LOCAL ECONOMIC ANALYSIS IN KWAZULU-NATAL[1]

Coetzee, Clive
KwaZulu-Natal Provincial Government Treasury Department
Treasury House
9th Floor
145 Commercial Street
Pietermaritzburg
3200
South Africa
Telephone (033) 897-4538
Fax (033) 897-4580
clive.coetzee@kzntreasury.gov.za

[1] **This is Chapter 7 from my PHD Thesis**

7.1 Introduction

The following is a demonstration and application of the various approaches and methods of local economic analysis as identified and discussed in chapters 2, 3, 4 and 5. The different methods will not be applied to each local economy but to one local economy only. This does not mean that each method cannot be applied to each local economy, however. The following table indicates which approaches or methods will be applied to which local economy. It must be noted that there is no particular reason why a particular approach or method are applied to a particular local economy. The process is purely random starting with the Ethekwini local economy, then the Msunduzi local economy followed by the Umhlathuze local economy. The Hibiscus Coast and Newcastle local economies are not used simple because there is less data available for them and therefore for comprehensiveness and completeness they are excluded.

Table 7.1: Method Application per Local Economy

Table	Approach or Method	Local Economy
7.2	Road Distance Matrix	All five
7.3	Population per Road Distance Matrix	All five
	Travel Costs in Comparison	All five
	Location Quotients	Ethekwini
	Minimum Requirements	Ethekwini
	Diversity	Msunduzi
	Competition	Umhlathuze
	Shift Share Analysis	All five
	National Share as a % of Total Employment Added per Sector	All five
	Industry Mix as a % of Total Employment Added per Sector	All five
	Local Share as a % of Total Employment Added per Sector	
	Growth in Value Added	All five
	Economic Profile	Msunduzi
	Local Economic Indicators	All five
	Business Confidence Survey	Ethekwini
Diagram		
	Size and Travel Time and Cost	All five
Graph		
	Lorenz curves	All five
	Population Growth and 1996 City Size	All five

	Zipf's Law	All five
	Comparative Location Quotients	All five
	Comparative Minimum Requirements	All five
	Comparative Diversity	All five
	Comparative Competition	All five
	Business Confidence Index	Umhlathuze

7.2 City Size and Distribution Analysis

The table below (table 7.2) indicates the road distance between the different local economies. The Ethekwini and Msunduzi local economies are the closest to each other whilst the Newcastle and Hibiscus Coast local economies are the farthest from each other. The two largest local economies are the closest to each other whilst the two smallest local economies are the farthest from each other as indicated in table 7.3.

Table 7.2: Road Distance Matrix

km	Ethekwini	Msunduzi	Umhlathuze	Hibiscus Coast	Newcastle
Ethekwini	0	77	172	117	333
Msunduzi	77	0	272	173	256
Umhlathuze	172	272	0	302	417
Hibiscus Coast	117	173	302	0	429
Newcastle	333	256	417	429	0

(own calculations)

