EFFECTIVE FULL TIME EMPLOYMENT FOR LOCATION QUOTIENTS – A PROPOSAL

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Submitted for consideration of entry for the Leontif Memorial Prize
Submitted to the International Input Output Association Conference Committee
Submitted for the 18th International Input Output Conference

ABSTRACT

Disaggregated input-output tables are increasingly used by developers, economic development practitioners and regional planners at the national, state and sub-state level. Although there are various non-survey techniques employed to produce disaggregated input-output tables within top-down or hybrid methods, this paper utilises an established model using cross industry location quotients to derive a disaggregated table. Unlike other studies that use total number of people employed as per the traditional location quotient method, this paper develops and utilises Effective Full Time (EFT) employment. This means that total employment data is manipulated before being utilised within location quotients that in turn, are utilised to disaggregate the national table. This paper proposes that the total number of people employed using the traditional location quotient method has the potential to inflate the results of regional input-output table generation.

Keywords: disaggregated input-output, location quotients, effective full time employment

INTRODUCTION

Economic modeling is becoming an increasingly important process for strategic planners at the local and state government level, as well as developers and other economic development practitioners. With this in mind, Input-Output tables play an increasingly important role as a tool for strategic, regional planners at the national, state and sub-state level. It is well established however, that utilising national input output tables that reflect the national economic structure at the local or sub-state level often leads to the use of national multipliers for impact analysis. This is not an optimal application of national multipliers as the national economic structure in no way will reflect the economic structure of states and sub-state regions.

To illustrate this point, Table 1 shows the differing contribution in terms of factor income that each industry has within each of the states of Australia. NSW has a high proportion of its income accounted for by the manufacturing industry, whilst Western Australia and the Northern Territory are highly dependent upon mining. It follows then, that the national Input-Output table will dilute each individual state's economic structure somewhat, when individual state data is represented at the national level. Thus it is important for the analyst to ensure that the state and sub-state tables derived via their respective methods reflect the economic structure of each region as accurately as possible. Utilising the same reasoning, it follows, that a state table will similarly not accurately represent a sub-state region.

Table 1: Industry Contribution to Total Factor Income - 2003-2004

	NSW %	Vic %	Qld %	SA %	WA %	Tas %	NT %	ACT %	Aust %
Agriculture, Forestry and Fishing	2	3	4	6	5	6	3	-	3
Mining	2	1	7	2	18	1	20	-	5
Manufacturing	12	15	10	14	9	14	4	2	12
Electricity, Gas and Water Supply	2	3	2	4	3	6	2	2	3
Construction	6	6	8	7	8	6	8	8	7
Wholesale trade	6	6	6	5	5	4	3	2	5
Retail trade	5	6	7	5	5	7	5	4	6
Accommodation, Café's and Restaurants	2	2	3	2	2	3	3	2	2
Transport and Storage	5	5	6	5	5	5	5	3	5
Communications Services	3	3	3	3	2	3	3	2	3
Finance and Insurance	10	9	5	7	5	7	3	4	8
Property and Business Services	14	13	9	9	10	5	9	14	12
Government administration and Defence	4	3	4	3	2	6	8	26	4
Education	4	5	5	5	4	5	5	6	5
Health and Community Services	6	6	6	8	6	9	7	6	6
Cultural and Recreational Services	2	2	1	2	1	1	2	3	2
Personal and others services	2	2	3	3	2	2	2	3	2
Ownership of Dwellings	10	9	8	9	6	8	6	8	9
General Government	2	2	3	2	2	3	3	4	2
Total	100	100	100	100	100	100	100	100	100
- nil or rounded to zero (a) Industries may not add to total due to rounding differences									

Source: ABS, Australian National Accounts: State Accounts, 5220.0

Thus there is an increasing need for the production of disaggregated national input output tables that reflect state or sub-state economic structures for the purposes of multiplier production or industry supply and use linkage studies for example.

Whilst there are various models for disaggregating national input output tables to state and sub-state tables, this paper concentrates on the Distributive Commodity Balance method. Most importantly, this method utilises employment based cross industry location quotients as one of the major disaggregation techniques, when superior data is not available, to capture the economic structure of the state and sub-state region. The literature review shows that the use of location quotients for disaggregating national input output tables to state and sub-state tables utilise total employment figures and that the location quotient method has done so since the method was developed.

The paper outlines the proposed method for converting labour data to effective full time employment data for use in the location quotients so as to produce disaggregated input output tables. This method shows that the rates of adjustment to account for casualisation or overtime within an industry differ between the local, state and national data sets. Finally the paper proposes that *not* using EFT converted employment data will lead to an overestimated local or sub-state input output table in terms of Gross Regional Product and multipliers for the use of impact studies. The paper concludes with recommendations for further study regarding the proposal for employment data conversion.

DISAGGREGATING

To produce a state or sub-state input output table, the analyst must start with a national input output table and utilise methods to appropriately scale the national table to reflect the economic structure as well as the supply and use of industry within the state and then in turn the sub-state.

The disaggregation method that will form the foundation of this paper and allow for the testing of the employment data preparation as proposed is the Distributive Commodity Balance (DCB) method. It is a hybrid disaggregation method that begins the state and sub-state table derivation process by using cross industry location quotients (described in more detail in the following section) to reflect the state or sub-state economic structure in the absence of superior data.

From Johnson (2001), the DCB method derives preliminary regional demand and supply tables using output or turnover data as its preference, or employment data as a secondary preference, to firstly scale the national table down to the state table and then scale the state table down to the sub-state table. The DCB method, in summary, uses trade coefficients and begins with a foundation table with the highest level of industry disaggregation possible. For the Australian 2001 national input output tables, there were 106 industries represented. The method allows for regionally specific data insertion, as well as other adjustments based on other data and/or knowledge. Importantly, the DCB method allows for cross-hauling in varying degrees at the state and sub-state levels. Cross-hauling is deemed to be important at the LGA level, as it is implausible to hold the position that at such a small region, cross-hauling does not occur.

The DCB method, as with all non-survey and hybrid methods, has some inherent assumptions. The first is that the foundation table columns are the initial indicator of the regional industry structure. The second, and exclusive to the DCB method, is that the rows of the foundation table are the initial indicator of the regional sales. The DCB method retains inputs and outputs in values, rather than coefficients as is used in some of the other methods outlined later in this paper. The DCB method, in using cross industry location quotients, identifies the size of an industry within a region, relative to the regional demand for its output, whereas simple location quotients identify the size of an industry within a region, relative to the size of that national industry.

METHODS OF DISAGGREGATION – LOCATION QUOTIENTS

There are various non-survey techniques utilised to produce disaggregated state and sub-state Input-Output tables within top-down or hybrid methods. Approaches to represent the state or sub-state economic structure within the derived disaggregated tables include the commodity balance technique[1], a semi-logarithmic quotient[2], and a logarithmic quotient technique[3], however this paper concerns itself only with the location quotient method.

