

ENDOGENOUS EMPLOYMENT GROWTH AND DECLINE IN SOUTH EAST QUEENSLAND

Alistair Robson

UQ Social Research Centre, Institute of Social Science, University of Queensland, St Lucia QLD

ABSTRACT: The South East Queensland region has been recording strong economic and population growth over several decades. It is becoming an increasingly important part of the Australian economy. This paper helps to explain the reasons for the strong economic growth by exploring employment growth over the ten years to 2001. It measures the impact of factors from both within and outside the region on employment using shift share analysis. A spatially disaggregated analysis is also performed in order to identify more accurately where and in what industries the endogenous and exogenous jobs have been created. It is significant for academic research, its policy implications and practice for economic geography researchers.

1. INTRODUCTION

The South East Queensland region has experienced rapid population¹ growth (28 percent) and employment growth (35 percent) over the decade to 2001 (Australian Bureau of Statistics 2002). Both are higher than the national average, with population growth of 13 percent and employment growth of 17 percent over the same period. When adjusted for population growth, the increase in employment remains higher in South East Queensland than the national average (5.3 versus 4.0 percent); see Table 1.

In this paper, South East Queensland is considered to be composed of four sub-regions (see Figure 1). The composition of these sub-regions is as follows:

- Brisbane City — Brisbane City Council;
- South Regional Organisation of Councils of Councils (SROC) – Beaudesert Shire Council, Gold Coast City Council, Logan City Council, Redland Shire Council;²
- Western Sub Regional Organisation of Councils (WESROC) — Boonah Shire Council, Esk Shire Council, Gatton Shire Council, Ipswich City Council, Laidley Shire Council (note for the purposes of this paper the Toowoomba City Council is excluded. This is because it is considered to be part of the Darling Downs region); and

¹ All population and employment data in this paper is for place of enumeration unless otherwise indicated (see Appendix for impact of different count methods of employment in South East Queensland). The reason for this is that employment and population time-series data for LGA's over 10 years is only freely available on a place by enumeration count method basis.

² For the purposes of this paper the Tweed Heads Shire Council in New South Wales is excluded. This is because it is not bound by any Queensland government planning laws and regulations, and subsequently is not part of the South East Queensland Region of Councils.

- Northern Sub Regional Organisation of Councils (NORSROC) — Caboolture Shire Council, Caloundra Shire Council, Kilcoy Shire Council, Maroochy Shire Council, Noosa Shire Council, Pine Rivers Shire Council, Redcliffe Shire Council.

Table 1. Selected Economic Indicators for the SEQ Region and Australia³

				Growth over period		
		1991	2001	Total		Average Annual
		(no.)	(no.)	(no.)	(%)	(%)
South East Queensland	Employment	764,328	1,033,201	268,873	35	3.1
	Population	1,847,848	2,372,104	524,256	28	2.5
	Employment to population ratio	0.41	0.44	0.02	5.3	0.5
Australia	Employment	7,086,175	8,298,606	1,212,431	17	1.6
	Population	16,850,334	18,972,350	2,122,016	13	1.2
	Employment to population ratio	0.42	0.44	0.02	4.0	0.4

Source: Australian Bureau of Statistics (2002).

