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Exploring regional disparities in employment growth?

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1.   Introduction

Australia has experienced a economic growth since the 1991 recession and convergence in labour market outcomes across space might reasonably have been expected given this 17 year span. The orthodox view of regional development suggests that 'provided there are no major barriers to the operation of market forces, in an integrated national space economy there are strong pressures leading to the general *convergence* of regional incomes over time' (Martin and Sunley, 1988, 201).

However, significant disparities in employment growth rates across Australia's metropolitan and regional areas have underpinned the persistence of unemployment rate differentials across the same spatial units and accompanying social disadvantage (Mitchell and Carlson, 2005). Overall, employment growth has not been sufficient overall to meet the preferences of the willing labour supply and has bee spatially concentrated (Mitchell and Muysken, 2008). It is hard to argue that an equilibrium convergence has resulted from the growth process.

This paper examines the relative importance of regional-specific versus macroeconomic factors in determining regional employment outcomes which is an on-going debate among regional scientists and policy-makers (Rissman, 1999). Keynesians typically argue that regional employment variations are caused by the national business cycle impacting on growth rates across industries and reflect changes in aggregate factors, such as fiscal and monetary policy settings, business and consumer confidence and productivity trends. Thus, the cyclical sensitivity of regional outcomes reflects the impact of common aggregate shocks on a specific regional industry mix. Regions dominated by goods-production allegedly lose employment share in recessions relative to service-providing regions. The solution is for aggregate policy to maintain strong growth with industry policy attenuating structural shifts.

In this context, Australia's terms of trade up during the period studied were at their highest level in 30 years particularly benefitting regions involved in primary commodities (mining).

A rival regional development paradigm, termed "new regionalism", has become popular among regional development agencies since it emerged in the mid-1980s. It was inspired by case studies documenting economic successes in regions such as Silicon Valley and Baden Württemberg. Scott and Storper (1989) posited that regions had displaced nation states as sites of successful economic organisation and the emphasis should be on localised institutions and collaborations. Accordingly, the status of macroeconomic policy is considered peripheral to a particular region's growth potential (Castells and Hall, 1994; Cooke and Morgan, 1998). Despite the growing popularity of new regionalism, the claim that the region offers a convincing theoretical explanation of recent and future economic development is under-researched and has weak empirical underpinnings. There is little known about how the national economy and its regions interact. Further, no empirical evidence exists to verify assumptions of, first, the emergence of capitalism centred on spatialised, autonomous economies, and, second, a hollowed out, macro-weakened nation state (Lovering, 1999; Markusen, 1996).

Related to the new regionalist approach is endogenous (or new) growth (EGT) theory which was initially developed to challenge neo-classical growth theory and has been,

more recently, extended to explain regional development. The main attraction of EGT is that it recognises that technology is not static. It thus requires us to not only explain the growth process but also the reasons why technology (and the potential growth rate) varies over time. All the many variants of EGT stress the importance of knowledge in the growth process. Given that "ideas" are not limited and can be shared and recycled, EGT rejects the traditional concept of diminishing marginal returns that economists have considered limit the productive usage of other productive inputs. If knowledge, which is assumed to be subject to increasing returns, is generated and diffused locally regional development will occur. Stough and Nijkamp (2007: 749) argue that 'the formulation of endogenous growth theory … brought back recognition that local resources and their deployment in a market fitted strategy make a significant contribution to growth. Local effort and resources are conditioned by a region's history, resources, market fit, institutions, leadership and orientation to entrepreneurship.'

There is very little research in Australia that attempts to disentangle macroeconomic and regional growth factors as drivers of observed employment growth disparities across regions. This paper uses dynamic shift-share analysis (Arcelus, 1984; Barff and Knight, 1988) to decompose regional employment growth into a national growth component, an industry mix component and a regional growth component. As an innovation, we modify the traditional shift-share framework to examine the regional impact of the increasing significance of part-time work in overall employment creation in Australia by decomposing employment dynamics into part-time and full-time components which helps us explore the spatial disparities more closely.

While we recognise the limitations of shift-share analysis raised long ago by Houston (1967), we consider that it provides a useful organising framework for more sophisticated hypothesis development and econometric modelling.

In relation to EGT, we might expect the regional shift component to be positive and dominant in regions where economic growth is strong. Stimson *et al.* (2005) clearly recognise that the shift-share components are constructed as accounting identities which exhaust total employment growth. Houston (1967: 578) says that 'to be useful in explaining regional growth, there should be some *theoretical* basis for identifying the three separate components. In this context, Stimson *et al.* (2005) used the regional (competitive) share component from a shift-share analysis as the proxy for endogenous elements. The presumption is that there is a strong mapping between the regional (competitive) component and the elements that are conceptually identified as being central drivers in endogenous growth theory?

We do not challenge that presumption in this paper. Rather we seek to determine whether there is a *prima facie* case for pursuing EGT further by computing (in an accounting sense) the relative importance of the "unexplained" regional component.

We acknowledge the difficulty in disentangling the shift components (industry and regional). Houston (1967: 579) said that 'supply changes, demand shifts, technological changes, locational shifts, any or all of these, may be behind either component.' However, strong regional shifts provide indication that "local" factors are worth exploring further.

This issue is particularly relevant to the 'two speed' economy of Australia where a major driving factor in the business cycle is the commodity price movements on international markets (Mitchell and Bill, 2006). It doesn't make much sense to suggest that the mining regions of Western Australia or Queensland have enjoyed strong economic growth as a result of large competitive shifts.

The paper is organised as follows. Section 2 details the impact of terms of trade trends on the Australian economic in recent years. Section 3 outlines the data used and the definitions of the growth rates. Section 4 provides an overview of the disparate patterns of regional employment growth in Australia in recent years, while Section 5 decomposes these patterns by industry. Section 6 conducts the dynamic shift-share analysis which is then decomposed into full-time and part-time components in Section 7. Concluding remarks follow.

2. Terms of trade trends

To understand the pattern of regional employment growth in Australia one has to appreciate that economic activity has been dominated in recent years by primary commodity prices and the impact these have had on exchange rates and export incomes. Australia's terms of trade, which during the period studied were at their highest level in 30 years, clearly delivered uneven benefits to Australian regions – leading to commentators calling Australia the "two-speed" economy (Mitchell and Bill, 2006). Figure 1 shows that while rural commodities have faced fairly flat world prices, non-rural commodity prices, especially Base Metals have escalated substantially.

The accompanying industrial (and regional) shifts in demand for labour, and the impact of the boom on the price of intermediate goods, has exacerbated trends in other sectors of the economy. The booming terms of trade has led to significant exchange rate appreciation with a classic Dutch Disease situation emerging. Employment in mining has grown by a staggering 65 per cent since 2002 (up to mid-2008). The strongest growth (2002-2008) has been in Queensland (97 per cent) and Western Australia (59 per cent).[ii] Conversely, Manufacturing is generally declining with regionally concentrated costs (for example in NSW, Victoria and South Australia). The manufacturing heartlands of NSW, Victoria and South Australia have experienced negative growth in manufacturing employment between 2002 and 2008. However, in the mining concentrated regions, manufacturing is resisting the absolute decline in employment, but still losing employment share (see Section 5).

These trends will condition our interpretation of the shift-share results presented in the later sections of this paper and how they might correspond with dynamics consistent with EGT.

3. Data issues

The typical unit of analysis for Australian regional studies, particularly in cross-national studies, has been the State/Territory (see Dixon and Shepherd, 2001; Mitchell and Carlson, 2005). While more detailed regional labour force data is available for 64 Major Statistical Regions collected through the Australian Labour Force Survey, the industry data is unreliable due to high sampling errors. To focus attention on industry employment movements the lowest reliable disaggregation available 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 available from 1978 for standard labour force categories and from 1985 for detailed employment data for the 17 ANZSIC industries (see Appendix for description of ANZSIC classification). The latter data are available for full-time, part-time and total employment by industry by region.