A location quotient, at its simplest, is an indicator of how much a characteristic within a defined region of interest differs from the average of a larger reference region. A quotient can measure and spatially represent the degree of dispersion of the characteristic within the region of interest from the reference region average. Such technique can be applied to the spatial pattern of computer use or language diversity for instance (Gibson, 2003, p245).

[1] See Isard (1953) and Schaffer and Chu (1969)
[2] See Round (1978)
[3] See Flegg *et al* (1995) and Flegg and Webber (1997).

In the field of regional economics, location quotients are used to apportion larger area data down to a smaller region and capture the economic structural characteristics of the smaller region. In this case, an Australian Input-Output table has been disaggregated to create a NSW Input-Output table, and that in turn, has been disaggregated to create a Penrith Local Government Area (LGA) Input-Output table using a particular kind of location quotient, described below.

A location quotient used in this way, indicates the share of employment that an industry has in the region of interest in relation to the share of employment within the same industry of the reference region. A location quotient greater than one (1) indicates that the industry within the region of interest is more important to that regional economy than the industry is to the economy of the reference region as a whole.

There are three major types of location quotients; namely: simple location quotients, purchases only and cross-industry quotients.

The simple location quotient (SLQ) is primarily used to identify which industry within a region has the capability to export, import or be self-sustaining. The simple location quotient can be calculated using production and consumption data, however this data is usually not available, therefore output or total employment data is substituted as proxy information[4] (O'Sullivan, 2003, p133). The equation takes the form,

$$SLQ = \frac{\frac{r_i}{r}}{\frac{R_i}{R}} \qquad (2.1)$$

where r_i is the employment within industry i within the region of interest and r is total employment within the region of interest, R_i is the employment within industry i within the reference region, and R is total employment within the reference region. The reference region is assumed to be self sufficient, which in actuality is not always the case. In a globally connected world, O'Sullivan (2003) rightly claims that the self-sufficiency assumption, along with the assumed uniform consumption patterns between the region of interest and the reference region underestimates export employment. Uniformity in consumption between the region of interest (in this case NSW and then Penrith LGA) and the reference region (in this study Australia and then NSW) is an issue that this paper is attempting to avoid in conjunction with avoiding uniform

[4] See also, Schaffer (1999)

industry patterns. Thus the SLQ is deemed unsuitable for the purposes of deriving state and sub-state Input-Output tables from the national table.

Purchases-only (PQ) and cross-industry (CIQ) location quotients attempt to incorporate differing economic structures between regions. The PQ calculates the numerator in the same manner as the SLQ, however the denominator is taken as an aggregate of the outputs of only those industries that purchase from the industry denoted in the numerator (Johnson, 2001).

The CIQ is also based on consuming industries output, but calculates a different quotient for each cell of the Input-Output table to disaggregate, rather than a single location quotient being applied to an entire row of the table as for SLQ and PQ.
The CIQ takes the form,

$$CIQ_{ij} = \frac{\frac{x_i}{X_i}}{\frac{r_j}{R_j}} \qquad (2.2)$$

where x_i is the output of industry i within the region of interest, x_i is the output of industry i within the reference region, r_j is the output of industry j (that consumes from industry i) within the region of interest and R_j is the output of industry j within the reference region.

As with the SLQ, the PQ and CIQ can be calculated using output or total employment data. In each cell of the Input-Output table, if the CIQ is greater than or equal to one, then the regional coefficient is set equal to the national coefficient, if the CIQ is less than one, the national coefficient is weighted by the CIQ (Johnson, 2001; Schaffer, 1999).

The CIQ is chosen as the location quotient to utilise to produce state and sub-state input output tables within the DCB method for the purposes of this paper as it allows for the relative sizes of the producing and consuming industries to be taken into account and in this way, the surplus of regional supply and demand can be ascertained (Flegg *et al*, 1997). This characteristic of the CIQ method proves useful when the analyst wishes to take into account the incidence of cross-hauling – where a commodity is simultaneously imported and exported. For the purpose of this paper, cross-hauling is considered especially important at the sub-state level, where the region of interest is a single LGA. It is certain that producing industries within the Penrith LGA sell their product locally, as well as outside of the region. It is also certain that consumers within the

Penrith LGA source goods and services from outside of the region that are also produced within the region.

Not withstanding Lahr's (1998, p10) suggestion that location quotient approaches that do not allow for cross-hauling is "…perhaps appropriate for the Australian setting…", the author has chosen a location quotient and disaggregation method that does allow for cross-hauling, taking the arguments above into account.

As Norcliffe (1983) rightly reminds us there are four main assumptions inherent within the location quotient technique when using employment data. The first assumes that there is identical productivity per employee in each region and in each industry so that the share of employment reflects the share of production. This assumption is tested when the differing rates of full time to part time employment is illustrated later in this paper. The second assumption requires that each employed person in the region of interest and the reference region have identical consumption patterns so that the share of employment reflects the share of consumption. For simple location quotients there is a need for no cross-hauling between regions, however the use of the cross industry location quotients over come this limitation. The final assumption relates to net exports and imports to enable production and consumption balance.

Thus it is established that cross industry location quotients will be utilised within the Distributive Commodity Balance model to produce a NSW state input output table from the Australian input output table, and the derived NSW input output table will be further disaggregated to produce a Penrith input output table. It is further established that employment data will be used in the absence of superior data for the cross industry location quotients to be calculated.

The remainder of this paper establishes that the method of location quotient calculation has not changed since it was developed and proposes a new method of employment data preparation for use in location quotient calculations.

LITERATURE REVIEW ON THE USE OF LOCTION QUOTIENTS TO DISAGGREGATE NATIONAL INPUT OUTPUT TABLES

In Australia the GRIT method was used at the sub-state level for the Barwon Darling region. The project was developed to ascertain the economic impact of an enterprise zone on the region. (Murphy *et al*, 2003). The region studied was an aggregate of 5 LGA's and where superior data was not available, total employment was used within location quotients.

Other Australian state and sub-state input output tables also include the Queensland Government Statisticians Office (GSO), (1995) that produced a 29 industry state table, which was derived from 109 industries, for the year 1985-85 (1995, p4) utilising hybrid methods that utilised total employment data when needed. Since then, other time period tables have also been produced. The model applied the standard Input-Output assumptions and notes that analysis derived from the tables is not well suited to dynamic analysis and that it is only an indicative measure of total economic impact. Additionally, the model acknowledges the ability of the method to scale further (from the state table) to the regional and sub-regional level. The GSO advocates the insertion of region specific, or superior data as it is known in the literature, and also suggests that superior data is used to verify disaggregation results.