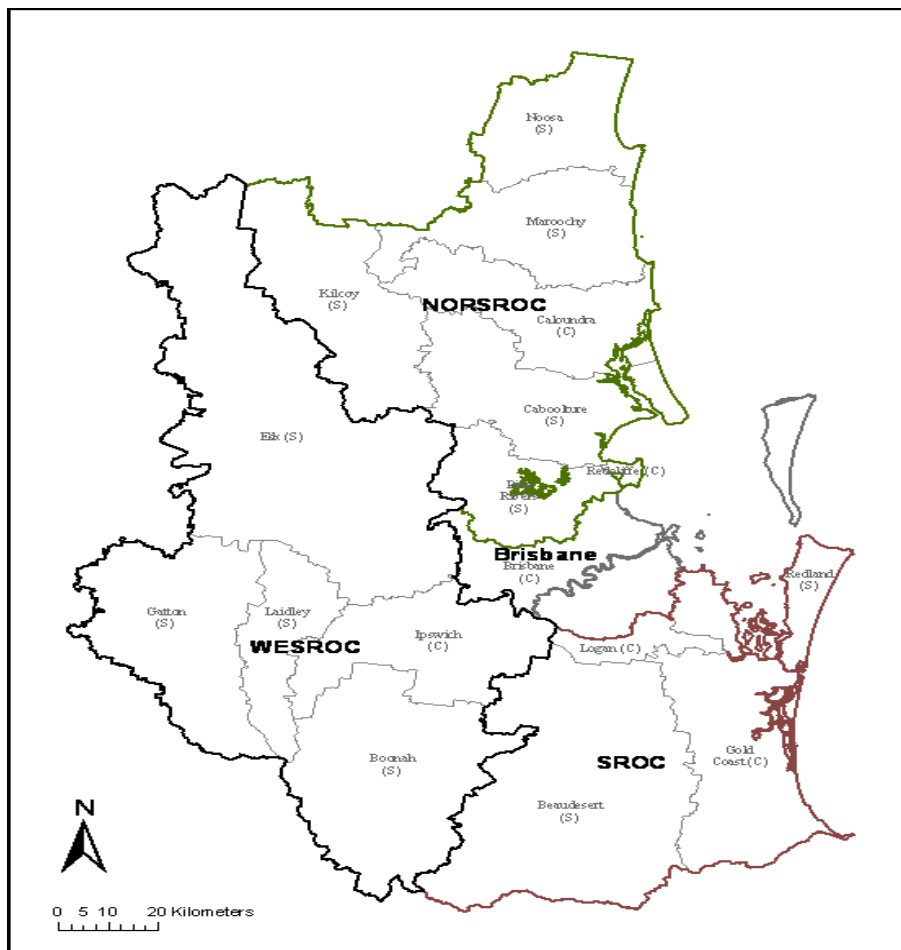
While employment growth across South East Queensland has been strong, this masks very divergent sub-regional performances within it; see Table 2. The largest absolute growth over this period took place in the South Regional Organisation of Councils (up 102,148), followed by Brisbane City (up 85,453), the Northern Sub Regional Organisation of Councils (up 72,051), and the Western Sub Regional Organisation of Councils (up 9,221). In percentage terms, the fastest growth in employment over the decade to 2001 was in the Northern Sub Regional Organisation of Councils (up 51 percent), followed by the South Regional Organisation of Councils (up 46 percent), Brisbane City (up 25 percent), and the Western Sub Regional Organisation of Councils (up 15 percent).

Over the decade to 2001 over half (53 percent) of the employment growth in the South East Queensland region was concentrated in the property and business services industry (53,594), the retail trade industry (48,183) and the health and community services industry (40,624); see Table 3. These industries tend to serve population growth and as such it is no surprise that they recorded strong employment growth over this period.

While employment has grown strongly across the South East Queensland region over the decade to 2001, so too has population, as shown in Table 4. Most of this growth (78 percent) has occurred in the Northern Sub and South Regional Organisation of Councils. The Brisbane City Council recorded a large absolute growth in population (121,950); however, in percentage terms (16

³ Data may not sum due to rounding effects.

percent) it did not record population growth as fast as the Northern Sub and South Regional Organisation of Councils (42 and 37 percent respectively). The Western Sub Regional Organisation of Councils recorded both the lowest absolute growth in population (19,884) and percentage growth in population (13 percent).



Source: Jonathan Corcoran.⁴

Figure 1. South East Queensland Regional Map

⁴ Research Fellow, UQ Social Research Centre, Institute for Social Science, University of Queensland.

Table 2. Employment in South East Queensland over the Decade to 2001

	Census		Change	
	1991 (no.)	2001 (no.)	(no.)	%
Brisbane City	337,430	422,883	85,453	25
South R.O.C.	223,809	325,957	102,148	46
Western Sub R.O.C.	61,345	70,566	9,221	15
Northern Sub R.O.C.	141,744	213,795	72,051	51
South East Queensland	764,328	1,033,201	268,873	35

Source: Australian Bureau of Statistics (2002).