Table 7.3: Population per Road Distance Matrix

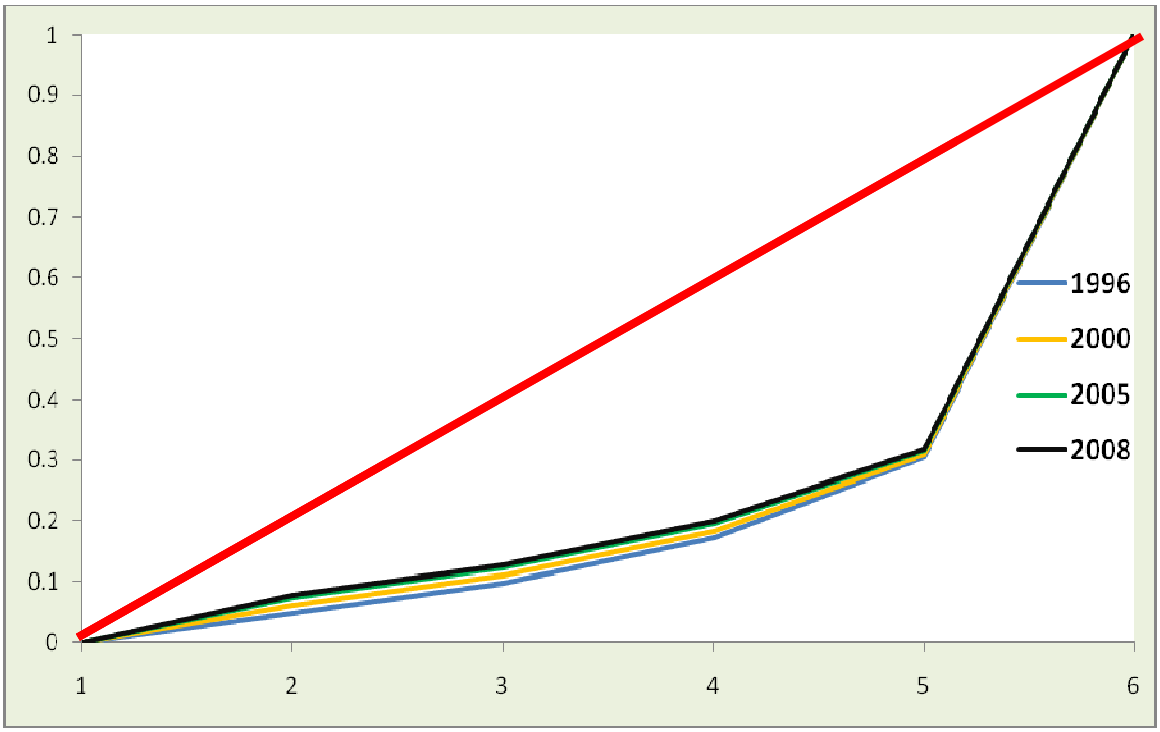
	Ethekwini	Msunduzi	Umhlathuze	Hibiscus Coast	Newcastle
Ethekwini	0	43,400	19,429	28,562	10,035
Msunduzi	7,451	0	2,109	3,316	2,241
Umhlathuze	2,241	1,109	0	1,276	924
Hibiscus Coast	1,888	1,277	785	0	553
Newcastle	1,008	1,311	873	849	0

(data supplied by Global Insight, own calculations)

The Lorenz curves for the five local economies are displayed in the below graph (graph 7.1). The vertical axis represents the cumulative population distribution of the total population of the five local economies and the horizontal axis represents the

five local economies. The red linear line represents equality in the population distribution and the non-linear lines represent the level of inequality in the population distribution for the stated periods.

Graph 7.1: Lorenz Curve for the Five Local Economies



(data supplied by Global Insight, own calculations)

The data demonstrate starkly how the size distributions of the local economies have not changed noticeably over the period even during the 2003 to 2007 economic boom period. This suggests that the relative population distributions for the five local economies have stayed fairly constant over the period. However it is also very clear that the size distributions are very unequal, i.e., there is a significant concentration of the population in one of the local economies (about 70 percent) where as the other four have similar but very smaller population sizes (cumulatively about 30 percent).

Graph 7.2 displays the average annual population growth rates of the five local economies from 1996 to 2008 and the initial population size of each local economy in 1996. The vertical axis and the red points represent the average annual population growth rate for the period whilst the horizontal axis represents the population size (in thousands) of each of the five local economies in 1996.

It is possible to estimate the regression line or function using the following equation:

$$\mathbf{Y_t = \alpha + \beta X_t + \varepsilon_t} \qquad \text{(eq 7.1)}$$

where:

Y_t = average annual population growth rate (1996 to 2008)
X_t = population in 1996 (‘000)
ε_t = error term

The coefficients will be estimated using Ordinary Least Squares (OLS) and regression makes use of cross-sectional data. It must be stated that because only five local economies are included there will only be five observations which suggests the regression will suffer serious limitations. It becomes then very difficult to say anything about the usefulness of the estimated coefficients. Despite the serious limitations an attempt will never the less be made given that the purpose of the chapter is to show what is possible rather than to derive statistical significant conclusions about the relationships. The application will therefore be for illustrative purposes rather than for inference or estimation purposes.

The descriptive statistics of the cross section is displayed in the table below. The normality test (Jargue-Bera) indicates that the variables are normally distributed (p>0.05).