For the dynamic shift-share analysis in Sections 6 and 7, annual industry employment data by region was used. Thus national employment growth is defined as:

(1) $\quad g_n = (E_t - E_{t-1})/E_{t-1}$

The growth in employment in industry *i* at national level is defined as:

(2) $\quad g_{in} = (E_{it} - E_{it-1})/E_{it-1}$

Finally, employment growth rate for industry *i* in region *r* is defined as:

(3) $\quad g_{ir} = (E_{irt} - E_{irt-1})/E_{irt-1}$

4.   The pattern of regional employment growth 1987-2008

The employment levels for the regions indexed to 100 at November 1987 are shown in Figure 2. The two-speed nature of the Australian economy that has emerged over the long growth cycle since the 1991 recession is clear: (a) high growth regions (Queensland, Western Australia, and the Northern Territory); and (b) moderate to low growth regions (NSW and Victoria, South Australia and Tasmania).

The regional areas of Queensland and Western Australia have clearly benefited from the mining boom associated with the terms of trade developments shown in Figure 1. The wealth generated from the boom has also aided their capital cities (Brisbane and Perth) where many of the administrative structures supporting the mining industry are located.

In general, the high growth group suffered relatively smaller contractions in size and duration during the severe 1991 than the below-average growth regions. Tasmania and South Australia seem to have particularly suffered during these cyclical episodes.

Figure 3 divides the growth period following the 1991 recession into two 8-year sub-periods. Employment growth for all regions has increased in the second half of this boom period with the exception of the Sydney region and the two territories. The two speed economy assessment is not negated by the improving overall situation.

Table 1 presents more detailed summary employment growth data for the regions from 1987:4 to 2008:1. The data confirms the regionally disparate nature of employment in Australia. The high growth regions in Queensland, Western Australia and Northern Territory exhibit strong annual rates of growth with relatively smaller variance whereas the other regions are slower growing and have relatively higher variability over the sample period. The regional areas of South Australia and Tasmania exhibit particularly low employment growth rates.

If we split the growth period since 1991 into two samples (1992-2000 and 2000-2008) we note that variances are falling as growth rates improve among the poorest performers. It

is not possible to conclude that convergence is occurring because the most populated region (Sydney or NSW_C) has experienced deteriorating conditions in the latter period.

5. The composition and structure of industry employment by region

Figure 4 shows the industry employment shares by region and nation for the years 1985 and 2008 (averaged up to June) as a percentage of total regional (national) employment. The figures have equivalent vertical scales to allow relative movements to be more easily appreciated. The composition of industry employment and the pattern of change provide a clue to why regional employment growth in Australia is so disparate. The highlights are:

- Agriculture has fallen sharply over the period but is still an important source of employment in regional NSW, Victoria, South Australia, Western Australia and Tasmania.

- Mining is not a large employer overall but is heavily concentrated in regional Queensland, Western Australia and Northern Territory. The combination of this concentration and the shift in commodity prices shown in Figure 1 goes a long way to explaining why these regions have enjoyed strong employment growth.

- Manufacturing shares have fallen sharply over the period particularly in Sydney (NSW_C), Hobart (TAS_C) and Perth (WA_C). It remains an important employer in the Victoria, regional NSW, South Australia and regional Tasmania. Each of these labour markets has exhibited below-average employment growth.

- The growth in construction employment shares has been strong in the growth economies, particularly regional Queensland and Western Australia but has been muted or negative in the below-average regions.

- The large increase in shares in the Property and Business Services industry is striking and reflects the property boom that occurred in the last decade and which is still on-going in the high growth city centres of Perth and Brisbane.

6. Dynamic shift-share analysis of regional employment

6.1 Industry-region decomposition

In this section we use dynamic shift-share analysis (Arcelus, 1984; Barff and Knight, 1988) to assess the extent to which the disparate regional employment growth patterns outlined in Section 3 reflect industry composition and regionally-specific (locational) factors.

We decompose regional employment growth into three components: (a) a national share (growth) effect, NS 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" (Barff and Knight, 1988: 2); (b) an industry mix (proportional) effect, IM being "the change the region would have experienced had each of its industries grown at their national rates less the national growth effect" (Barff and Knight, 1988: 2); and a (c) regional share (differential or competitive effect), RS being "the difference between the actual change in employment and the employment change to be expected if each industrial sector grew at the national rate (Barff and Knight, 1988: 2).

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Total employment change for any region r and industry i is the sum of the three effects:

(4) $\Delta E_{ir} = NS_{ir} + IM_{ir} + RS_{ir}$

A derivative measure, the total shift (*TS*) measures the net variation in total employment that is not predicted by the national share and equals the actual change in employment minus the national share (or *IM* + *RS*).

There are 14 regions in the study (as defined above, 6 metropolitan areas, 6 rest of state areas, and 2 Territories) and 17 ANZSIC industries. The components for each industry i in region r are defined as:

(5) $NS_{ir} = E_{ir}^{t} g_{n}$

$IM_{ir} = E_{ir}^{t} \left(g_{in} - g_{n} \right)$

$RS_{ir} = E_{ir}^{t} \left(g_{ir} - g_{in} \right)$

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

The results of the dynamic shift-share analysis are presented in Table 2 for three different periods: full sample - 1985-2008, 1992-2000, and 2000-2008. The shift-share components shown were derived as sums of the year-by-year components over the relevant time period.

A summary of the results is as follows:

1. The striking result is that non-metropolitan areas all suffered negative industry mix effects (for the overall sample and each of the sub-periods shown) which is in contradistinction to the good fortunes enjoyed by metropolitan areas. So 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. We will examine more detailed industry breakdowns in Section 6.2 to identify the likely sources of these problems.

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. These results provide some comfort for EGT proponents.

3. Conversely, the main city centres of Sydney, Melbourne, Adelaide and Hobart all experienced negative regional shifts which have exacerbated their poor industry mix performance.

4. The sub-period analysis shows however that in the recent growth phase (2000-08) the regional areas of NSW, Victoria, and South Australia have enjoyed positive regional shares which has dampened the deteriorating industry mix.

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5. Consistent with Figure 2, only QLD, WA and the Northern Territory 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.

6.2 Detailed industry shift-share analysis

The breakdown of the dynamic shift-share results into individual industries for each region provide a better understanding of which sectors have been responsible for the variations shown. While there is too much detail to present here (full tables are available on request from the author) some salient points include:

- National employment grew by 19 per cent between 2000 and 2008. Three industries declined absolutely, Agriculture, Manufacturing and the Communication. The below-average growth industries included Wholesale Trade (5.1 per cent growth) and Accommodation, Cafes, and Restaurants (11.8 per cent growth). The latter had been one of the strongest growing industries of the 1990s as the services boom pushed the economy forward. The above-average growth industries were dominated by Mining (a staggering 74 per cent growth), followed by Construction (44 per cent), the Utilities (41 per cent), Government and Defence (37 per cent), Health and Community Services (33 per cent), Property and Business Services (24.4 per cent, Cultural and Recreational Services (24 per cent), Education (22 per cent), Transport and Storage (16 per cent), Finance and Insurance (19 per cent), Personal and Other Services (19 per cent), and Retail Trade (19 per cent);

- Mining employment has increased in all regions except ACT (where it has no presence) and TAS_R. The largest total changes are in WA_C (20.5 thousand), QLD_R (13.5 thousand), NSW_C (5.25 thousand) and WA_R (5.1 thousand). This reflects a combination of head office growth (in the cities) and an expansion of extractive employment (in the regions). Table 3 shows the shift share components and other summary measures for the important mining regions in Australia (either administrative or extraction sites). The interesting result is that despite favourable industry mix components in all regions, the total shift was negative in NSW_R, WA_R, TAS_R and the NT due to adverse regional shift components. This would appear to be a difficult result for those wanting to use the regional share component as a measure of endogenous growth. These three regions account for 28 per cent of the total mining employment in Australia;

- The absolute national decline in manufacturing employment between 2000 and 2008 was resisted by NSW_R, VIC_R, QLD_C, QLD_R, SA_R, WA_C and WA_R, TAS_C, TAS_R, NT and ACT due to advantageous regional effects offsetting the negative industry mix effects. It is likely that some of the mining growth has spilled over into manufacturing in these regions (some of which specialise in metals industries). Conversely, the manufacturing strongholds of NSW_C, VIC_C and SA_C faced significant deterioration in their manufacturing with negative industry and regional shift components;

- While Accommodation, Cafes and Restaurants was the dominant service industry in the 1990s, in the 2000 to 2008 period its growth has been modest. Among the strong employment growth service industries, Property and Business Services (PBS) and Health and Community Services (HCS) have stood out. With the exception of WA_R and NT, the regional shares for PBS have been strong. The below-average growth regions have experienced negative regional shares in PBS. The pattern of regional shares for HCS is less clear and is not supportive of the view that the high growth regions enjoy favourable regional shares in the high growth industries;

- It remains true that the high growth regions generally had strong positive regional effects in above-average growth industries which reinforced the positive industry mixes.