Table 3. Employment Change by Industry, 1991-2001

	<i>Brisbane City</i>	<i>South R.O.C.</i>	<i>West Sub R.O.C.</i>	<i>Northern Sub R.O.C.</i>	<i>SEQ</i>
	(no.)	(no.)	(no.)	(no.)	(no.)
Agriculture, Forestry and Fishing	641	390	304	929	2,264
Mining	740	112	-206	193	839
Manufacturing	6,180	14,024	2,035	7,549	29,788
Electricity, gas and water	-53	115	-77	203	188
Construction	4,590	8,630	700	5,982	19,902
Wholesale trade	-628	3,242	945	2,353	5,912
Retail trade	12,101	19,757	2,020	14,305	48,183
Accommodation., cafes and restaurants	8,190	8,816	684	5,924	23,614
Transportation	3,150	5,144	543	3,549	12,386
Communication services	1,580	1,884	98	844	4,406
Finance and Insurance services	1,945	1,495	-153	576	3,863
Property and business services	27,294	14,447	1,690	10,163	53,594
Government admin. and defence	-189	1,613	-1,011	1,225	1,638
Education	10,823	7,978	1,071	6,629	26,501
Health and Community services	13,881	13,638	2,246	10,859	40,624
Cultural and recreational services	4,487	4,738	431	2,229	11,885
Personal and other services	4,447	5,118	689	4,067	14,321
Non-classifiable	885	920	110	628	2,543
Not stated	-14,611	-9,913	-2,898	-6,156	-33,578
Total	85,453	102,148	9,221	72,051	268,873

Source: Australian Bureau of Statistics (2002).

Table 4. Population in South East Queensland Over the Decade to 2001

	1991 (no.)	2001 (no.)	Change	
			(no.)	%
Brisbane City	751,830	873,780	121,950	16
South R.O.C.	554,010	756,646	202,636	37
Western Sub R.O.C.	152,974	172,858	19,884	13
Northern Sub R.O.C.	373,013	529,418	156,135	42
SEQ	1,831,827	2,332,432	500,605	27

Source: Australian Bureau of Statistics (2002).

To gauge the net effect of both population and employment growth the employment to population ratio is presented in Table 5. The employment to population ratio has increased for all sub-regions of the South East Queensland region from 0.42 to 0.44 (or 6.2 percent) over the decade to 2001⁵. This may exaggerate growth in the employment market given that 1991 was a recessionary year⁶ which may have discouraged people from entering the labour market. Nonetheless, Brisbane City recorded the fastest increase in the employment to population ratio (up 7.8 percent), followed by the Southern Regional Organisation of Councils (up 6.6 percent) and the Northern Sub Regional Organisation of Councils (up 6.3 percent), and the Western Sub Regional Organisation of Councils (up 1.8 percent). The employment to population ratio can be affected by many variables, which may include job opportunities, qualification mix, age profile, etc.

Table 5. Employment to Population Ratio in South East Queensland

	Employment-population	Employment-population	Change	
	ratio (1991)	ratio (2001)	(no.)	%
	(no.)	(no.)		
Brisbane City	0.45	0.48	0.04	7.8
South R.O.C.	0.40	0.43	0.03	6.6
Western Sub R.O.C.	0.40	0.41	0.01	1.8
Northern Sub R.O.C.	0.38	0.40	0.02	6.3
SEQ	0.42	0.44	0.03	6.2

Source: Australian Bureau of Statistics (2002).

In summary, although most of the employment growth in the South East

⁵ Comparatively, the employment to population ratio for Queensland grew by 6.8 percent to 0.40 over the same period; although, nationally it grew slower at 4.6 percent to reach 0.44.

⁶ Real national Gross Domestic Product (E) fell by 1.2 percent during 1991 (ABS, cat. no. 2506.0 table 2).

Queensland region over the decade to 2001 has been in the Northern Sub and South Regional Organisation of Councils, this has been largely nullified by the strong population growth. This is particularly stark for Brisbane City. When adjusting for population growth, employment has actually grown faster than in the Northern Sub and South Regional Organisation of Councils (see Table 5).