More recently, the Queensland Government has developed the Queensland General Equilibrium Model (QGEM). QGEM develops an Input-Output table for two identified regions - Queensland and the rest of Australia, for use within a computable general equilibrium model. The state table is derived from statistical information that is region and industry specific and, is based on the 1996-97 national tables and is at the 110 industry level (Watts, 2004, p3). Whilst the time period of the table is not updated via price changes, the disaggregation method is based initially on the GRIT method using total employment for location quotients and then applies a modified RAS procedure to balance the tables.

Another Australian model was REMPLAN, developed by the Centre for Sustainable Regional Communities at La Trobe University (Pinge, 2004). It is an impact analysis model that makes use of regional Input-Output tables at the LGA level. The model has been utilised to assess economic impacts of the assistance to the Textile, Clothing and Footwear industry within the rural city of Wangaratta (Productivity Commission, 2003). The model can provide 17, 35 or 106 industries, and be derived by top down or hybrid methods, though total employment data is used when no superior data is available. The model can also include Greenhouse data, energy data, or both together.

In the Methods Testing for Industrial Agglomeration undertaken by O'Donoghue and Gleave (2004) all location quotients that used employment data used total number of people employed. The studies that they in turn used for their testing proposal were of Martin and Sunley (2003), Miller et al (2001), Isaksen (1996) and Malmberg and Maskell (2002). All of these location quotient calculations used total employment in the same way.

Bonfiglio and Chelli (2008) tested the accuracy of non-survey techniques of constructing regional input-output tables. The disaggregation methods tested were the various types of location quotients, including all of the location quotients previously mentioned, as well as the Symmetric Cross Industry Location Quotient, nine versions each of the Flegg Location Quotient and the augmented Flegg Location Quotient. Each of the location quotient methods referred to by Bonfiglio and Chelli used total employment data in the absence of superior data (Schaffer and Chu, 1969a, 1969b; Morrison and Smith, 1974; Eskelinen and Suorsa, 1980; Sawyer and Miller, 1983, Flegg et al., 1995; Flegg and Webber, 1997, 2000; Tohmo, 2004, Morrison and Smith, 1974; Harrigan et al., 1980; Stevens et al., 1989)

The study by Beemiller (1989) comes close to recognising true labour market characteristics by including the level of unemployment into the Regional Input-Output Modeling System (RIMS II) however, as with all previous studies cited, when calculating location quotients, the "persons-employed basis" is followed and hence the study does not take into account effective full time employment.

All of these models use location quotients to disaggregate the national tables and the location quotients use total employment to represent the economic structure of the state or sub-state.

HISTORY OF LOCATION QUOTIENTS

It is the position of this paper that using the total number of people employed as a proxy for the economic structure will inflate the GRP results of state and sub-state Input-Output table generation, inflate impact multipliers and underestimate regional imports. Location quotients were developed in the 1940's for use in deriving state and sub-state Input-Output tables, and the convention of using total employment has been followed since then.

For disaggregation models utilising location quotients, employment data is an acceptable substitute for output data in the calculation of the adjusting coefficients. However total employment data as an indicator of the size of an industry may not be infallible. The number of people employed will not indicate the effective full time number of people employed, and there may be differential rates of casualisation of individual industries across the national to regional economies. This challenges the assumption of constant productivity per person in both the region of interest and the reference region.

Unfortunately, the author was unable to discover full time to part time employment statistics for the period when location quotients were first developed for the use of disaggregating input-output tables, however in 1964 some 20 years later, the Australian labour market was characterised by some 92%[5] full time employment. It made reasonable sense to consider that total employment was roughly equivalent to full time employment. Hence the total number of people employed as a data input to the calculation of location quotients was more or less reflective of the structure of the actual labour market.

However as at 2001 Census, the full time percentage of the Australian workforce was 66.59%, where full time is defined by ABS as a person who worked more than 35 hours during the week prior to Census (ABS, 2003a). For NSW, the full time percentage of the workforce was 67.97 % and for Penrith, the full time percentage of the workforce was 63.69%.

It can be seen from Table 2 that there are differences in full time and part time employment between regions, and between industries across those regions.

[5] See Reserve Bank of Australia for employment data dating from 1960 to date.

Table 22: Percentage of the Workforce Working Full Time by Industry

Percentage of the Workforce Working Full Time by Industry			
Industry	Penrith	NSW	Australia
Agriculture, Forestry and Fishing	64.45%	75.18%	74.07%
Mining	92.92%	88.79%	86.79%
Manufacturing	84.34%	82.70%	81.75%
Electricity, Gas and Water Supply	88.82%	86.33%	86.14%
Construction	73.32%	76.88%	76.80%
Wholesale Trade	78.22%	79.55%	78.29%
Retail Trade	47.82%	52.67%	51.39%
Accommodation, Cafes and Restaurants	40.55%	50.00%	47.67%
Transport and Storage	73.15%	75.53%	75.30%
Communication Services	73.12%	81.12%	77.98%
Finance and Insurance	59.10%	77.08%	74.34%
Property and Business Services	64.00%	71.60%	69.51%
Government Administration and Defence	71.16%	77.76%	75.76%
Education	63.60%	59.07%	59.37%
Health and Community Services	55.96%	54.43%	51.33%
Cultural and Recreational Services	43.98%	58.63%	54.46%
Personal and Other Services	67.14%	65.66%	64.21%

The employment adjustment method introduced and proposed by this paper is that the working population profile (WPP) employment data for the Australian, NSW and Penrith areas be manipulated to reflect effective full time (EFT) employment for use in location quotient calculation, rather than the total number of people employed as has been the standard in the past. Within the literature, the formulas note that the employment figures used in calculating location quotients are total employment figures.

PROPOSED EMPLOYMENT DATA CONVERSION METHOD

For the industries where no production data is available to place within the DCB model to allow for disaggregation, that industry's share of national output was scaled using cross industry location quotients derived from unpublished employment data from the Australian Bureau of Statistics (ABS) (2003a). Location quotients are an output or employment based measure. From inception, when concerning themselves with employment, location quotients have used the total number of people employed for individual industry and total industry figures. However in light of the structural changes within labour markets in terms of casualisation and reduced working hours of employment positions in recent years, this practice of using total employment within industry is dated.

It is proposed that instead of using the total number of people employed as per the traditional location quotient method, that effective full time equivalent (EFT) employment be used. The EFT employment figures make allowance for industries that have high rates of overtime, or high levels of part time and casual employment. If 35-40 hours of work a week is considered full time (consistent with ABS assumptions), then in the case of an industry that has two (2) people working 20 hours each, the total number of people working is two (2) according to official employment figures, but in terms of effective full time workers, 20 hours of person one (1) plus 20 hours of person two (2), actually equals 40 hours, hence an effective employment figure of one (1) person. This is seen to be the case particularly for the retail industry.