The regional (competitive) shift component tells us whether a region is expanding or contracting its share of total industry employment. A positive component for a region's industry indicates that local employment in that industry is growing faster than the industry as a whole and hence the region is gaining industry share. The opposite holds for a negative regional component. Table 3 reports the regional shift components (RS) and the total employment change (Δ) for each region between 1985 1985 and 2008 in thousands. The Δ row provides scale upon which the RS can be judged. Over the period covered, all industries bar Agriculture, Manufacturing, Electricity, Gas and Water and Wholesale Trade experienced positive growth.

It is apparent that regional shifts have been positive in most industries for the leading growth regions - QLD_C, QLD_R and WA_C. The same holds, albeit to a lesser extent for WA_R, The other top growth region, NT does not have the same. The scale of the regional shifts is fairly constant across these regions and their industries.

7. Full-time and part-time employment

7.1 Trends in full-time and part-time employment in Australia

In addition to the vast sectoral changes noted in Section 5, there have also been substantial shifts in the employment mix between full-time and part-time across the regions since 1985 (see Table 4 and Table 5). In 1985, 81.9 per cent of total employment in Australia was full-time (5489 thousand). By 2008 (average January to May), this share had fallen to 72.3 per cent (7677 thousand). Of the 3923 thousand jobs created since 1985 in Australia 44 per cent (1734 thousand) have been part-time.

Two questions are relevant for this paper: (a) Is the spatial superiority of the cities in employment generation overstated once we allow for part-time employment trend?; and (b) Where the regional shares are strongly positive, what percentage of the net job creation is part-time? If the regional employment growth is being driven by a proliferation of precarious low-pay part-time jobs then we have to question the meaning of the regional shares.

In the period between 1985 and 2008, net part-time job creation constituted 44 per cent of the total employment change, reflecting the increasing fractionalisation of employment in Australia. This trend was not consistent across regions.

Table 5 indicates that overall the full-time share in total employment has fallen by 9.6 percentage points since 1985. No region has resisted that trend. However, with the exceptions of Sydney (NSW_C) and regional South Australia (SA_R), the loss of full-time share has been lowest in the above-average employment growth regions (Queensland, Western Australia). The ACT is an outlier largely due to the concentration of public service jobs which tend to be full-time.

7.2   Modified shift-share analysis to account for full-time and part-time trends

To consider whether the regional shares are weighted towards full-time or part-time work across the regional space, we modify the shift-share model outlined in Section 6 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) as the sum of four effects:

(6) $\Delta E_{irs} = NS_{irs} + IM_{irs} + RS_{irs} + EC_{irs}$

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_{irs} indicates the shift in employment category s in industry i in region r 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 are now defined as:

(7) $NS_{irs} = E_{irs}^{t} g_n$

$IM_{irs} = E_{irs}^{t} \left(g_{in} - g_n \right)$

$RS_{irs} = E_{irs}^{t} \left(g_{ir} - g_{in} \right)$

$EC_{irs} = E_{irs}^{t} \left(g_{irs} - g_{ir} \right)$

where E_{irs}^{t} is employment in industry i in region r in category s at time t (the start of the period). The growth rates, g_n, g_{in} and g_{ir} are defined earlier. The category s employment growth in industry i and region r is defined as $g_{irs} = \left(E_{irst} - E_{irst-1} \right) / E_{irst-1}$. 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_{irs} component will be positive and measures the shift away from part-time employment. Obviously $EC_{irf} + EC_{irp} = 0$ (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 the four-shift model are presented for the period 1985 to 2008 (with dynamic sums being shown) in Table 6. We are now able to appreciate the impact of the shifting full-time/part-time ratio in a spatial sense. The various totals correspond to the total shares displayed in Table 2. 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. Overall, the nation has seen a loss of employment due to industry shifts with the loss of full-time employment being marginally above the gains in part-time employment. All regions lost full-time opportunities as a consequence of industry shifts. However, this decline was more than offset by gains in part-time work arising from industry shifts in all the urban areas (NSW_C, VIC_C, QLD_C, SA_C, WA_C, TAS_C, ACT and NT). In stark contrast, the substantial loss of full-time work in regional areas (NSW_R, VIC_R, QLD_R, SA_R, WA_R, TAS_R) was not offset by positive part-time industry mix effects. This suggests that the job generating potential of the growth industries in cities is superior to regional areas although the gains are in part-time work at the expense of full-time employment.

In terms of the breakdown of regional share effects, the growth in QLD and WA (both urban and regional) employment arising from local factors is heavily weighted towards full-time employment. This stands in contrast to the other Australian regions which suffered negative regional effects overall and in their full-time job generation. In some cases, the regional effects of part-time employment was positive and attenuated the regional shift losses (NSW_R and VIC_R).

In total, the shifting full-time/part-time landscape has seen 765 thousand less full-time jobs than would have been the case if the full-time ratio had have remained at its 1985 level. This is in the context of a change in total employment of 4 million over the 1985 to 2008 period. These are substantial shifts and the loss of full-time work has hurt regional areas more than metropolitan centres.

8.   Conclusion

In this paper, dynamic shift-share analysis has been used to explore the disparate patterns of regional employment growth in Australia. We were motivated by an aim to generate more detailed breakdowns of the regional shift to inform the debate surrounding EGT.

It is clear that changes in industry composition have favoured the metropolitan labour markets. This result applies to high, moderate and low growth regions alike. Overall, the nation has seen a loss of employment due to industry shifts with the loss of full-time employment being marginally above the gains in part-time employment. However, without exception, the industry mix gains in metropolitan areas have manifested in part-time employment. Further, the regional 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. It appears that the job generating potential of the growth industries in cities is superior to regional areas although the gains are in part-time work at the expense of full-time employment. Given that the incidence of precarious work has increased over the period studied, the positive industry shifts are not unambiguously favourable.

It is also clear that the ability to benefit from positive regional factors goes some of the way to explaining the separation of high from low growth regions. The high growth regions all have strong positive regional (local-specific) factors operating in their favour.

With the exception of WA_R and NT, these regions have regional gains in both full-time and part-time employment. The growth in QLD and WA (both urban and regional) employment arising from local factors is heavily weighted towards full-time employment. In sharp contrast, the below-average growth regions have negative regional shifts overall. Several experienced unfavourable regional shifts in both full-time and part-time job generation whereas, for NSW_R and VIC_R, positive part-time regional effects attenuated the regional shift losses. More research is needed to determine the sources of these local advantages.

We repeat the difficulty that exists in disentangling the industry and regional shift components especially in the face of the commodity price boom identified in Section 2. In the latter part of the study period, economic growth was driven by this boom which, in turn, was spatially concentrated. The high growth regions identified with the strong regional shifts were the primary beneficiaries. In that context, it would be hard for an EGT to argue that the beneficial economic growth in recent years was the result of large competitive shifts. The spatial specificity of primary commodity deposits is the primary reason for the favourable outcomes enjoyed by these regions. Clearly, no policy tool can influence these advantages.