Did employment growth drive population growth over the decade to 2001? Or, did population growth drive employment growth? There does not appear to be a clear answer on the direction of causality between the two. What is known is that there has been a large increase in the number of jobs over this period. This paper will introduce a technique to examine this large increase in employment in more detail. It is known as shift-share analysis, and will provide more information on key drivers of this growth.

2. METHODOLOGY

One useful benefit of using shift-share analysis is that it can identify the effects on employment from factors within the geographic area (endogenous shift) and from those outside (exogenous shift).

Shift-share analysis is a regional economic analysis technique, based on an identity rather than a model (Hassan 2004), that has long been employed by economic geographers. According to Crafts and Mulatu (2005) the technique was pioneered in the Barlow Commission in the United Kingdom during 1940. Since that time most of the literature on shift-share analysis discusses the conceptualised shift-share analysis of Dunn (1960) and subsequently numerous amendments and improvements, who himself attributes his genesis to earlier research by Creamer (1942) several years earlier. Over the years shift-share analysis has attracted plenty of criticisms,⁷ so much so that Richardson (1978, p. 206) suggests the technique should be abandoned. Nonetheless, the easy of use and readily available data has played a large part in the continuation of this technique as an important tool in regional economic analysis.

In this paper the Haynes and Dinc (1997) method is used. This method decomposes the total change (also known as Total Shift in shift-share analysis) in a region's employment into three factors, which are:

National share – the change in employment that would have occurred if total employment in a region grew at the same rate as the nation.⁸ Because the reason for this shift is from outside the area it is an exogenous effect. It is calculated mathematically by multiplying employment in the region for each industry (E_i^r)

⁷ Such as that the results may be highly sensitive to the level of industrial desegregation, Buck (1970) found that position regional shift effects in for several industries in Merseyside were attributable to product heterogeneity, incorrect industrial classification, interregional relocation subsidies and the reorganisation of branch plants by companies rather than location advantages.

⁸ Generally the nation is used as a reference area; however, it may be another geographical area such as a state or regional grouping of nations. Nonetheless, in most instances the nation is often viewed as being the most appropriate reference area to use.

in the initial year by the growth rate in national employment (g^n), or:

$$\text{National growth effect for industry } i \text{ in region } r = E_i^r \cdot g^n$$

Industry-mix (also known as the proportional shift) – the change in employment that would have occurred if employment in each industry for a region grew at the same rate as that industry nationally (minus the national growth rate for all industries). Because the reason for this shift is from outside the area it is an exogenous effect. It is calculated mathematically by multiplying employment in a particular region's industry (E_i^r) in the initial year by the difference of the growth rate in national employment for a particular industry (g_i^n) and the growth rate of employment in all industries nationally (g^n), or:

$$\text{Industry mix effect for industry } i \text{ in region } r = E_i^r \cdot (g_i^n - g^n)$$

Regional shift (also known as the differential shift) – the change in employment due to factors within the region. Because the reason for this shift is from inside the area it is an endogenous effect. It is calculated mathematically by multiplying employment in a particular region's industry (E_i^r) in the initial year by the difference of the growth rate in that region's employment over the period for a particular industry (g_i^r) and the growth rate of employment in all industries nationally (g_i^n), or:

$$\text{Regional shift effect for industry } i \text{ in region } r = E_i^r \cdot (g_i^r - g_i^n)$$