Table 7.4: Descriptive Statistics of the Cross-Section

	Y	X
Mean	2.133250	811.4618
Median	1.433981	298.4567
Maximum	5.654030	2817.420
Minimum	0.485097	199.7055
Std. Dev.	2.020068	1130.011
Skewness	1.300771	1.445024
Kurtosis	3.032345	3.171047
Jarque-Bera	1.410223	1.746173

Probability	0.494054	0.417660
Observations	5	5

The results of the regression are displayed in the table below. The test statistics (t-Statistics and adjusted R-squared) shows that the α and β coefficients and the regression function is not statistical significant. However it's not possible to draw any inference from the regression given the limitations as mentioned earlier.

Table 7.5: Regression Function

Dependent Variable: Y
Method: Least Squares
Sample: 1 5
Included observations: 5

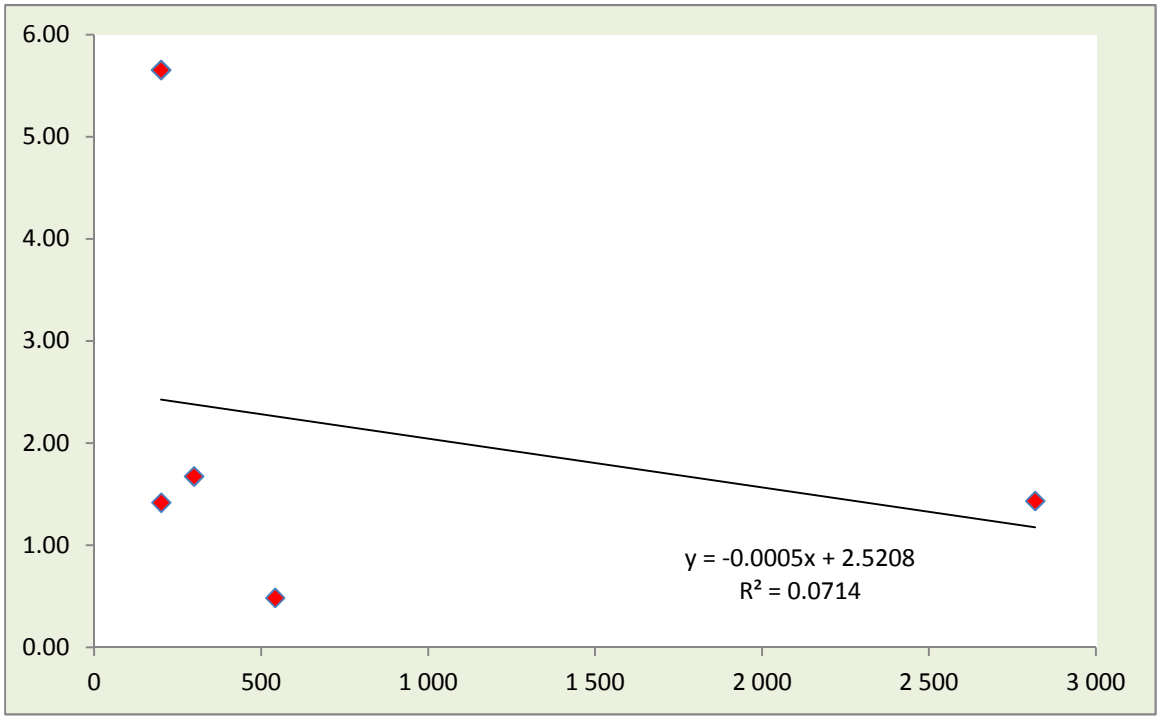
Variable	Coefficient	Std. Error	t-Statistic	Prob.
X	-0.000478	0.000995	-0.480177	0.6639
C	2.520787	1.289139	1.955404	0.1455

R-squared	0.071371	Mean dependent var	2.133250
Adjusted R-squared	-0.238172	S.D. dependent var	2.020068
S.E. of regression	2.247794	Akaike info criterion	4.746950
Sum squared resid	15.15773	Schwarz criterion	4.590725
Log likelihood	-9.867374	F-statistic	0.230570
Durbin-Watson stat	1.539248	Prob(F-statistic)	0.663939

However let's assume that it was indeed possible to infer from the regression then the regression line implies or suggests that there is a very modest negative relationship between initial size of the local economy and the population growth rate during that period. However the regression line is not statistical significant as per the statistical test and thus it's not possible to argue, as expected, that the smaller the initial population size the faster does the population increase and vice-versa.