In terms of the issues raised in the introduction, the results support the previous conclusions of Mitchell and Carlson (2005) who argued that neither traditional Keynesian nor new regionalist strategies 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.

The results generally suggest that any regional development policy aimed at stimulating local factors (for example, knowledge accumulation) should be buttressed with strong aggregate demand policies to ensure there is no spending gap at the aggregate level. This will generally require positive national government deficits in the face of a desire to net save by the private sector (Mitchell and Muysken, 2008). However, indiscriminate Keynesian expansion without regard to its spatial distribution is unlikely to reverse the trends identified in this paper. To ensure that this spending is spatially distributed to regions that have declining industry and negative regional factors operating targeted regional development policies incorporating infrastructure and industry development are required.

The results of the paper thus demonstrate that a mix of Keynesian aggregate demand policies and region-specific policies (favoured by EGT) should comprise the regional development strategy aimed at sustaining strong employment growth without significant disparities across space.

Appendix

The Australian and New Zealand Standard Industrial Classification (ANZSIC), Cat. No. 1298 uses the classification (at 1-digit level) outlined in Table A1.

Table A1 The Australian and New Zealand Standard Industrial Classification

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 Regional mnemonics

| Mnemonic	State/Territory/Region
NSW	New South Wales
NSW_C	Sydney Main Statistical Region
NSW_R	NSW Balance of State
VIC	Victoria
VIC_C	Melbourne Main Statistical Region
VIC_R	VIC Balance of State
QLD	Queensland
QLD_C	Brisbane Main Statistical Region
QLD_R	QLD Balance of State
SA	South Australia
SA_C	Adelaide Main Statistical Region
SA_R	SA Balance of State
WA	Western Australia
WA_C	Perth Main Statistical Region
WA_R	WA Balance of State
TAS	Tasmania
TAS_C	Hobart Main Statistical Region
TAS_R	TAS Balance of State
NT	Northern Territory
ACT	Australian Capital Territory

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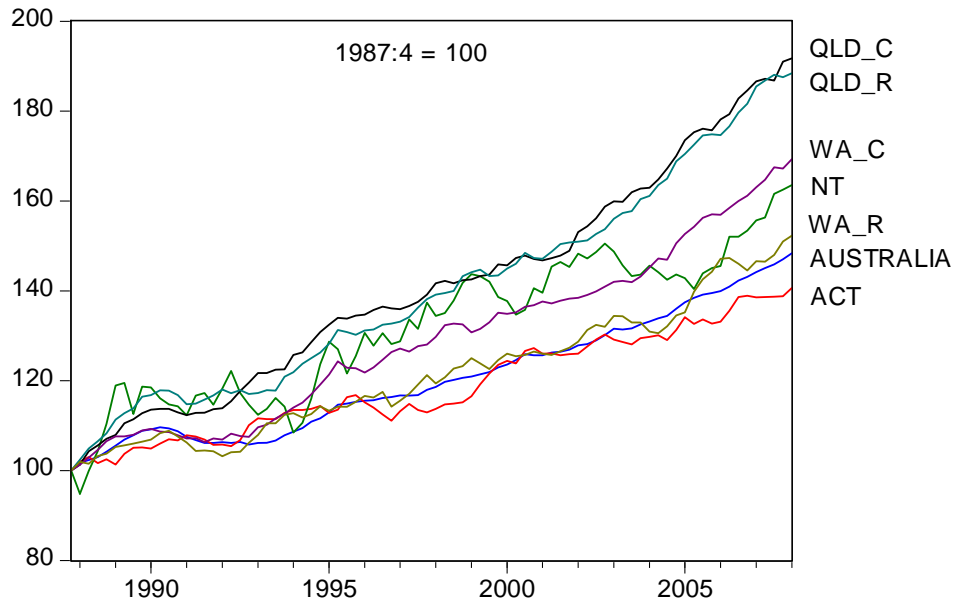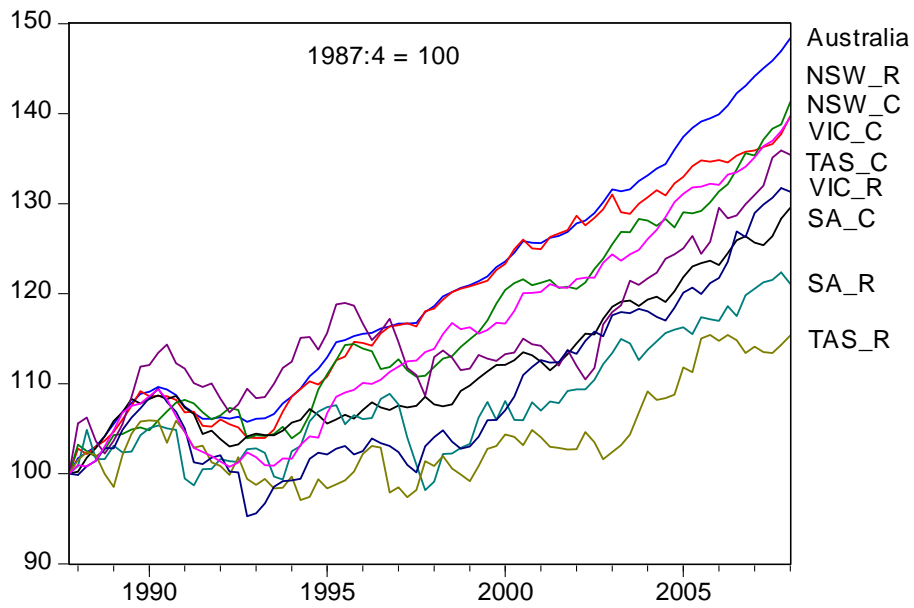Figure 1 Commodity prices in Australia, $A, 2001-02 = 100, 2000-2008
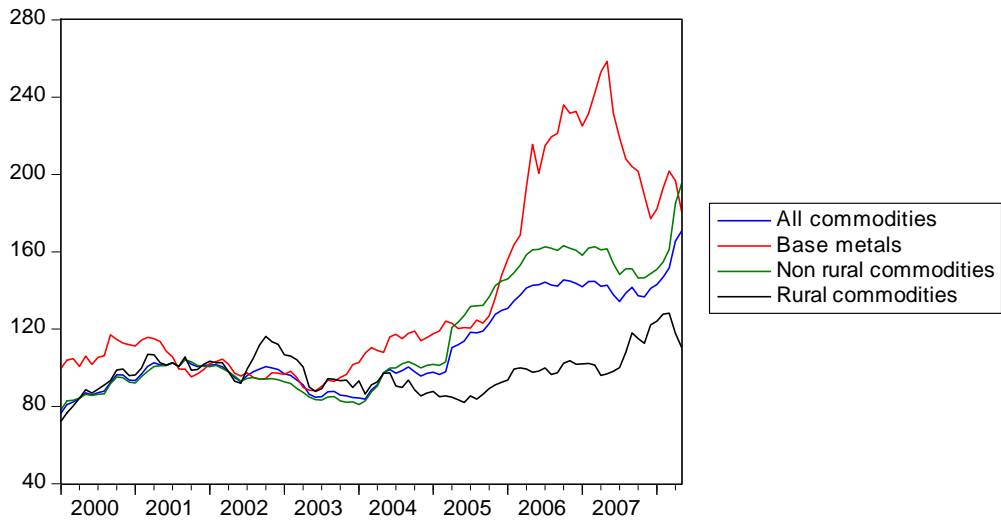
Source: Reserve Bank of Australia, Index of commodity prices ($A).