When these three factors are added together they equal the change in total employment (Total Shift). This identity is mathematically provided below:

$$\text{Total Shift} = \text{National Share} + \text{Industry Mix} + \text{Regional Shift}$$

or more succinctly:

$$\text{Total Shift} = \text{Exogenous Shifts} + \text{Endogenous Shift}$$

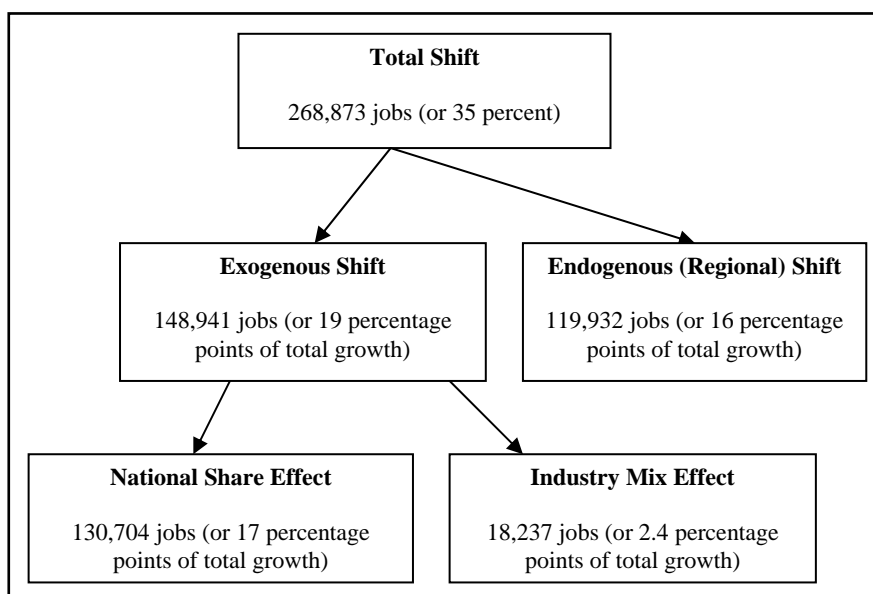
The endogenous / regional shift provides evidence of the relative performance of the regions labour market.⁹ A region with a higher regional shift will indicate that factors from within it are helping to drive employment growth. These factors may include local government economic development strategies (reflecting local leadership in promoting economic development), endowments

⁹ It is important to note that an increase in the number of jobs due to endogenous factors may not necessarily mean a relatively stronger labour market. The value of jobs is also an important guide to regional labour market performance. An example of this is where a labour market with a strong regional shift creates many low-value added jobs which will actually reduce the value-added per labour unit employed relative to the nation. Nonetheless, data on the value of labour (wages, salaries and supplements) is often not available at regions below the state level in Australia.

of resources, population growth, etc. In the study area of South East Queensland it is the population growth effect that would be expected to have a large impact on regional shift in employment, plus it is a relatively easy variable to measure and standardise for.

3. RESULTS

Using Shift-share analysis to decompose total employment growth of 268,873 (or 35 percent) in South East Queensland over the decade to the 2001 Census of Population and Housing yields some interesting results. Most of the growth (148,941 jobs or 19 percentage points of total employment growth) during this period came from factors outside of South East Queensland. Of this, most came from growth in the national economy (130,704 jobs or 17 percentage points of total employment growth), while a much smaller portion came from changes to the industry mix of the region (18,237 jobs or 2.4 percentage points of total growth in employment). Endogenous shift effects on employment growth in South East Queensland contributed 119,932 jobs or 16 percentage points to total growth in employment over the decade to 2001; see Figure 2.



Source: Author using data from the Australian Bureau of Statistics (2002).

Figure 2. Effect of Endogenous and Exogenous Factors on Aggregate Employment Growth in South East Queensland Over the Decade to 2001

Table 6 provides a more disaggregated analysis of the components of the total shift in the South East Queensland region by sub-region. Most of the employment growth in the region was in the South Regional Organisation of Councils (102,148 or 38 percent), followed by Brisbane City (88,453 or 32 percent), the Northern Sub Regional Organisation of Councils (72,051 or 27 percent), and the Western Sub Regional Organisation of Councils (9,221 or 3 percent). As Figure 2 demonstrated, most of the growth in total employment in the South East Queensland region was attributable to factors from outside of the region (i.e. exogenous factors). This largely impacted on Brisbane City (which accounted for almost half of the total exogenous employment growth in the region) and was followed by the South Regional Organisation of Councils (31 percent), the Northern Sub Regional Organisation of Councils (18 percent), and the Western Sub Regional Organisation of Councils (6 percent). The endogenous shift in employment for the South East Queensland region was concentrated in the South Regional Organisation of Councils (almost half of the total endogenous shift) and the Northern Sub Regional Organisation of Councils (38 percent), and was followed by Brisbane City (14 percent) and the Western Sub Regional Organisation of Councils (0.4 percent).

