EXPLORING EMPLOYMENT GROWTH DISPARITIES ACROSS METROPOLITAN AND REGIONAL AUSTRALIA

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ABSTRACT: In this paper, dynamic shift-share analysis using industry level data for full-time and part-time employment is employed to explore regional employment growth in Australia and to estimate the regional impact of the increasing trend to part-time job creation. The regions are defined by the metropolitan/rest of state distinction used by the Australian Bureau of Statistics. National factors dominate but changing industry structure and unspecified local factors also play a significant role in explaining these outcomes. Non-metropolitan areas generally fail to benefit from industry mix changes because they do not offset substantial full-time employment losses with commensurate part-time employment growth.

1. INTRODUCTION

Over the last few decades there has been considerable change in the industrial and demographic composition of employment with substantial impacts on the spatial economy. There are significant disparities in employment growth rates across metropolitan and regional areas of Australia.   These disparities are intrinsically linked to the persistence of unemployment rate differentials across the same spatial units and accompanying social disadvantage (Mitchell and Carlson, 2003a). The capital cities typically enjoy lower unemployment rates, higher employment growth and recover from recession more easily.

Demarcating the regions into Capital City and Rest of State with the Territories as single regions (based on ABS Labour Force categories) and employing an array of statistical techniques (multiple regression, contingency table analysis, causality analysis, vector autoregression, and cointegration analysis), Mitchell and Carlson (2003a) examined the relative significance of national factors and region-specific factors in explaining these disparities. They concluded that while a region's employment growth (and unemployment ranking) is significantly influenced by aggregate (national) fluctuations, region-specific fluctuations are also important. The spatial diversity of response to aggregate fluctuations and region-specific dynamics was notable with high growth regions (both capital city and rest of state regions in WA and QLD, as well as NT, and ACT - see Appendix for regional mnemonics) able to resist negative impacts from national contractions more effectively than moderate

growth (both capital city and rest of state regions in VIC and NSW) and low growth (both regions in TAS and SA) regions. In particular, low growth regions have stagnant labour markets and negative shocks endure for long periods. The disaggregated data set used was a development on previous studies of regional unemployment, where States and Territories as a whole defined the regional unit (for example, Dixon and Shepherd, 2001).

Over the course of the business cycles analysed by Mitchell and Carlson (2003a) major structural changes have occurred in the industrial composition of employment, with service sector employment growth being vastly superior to that in the goods-producing sectors. Given the unequal distribution of industry across regional space, these changes have impacted differentially across that space. It is useful, therefore to separate out the regional employment growth implications of national growth *per se* from employment changes arising from a changing industrial mix.

Dynamic shift-share analysis (Arcelus, 1984; Barff and Knight, 1988) is an ideal exploratory tool for decomposing regional employment growth into a national growth component, an industry mix component and a regional growth component. This decomposition will allow us to further understand regional employment growth processes and to develop appropriate regional development policy initiatives which avoid the 'one-size-fits-all' approach.

In addition to the vast sectoral changes that have occurred across regional space, there have also been substantial shifts in the employment mix between full-time and part-time across the regions since 1985. In 1985, 78 per cent of total employment in Australia was full-time (5466 thousand). By March 2003, this share had fallen to 67 per cent (6677 thousand). Of the 2881 thousand jobs created since 1985 in Australia 58 per cent (1670 thousand) have been part-time. In this paper we explore the impact that these changes have had across the regions in our analysis. While we find that employment generation in the capital cities is superior, we also seek to explore whether that success is overstated once we allow for the part-time employment trend. We thus modify the dynamic shift-share framework to address the part-time/full-time issue.

This paper thus aims to extend current understanding of the disparities in employment growth across regions. The paper seeks to determine whether metropolitan areas have benefited from favourable changes in industry mix relative to 'de-industrialised' regional areas. Dynamic shift-share analysis is an extremely useful exploratory tool by which we can decompose regional employment growth into separate and meaningful components (national, industry mix and regional). Further, using industry level data by full-time and part-time employment we can relate these shares to observed employment growth differentials between metropolitan and regional labour markets.

2. DATA ISSUES

The lowest disaggregation available to facilitate a focus on regional industry employment movements is at capital city (metropolitan)/rest of state level. Accordingly, we define the regions by capital city (metropolitan) (denoted _C) and rest of state (denoted _R) with the ACT and NT treated as complete regions.

The data are from 1985 for detailed employment data for the 17 ANZSIC industries (see Appendix for the ANZSIC mnemonics used) and are available for full-time, part-time and total employment by industry by region.