Alternatively, industries that have one (1) person working say, 60 hours a week, would have official figures state that the total number of people employed is one (1). When in contrast to a standard 40 hour week, the effective full time equivalent for the industry is actually one and a half (1.5) people.

It follows then, that location quotients that utilise the total number of people employed (in light of overtime, casual and part time work practices) can alter the results of location quotient calculations. Hence the results of the derived state and sub-state Input-Output tables will be different.

The 2001 Census Working Population Profile (WPP) is used to formulate weightings for total industry employment at the one (1) digit ANZSIC level. These weightings are then applied to the total employment data, that is, to the unpublished ABS total employment data formatted in the same industry structure as the Australian 106 Industry Input-Output table. The EFT employment data at the 106 industry level is then ready for insertion to the DCB model. This paper utilises EFT employment figures for the formation of cross industry location quotients and they in turn are used to derive state and sub-state Input-Output tables in the interests of reflecting modern day labour market characteristics as accurately as possible.

To convert the unpublished WPP employment data by 106 industry level, employment data is sourced from the ABS WPP, Census 2001. WPP data is employment data that is based on the place of work, not the place of residence. Thus WPP data gives a complete account of the industry based employment within Australia, NSW and Penrith. It should be noted that the WPP employment information is manipulated to furnish an industry weighting. This weighting is then used to convert the total number of people employed to effective full time employment *before* the employment data is inserted into the DCB model to calculate cross industry location quotients and disaggregate the national table to state and sub-state tables.

The weighting is then applied to unpublished ABS employment data that states the total number of people employed by industry. The unweighted employment data is in the same industry and ANZSIC aggregation as the 106 Input-Output national table, and once weighted, will reflect EFT employment by industry and ANZSIC aggregation for 106 industries.

This 106 EFT employment data is then used to calculate cross industry location quotients where output data is not available. The cross industry location quotient is used to disaggregate the national table to produce a NSW input output table, and then the NSW table is further disaggregated to produce an input output table for Penrith LGA.

Shown below is the WPP table from which the weightings are calculated. It is from this data the process described below initially relates (ABS, 2003a).

AUSTRALIAN BUREAU OF STATISTICS 2001 Census of Population and Housing
Penrith (C) (LGA 16350) 404.8 sq. Kms

W10 INDUSTRY BY HOURS WORKED(a) BY SEX (2 of 2)
Employed persons

	0 hours	*1-15 hours*	*16-24 hours*	*25-34 hours*	*35-39 hours*	*40 hours*	*41-48 hours*	*49 or more hours*	*Not stated*	*Total*
					PERSONS					
Agriculture, Forestry and Fishing	11	78	67	73	71	103	40	203	18	664
Mining	5	6	0	0	20	26	17	82	3	159
Manufacturing	190	252	295	380	1,749	1,703	1,123	1,465	144	7,301
Electricity, Gas and Water Supply	10	7	3	19	127	69	51	64	3	353
Construction	106	250	226	267	348	889	362	744	76	3,268
Wholesale Trade	61	128	131	149	367	488	282	554	35	2,195
Retail Trade	305	2,300	1,299	976	1,251	1,177	767	1,296	204	9,575
Accommodation, Cafes and Restaurants	84	536	387	380	226	277	162	285	51	2,388
Transport and Storage	56	129	114	99	148	289	181	471	38	1,525
Communication Services	28	25	38	47	121	109	72	75	14	529
Finance and Insurance	37	57	128	144	129	175	94	133	11	908
Property and Business Services	115	434	393	378	537	726	366	728	71	3,748
Government Administration and Defence	136	94	246	275	956	467	281	157	50	2,662
Education	205	438	443	658	923	871	511	755	76	4,880
Health and Community Services	278	497	909	832	949	1,224	452	586	67	5,794
Cultural and Recreational Services	42	263	127	121	120	118	78	120	29	1,018
Personal and Other Services	99	240	187	152	429	362	266	334	41	2,110
Non-classifiable economic units	8	20	13	15	24	29	8	18	17	152
Not stated	19	36	28	22	33	33	10	28	78	287
Total	**1,795**	**5,790**	**5,034**	**4,987**	**8,528**	**9,135**	**5,123**	**8,098**	**1,026**	**49,516**

(a) Hours worked is an aggregate of the hours worked in all jobs, not just main job.

PART 1 – Allocating "not stated" hours

Step 1A Subtract the 'Not stated' hours for each industry from the industry total employment figure. This was to determine the percentage spread of PT and FT of total employment so as to allocate the 'Not stated' category employment numbers accordingly - in the same % as PT and FT distibution

Step 1B Calculate the totals of PT and FT employment categories to determine the share of PT and FT employment to total employment

Step 1C Allocate "not stated" in hours, to part time and full time dependent upon share of pt and ft to each industry.

PART 2 – Calculating EFT

Step 2A Aggregate 0 hours to 1-15 hours category so as to not lose the number of people who may have worked less than 1 hour, or not at all due to casual nature of work. Aggregate 35 to 39 hours with the + 40 hours category so as to ensure a 35 to 40 hours week is classed as full time.

Calculate mid point of the time category. Calculate midpoint of "full time" as 37.5 hours and thus equal to EFT 1. Categories over 40 hours will equate to more than 1 EFT. Divide the mid point of the time category by the mid point of the full time category to calculate an FTE benchmark figure for each time category. The time category of 35 to 40 hours has been classed as full time due to data limitations, and that ABS classed any person working 35 or more hours as a full time person, thus the data represented FTE as a bracket of 35 to 40 hours. This allows for the usage of RDO's and flexitime in the workplace, where a person works a 40 hour week, but is then entitled to one RDO every 20 working days (this actually equates to a full time person working a 38 hour week).

Step 2B Calculate each time category as FTE by dividing the number of people employed in the time category, by the EFT figure derived above. Thus a person who worked 20 hours will effectively be worth 0.53 of a full time equivalent person. This method allows for the true nature of the labour force to be represented in terms of casual and part time employment, whereas the total number of people employed would inflate any data modelled.

Step 2C Multiply the total number of people in each time category by the EFT result for the time category to give the EFT for each industry by hours worked. Sum columns and rows to calculate the difference between the EFT employment figure, and the total number of people employed figure. An industry with a large proportion of part time work and a small percentage of overtime, will have an EFT employment figure calculated as a much smaller figure than total number employed. Conversely, an industry that has a large proportion of the workforce working overtime will have a larger EFT employment figure than total number employed figure.

Step 2D Allocate the NEC and 'not stated' categories by hourly categories to each industry, according to industry share of total employment.