However the graph does suggest that the average annual population growth rates four of the local economies have not been that dissimilar from one another support the findings of a constant level of inequality in the population distributions amongst the five local economies for the period.

Graph 7.2: Population Growth Rates and 1996 Cities Size



(data supplied by Global Insight, own calculations)

"Zipf's Law" is the name of a remarkable regularity in the distribution of city sizes all over the world, also known as the "Rank-Size Distribution", according to Brakman, et all (2009). They argue further that the remarkable log-linear relationship of the city-size distribution holds for virtually all countries. The process involves assigning ranks based on population size to each of the local economies, for example the local economy with the largest population size is given a rank number of 1 and so forth. If the natural logarithm of the rank and of the city size (measured in terms of the number of people) are calculated and then plotted in a diagram it will show a remarkable log-linear pattern, i.e., the Rank-Size Distribution. If the slope of the line equals minus 1 the relationship is known as Zipf's Law. The graph below (vertical axis = log of population and horizontal axis = log of rank) indicates the distribution of the five local economic sizes and the regression line. The regression equation is as follows:

$$Y_t = \alpha + \beta X_t + \varepsilon_t \qquad \text{(eq 7.2)}$$

where:

Y_t = log of the rank

X_t = log of population size in 2008

ε_t = error term

The coefficients will be estimated using Ordinary Least Squares (OLS) and the regression makes use of cross-sectional data. However the situation here will be exactly similar to the previous situation in that only five observations are included. Never the less the regression function will be estimated and applied for illustrative purposes.

The descriptive statistics of the cross section is displayed in the table below. The normality test (Jargue-Bera) indicates that the variables are normally distributed ($p>0.05$).

Table 7.6: Descriptive Statistics of the Cross-Section

	Y	X
Mean	0.958000	13.26600
Median	1.100000	12.86000
Maximum	1.610000	15.02000
Minimum	0.000000	12.38000
Std. Dev.	0.636687	1.028873
Skewness	-0.582438	1.164839
Kurtosis	2.022286	2.830976
Jarque-Bera	0.481846	1.136660
Probability	0.785902	0.566471
Observations	5	5

The results of the regression are displayed in the table below. The test statistics (t-Statistics and adjusted R-squared) shows that the α and β coefficients and the regression function is indeed statistical significant. However it's not possible to draw any inference from the regression given the limitations as mentioned earlier.