Using annual industry employment data by region, national employment growth is defined as:

$$g_{nt} = \left(E_t - E_{t-1} \right) / E_{t-1} \tag{1}$$

where E_t is national employment at time t. Similarly, the growth in employment in industry i at national level at time t is defined as:

$$g_{\text{int}} = \left(E_{it} - E_{it-1} \right) / E_{it-1} \tag{2}$$

Finally, the employment growth rate for industry i in region r at time t is defined as:

$$g_{irt} = \left(E_{irt} - E_{irt-1} \right) / E_{irt-1} \tag{3}$$

3.   DYNAMIC   SHIFT-SHARE   ANALYSIS   OF   REGIONAL   EMPLOYMENT

3.1 Industry-Region Decomposition

In this section dynamic shift-share analysis (Arcelus, 1984; Barff and Knight, 1988) is used to assess the extent to which the disparate regional employment growth patterns found in Mitchell and Carlson (2003a) reflect industry composition and regionally-specific (locational) factors. In the dynamic shift-share framework, total employment change for any region r and industry i is decomposed into three components:

$$\Delta E_{irt} = NS_{irt} + IM_{irt} + RS_{irt} \tag{4}$$

The components for each industry i in region r are, in turn, defined as:

$$5(a) \quad NS_{irt} = E_{irt} g_{nt} \tag{5}$$

$$5(b) \quad IM_{irt} = E_{irt} \left(g_{\text{int}} - g_{nt} \right)$$

$$5(c) \quad RS_{irt} = E_{irt} \left(g_{irt} - g_{\text{int}} \right)$$

where E_{irt} is employment in industry i in region r at time t (taken as the start of the period under scrutiny). The growth rates, g_{nt}, g_{int} and g_{irt} are as defined earlier. For each region, the individual industry components are summed to give NS_{rt}, IM_{rt} and RS_{rt}.

The components in Equation (5) are explained as follows: (a) the national share (growth) effect, NS_{irt} captures the extent to which employment in industry i in region r would have expanded had it grown at the overall national employment growth rate, g_{nt}. It is described by Barff and Knight (1988: 2) as being "that part of the change in total employment in a region ascribed to the rate of growth of employment in the nation as a whole"; (b) the industry mix (proportional) effect, IM_{irt} captures the component of the change in employment in industry i in region r that is attributable to that industry's national growth rate, g_{int} being greater (less) than the overall national employment growth rate, g_{nt}.

Regions with a favourable industry composition (predominance of high employment growth industries) will have positive industry mix effects whereas regions dominated by declining industries will record negative industry mix effects; and (c) the regional share (differential or competitive) effect, RS_{irt} which is the change in employment in industry i in region r that is attributable to the industry's growth rate in that region, g_{irt} less the industry's national growth rate, g_{int}. A positive (negative) change is interpreted as evidence of unexplained favourable (unfavourable) region-specific effects (such as transport systems and other infrastructure).

A derivative measure from Equation (4) is the total shift (TS), which measures (specific to a given level of aggregation) the net variation in total employment that is not predicted by the national share. It equals the actual change in employment minus the national share. So the total shift for industry i in region r at time period t is given as:

$$TS_{irt} = \Delta E_{irt} - NS_{irt} = IM_{irt} + RS_{irt} \qquad (6)$$

Dynamic shift-share methodology addresses some well-known problems of static shift-share analysis which examines employment changes over some lengthy time interval and thus considers the "conditions only at the beginning and end years of the time interval" (Barff and Knight, 1988: 1). Addressing the so-called choice-of-weights problem, Barff and Knight (1988: 2) outline two ways in which the choice of time period "influences the allocation of employment change" across the three components. First, the industrial mix component is computed based on the industrial mix prevailing at the start of the period and therefore ignores the changes in industrial mix that have occurred during the period. In times of rapid restructuring, this will lead to poor measures of the industry effect. Second, there is no accounting for on-going changes in the region's total employment, which Barff and Knight (1988: 3) termed the "compounding effect because of the analogy to the compounding of interest." Suppose a region grows more quickly (more slowly) than the overall economy over some time interval, then the comparative static shift-share analysis will under (over) allocate the employment growth to the national growth effect.

The solution provided by dynamic shift-share analysis is to compute the national growth effect over the shortest possible intervals. In our case, the growth rates in Equations 5(a) to (c) are computed annually for each year between 1985 and 2003 and the corresponding shift components specified are computed for each year. The total effects for the whole study period are the sum of these individually computed annual effects. In this way, there is a continuous correction being made for the change in industrial composition and the revised levels of regional employment. Barff and Knight (1988: 3) argue that the dynamic approach thus:

> measures the extent to which industrial mix, updated annually influences total employment growth

and the

> summation of the dynamic industrial mix effects over a period presents an accurate expression of the contribution of a continuously changing industrial mix to total job growth

The dynamic shift-share components (derived as sums of the year-by-year components over 1985-2003) are presented in Table 1 (see Mitchell and Carlson, 2003b for more detailed breakdowns). The results are summarised as follows:

1. The striking (and robust) result is that non-metropolitan areas (excluding the Territories) all suffered negative industry mix effects, which is in contradistinction to the good fortunes enjoyed by metropolitan areas. Thus industries that contribute the most employment in those regions have been declining relative to the national average. The large cities are thus gaining employment relative to regional areas as a consequence of their more favourable industry structure. More detailed industry breakdowns are examined in Section 3.2.

2. Some non-metropolitan regions (QLD_R, WA_R) have enjoyed strong local factors that have more than offset the negative industry mix components. The strong employment growth in QLD and WA (both metropolitan and rest of state) has been driven by substantial regional share effects, which for the metropolitan areas of these states, has reinforced the positive industry mix components.