Part 3 – Weighting total employment to create EFT

Step 3A Determine the industry employment coefficient to be applied at the NSW and Penrith LGA level by calculating the difference between the total number of people employed, and the EFT number of people employed. Divide this difference by the total number of people employed to arrive at a weighting by which the total number of people employed within each industry can be multiplied by to furnish an EFT employment figure - this becomes an industry employment coefficient that will indicate whether the total number of people employed will increase (if greater than 1) when converted to EFT (such as in mining and indicative of extensive overtime) or decrease (if less than one) when converted to EFT (such as retail and indicative of extensive casualisation).

Step 3B Once the industry employment coefficient has been calculated, it can be used to convert the total number of people employed by industry to EFT employment to then insert into the DCB model and calculate the location quotients that are then used to disaggregate the national Input-Output table to a state and then sub-state level.

The results of the conversion of employment data are presented in Table 3. The raw data of one (1) digit ANZSIC employment figures for the regions of Penrith, NSW and Australia is shown. Within each region, the total number of people employed is followed by the EFT calculated number of people employed, and concluded with the difference in employment figures – whether positive or negative. Those industries that receive a significant decrease in the number of people employed within that industry, indicates extensive part-time employment opportunities –

particularly the Retail industry, followed by Health and Community Services and the Accommodation, Café and Restaurant industry. The Mining industry indicates widespread use of overtime, indicated by the increase of EFT over the total number of employed.

Table 4 shows the relative weightings applied to the labour data available at the 106 industry level that is supplied by ABS as the total number of people employed. Each regions individual industry weightings were applied to that regions employment data to arrive at EFT employment for the 106 industries that correspond to the Input-Output table.

It can be seen from the table, that each industry within each region had its own unique employment weighting. This supports the notion that industries have differing rates of casualisation or overtime across regions.

Table 3: Total Number of People Employed Compared to EFT Employment

	Penrith			NSW			Australia		
ANZSIC Industry	***Total # Employed****	***EFT Total***	***Difference between Total # employed and EFT***	***Total # Employed****	***EFT Total***	***Difference between Total # employed and EFT***	***Total # Employed****	***EFT Total***	***Difference between Total # employed and EFT***
Agriculture, Forestry and Fishing	669.92	649.82	-20.10	91109.99	97980.33	6870.35	338220.97	361083.63	22862.66
Mining	160.23	192.54	32.31	14415.49	16450.18	2034.69	76712.11	88795.72	12083.61
Manufacturing	7359.91	7664.65	304.74	308667.02	316623.99	7956.98	1031624.75	1051061.53	19436.78
Electricity, Gas and Water Supply	355.78	375.41	19.63	20262.38	20751.46	489.08	61936.88	64087.38	2150.51
Construction	3295.89	3248.78	-47.12	180125.80	182273.26	2147.47	570894.37	579694.04	8799.67
Wholesale Trade	2213.28	2272.38	59.10	150718.87	154152.78	3433.92	446662.16	453669.77	7007.61
Retail Trade	9667.09	7417.08	-2250.01	383847.80	311407.81	-72439.99	1243099.77	995671.09	-247428.68
Accommodation, Cafes and Restaurants	2411.71	1790.80	-620.90	139043.49	112562.55	-26480.93	421609.46	334781.01	-86828.45
Transport and Storage	1538.03	1562.12	24.10	122864.86	125202.34	2337.48	363805.44	372758.14	8952.70
Communication Services	533.52	509.46	-24.06	53792.77	55019.72	1226.94	151724.01	151321.30	-402.71
Finance and Insurance	916.30	825.39	-90.91	130990.52	131211.60	221.08	319407.62	312791.38	-6616.24
Property and Business Services	3781.47	3463.24	-318.24	327613.60	320200.62	-7412.98	941718.57	903546.06	-38172.51
Government Administration and Defence	2684.97	2442.06	-242.91	101887.24	97604.48	-4282.76	378070.13	359931.98	-18138.15
Education	4923.67	4483.63	-440.04	185270.24	162644.18	-22626.06	610228.39	538234.12	-71994.27
Health and Community Services	5847.72	4949.90	-897.82	254712.28	212935.07	-41777.22	827321.90	677204.96	-150116.94
Cultural and Recreational Services	1027.96	756.17	-271.79	66242.20	57147.71	-9094.49	207662.70	171318.08	-36344.62
Personal and Other Services	2128.56	1930.80	-197.76	96443.47	86997.09	-9446.37	307906.78	275297.28	-32609.50
Total	**49516.00**	**44534.23**	**-4981.77**	**2628008.00**	**2461165.18**	**-166842.82**	**8298606.00**	**7691247.47**	**-607358.53**

*** Sourced from ABS (2003a).**

Table 4: Weightings applied to total number employed to produce EFT employment

	Australia	NSW	Penrith
ANZSIC Industry	***Employment Weighting***	***Employment Weighting***	***Employment Weighting***
Agriculture, Forestry and Fishing	1.0676	1.0754	0.9700
Mining	1.1575	1.1411	1.2017
Manufacturing	1.0188	1.0258	1.0414
Electricity, Gas and Water Supply	1.0347	1.0241	1.0552
Construction	1.0154	1.0119	0.9857
Wholesale Trade	1.0157	1.0228	1.0267
Retail Trade	0.8010	0.8113	0.7673
Accommodation, Cafes and Restaurants	0.7941	0.8095	0.7425
Transport and Storage	1.0246	1.0190	1.0157
Communication Services	0.9973	1.0228	0.9549
Finance and Insurance	0.9793	1.0017	0.9008
Property and Business Services	0.9595	0.9774	0.9158
Government Administration and Defence	0.9520	0.9580	0.9095
Education	0.8820	0.8779	0.9106
Health and Community Services	0.8186	0.8360	0.8465
Cultural and Recreational Services	0.8250	0.8627	0.7356
Personal and Other Services	0.8941	0.9021	0.9071

RESULTS OF USING TOTAL EMPLOYMENT AND EFT TO DERIVE STATE AND SUB-STATE INPUT OUTPUT TABLES

As can be determined from the worked examples of the sub-state input output table for the Penrith LGA derived from national and then state input output tables, the results for Gross Regional Product are different when using total employment and EFT employment.

	Total employment	EFT employment	% difference	IO result for Total Employ	IO result for EFT Employ	% difference
Penrith LGA	46,388	41,254	11%	4,383,117	4,225,737	3.5%

The conversion of total employment to effective full time employment results in a "loss" of 5,134 employment figures. This in turn gives a $157 million "loss" to the GRP of Penrith. The summary table for NSW and both of the Penrith tables can be seen overleaf.

Whilst this paper has utilised the DCB model for disaggregating the national input output table into state and sub-state input output tables, it is possible to use any other disaggregating model that uses location quotients, such as REMPLAN or GRIT as discussed earlier in this paper. Utilising the total employment conversion as proposed in this paper and comparing the table generation results against total employment table generation results will begin to add to the body of knowledge and perhaps inspire further research into the effect that changing labour market conditions has on state and sub-state table generation.