Figure 2 Employment indexes, Cities and Regions, 1987:4 = 100
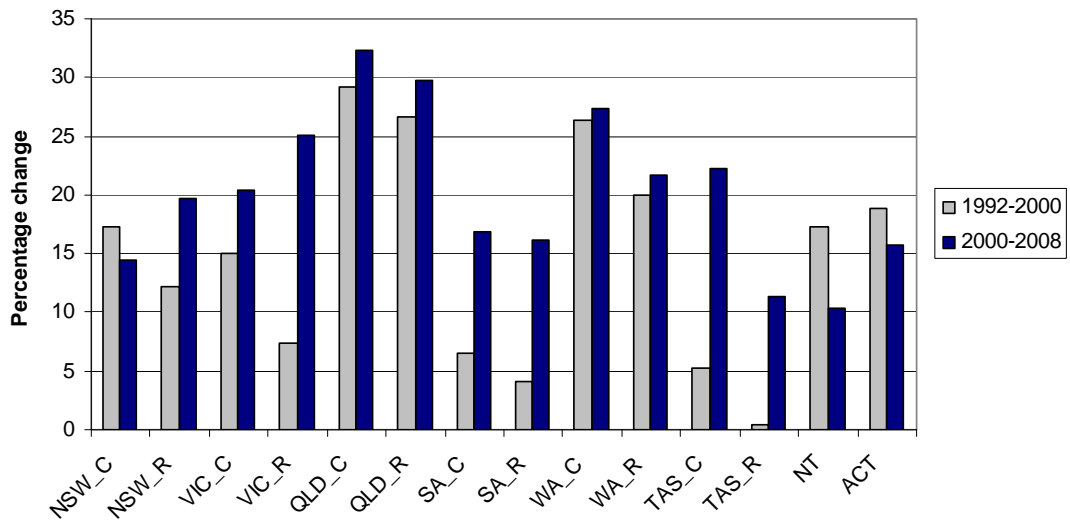

(a) Above-average regions

(b) Below-average regions

Source: ABS Labour Force.

Figure 3 Employment growth by region, 1992-2000 and 2000-2008, percentage change

Source: ABS Labour Force.

Table 1 Summary average annual rates of employment growth and dispersion, various periods

Region	1987:4 to 2008:1			1992:1 to 2000:1			2000:1 to 2008:1		
	Average annual growth % p.a.	Standard. deviation	CoV (%)	Average annual growth % p.a.	Standard. deviation	CoV (%)	Average annual growth % p.a.	Standard. deviation	CoV (%)
QLD_C	3.1	2.0	63.5	3.00	1.79	59.7	3.32	1.70	51.1
QLD_R	3.1	2.2	72.0	2.68	1.78	66.5	3.22	1.52	47.0
WA_C	2.5	2.0	80.4	2.70	2.07	76.5	2.81	1.36	48.5
NT	2.5	5.4	218.2	2.40	5.05	210.9	1.53	4.00	261.6
WA_R	2.0	2.6	130.5	2.06	2.17	105.0	2.26	2.78	122.9
Australia average	1.9	1.6	85.2	1.68	1.42	84.4	2.24	0.70	31.4
ACT	1.6	2.1	132.6	1.60	2.75	171.4	1.78	1.84	103.1
VIC_C	1.6	2.3	143.3	1.47	1.98	134.5	2.07	1.07	51.6
NSW_R	1.6	2.3	142.1	1.16	2.91	250.4	2.11	1.70	80.4
NSW_C	1.5	1.7	112.5	1.71	1.79	104.6	1.51	0.89	59.2
VIC_R	1.4	3.0	223.9	0.41	2.87	707.4	2.70	1.75	64.8
TAS_C	1.3	3.2	236.7	0.28	2.93	1,041.6	2.17	2.43	112.2
SA_C	1.2	1.9	157.6	0.64	1.50	233.6	1.68	1.29	76.7
SA_R	0.9	3.1	345.5	0.85	3.97	466.3	1.68	1.52	90.9
TAS_R	0.6	2.9	475.3	-0.03	2.92	n/a	1.43	2.53	176.9

Source: ABS Labour Force data. Regions ranked by growth rate over full sample (1987:4 to 2008:1). CoV is the Coefficient of Variation in percent.

Figure 4 Industry employment shares by region and nation, 1985 and 2008, per cent of total regional employment

Agriculture_1985 ☐ 2008 ■

Mining_1985 ☐ 2008 ■

Manufacturing_1985 ☐ 2008 ■

Electricity, Gas and Water_1985 ☐ 2008 ■

Construction_1985 ☐ 2008 ■

Wholesale Trade_1985 ☐ 2008 ■

Figure 4 Industry employment shares by region and nation, 1985 and 2008, per cent of total regional employment (continued)

Retail Trade_1985 ■ 2008

Accommodation, Cafes and Restaurants_1985 ■ 2008

Transport and Storage_1985 ■ 2008

Communications_1985 ■ 2008

Finance and Insurance_1985 ■ 2008
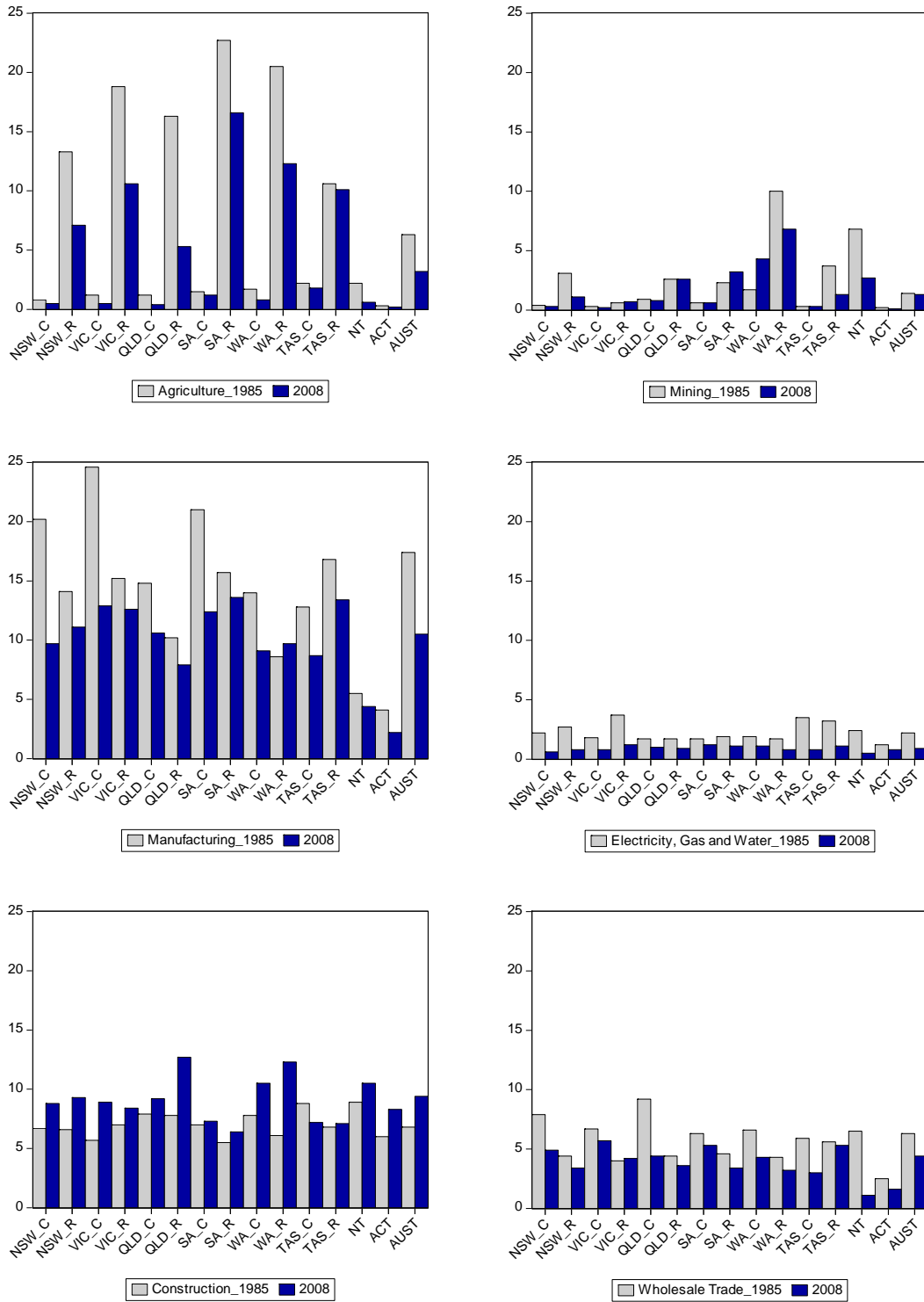
Property and Business Services_1985 ■ 2008