3. Only QLD and WA have experienced stronger employment growth than would be predicted if the regions had grown proportional to the national average. All other regions "underperformed" (total shift negative) with the sum of their industry mix and regional share effects being negative. However, there is considerable heterogeneity among these regions in terms of the balance between these effects.

Table 1. Shift Share Components for Australian Regions, 1985-2003, 000's.

State	Region	NS	IM	RS	Total	TS	Growth %
NSW	City	639.7	35.1	-70.2	604.6	-35.1	38
	Rest	327.1	-37.8	-20.4	268.9	-58.2	33
VIC	City	541.2	17.5	-52.1	506.5	-34.6	37
	Rest	195.1	-35.9	-19.2	140.0	-55.1	28
QLD	City	237.9	22.9	106.1	367.0	129.0	70
	Rest	268.6	-17.6	154.2	405.2	136.6	69
SA	City	170.1	12.1	-81.3	100.9	-69.2	22
	Rest	61.1	-18.6	-16.6	26.0	-35.2	16
WA	City	208.4	26.5	42.2	277.2	68.7	59
	Rest	78.1	-18.7	24.9	84.3	6.2	45
TAS	City	29.2	3.0	-22.5	9.6	-19.5	12
	Rest	40.6	-7.2	-24.5	8.9	-31.7	8
NT		29.9	4.9	-5.4	29.4	-0.5	41
ACT		54.2	13.6	-14.8	53.0	-1.2	42

3.2 Detailed Industry Shift-Share Analysis

We next examined the dynamic shift-share components by individual industries for each region to try to better understand which sectors have been responsible for the variations shown. While the complete results are very detailed (see Mitchell and Carlson, 2003b, Tables 7 to 20), some interesting summary points can be made.

1. National employment grew by 41 percent between 1985 and 2003. Four industries declined absolutely - Agriculture, Mining, Manufacturing and Electricity, Gas and Water. The below-average growth industries included Wholesale Trade (10 percent growth), Transport and Storage (16 percent growth), Communication Services (15 percent growth), Finance and Insurance (27 percent growth) and Government Administration and Defence (36 percent growth). The above-average growth industries included Construction (42 percent growth), Retail Trade (63 percent growth), Accommodation, Cafes and Restaurants (103 percent growth), Property and Business Services (150 percent growth), Education (49 percent growth), Health and Community Services (69 percent growth), Cultural and Recreational Services (87 per cent growth) and Personal and Other Services (55 percent growth).

2. The absolute national decline in manufacturing employment between 1985 and 2003 was not apparent in QLD_C, QLD_R, WA_C and WA_R, NT and ACT due to advantageous regional effects offsetting the negative industry mix effects. All other regions suffered negative industry mix and regional share effects. VIC_C was particularly hard hit by the decline in manufacturing.

3. The absolute decline in the traditional rural and regional industries of Agriculture, Forestry and Fishing and Mining impacted significantly on NSW_R, VIC_R, SA_R, WA_R and TAS_R, although there were some differences between these regions with respect to whether there were positive or negative regional factors for the two industries. QLD_R experienced positive growth in employment for the sum of these two industries (Agriculture, Forestry and Fishing increased and Mining decreased) with both industries enjoying positive regional shares.

4. Among the strong employment growth service industries, Property and Business Services and Accommodation, Cafes and Restaurants have stood out. The regional shares for these two industries have been diverse. QLD_C and QLD_R enjoyed both positive industry mix and regional effects. In contrast, both regions in SA and TAS demonstrated offsetting negative regional shares in the two industries, thus reducing positive industry mix effects. NSW_R and VIC_R enjoyed very modest regional shares in the two industries and so the potential to build on their strong industry mix effects has been muted.

5. The regional share results are summarised in Table 2 and show that high growth regions generally had strong positive regional effects in above-average growth industries. The low growth regions (SA_C, SA_R, TAS_C

and TAS_R) not only exacerbated the negative industry mixes in their declining industries but also had negative regional shares for the growth industries.

Table 2. Regional Shares for Industry Grouped by Growth Relative to National Average.

| Region	Negative growth 000's	Above-average growth 000's	Below-average growth 000's	PBS/ACR 000's
NSW_C	-22.0	-51.6	3.4	-6.7
NSW_R	-26.2	16.3	-10.5	-5.9
VIC_C	-32.1	3.2	-23.2	1.4
VIC_R	-22.3	-3.3	6.4	6.6
QLD_C	25.8	51.3	29.0	17.1
QLD_R	45.1	95.0	14.1	13.3
SA_C	-6.6	-68.1	-6.6	-14.0
SA_R	-1.5	-11.2	-3.9	-2.5
WA_C	35.3	1.9	5.1	-0.9
WA_R	5.8	20.2	-1.1	1.7
TAS_C	-1.3	-16.1	-6.7	-2.1
TAS_R	-3.2	-18.2	-3.2	-4.6
NT	1.6	-7.1	0.1	-3.5
ACT	1.8	-12.4	-4.5	0.2

Note: PBS/ACR refers to the sum of Property and Business Services and Accommodations, Cafes and Restaurants.