Table 6. Decomposed Employment Growth in South East Queensland Over the Decade to 2001

	Total Shift		Exogenous Shift		Endogenous Shift	
	Contribution to SEQ Total Shift		Contribution to SEQ Exogenous Shift		Contribution to SEQ Endogenous Shift	
	(no.)	(p.p.'s)	(no.)	(p.p.'s)	(no.)	(p.p.'s)
Brisbane City	88,453	32	68,394	46	17,059	14
South R.O.C.	102,148	38	45,531	31	56,617	47
Western Sub R.O.C.	9,221	3	8,704	6	517	0.4
Northern Sub R.O.C.	72,051	27	26,312	18	45,739	38
SEQ	268,873	100	148,941	100	119,932	100

Source: Author using data from the Australian Bureau of Statistics (2002).

This demonstrates that in aggregate terms most of the endogenous growth in the South East Queensland region occurred in the Northern Sub and South Regional Organisation of Councils – i.e. not in Brisbane City or the Western Sub Regional Organisation of Councils.

One method of measuring the relative impact on local labour markets of these shifts is to standardise them to employment levels in 1991; see Table 7. It shows

that the South and Northern Sub Regional Organisation of Councils gained the most from endogenous shifts in employment (contributing 25 and 32 percentage points to total employment growth) over this period. Comparatively, Brisbane City and the Western Sub Regional Organisation of Councils gained much less from endogenous shifts in employment (contributing 5 percentage points and less than 1 percentage point respectively).

Table 7. Decomposed Employment Growth in South East Queensland over the Decade to 2001—Standardised for 1991 Employment Levels¹⁰

	Total Shift % (of 1991 employment level)	Exogenous Shift % (of 1991 employment level)	Endogenous Shift % (of 1991 employment level)
Brisbane City	25	20	5
South R.O.C.	46	20	25
Western Sub R.O.C.	15	14	0.8
Northern Sub R.O.C.	51	19	32
SEQ	35	19	16

Source: Author using data from the Australian Bureau of Statistics (2002).

Disaggregating the endogenous shift in employment growth (standardised for 1991 employment) of 16 percent for South East Queensland over the decade to 2001, the main industry drivers were:

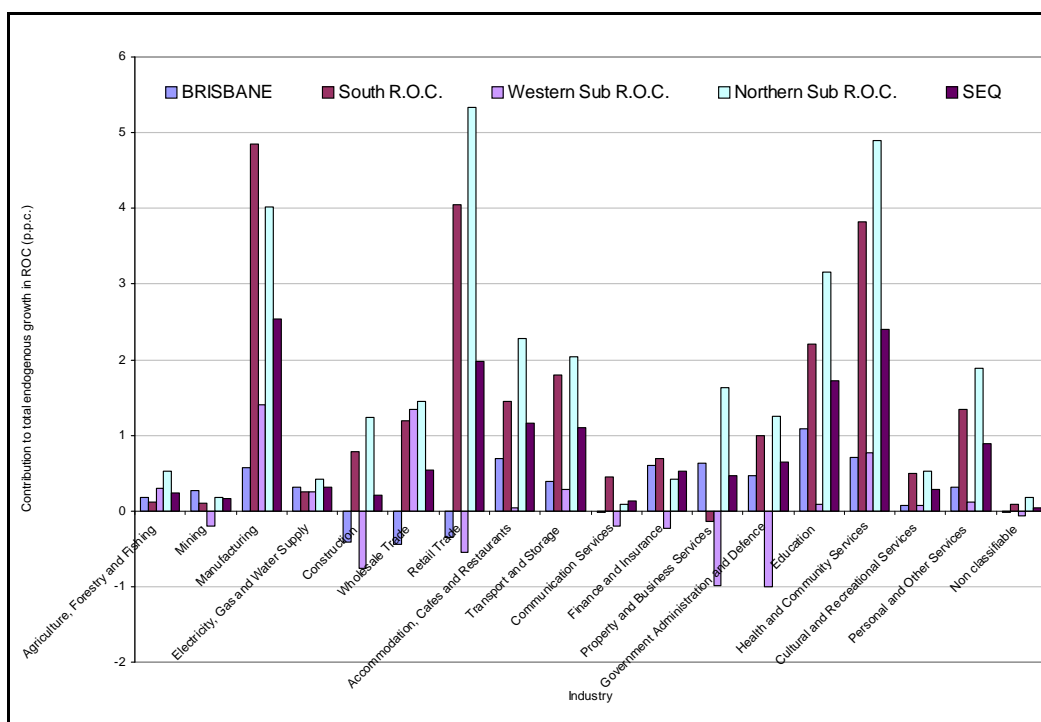
- manufacturing (contributing 2.5 percentage points);
- health and community services (contributing 2.4 percentage points); and
- retail trade (contributing 2.0 percentage points)—see Figure 3.