Future studies can also be undertaken to establish the impact that the adjustment of employment data to EFT employment has on the final tables to the Gross Regional Product, and any multipliers derived from the tables. Conceptually, the author expects that the multipliers derived from a table disaggregated via total employment location quotients would be larger than those derived from EFT location quotients. Preliminary analysis seems to support this. This then leaves the possibility to test economic impact studies to ascertain the significance of the difference between total and EFT employment being used in Location Quotient derived input output tables.

CONCLUSION

Employment based location quotients are used at the small region level in the absence of any other regionally specific data, such as output and/or consumption data to derive state and sub-state input output tables. Other key indicators of a regions strengths and weaknesses within its economic landscape include capital formation or gross regional product, however in light of the difficulty in obtaining small area data, employment related measures are a useful, inclusive substitute to measure economic performance and be applied for analysis. It is the position of this paper that employment related measures become even more useful when they reflect EFT employment, rather than the total number of people employed. The DCB method, along with EFT employment and the analysts knowledge should minimise the acknowledged methodological problems concerning location quotients as a disaggregation technique.

It is the position of this paper that using the total number of people employed as a proxy for the economic structure will inflate the GRP results of state and sub-state Input-Output table generation, inflate impact multipliers and underestimate regional imports. Location quotients were developed in the 1940’s for use in deriving state and sub-state Input-Output tables, and the convention of using total employment has been followed since then.

Therefore, the conclusion of this paper is that employment data should be adjusted for effective full time employment, and then utilised within adjusting coefficient methods such as location quotients so as to remove one of the possible inflationary characteristics of these methods.

Total Employment Penrith Input-Output Table

"000	Agriculture, Forestry and Fishing	Mining	Manufacturing	Electricity, Gas and Water Supply	Construction	Wholesale Trade	Retail Trade	Accommodation, Cafes and Restaurants	Transport and Storage	Communications Services	Finance and Insurance	Property and Business Services	Government Administration and Defence	Education	Health and Community Services	Cultural and Recreational Services	Personal and Other Services	Dummies, Site Construction, Exoge	T4 Total intermediate usage	Q1 Private final consumption expe	Q2 Government final consumption	Capital expenditure	Q6 Change in Inventories	Q7 Exports	T5 Total final demand	T6 Total supply
Agriculture, Forestry and Fishing	7303	5	14579	52	664	35	1213	2127	35	2	41	730	371	11	93	2756	243		30261	14141	231	807	0	43268	58447	88708
Mining	-118	138	-13481	-1599853	1447	-347	-525	-522	-128	-129	-9	37	-304	-76	-272	200	-52		-1613993	-4806	19	3915	0	1668197	1667326	53332
Manufacturing	7163	5588	349275	30947	85186	16786	35887	19036	19511	6626	1827	25403	13584	3598	8809	4225	4636		638087	86536	3733	67973	8435	864891	1031569	1669656
Electricity, Gas and Water Supply	453	32	-21964	73547	835	-787	646	689	1571	321	485	11460	1246	1287	534	710	473		71537	-8633	341	-133	385897	113663	491134	562671
Construction	559	774	540	3596	1106	1722	434	4852	2107	42	173	14806	6447	71	286	71	79		37666	7	15337	374553	0	4878	394776	432442
Wholesale Trade	1506	1274	42369	4661	19803	5817	17468	5733	7911	4715	724	7255	2458	2464	4727	1771	1848		132503	23374	22	59208	0	119018	201622	334125
Retail Trade	771	692	6628	13106	6775	6554	17893	8979	9937	2392	1625	8174	433	278	1010	1199	1073		87519	181267	0	4699	0	393625	579591	667109
Accommodation, Cafes and Restaurants	513	323	11776	2917	2103	6391	4388	929	2624	1863	3115	14696	4909	770	1390	1719	1203		61628	48873	1	0	0	113462	162335	223964
Transport and Storage	1700	2733	56850	5653	10456	17786	4281	2464	30381	2180	927	8234	2618	955	1772	1780	1104		151874	20888	5091	3083	0	104695	133757	285631
Communications Services	296	271	4815	500	795	8352	10521	3037	4624	1898	3672	11744	4460	1133	2246	1609	1543		61517	7238	58	275	0	30822	38393	99910
Finance and Insurance	808	370	5552	801	4527	6681	7413	3450	2937	1307	42054	27082	3939	1268	1739	1443	825		112195	18338	23	414	0	92528	111303	223498
Property and Business Services	1033	1283	55102	30964	36327	62570	61157	25164	21481	5095	13167	203526	13869	2124	12595	9449	6749		561654	149611	3786	31013	0	472180	656591	1218245
Government Administration and Defence	93	739	3383	1559	1097	787	2681	216	6617	713	249	3311	21190	1197	621	146	243		44841	3459	99327	2523	0	182369	287678	332518
Education	17	45	1430	1157	163	127	640	272	359	45	975	2237	848	796	387	98	507		10104	23607	55966	536	0	192305	272413	282517
Health and Community Services	133	49	849	8	45	98	208	63	94	109	65	224	403	117	4357	293	198		7315	41645	69436	223	0	252291	363596	370911
Cultural and Recreational Services	7	5	442	4	7	584	1364	1256	80	44	520	4073	188	318	226	6438	167		15722	30159	3081	1047	0	65715	100002	115724
Personal and Other Services	29	33	3427	817	332	325	1656	825	539	164	211	3443	1252	456	2233	335	567		16643	26392	17711	0	0	83461	127563	144206
Dummies, Site Construction, Exogenous Labour																		5	5	0	0	0	0	0	0	5
Total Intermediate Usage	22264	14356	521573	-1429565	171667	133481	167325	78570	110680	27387	69819	346435	77913	16766	42754	34243	21405	5	427079	662095	274162	550138	394333	4797366	6678094	7,105,173
Compensation of employees	10520	5543	272723	210611	76848	106477	216139	52291	69734	26997	57884	197103	159623	207719	236411	26388	77082		2010094	0	0	0	0	0	0	2,010,094
Gross operating surplus and mixed income	39806	20664	196682	669332	93463	25891	78649	23789	43521	32760	68315	511583	24617	30893	51217	29678	22185		1963045	0	0	0	0	0	0	1,963,045
Taxes less subsidies on products and production	1824	1148	28688	49266	7185	14561	21844	9335	17033	3499	14519	39671	2487	2883	5066	2516	3631		225156	162388	0	21683	0	751	184822	409,978
Imports	14295	11620	649991	1063027	83279	53715	183153	59979	44662	9266	12960	123453	67879	24257	35462	22899	19904		2479799	767190	52542	261038	0	22047	1102816	3,582,616
Production	88708	53332	1669656	562671	432442	334125	667109	223964	285631	99910	223498	1218245	332518	282517	370911	115724	144206	5	7105173	1591674	326704	832858	394333	4820164	7965732	15,070,905
Industry contribution to GRP at mkt prices (does not incl taxes of quad 4)	52150	27356	498093	929209	177497	146929	316632	85414	130289	63257	140718	748357	186727	241495	292694	58582	102897									
% of total	1.24%	0.65%	11.86%	22.13%	4.23%	3.50%	7.54%	2.03%	3.10%	1.51%	3.35%	17.83%	4.45%	5.75%	6.97%	1.40%	2.45%				Gross Regional Product Expenditures					4,383,117
																	4198295				Gross Regional Product Income					4,383,117
																diff	-184822									
																					Rate of error					0.00%

