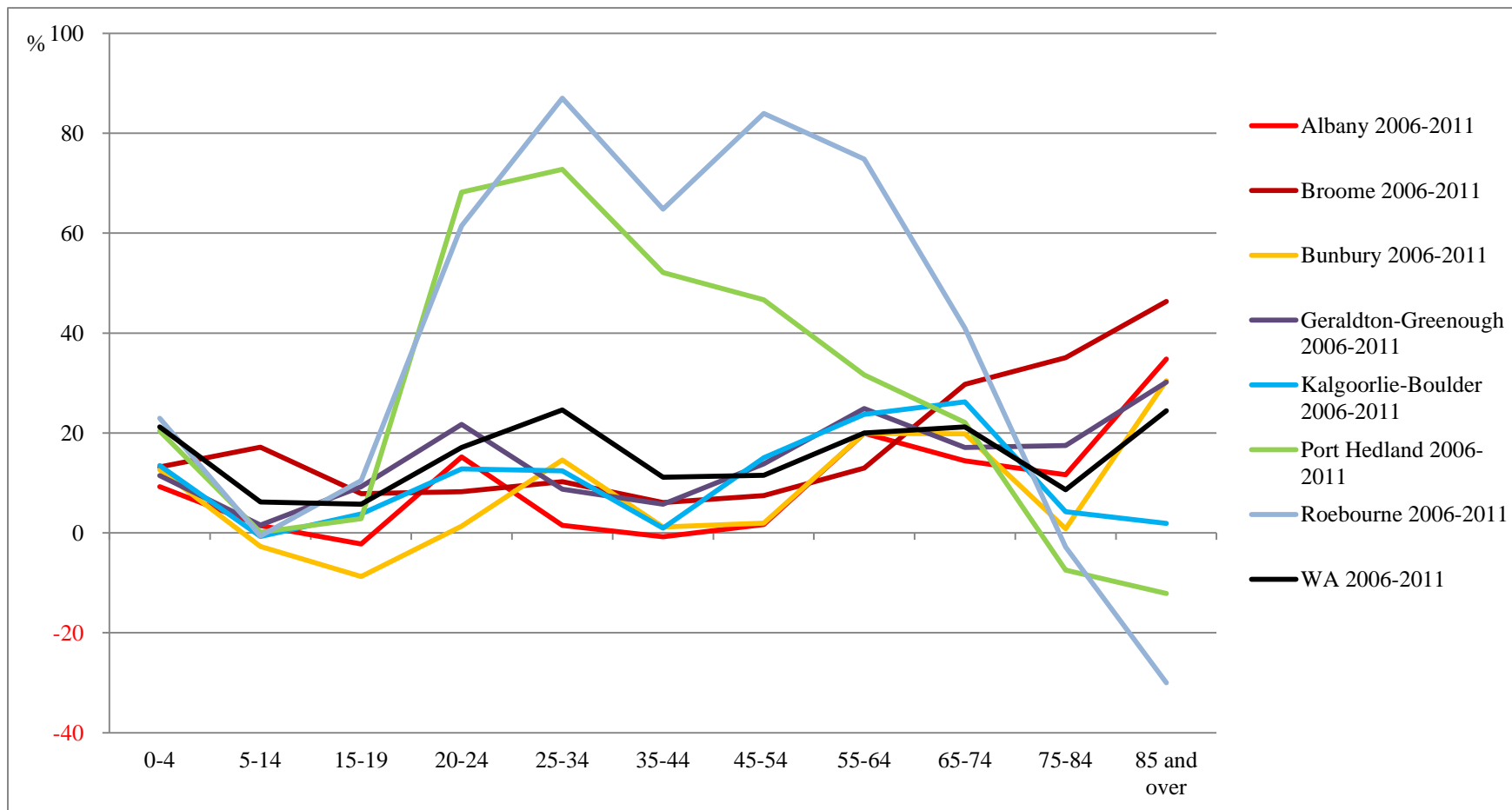


Figure 16: Population rate of change by age cohort 2006-2011(continued)



6. Concluding Remarks

This analysis of population trends gives some indication of the significantly different dynamics and forces shaping each city in the Alliance as well as broader patterns of settlement in Western Australia. One of the features of the State's settlement geography is the concentration of people in Perth, which now accounts for around 75 per cent of the State's population. Indeed, although the populations of all WARCA members had real population growth, the majority experienced steady declines in population relative to the State. Nonetheless, rankings of regional cities' populations in relation to total non-metropolitan population remained consistent from 2001 to 2011. In other words, they held their own at a time when the State experienced rapid population and economic growth.

Amongst the regional cities though, there are quite distinctive growth trajectories. Whilst the population growth of Broome was most comparable to WA, Roebourne and Port Hedland experienced sharp increases in growth between the periods 2001-2006 and 2006-2011. Bunbury and Albany demonstrated the least change. Further analysis revealed that these growth rates are diverging at similar rates between the two periods, with Broome and Roebourne the only cities to have growth faster than would be anticipated based on the 2001 population levels. In terms of demographic structure, Broome, Bunbury, Albany and Geraldton-Greenough fit descriptions of an aging population, whilst Geraldton-Greenough's much higher and growing proportion of 5-14 year olds to 25-44 year olds suggests families. Similarly, where Roebourne, Port Hedland and Kalgoorlie-Boulder are viewed as largely working populations, Kalgoorlie-Boulder has high proportions of children.

Indeed, the broad categories appear to describe two equally strong and well-documented drivers of the Western Australian settlement landscape. First, one shaped by the demands of a

resource-driven economy where cities are subject to large fluctuations in working populations. Second, one formed by the desire to choose residence based on lifestyle where cities are more stable being defined by older cohorts and those whose work is not location-bound.

The cumulative impact of the differences between each city in the member Alliance will largely influence the efficacy of various policy measures adopted within in their respective locations.

The evidence presented in this report on the evolving distribution of population across Western Australia and WARCA only scratches at the surface of the dynamism that characterizes the Western Australian experience over the course of the past decade. Encompassing the ongoing resource boom and global financial crisis, the changing settlement hierarchy needs to be understood in a broader social and economic context, as well as how the regional capitals are situated within that hierarchy. Understanding the growth potential and local competitiveness of the regional capitals helps to determine the strategic needs and policy options available to the regional capitals. The second report in this series will focus on employment and job creation across Western Australia, with subsequent reports focusing on the drivers of local competitiveness, labor force attraction and retention.