3.3 Shift Components over Time

It is also useful to examine the variation in the contributions over time. We computed the industry mix and regional shares for the periods 1986-1990, 1991-1995, and 1996-2003 for the 14 regions. The three periods broadly cover the growth phase in the 1980s; the 1990s recession and early recovery period; and finally the recent stronger growth period. Figure 1(a) shows the industry mix components and Figure 1(b) shows the regional share components for each region and period. In terms of Figure 1(a), the performance of the regions (positive and negative) has been consistent over the sample period (1986-2003). The improving regions (with the exception of NSW_C) have all shown strengthening industry mix components in the period between 1996 and 2003, a period was marked by strong national employment growth. Conversely, the negative industry mix (non-metropolitan) regions have all experienced increasing deterioration over the same period.
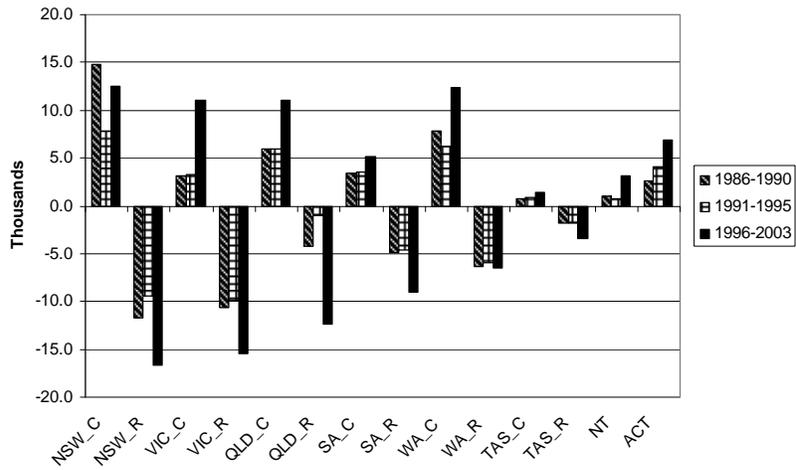
(a)   Industry Mix Components
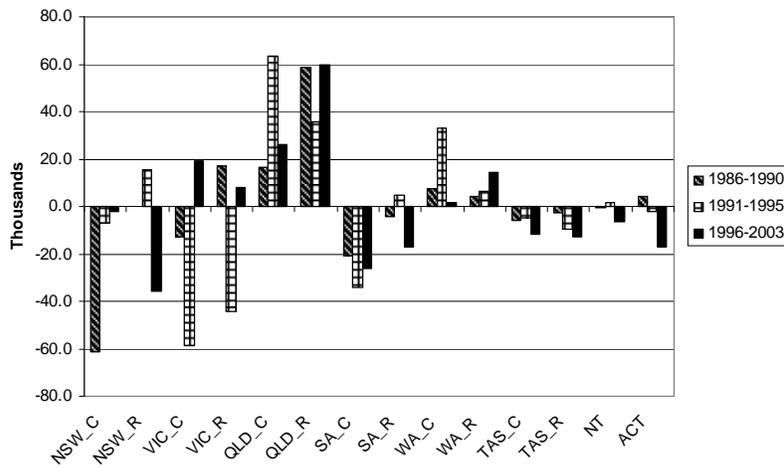
(b) Regional Share Components

**Note:** for NSW_R in Panel (b) the 1986-1990 value was close to zero.

Figure 1. Shift-share Components, 1986-1990, 1991-1995, 1996-2003.

Contrary to the temporal behaviour of the industry mix components, there is nowhere near the degree of consistency in the temporal behaviour of the regional shares (Figure 1(b)) over the sample period (1986-2003). While, in general, regions enjoy consistent positive or negative regional shares over the three time periods shown, there are examples of fortune reversals (NSW_R, VIC_C, VIC_R, SA_R, and the Territories). Victoria is a particularly interesting case as it has seemingly recovered from the major employment growth problems that occurred during the early 1990s recession, enjoying favourable regional specific effects in the latest period.

4. FULL-TIME AND PART-TIME EMPLOYMENT

4.1 Trends in Full-time and Part-time Employment in Australia

In addition to the vast sectoral changes noted in Section 3, there have also been substantial shifts in the employment mix between full-time and part-time across the regions since 1978 as outlined in the Introduction (see also Figure 2 and Table 3). In this section we examine how these changes have manifested across the regions in our analysis. The question arises as to whether the spatial superiority of the cities in employment generation is overstated once we allow for the strong part-time employment trend.
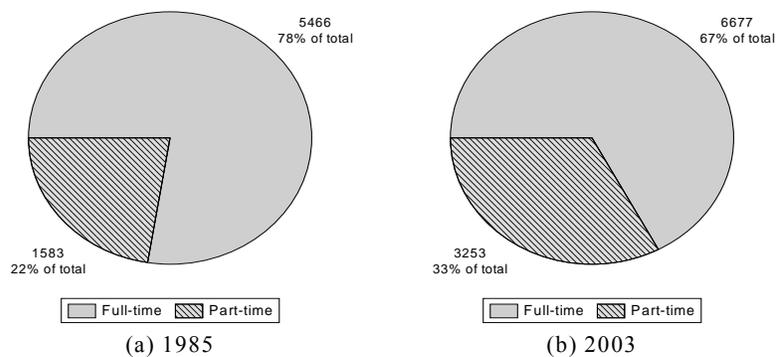
Figure 2. Full-time and Part-time Employment in Australia, 1985 and 2003
        (Source: ABS Labour Force Survey).