Figure 4 Industry employment shares by region and nation, 1985 and 2008, per cent of total regional employment (continued)

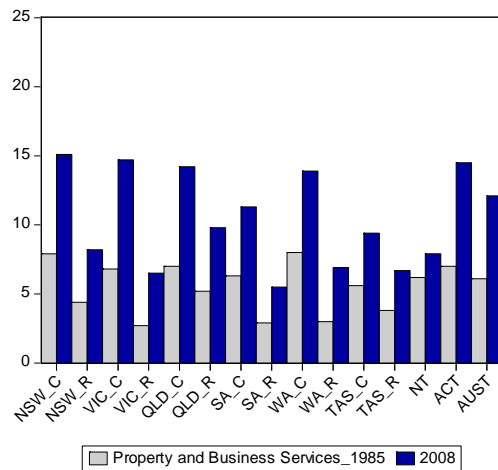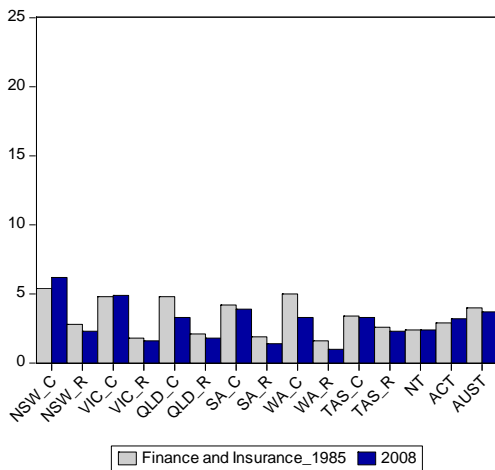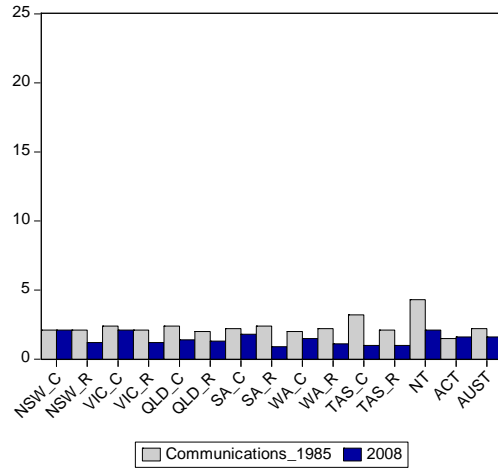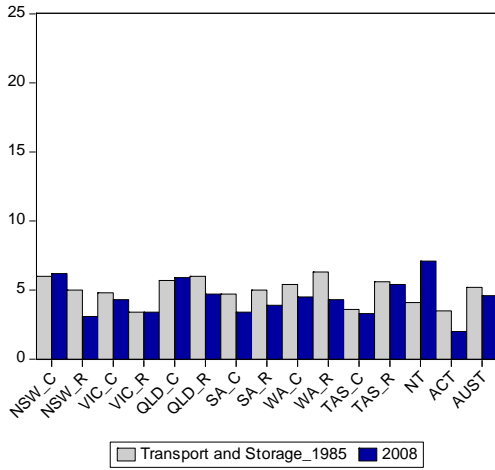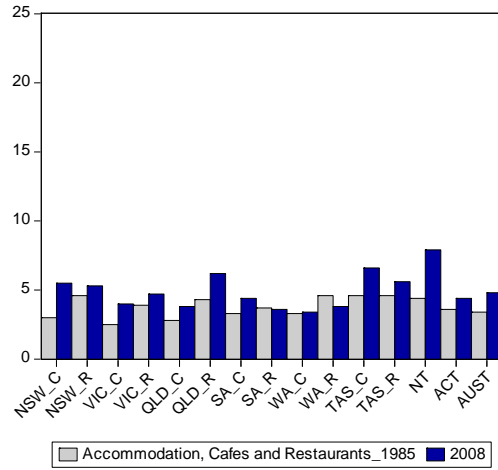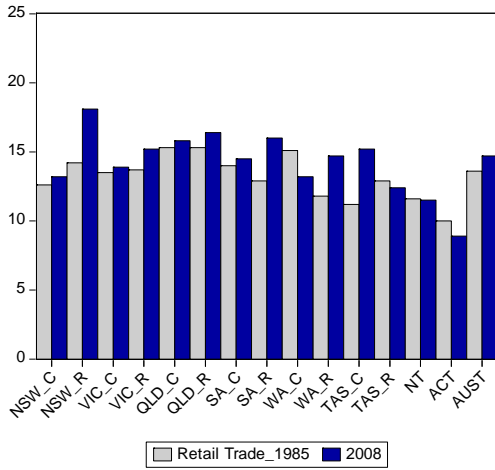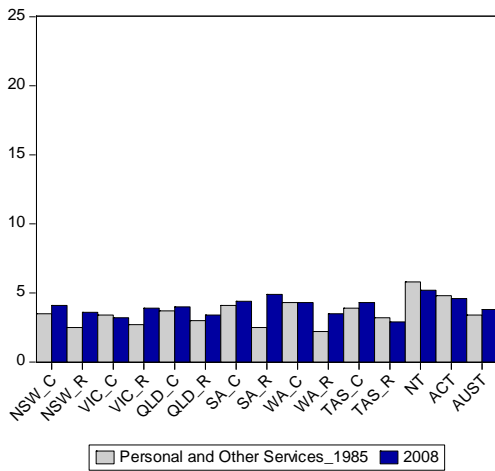Government Administration and Defence_1985 ■ 2008

Education_1985 ■ 2008

Health and Community Services_1985 ■ 2008

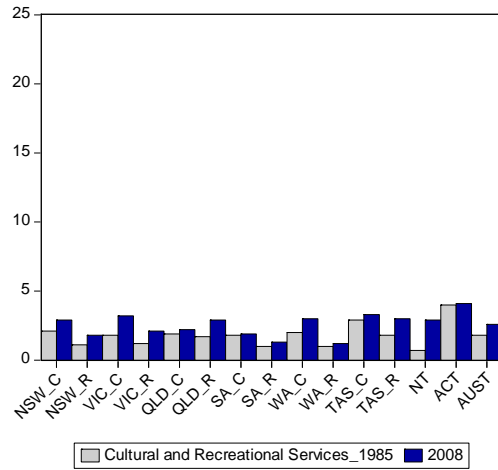Cultural and Recreational Services_1985 ■ 2008