Each sub-region provides interesting patterns of employment change (see Figure 3). In summary, the main industry drivers of endogenous employment growth in the various sub-regions were:

- Brisbane City — education (contributing 1.1 percentage points to total growth of Brisbane City employment); accommodation cafes and restaurants, and health and community services (both contributing 0.7 of a percentage point to total growth of Brisbane City employment);
- South R.O.C. — manufacturing (contributing 4.8 percentage points to total growth of South R.O.C. employment); retail trade (contributing 4.0 percentage points to total growth of South R.O.C. employment); and health and community services (contributing 3.8 percentage points to total growth of South R.O.C. employment);
- Western Sub R.O.C. — manufacturing (contributing 1.4 percentage points to total growth of Western Sub R.O.C. employment); wholesale

¹⁰ Data may not sum due to rounding effects.

- trade (contributing 1.3 percentage points to total growth of Western Sub R.O.C. employment), and health and community services (contributing 0.8 of a percentage point to total growth of Western Sub R.O.C. employment); and,
- Northern Sub R.O.C. — retail trade (contributing 5.3 percentage points to total growth of Northern Sub R.O.C. employment); health and community services (contributing 4.9 percentage points to total growth of Northern Sub R.O.C. employment); and manufacturing (contributing 4.0 percentage points to total growth of Northern Sub R.O.C. employment).



Source: Author using data from the Australian Bureau of Statistics (2002).

Figure 3. Growth / Decline in Factors Endogenous to the Sub-region – Standardized for 1991 Employment level

For the region as a whole there were no industries which experienced a fall in endogenous shift employment. However, disaggregated by sub-region there were, as listed below:

- Brisbane City — wholesale trade and construction (both detracting 0.4 of a percentage point from total growth in Brisbane City employment) and retail trade (detracting 0.3 of a percentage point from total growth

- in Brisbane City employment);
- South R.O.C. — property and business services (detracting 0.1 of a percentage point from total growth in South R.O.C. employment);
 - Western Sub R.O.C. — property and business services and government administration and defence (both detracting 1.0 percentage point from total growth in Western Sub R.O.C. employment); construction (detracting 0.8 of a percentage point from total growth in Western Sub R.O.C. employment); retail trade (detracting 0.5 of a percentage point from total growth in Western Sub R.O.C. employment); mining, communication services, and finance and insurance (all four detracting 0.2 of a percentage point from total growth in Western Sub R.O.C. employment)¹¹; and
 - Northern Sub R.O.C. — none.

Another method of standardising endogenous shift in employment is to compare it with population change over time. With employment growth over the decade to 2001 of 268,873 and population growth of 500,605 in South East Queensland, approximately 54 jobs were created for every 100 increase in population – see Table 8 (above the employment to population ratio of 42 jobs in 1991 — see Table 5). The Northern Sub Regional Organisation of Councils recorded the highest increase in endogenous shift jobs per 100 extra people of 29, compared with only 3 for the Western Sub Regional Organisation of Councils.