Table 3 indicates that the national trend towards increasing part-time employment (both absolutely and as a share of total employment) is more pronounced in regional areas. In 1985 there were no substantial spatial differences in the full-time share in total employment, with all regions lying around the national average. By 2003, considerable disparity is evident. In capital city regions (and the Territories), 56 percent of total employment change

over 1985 to 2003 was part-time, whereas the corresponding proportion for non-metropolitan areas was 64 percent. Tasmania stands out as having actually lost full-time employment between 1985 and 2003 and all its (modest) employment growth has been part-time. South Australia has also enjoyed very little full-time net job creation relative to part-time net employment creation since 1985.

Table 3. Trends in Employment Generation, 1985, 1990, 1995 and 2003.

	Full-time as a % of Total Employment				1985-2003			
	1985	1990	1995	2003	Total Δ	Full-time Δ	Part-time Δ	PT Δ
	%	%	%	%	000's	000's	000's	% of Total Δ
NSW_C	79.7	75.9	74.4	70.4	604.6	278.1	326.5	54.0
NSW_R	77.2	72.8	69.9	63.7	268.9	60.3	208.6	77.6
VIC_C	78.8	74.9	72.9	67.6	506.5	189.8	316.7	62.5
VIC_R	76.3	72.3	68.9	65.8	140.0	38.8	101.2	72.3
QLD_C	76.5	74.8	70.8	66.3	367.0	190.5	176.5	48.1
QLD_R	76.1	71.9	70.0	65.4	405.2	202.0	203.2	50.1
SA_C	75.0	73.4	70.6	67.3	100.9	33.3	67.7	67.0
SA_R	76.5	72.4	69.2	67.4	26.0	2.7	23.3	89.8
WA_C	75.0	72.8	69.5	66.3	277.2	142.7	134.5	48.5
WA_R	76.6	73.0	70.2	65.7	84.3	34.9	49.5	58.7
TAS_C	76.9	74.5	70.0	67.0	9.6	-1.4	11.0	114.5
TAS_R	77.6	74.4	69.6	67.4	8.9	-5.5	14.4	161.6
NT	80.3	79.4	73.4	69.5	29.4	12.8	16.7	56.7
ACT	74.3	76.2	71.4	70.6	52.7	32.5	20.3	38.4
AUST	77.5	74.1	71.5	67.2	2881.2	1211.3	1669.9	58.0

Source: ABS Labour Force Survey. The operator Δ refers to absolute change.

It is notable that the concentration of part-time employment growth in the regional areas is also accompanied by lower rates of employment growth overall and higher rates of unemployment, all signs of demand deficiency (see Mitchell and Carlson, 2003a). More research is being undertaken by the authors in this regard.

In Table 4, the trends in full-time and part-time employment by region are broken down by industry. The changing patterns are difficult to summarise but regional areas appear to have generated a higher proportion of part-time jobs in

the growth industries (Retail Trade, Accommodation, Cafes and Restaurants, Communications, Property and Business Services, Education, Health and Community Services, Cultural and Recreational Services and Personal and Other Services) than metropolitan areas.

Table 4. Full-time Employment Shares by Region and Industry, 1985 and 2003.