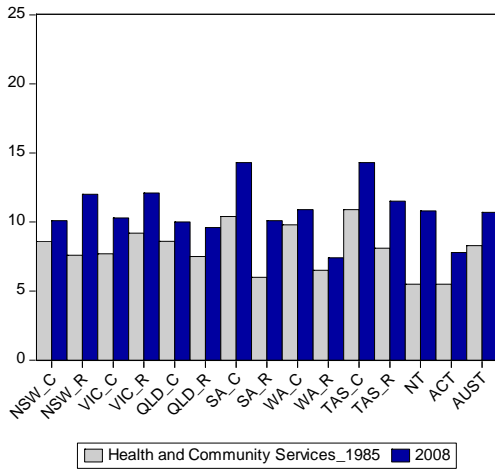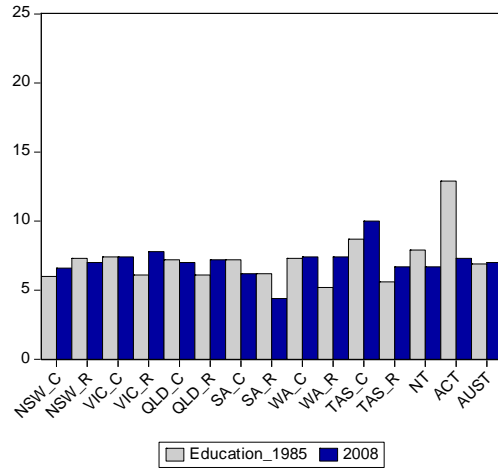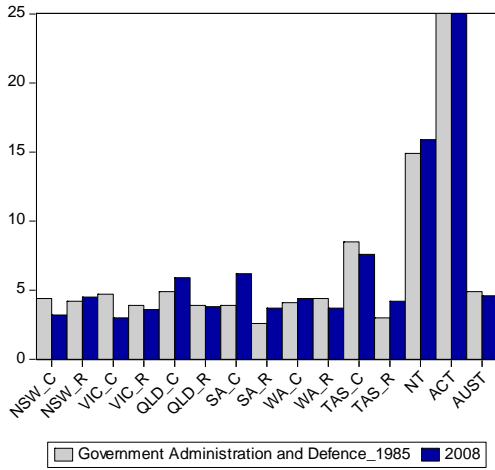Personal and Other Services_1985 ■ 2008

Table 2 Shift-share components for Australian regional employment, various periods, 000s (% for last column)

1985-2008	NS	IM	RS	Total Change	Total Shift	% Growth
NSW_C	890.1	22.7	-187.6	725.2	-164.9	48.7
NSW_R	459.7	-44.2	-15.0	400.4	-59.3	51.0
VIC_C	756.2	12.5	-114.1	654.5	-101.7	50.6
VIC_R	271.2	-41.1	-2.1	228.0	-43.2	48.8
QLD_C	345.5	25.2	176.0	546.7	201.2	116.5
QLD_R	389.2	-11.4	215.5	593.3	204.1	109.5
SA_C	234.7	14.7	-98.4	151.0	-83.7	35.7
SA_R	61.9	-36.4	-4.9	20.6	-41.3	30.3
WA_C	296.4	42.8	69.3	408.5	112.1	94.6
WA_R	110.1	-16.4	25.5	119.3	9.2	69.5
TAS_C	41.0	4.1	-16.0	29.1	-12.0	40.6
TAS_R	54.4	-8.3	-20.6	25.5	-28.9	25.0
NT	40.7	5.9	-0.3	46.3	5.6	79.1
ACT	75.3	14.9	-16.4	73.8	-1.5	63.9
1992-2000						
NSW_C	282.9	3.4	2.7	289.1	6.1	17.3
NSW_R	145.4	-13.2	-22.5	109.7	-35.8	12.2
VIC_C	236.3	10.3	-34.9	211.8	-24.6	15.0
VIC_R	83.5	-10.1	-34.7	38.7	-44.8	7.4
QLD_C	111.1	6.2	62.8	180.2	69.1	29.2
QLD_R	124.2	-1.2	67.2	190.2	66.0	26.7
SA_C	74.3	5.1	-49.3	30.1	-44.2	6.6
SA_R	19.4	-10.4	-8.5	0.5	-18.9	4.1
WA_C	94.7	10.0	35.8	140.5	45.8	26.4
WA_R	35.3	-6.9	11.6	40.1	4.8	19.9
TAS_C	13.7	0.7	-10.3	4.0	-9.7	5.2
TAS_R	16.6	-1.8	-14.3	0.5	-16.1	0.4
NT	13.1	-0.7	1.2	13.6	0.5	17.3
ACT	24.4	2.3	0.6	27.3	2.9	18.9
2000-08						
NSW_C	413.5	8.9	-134.4	288.0	-125.5	14.5
NSW_R	212.8	-16.0	4.2	201.0	-11.8	19.7
VIC_C	350.4	6.1	-19.3	337.3	-13.1	20.4
VIC_R	123.1	-20.0	41.7	144.8	21.7	25.1
QLD_C	173.5	10.5	68.2	252.2	78.7	32.4
QLD_R	195.9	-7.5	75.2	263.6	67.7	29.7
SA_C	104.7	4.5	-24.9	84.3	-20.4	16.9
SA_R	26.0	-13.2	9.2	22.1	-4.0	16.1
WA_C	144.6	19.4	19.6	183.6	39.0	27.4
WA_R	52.0	-4.1	5.0	52.9	0.9	21.7
TAS_C	17.8	2.2	-1.5	18.5	0.6	22.2
TAS_R	24.0	-4.5	-6.2	13.3	-10.7	11.3
NT	19.4	4.8	-14.9	9.3	-10.1	10.4
ACT	35.1	8.5	-16.8	26.9	-8.3	15.7

Table 3 Regional shift component (RS) and total employment change (Δ) by region and industry, 1985-2008, 000s

		AGR	MIN	MAN	EGW	CON	WHO	RET	ACR	TAS	COM	FAI	PBS	GAD	EDU	HCS	CRS	POS
NSW_C	RS	1.8	0.9	-78.1	-9.0	-23.1	-23.3	-27.7	20.7	9.7	9.3	12.4	-25.9	-19.5	-3.0	-25.9	-6.5	-0.6
	Δ	-0.2	1.6	-86.5	-20.8	94.0	-9.1	103.6	77.7	47.9	14.9	56.1	216.4	6.0	55.6	96.5	32.4	39.1
NSW_R	RS	-2.1	-17.7	24.1	-2.9	-2.7	-0.4	23.1	-15.3	-18.0	-5.2	-5.1	-5.6	4.3	-9.4	15.0	-0.4	3.5
	Δ	-20.0	-10.6	21.0	-12.1	57.6	5.5	103.9	26.9	-2.4	-1.5	5.5	62.7	20.8	25.3	82.0	13.0	22.5
VIC_C	RS	-3.8	-1.4	-58.8	-0.1	4.9	10.9	-24.6	5.4	-4.1	3.5	1.9	6.6	-32.5	-6.1	-6.4	7.8	-17.4
	Δ	-5.3	0.2	-66.0	-7.5	98.9	24.5	95.9	46.8	21.8	9.9	33.7	199.4	-2.9	49.0	100.3	38.6	17.1
VIC_R	RS	-2.5	0.6	17.5	-2.4	-10.0	7.1	-4.6	-3.9	-0.6	-2.9	-2.3	0.2	-6.6	4.6	-0.6	0.4	3.9
	Δ	-14.1	2.1	16.8	-8.8	25.5	10.4	42.0	14.5	7.4	-1.1	2.9	32.9	6.9	26.0	41.3	8.6	14.7
QLD_C	RS	-0.7	1.0	39.8	4.5	6.8	-3.3	28.6	4.9	18.3	1.2	0.0	26.0	21.8	10.3	9.6	0.0	7.0
	Δ	-1.7	3.5	38.3	1.7	56.1	2.1	88.7	26.0	33.3	3.3	11.0	112.0	36.5	37.0	61.4	14.0	23.7
QLD_R	RS	-11.0	7.7	34.9	4.5	34.5	13.3	35.8	9.4	4.3	0.4	2.4	17.9	9.3	20.8	18.5	7.0	6.1
	Δ	-28.0	15.4	34.4	1.1	102.2	16.7	103.7	47.2	21.2	3.1	9.5	82.7	21.6	48.4	68.1	23.3	22.8
SA_C	RS	1.1	-0.4	-14.7	2.8	-15.2	-1.1	-16.6	-4.3	-8.0	-1.2	-3.7	-15.0	10.1	-12.9	-7.0	-7.5	-4.9
	Δ	0.3	0.7	-17.7	-0.3	12.4	3.6	24.0	11.2	-0.5	1.0	4.5	38.1	19.2	5.2	38.4	3.1	7.9
SA_R	RS	4.4	0.9	3.5	0.8	-4.8	-1.5	0.0	-4.8	-2.8	-2.8	-1.3	-2.7	1.4	-6.4	-1.2	-0.8	2.6
	Δ	-1.7	2.9	3.0	-0.6	4.5	-0.3	12.3	1.5	0.2	-1.9	-0.2	6.6	3.4	-0.7	11.0	1.1	6.1
WA_C	RS	0.5	17.6	17.3	3.5	8.9	2.9	-7.7	-4.3	4.3	2.1	-3.3	4.4	8.5	7.4	1.8	3.0	2.2
	Δ	-0.7	28.6	16.5	0.7	55.0	7.7	45.4	14.6	14.5	4.1	6.6	82.3	19.4	30.6	48.9	16.6	17.7
WA_R	RS	7.1	-4.4	13.2	0.7	8.5	0.8	6.8	-5.7	-3.1	-1.4	-1.2	0.9	-1.0	4.8	-1.7	-0.7	1.9
	Δ	0.7	2.7	13.3	-0.8	25.4	1.9	22.5	3.1	1.6	-0.5	0.1	14.8	3.4	12.5	10.3	1.9	6.4
TAS_C	RS	0.5	0.0	-0.1	-0.9	-4.2	-1.8	0.4	-0.4	-0.5	-1.8	-0.5	-2.2	-1.5	0.3	-1.3	-1.1	-1.0
	Δ	0.2	0.1	-0.4	-1.7	0.9	-1.2	7.3	3.3	0.7	-1.3	0.9	5.5	1.5	3.9	6.6	1.2	1.5
TAS_R	RS	4.8	-3.0	0.5	-1.1	-3.9	0.0	-6.4	-2.1	-1.1	-1.0	-0.7	-2.0	0.5	-1.3	-2.4	0.4	-1.7
	Δ	2.0	-2.1	0.0	-1.9	2.2	1.1	2.7	2.4	1.2	-0.8	0.3	4.6	2.2	2.8	6.3	2.0	0.4
NT	RS	0.3	-1.6	1.4	-0.9	-0.1	-3.1	-0.7	1.9	3.4	-0.6	0.2	-2.4	0.6	-1.1	3.2	0.2	-0.8
	Δ	-0.7	-1.2	1.4	-0.9	5.8	-2.6	5.3	5.7	5.1	-0.3	1.1	4.7	8.0	2.4	8.2	2.6	2.1
ACT	RS	-0.4	-0.1	-0.6	0.6	0.4	-0.5	-6.4	-1.5	-1.9	0.6	1.2	-0.3	4.6	-8.1	-1.5	-1.8	-0.7
	Δ	-0.1	-0.1	-0.6	0.1	8.9	0.1	5.2	4.2	-0.3	1.3	2.7	19.4	19.6	-1.1	8.4	3.2	3.2