EFT Penrith Input-Output Table

"000	Agriculture, Forestry and Fishing	Mining	Manufacturing	Electricity, Gas and Water Supply	Construction	Wholesale Trade	Retail Trade	Accommodation, Cafes and Restaurants	Transport and Storage	Communications Services	Finance and Insurance	Property and Business Services	Government Administration and Defence	Education	Health and Community Services	Cultural and Recreational Services	Personal and Other Services	Dummies, Site Construction, Exoge	T4 Total intermediate usage	Q1 Private final consumption expe	Q2 Government final consumption	Capital expenditure	Q6 Change in Inventories	Q7 Exports	T5 Total final demand	T6 Total supply
Agriculture, Forestry and Fishing	3833	4	13628	11	654	31	833	1742	28	2	26	520	223	7	57	1949	214		23761	19587	352	617	0	43028	63584	87345
Mining	8	515	6456	428	1386	45	41	91	20	4	5	240	99	4	75	189	52		9658	54	46	4726	0	51982	56809	66467
Manufacturing	2482	4152	325231	6705	100560	15741	31353	17370	18169	5764	1328	18281	13520	3957	9765	4587	6079		585045	168090	11016	60107	0	1043082	1282295	1867341
Electricity, Gas and Water Supply	230	620	15643	12519	1034	1144	3122	3950	1803	500	351	9642	1873	1737	2117	859	851		57996	47619	1104	1377	0	35422	85522	143518
Construction	201	747	432	312	1394	1894	432	5028	2356	41	147	10641	5226	63	290	72	99		29374	17	35608	419927	0	23802	479355	508729
Wholesale Trade	576	1312	37972	2416	22887	5880	17756	5818	8162	4110	515	5182	2610	2509	4866	1894	2321		126786	69061	67	64918	0	76902	210948	337734
Retail Trade	246	357	5791	675	8256	6625	18918	8600	11233	2086	1196	5917	485	270	1073	1289	1531		74545	611448	0	5054	0	82350	698851	773397
Accommodation, Cafes and Restaurants	144	324	10345	618	2544	6460	4461	890	2710	1624	2228	10776	4855	713	1353	1775	1531		53351	128622	2	0	0	50583	179207	232557
Transport and Storage	572	1276	45648	1013	12627	17472	4532	2375	34142	1910	694	6118	2627	912	1875	1906	1541		137240	51183	14069	3470	0	93075	161797	299036
Communications Services	114	294	4622	731	907	7683	11443	2863	4839	1655	2463	8396	4797	1132	2309	1734	2058		58042	23040	167	263	0	14217	37687	95729
Finance and Insurance	276	380	5283	3422	4981	5952	7896	3169	2931	1091	30085	17835	3930	1258	1778	1455	1088		92811	59488	66	380	0	53160	113093	205904
Property and Business Services	403	1407	41684	3261	43253	60563	59638	23672	22189	4438	8667	156521	13929	1925	11797	9468	8312		471127	537262	10535	30705	0	135889	714391	1185518
Government Administration and Defence	26	321	2951	292	1326	789	3103	203	7503	620	167	2456	24982	1332	733	154	368		47326	8495	302855	2564	0	20834	334749	382075
Education	6	40	1380	195	196	128	758	260	404	40	675	1694	1002	951	457	97	751		9034	78816	179301	557	0	69881	328555	337589
Health and Community Services	70	38	900	16	56	99	257	61	109	95	46	172	453	135	5204	371	297		8380	153650	232314	232	0	10647	396843	405223
Cultural and Recreational Services	4	7	421	8	7	506	1442	1110	82	35	353	2678	190	306	240	6686	224		14297	92822	8645	935	0	13914	116316	130613
Personal and Other Services	11	40	3293	197	406	328	2037	790	609	143	152	2633	1428	514	2623	377	876		16457	90727	57339	0	0	10303	158368	174824
Dummies, Site Construction, Exogenous Labour																		5	5	0	0	0	0	0	0	5
Total Intermediate Usage	9203	11832	521681	32819	202474	131341	168023	77991	117288	24158	49099	259704	82226	17725	46611	34861	28192	5	1815235	2139981	853486	595833	0	1829071	5418371	7,233,606
Compensation of employees	11985	9266	330443	22201	97692	107627	252022	58332	81346	30993	66863	239410	183690	248221	264780	29200	85005		2119078	0	0	0	0	0	0	2,119,078
Gross operating surplus and mixed income	58482	26581	261300	52888	95790	26171	86863	31273	26606	29382	70686	559706	27990	36917	42441	35592	23164		1491832	0	0	0	0	0	0	1,491,832
Taxes less subsidies on products and production	629	1229	30585	2298	8672	14718	25320	9093	19124	3057	8249	26514	3393	3444	6012	2780	5361		170477	420707	0	22625	0	1019	444350	614,827
Imports	7046	17559	723331	33311	104101	57877	241169	55869	54671	8140	11006	100185	84775	31283	45379	28180	33102		1636984	1562933	181277	246607	0	22047	2012865	3,649,848
Production	87345	66467	1867341	143518	508729	337734	773397	232557	299036	95729	205904	1185518	382075	337589	405223	130613	174824	5	7233606	4123621	1034764	865064	0	1852137	7875586	15,109,192
Industry contribution to GRP at mkt prices (does not incl taxes of quad 4)	71096	37076	622329	77388	202154	148516	364205	98697	127077	63431	145799	825629	215074	288581	313233	67572	113530									
% of total	1.88%	0.98%	16.46%	2.05%	5.35%	3.93%	9.63%	2.61%	3.36%	1.68%	3.86%	21.83%	5.69%	7.63%	8.28%	1.79%	3.00%				Gross Regional Product Expenditures					4,225,737
																	3781387				Gross Regional Product Income					4,225,737
																diff	-444350									
																					Rate of error					0.00%