	NSW		VIC		QLD		SA		WA		TAS		NT	ACT	AUS
	City	Rest	City	Rest	City	Rest	City	Rest	City	Rest	City	Rest			
	% of Total Employment in Region (1985 first row, 2003 second row)														
AGR	78.4	81.7	72.0	79.5	78.3	83.1	70.9	81.2	74.1	83.0	78.3	81.2	94.3	58.6	80.8
	79.8	73.9	67.3	71.3	67.2	77.7	70.4	79.7	71.0	75.7	73.3	76.9	88.1	25.0	74.9
MIN	100.0	98.8	96.6	94.6	95.4	98.1	97.3	96.5	96.3	98.7	75.0	99.2	97.3	100.0	97.9
	94.6	93.6	80.2	100.0	100.0	97.2	100.0	94.2	96.5	99.0	100.0	93.9	100.0	100.0	95.8
MAN	92.8	94.1	92.9	92.4	90.5	91.6	93.0	94.1	90.4	91.5	96.4	95.9	94.2	80.8	92.6
	88.5	88.8	90.3	88.8	87.6	88.4	89.4	92.4	86.7	86.3	89.4	88.8	91.5	74.5	88.8
EGW	98.6	98.3	99.8	99.4	98.7	98.5	99.3	100.0	99.6	99.3	96.4	97.9	91.7	95.0	98.9
	96.3	95.6	98.2	92.2	97.9	95.3	96.1	93.5	95.2	94.3	90.9	100.0	86.7	88.5	95.4
CON	50.4	48.3	47.5	50.1	49.8	46.5	48.5	50.9	49.3	46.3	49.0	51.0	43.1	38.9	48.6
	44.6	44.2	45.3	51.8	43.9	42.3	47.5	38.9	43.8	42.9	46.0	53.1	36.0	44.3	44.8
WHO	90.2	89.2	90.9	88.0	87.5	88.4	88.1	84.5	89.3	89.8	94.5	91.0	99.2	88.7	89.6
	82.1	80.8	83.6	81.9	84.4	80.2	81.8	85.1	81.0	88.1	91.8	85.7	95.5	84.8	82.6
RET	71.1	70.8	69.2	66.0	64.7	70.1	64.7	71.2	64.4	71.9	73.4	73.9	68.4	56.0	68.7
	54.2	51.2	50.6	54.6	49.7	55.8	52.4	57.7	54.7	59.2	54.9	57.0	64.7	52.4	53.2
ACR	64.0	57.4	57.3	56.1	53.0	62.6	48.8	50.8	55.9	58.5	58.8	41.0	77.5	57.7	58.1
	55.3	45.6	50.9	49.8	42.2	56.4	45.0	31.8	50.2	45.6	39.0	48.2	61.6	48.6	50.2
TAS	92.2	88.9	93.5	89.2	91.5	91.1	93.6	85.8	91.2	87.9	90.6	87.0	91.1	91.6	91.4
	84.9	81.5	84.8	80.6	83.9	80.8	86.5	77.9	79.0	83.0	66.7	82.4	83.2	76.3	83.2
COM	94.7	87.9	95.2	89.5	96.5	92.4	91.7	91.9	91.8	80.4	92.9	90.0	90.5	98.4	93.0
	93.8	71.9	88.1	75.4	83.6	76.5	95.7	70.8	83.5	83.9	87.5	66.7	84.6	86.8	86.1
FAI	90.9	88.8	90.7	88.3	86.7	87.3	87.4	82.1	88.3	82.0	89.5	82.3	85.5	81.7	89.2
	87.2	75.3	81.9	68.1	75.8	79.8	79.2	59.7	76.2	52.9	80.3	65.5	80.5	86.5	81.1
PBS	79.4	71.3	81.0	81.8	84.1	78.1	76.9	73.6	79.1	72.9	79.1	80.8	84.6	79.4	79.3
	76.6	69.8	74.8	68.2	70.8	71.9	74.7	71.1	71.2	63.4	69.0	59.0	79.0	76.3	73.3
GAD	94.7	98.2	87.9	82.0	97.9	95.4	92.3	90.9	95.5	93.1	95.1	89.2	97.3	96.3	93.1
	82.9	84.4	78.0	79.7	88.9	75.3	87.5	86.4	87.2	87.7	87.7	87.2	68.7	92.3	83.6
EDU	72.6	66.0	73.3	75.6	70.0	68.4	69.8	65.9	72.4	60.6	74.4	72.3	92.6	75.1	71.4
	68.4	56.3	65.3	69.4	63.6	62.2	66.9	63.6	65.8	64.4	70.7	65.0	66.3	70.3	64.9

Table 4 (Continued)

	NSW		VIC		QLD		SA		WA		TAS		NT	ACT	AUS
	City	Rest	City	Rest	City	Rest	City	Rest	City	Rest	City	Rest			
	% of Total Employment in Region (1985 first row, 2003 second row)														
HCS	74.4	74.4	67.2	66.2	75.0	74.7	64.4	61.7	68.5	61.2	65.6	67.7	86.2	62.5	70.5
	63.2	56.9	53.9	47.2	55.7	55.0	49.1	46.7	54.3	51.1	58.3	46.3	68.1	57.0	55.7
CRS	73.0	61.5	65.1	61.4	64.6	66.8	58.4	61.3	63.5	52.9	81.1	69.8	85.9	72.0	67.3
	69.1	49.9	54.3	47.8	55.5	63.0	63.5	48.9	56.8	52.9	67.3	52.1	67.9	62.7	59.8
POS	77.1	72.4	77.4	77.0	74.3	70.6	75.3	66.2	73.5	63.5	73.8	67.5	82.1	66.7	74.8
	73.9	64.5	72.0	66.7	71.8	75.2	66.1	79.6	68.8	44.8	73.5	78.0	79.6	70.2	70.2
ALL	79.7	77.2	78.8	76.3	76.5	76.1	75.0	76.5	75.0	76.6	76.9	77.6	80.3	74.3	77.5
	70.4	63.7	67.6	65.8	66.3	65.4	67.3	67.4	66.3	65.7	67.0	67.4	69.5	70.6	67.2

For example, in the strongest growing industry, Property and Business Services, the national trend towards increasing use of part-time work has been more evident in regional areas such as VIC_R, QLD_R, WA_R and TAS_R . Brisbane and Perth stand out from the other capital city regions having experienced a 13.1 percentage point and 7.9 percentage point reductions, respectively, in their full-time employment shares over the sample shown. In the other capital cities notably NSW_C, VIC_C, SA_C, as well as the NT and the ACT this shift, while apparent, has been weaker. Tasmania overall has had substantial declines in the full-time ratio in this industry. It is also interesting to note that Brisbane has seen substantial falls in the full-time ratio in key growth industries such as Retail Trade, Accommodation, Cafes and Restaurants, Property and Business Services.