Note: Industry acronyms are provided in Appendix A. Agriculture; Manufacturing; Electricity, Gas and Water; and Wholesale Trade all contracted nationally over this period.

Table 4 Full-time and part-time employment in Australia, 1985 and 2008

	1985		2008	
	000's	% of total	000's	% of total
Full-time	5488.8	81.9	7677.0	72.3
Part-time	1214.2	18.1	2948.7	27.7

Source: ABS Labour Force Survey, Australia. 2008 is the average to May.

Table 5 Trends in employment generation, 1985 and 2008.

	Full-time as % total employment		1985-2008			
	1985	2008	Total Δ	Full-time Δ	Part-time Δ	Δ PT
	%	%	000's	000's	000's	% of Total
NSW_C	83.8	75.0	702.8	394.6	308.3	43.9
NSW_R	81.7	68.3	405.6	173.1	232.5	57.3
VIC_C	82.7	72.1	644.8	327.5	317.3	49.2
VIC_R	80.2	69.0	212.7	92.6	120.1	56.5
QLD_C	81.2	73.4	523.3	345.7	177.6	33.9
QLD_R	81.4	72.0	577.1	363.2	213.9	37.1
SA_C	79.4	69.1	147.3	57.6	89.7	60.9
SA_R	79.6	70.6	47.6	19.6	27.9	58.7
WA_C	79.4	72.5	394.9	255.6	139.3	35.3
WA_R	80.7	73.7	110.8	68.9	41.9	37.8
TAS_C	82.4	71.1	26.6	10.5	16.1	60.6
TAS_R	81.8	72.2	21.3	5.2	16.1	75.6
NTE	88.3	80.8	38.7	26.3	12.4	32.0
ACT	80.7	76.5	69.4	48.0	21.4	30.8
AUST	81.9	72.3	3922.7	2188.2	1734.5	44.2

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

Table 6 Shift-share components for Australian regions, by full-time and part-time, 1985-2008, 000's

	NSW_C	NSW_R	VIC_C	VIC_R	QLD_C	QLD_R	SA_C	SA_R	WA_C	WA_R	TAS_C	TAS_R	NTE	ACT	AUST
NS															
Full-time	696.4	338.1	575.6	197.3	259.5	290.1	171.4	61.9	218.0	82.7	29.9	40.1	32.5	57.3	3050.9
Part-time	193.7	121.6	180.6	73.9	86.0	99.1	63.3	23.5	78.3	27.4	11.1	14.3	8.2	18.0	998.8
Total	890.1	459.7	756.2	271.2	345.5	389.2	234.7	85.4	296.4	110.1	41.0	54.4	40.7	75.3	4049.7
IM															
Full-time	-133.8	-129.3	-134.8	-90.7	-38.6	-78.2	-40.8	-36.4	-21.0	-33.2	-5.8	-18.6	-2.4	-1.5	-765.1
Part-time	156.5	85.1	147.3	49.7	63.8	66.9	55.4	13.8	63.8	16.9	9.9	10.2	8.3	16.4	764.0
Total	22.7	-44.2	12.5	-41.1	25.2	-11.4	14.7	-22.6	42.8	-16.4	4.1	-8.3	5.9	14.9	-1.1
RS															
Full-time	-142.5	-40.2	-107.1	-2.3	140.4	159.9	-71.1	-4.9	64.5	25.8	-10.2	-11.4	4.1	-5.0	0.0
Part-time	-45.2	25.2	-7.0	0.1	35.6	55.5	-27.3	-10.7	4.8	-0.3	-5.8	-9.2	-4.4	-11.5	0.0
Total	-187.6	-15.0	-114.1	-2.1	176.0	215.5	-98.4	-15.6	69.3	25.5	-16.0	-20.6	-0.3	-16.4	0.0
FTPT															
Full-time	-103.6	-92.4	-118.2	-51.0	-42.7	-60.7	-37.5	-10.2	-40.3	-13.3	-4.4	-6.7	-8.0	-6.4	-595.1
Part-time	103.6	92.4	118.2	51.0	42.7	60.7	37.5	10.2	40.3	13.3	4.4	6.7	8.0	6.4	595.1
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total shift															
Full-time	-276.3	-169.5	-242.0	-93.0	101.8	81.7	-111.8	-41.3	43.5	-7.4	-16.1	-29.9	1.7	-6.4	-765.1
Part-time	111.4	110.2	140.3	49.8	99.4	122.4	28.1	3.2	68.7	16.6	4.1	1.0	3.9	4.9	764.0
Total	-164.9	-59.3	-101.7	-43.2	201.2	204.1	-83.7	-38.2	112.1	9.2	-12.0	-28.9	5.6	-1.5	-1.1
Total change															
Full-time	420.1	168.6	333.6	104.3	361.3	371.8	59.6	20.6	261.5	75.3	13.8	10.2	34.2	50.9	2285.8
Part-time	305.1	231.8	320.9	123.7	185.4	221.5	91.4	26.6	147.0	44.0	15.3	15.3	12.1	22.9	1762.9
Total	725.2	400.4	654.5	228.0	546.7	593.3	151.0	47.2	408.5	119.3	29.1	25.5	46.3	73.8	4048.7