Table 8. Change in Employment Relative to Population over the Decade to 2001¹²

	Total Shift Per 100 change in population (no.)	Exogenous Shift Per 100 change in population (no.)	Endogenous Shift Per 100 change in population (no.)
Brisbane City	70	56	14
South R.O.C.	50	22	28
Western Sub R.O.C.	46	44	3
Northern Sub R.O.C.	45	17	29
South East Queensland	54	30	24

Source: Author using data from the Australian Bureau of Statistics (2002).

¹¹ Non-classifiable employment detracted 0.1 of a percentage point from total growth in Western Sub R.O.C. employment.

¹² Components may not sum due to rounding.

4. CONCLUSION

Over the decade to 2001 the level of employment and population in the Council of Mayors (SEQ) region has grown rapidly relative to the nation. Employment grew the fastest over this period, resulting in an increase in the participation of the population in employment.

Employment growth in the Council of Mayors (SEQ) region over the ten years to 2001 was slightly higher due to exogenous factors than endogenous factors. Marginally over half of this endogenous growth was attributable to four industries, namely—manufacturing, retail trade, education, and health and community services. Most of these industries are typically related to strong population growth.

Disaggregating employment growth by sub Regional Organisation of Council produces very stark differences between the Northern Sub and South grouping (up 51 and 46 percent respectively over the ten years to 2001), and the Brisbane City and the Western Sub grouping (up 25 and 15 percent respectively over the ten years to 2001). When adjusted for population growth though, employment grew fastest in Brisbane City (up 7.8 percent) followed by the South Regional Organisation of Councils (up 6.6 percent), the Northern Sub Regional Organisation of Councils (up 6.3 percent), and the Western Sub Regional Organisation of Councils (up 1.8 percent).

Most of the employment growth due to exogenous factors in the Council of Mayors (SEQ) region was concentrated in Brisbane City (contributing 46 percent) and the Northern Sub Regional Organisation of Councils (contributing 31 percent). In comparison, most of the endogenous shift effect on employment growth in the Council of Mayors (SEQ) region was attributable to the South Regional Organisation of Councils (contributing 47 percent) and the Northern Regional Organisation of Councils (contributing 38 percent).

For every increase in population of 100 people there was an increase of 54 jobs across the Council of Mayors (South East Queensland) region over the decade to 2001. Of these 30 jobs were attributable to exogenous shift effects, and 24 jobs were attributable to endogenous shift effects. By region, the largest total shift in employment after adjusting for population growth was in Brisbane City (an increase of 70 jobs with every increase of 100 in population), with the lowest being in the Northern Sub Regional Organisation of Councils (45 jobs with every increase of 100 in population).

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APPENDIX

The Australian Bureau of Statistics (ABS) used three main count methods in the 2001 Census of population and Housing, which were:

- Place of enumeration — the number of people employed in an area based on their location on the night of the census;
- Place of usual residence — the number of people employed in an area based on their usual location of residence; and
- Place of employment — the number of people employed in an area based on where they work.

As Table A1 shows this can have a significant effect on the count of the number of people are employed in the South East Queensland area.

Table A1. Employment by count method in 2001.

		Place of Enumeration ^(a) (no.)	Place of Usual Residence ^(b) (no.)	Place of Employment ^(c) (no.)
Brisbane City		422,883	423,280	496,643
South R.O.C.		325,957	321,740	226,021
Western Sub.		70,566	71,418	52,605
R.O.C.				
Northern Sub		213,795	213,247	139,994
R.O.C.				
South East Queensland		1,033,201	1,029,685	915,263

Notes: (a) Source – ABS, CDATA 2001 (Time Series Profile); (b) Source – ABS, CDATA 2001 (Usual Residence Profile); (c) Source – ABS, CDATA 2001 (Working Population Profile).

For a static analysis all three measures are freely available from either the ABS web-site or through CDATA (an official ABS CD that includes most 2001 Census data). However, for a time-series analysis (particularly 10 years) only Place of enumeration data is freely available. This is why when using employment data over a period of time (such as for Shift Share analysis) only place of enumeration data is used (unless other count methods are paid for).