EFT NSW Input Output Table

"000	Agriculture, Forestry and Fishing	Mining	Manufacturing	Electricity, Gas and Water Supply	Construction	Wholesale Trade	Retail Trade	Accommodation, Cafes and Restaurants	Transport and Storage	Communications Services	Finance and Insurance	Property and Business Services	Government Administration and Defence	Education	Health and Community Services	Cultural and Recreational Services	Personal and Other Services	Dummies, Site Construction, Exog	T4 Total intermediate usage	Q1 Private final consumption expe	Q2 Government final consumption	Capital expenditure	Q6 Change in Inventories	Q7 Exports	T5 Total final demand	T6 Total supply
Agriculture, Forestry and Fishing	589729	4269	5282634	887	47117	2214	60733	156565	8688	517	4183	49289	18232	430	9792	130399	18951		6384631	1254443	109125	374603	0	3601103	5339274	11723905
Mining	914	102535	460066	624874	91901	3041	1689	5976	3310	408	810	13761	4107	366	4310	11814	2291		1332172	2264	5473	299968	1	5266906	5574613	6906784
Manufacturing	478499	664859	16076484	446151	7029772	1426369	2609739	1961913	3552363	723562	208153	1734031	1038879	277165	683247	458775	530586		39900547	15764900	623289	4170383	-3	25508610	46067179	85967725
Electricity, Gas and Water Supply	25542	123322	1732549	968717	90730	129440	302910	390788	251697	57591	49702	835764	139897	141520	153810	80101	72209		5546289	3080880	81206	107989	-1	187439	3457513	9003802
Construction	30368	94604	38123	30165	93726	126473	28521	329845	205605	4324	20359	734367	342948	4187	19287	6730	6583		2116215	1150	2335205	28491366	-1	1012624	31840345	33956560
Wholesale Trade	112755	202521	3240356	203955	1545167	392322	1184707	388170	819209	438854	71642	459470	174110	167375	324650	167863	154879		10048004	4607838	4479	4331438	0	3542272	12486027	22534031
Retail Trade	40791	59055	462384	66508	550335	442037	877833	536783	677014	222674	169439	413149	20032	12037	49983	80718	73655		4754427	24938607	0	296888	-1	1479379	26714872	31469299
Accommodation, Cafes and Restaurants	22774	37616	1089327	54445	170242	431018	278439	55523	311537	173427	315244	971754	303024	44523	84453	152767	95540		4591654	8028447	111	0	0	1895750	9924308	14515962
Transport and Storage	93219	196620	4255805	121661	941822	2254957	475833	216307	3460994	402126	186438	1098923	410042	85744	148902	197651	114823		14661870	4178398	1554034	233291	1	7019594	12985317	27647187
Communications Services	24400	53583	595738	81228	96847	820338	1221773	305705	677654	176671	368016	938401	512142	120873	246491	213238	219678		6672776	2459880	17825	28133	0	1042054	3547892	10220668
Finance and Insurance	77792	169546	946873	476508	722963	890068	1169492	503794	597823	157234	5349638	2581619	610370	171533	255991	245995	155425		15082665	9398716	9117	58266	0	7482076	16948174	32030838
Property and Business Services	77304	301400	4268207	421480	3587467	5055981	4758222	1807782	3037922	505251	1308472	11485780	1463552	170171	932949	889918	754349		40826205	28190018	1217919	3494038	-1	5718103	38620078	79446283
Government Administration and Defence	3913	28566	255195	14137	88685	52645	128416	12678	469703	66242	25222	203882	971494	51612	30922	11227	16883		2431421	329048	12079939	161508	0	158826	12729320	15160741
Education	699	3330	82933	15768	13154	8574	31346	16245	43626	4234	96493	136904	39244	34322	19166	8656	32295		586990	2894175	6944889	35088	0	1725773	11599925	12186915
Health and Community Services	8141	73526	72991	872	3663	6618	11101	3792	13956	10186	6589	13296	19949	5798	223409	21293	13283		508464	6527138	9946998	14620	0	299874	16788630	17297094
Cultural and Recreational Services	1012	1256	101403	1386	1223	89072	255165	170239	19951	6502	66261	473987	28213	35007	19913	675389	25290		1971269	4678539	811281	161376	0	1267596	6918792	8890061
Personal and Other Services	2009	18095	224666	16192	27012	21895	92146	49299	44177	15221	21637	202668	62454	23243	124784	33041	41296		1019835	4106512	2375648	0	0	161148	6643308	7663143
Dummies, Site Construction, Exogenous Labour																		5	5	0	0	0	0	0	0	5
Total Intermediate Usage	1589862	2134703	39185734	3544935	15101827	12153064	13488066	6911404	14195228	2965025	8268298	22347044	6158690	1345905	3332060	3385575	2328016	5	158435439	120440952	38116538	42258955	-6	67369127	268185566	426621005
Compensation of employees	1342000	1481999	14126000	1480001	6470000	7181003	10328662	3641000	7559000	3309000	10654000	20787000	7280331	8960732	11328000	2311000	3628000		121867728	0	0	0	0	0	0	121867728
Gross operating surplus and mixed income	8475338	2708000	11902764	3171000	6420000	1746144	3462433	1952000	2566000	3137000	11061000	32477000	1119884	1332684	1818000	2346000	1058000		96753246	0	0	0	0	0	0	96753246
Taxes less subsidies on products and production	82739	103527	1390232	172203	577844	982011	1036950	567566	1472973	326332	1316792	1646286	117932	124321	255877	178297	231355		10583240	15448600	0	1362681	0	320155	17131436	27714677
Imports	233965	478555	19362996	635664	5386888	471809	3153188	1443993	1853986	483312	730748	2188953	483904	423273	563157	669189	417771		38981352	15532249	1963144	8804484	0	396108	26695985	65677337
Production	11723905	6906784	85967725	9003802	33956560	22534031	31469299	14515962	27647187	10220668	32030838	79446283	15160741	12186915	17297094	8890061	7663143	5	426621005	151421801	40079682	52426119	-6	68085391	312012988	738633992
Industry contribution to GRP at mkt prices (does not incl taxes of quad 4)	9,900,078	4,293,527	27,418,996	4,823,204	13,467,844	9,909,158	14,828,045	6,160,566	11,597,973	6,772,332	23,031,792	54,910,286	8,518,147	10,417,737	13,401,877	4,835,298	4,917,355									
% of total	4.32%	1.87%	11.96%	2.10%	5.88%	4.32%	6.47%	2.69%	5.06%	2.95%	10.05%	23.96%	3.72%	4.55%	5.85%	2.11%	2.15%				Gross Regional Product Expenditures					246335650
																	229204214				Gross Regional Product Income					246335650
																	-17131436				Target GSP					249760000
																					Rate of error					-1.39%

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