4.2 Modified Shift-share Analysis to Account for Full-time and Part-time Trends

To account for the trends discussed in Section 4.1, we modify the shift-share model outlined in Section 3 to account for separate movements in full-time and part-time employment. The modified shift-share identity now explains total employment change for any region r and industry i and employment category s (where s is either full-time or part-time) at time t as the sum of four effects:

$$\Delta E_{irst} = NS_{irst} + IM_{irst} + RS_{irst} + EC_{irst} \tag{7}$$

The previously defined components *NS*, *IM* and *RS* have the same meaning as before except now they can be computed for the two employment categories. The employment category shift, EC_{irst} indicates the shift in employment category s in industry i in region r at time t due to faster or slower employment growth in that category relative to average employment growth in that industry and region.

The components for each industry i in region r and category s at time t are now defined as:

$$(8a) \quad NS_{irst} = E_{irst} g_n \qquad\qquad\qquad\qquad (8)$$

$$(8b) \quad IM_{irst} = E_{irst} \left(g_{int} - g_{nt} \right)$$

$$(8c) \quad RS_{irst} = E_{irst} \left(g_{irt} - g_{int} \right)$$

$$(8d) \quad EC_{irst} = E_{irst} \left(g_{irst} - g_{irt} \right)$$

where E_{irst} is employment in industry i in region r in category s at time t (the start of the period). The growth rates, g_{nt}, g_{int} and g_{itr} are as defined earlier. The category s employment growth in industry i and region r at time t is defined as $g_{irst} = (E_{irst} - E_{irst-1})/ E_{irst-1}$. For example, if an industry in a region is experiencing faster growth in full-time employment relative to total industry employment in that region, the EC_{irst} component will be positive and measures the shift away from part-time employment. Obviously $EC_{irft} - EC_{irpt} = 0$ (where f is full-time and p is part-time). However, this decomposition allows us to examine the impact of the shifting full-time/part-time ratio within a region on the other components NS, IM and RS. For an industry as a whole in any region, the total change in employment is the sum of the change in the two s categories (f and p). For the region as a whole, these individual industry components are then summed to give NS_r, IM_r and RS_r.

The results of the dynamic shift-share applied to this four-shift model are presented for the period 1985 to 2003 (with the dynamic sums being shown) in Table 5 and show the spatial impacts of the shifting full-time/part-time ratio. The various totals correspond to the total shares displayed in Table 1. The national shares are simply the employment change in full-time and part-time if they had both grown at the annual national employment growth rate without any changes in the industry mix or regionally-specific factors.

The negative industry mix effects noted earlier are now more transparent. The decline in the prominent industries in most regional areas has been accompanied by a substantial loss of full-time work (NSW_R, VIC_R, QLD_R, SA_R, WA_R, TAS_R) which has not been offset by small positive part-time industry mix effects. The high growth metropolitan regions (WA_C and QLD_C) were able to enjoy both positive full-time and part-time employment changes due changing industrial structure. In the traditional manufacturing city economies (NSW_C, VIC_C and SA_C) the loss in full-time work arising from the shifting industrial structure was more than compensated by growth in part-time work arising from changes in industrial composition. This suggests that the job generating potential of the growth industries in cities is superior to that in regional areas. Not only did Brisbane and Perth enjoy positive benefits from changing industrial mix, in terms of the breakdown of regional share effects, the growth in employment arising from local factors is heavily weighted towards full-time employment. This latter result was also found for the rest of state areas in Queensland and Western Australia.

In total, the shifting full-time/part-time landscape resulted in 878 thousand less full-time jobs in 2003 than would have been the case if the full-time ratio had remained at its 1985 level. This is in the context of a change in total

employment of 2.8 million over the period. These are substantial shifts and the loss of full-time work has hurt regional areas more than metropolitan centres.

Table 5. Shift-Share Components for Australian Regions, 000's.

	NS			IM			RS		
	Full-Time	*Part-Time*	*Total*	*Full-Time*	*Part-Time*	*Total*	*Full-Time*	*Part-Time*	*Total*
NSW_C	480.7	159.0	639.7	-9.5	44.6	35.1	-55.7	-14.5	-70.2
NSW_R	234.0	93.1	327.1	-56.6	18.9	-37.8	-20.0	-0.4	-20.4
VIC_C	399.1	142.0	541.2	-23.6	41.1	17.5	-57.0	4.9	-52.1
VIC_R	137.6	57.4	195.1	-40.3	4.4	-35.9	-12.2	-7.0	-19.2
QLD_C	170.5	67.5	237.9	2.9	20.0	22.9	85.4	20.7	106.1
QLD_R	189.3	79.4	268.6	-31.1	13.5	-17.6	112.3	41.9	154.2
SA_C	121.2	48.9	170.1	-4.5	16.7	12.1	-54.7	-26.7	-81.3
SA_R	43.2	17.9	61.1	-18.9	0.3	-18.6	-10.9	-5.7	-16.6
WA_C	146.0	62.4	208.4	6.2	20.3	26.5	37.3	4.9	42.2
WA_R	55.9	22.2	78.1	-20.8	2.1	-18.7	17.1	7.8	24.9
TAS_C	20.6	8.6	29.2	0.2	2.8	3.0	-15.0	-7.5	-22.5
TAS-R	29.0	11.6	40.6	-8.5	1.3	-7.2	-16.1	-8.4	-24.5
NT	22.6	7.3	29.9	1.9	3.0	4.9	2.5	-7.9	-5.4
ACT	39.6	14.6	54.2	8.1	5.5	13.6	-10.5	-4.3	-14.8
AUST	2089.3	791.9	2881.2	-194.5	194.5	0.0	0.0	0.0	0.0

	EC			Total Change			Total Shift		
	Full-Time	*Part-Time*	*Total*	*Full-Time*	*Part-Time*	*Total*	*Full-Time*	*Part-Time*	*Total*
NSW_C	-137.4	137.4	0.0	278.1	326.5	604.6	-202.6	167.5	-35.1
NSW_R	-97.0	97.0	0.0	60.3	208.6	268.9	-173.7	115.5	-58.2
VIC_C	-128.7	128.7	0.0	189.8	316.7	506.5	-209.3	174.6	-34.6
VIC_R	-46.3	46.3	0.0	38.8	101.2	140.0	-98.8	43.7	-55.1
QLD_C	-68.3	68.3	0.0	190.5	176.5	367.0	20.0	109.1	129.0
QLD_R	-68.5	68.5	0.0	202.0	203.2	405.2	12.8	123.9	136.6
SA_C	-28.7	28.7	0.0	33.3	67.7	100.9	-87.9	18.7	-69.2
SA_R	-10.7	10.7	0.0	2.7	23.3	26.0	-40.6	5.4	-35.2
WA_C	-46.9	46.9	0.0	142.7	134.5	277.2	-3.3	72.1	68.7
WA_R	-17.4	17.4	0.0	34.9	49.4	84.3	-21.1	27.3	6.2
TAS_C	-7.2	7.2	0.0	-1.4	11.0	9.6	-22.0	2.4	-19.5
TAS-R	-9.9	9.9	0.0	-5.5	14.4	8.9	-34.5	2.8	-31.7
NT	-14.4	14.4	0.0	12.8	16.7	29.4	-9.9	9.4	-0.5
ACT	-4.6	4.6	0.0	32.5	20.3	52.7	-7.1	5.6	-1.5
AUST	-683.5	683.5	0.0	1211.3	1669.9	2881.2	-878.0	878.0	0.0

5. CONCLUSION

In this paper, dynamic shift-share analysis has been used to explore the disparate patterns of regional employment growth in Australia identified in the earlier econometric work of Mitchell and Carlson (2003a). Australian regions can be divided into three broad types of employment experience: (a) high growth regions that not only seem capable of benefiting from changing industry mix but also have regional (local-specific) factors operating in their favour. More research is needed to determine the sources of these local advantages; (b) moderate growth regions that have benefited from industry shifts but typically through increasing the ratio of part-time to total employment. They also seem to have negative regional share effects that need explaining; and (c) low growth

regions that have negative industry mix and regional share effects. These regions would appear to require targetted regional industry, infrastructure and job creation strategies.

The dichotomy between city labour markets and the rest of state labour markets is marked. This dichotomy cuts across the moderate and low growth regions. The rest of state areas have all failed to take advantage of the shifting industry mix because they have not been able to offset substantial full-time employment losses with commensurate part-time employment growth. These areas would also benefit from targeted industry, regional infrastructure and job creation strategies.

In terms of the issues raised in the introduction, the results support the previous conclusions of Mitchell and Carlson (2003a) who argued that neither traditional Keynesian nor new regionalist strategies alone were likely to provide a sound basis for sustained regional development. It is clear that national factors remain dominant in determining a region's labour market outcomes. However, changing industry structure and unspecified local factors also play a significant role in employment growth across the regions.

ACKNOWLEDGMENTS

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APPENDIX : MNEMONICS EXPLANATIONS

Table A1. The Australian and New Zealand Industrial Classification (ANZIC), ABS Cat. No. 1298 Mnemonics used.

Industry	Mnemonic used in paper
Agriculture, Forestry and Fishing	AGR
Mining	MIN
Manufacturing	MAN
Electricity, Gas and Water Supply	EGW
Construction	CON
Wholesale Trade	WHO
Retail Trade	RET
Accommodation, Cafes and Restaurants	ACR
Transport and Storage	TAS
Communication Services	COM
Finance and Insurance	FAI
Property and Business Services	PBS
Government Administration and Defence	GAD
Education	EDU
Health and Community Services	HCS
Cultural and Recreational Services	CRS
Personal and Other Services	POS

Table A2. The Regional Classification Mnemonics used.

Region (State/Territory)	Mnemonic used in paper
New South Wales	NSW
Victoria	VIC
Queensland	QLD
South Australia	SA
Western Australia	WA
Tasmania	TAS
Northern Territory	NT
Australian Capital Territory	ACT