Table 7.7: Regression Function

Dependent Variable: Y
Method: Least Squares
Sample: 1 5

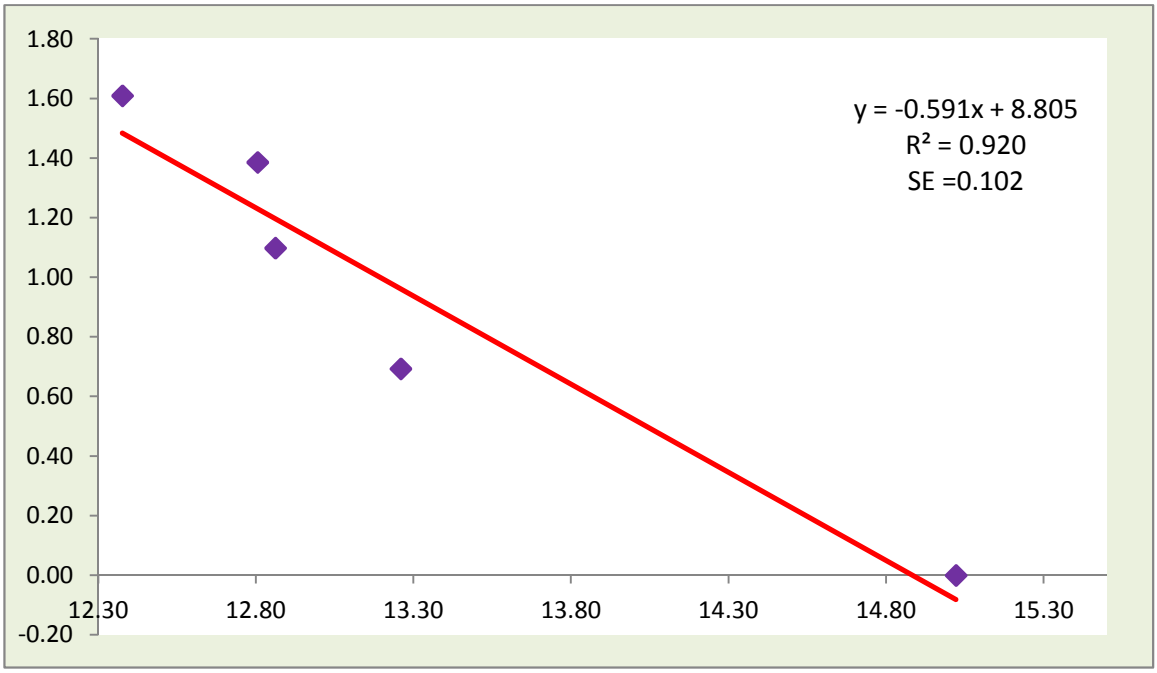
Included observations: 5

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X	-0.593021	0.102085	-5.809111	0.0102
C	8.825014	1.357509	6.500889	0.0074

R-squared	0.918358	Mean dependent var	
Adjusted R-squared	0.891144	S.D. dependent var	
S.E. of regression	0.210064	Akaike info criterion	
Sum squared resid	0.132381	Schwarz criterion	
Log likelihood	1.984081	F-statistic	
Durbin-Watson stat	1.691927	Prob(F-statistic)	

However let's assume that it was indeed possible to infer from the regression then the regression line implies or suggests that the Rank-Size Distribution is indeed statistical significant. The result is a slope that is indeed statistical significant equal to 1 indicating that the local economies are as evenly distributed as per the prediction. The local economies are thus characterized by a largest local economy, with other local economies decreasing in size respective to it, initially at a rapid rate and then more slowly.

Graph 7.3: Zipf's Law, 2008



(data supplied by Global Insight, own calculations)

What limits city size? Hypothesizing that agglomeration occurs due to scale economies in production of a city's traded good. Mills demonstrates that activity

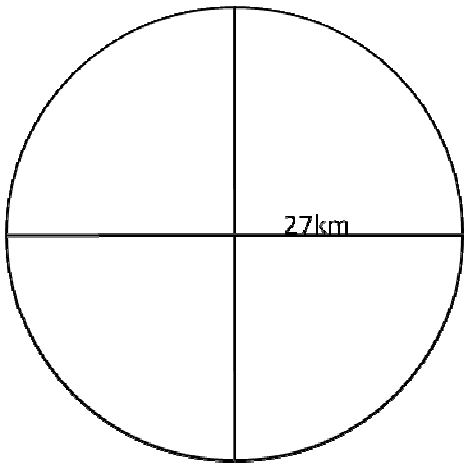
associated with traded good production involves increasing per unit resource costs. In particular, workers employed in traded good production must be housed. Mills assumes traded good production occurs in the Central Business District (CBD) and housing is located around the CBD. People commute from their homes to work and back daily. As city size and the area devoted to housing increase spatially, the average distance a worker commutes and congestion necessarily increase. Therefore the per person resource costs of commuting in terms of workers 'time and expenditure on transportation facilities increase with city size. Efficient city size is achieved when these increasing per person resource costs offset the initial resource savings due to scale economy exploitation in trade's good production.

The below diagrams displays the size of each local economy in circular format, i.e., monocentric or polycentric model format. The radius is displayed for each local economy. The travel time and cost statistics for each local economy is also displayed. The costs are based on the Automobile Association of SA rates.

The travel cost is based on travelling between the outer edge of the city to the CBD and back. For example the total costs of travelling between the outer edged and the CBD in Newcastle will be about R50 000 per annum.

Diagram 7.1: Size and Travel Time and Cost for each Local economy

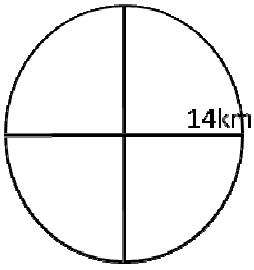
eThekwini



km	27.00
km/h	60
Travel Time	27.00
Total km's per Month	1,080
Total km's per Year	11,881
Fix Costs per km	3.38
Running Cost per km	1.22
Total Travel Costs	54,651

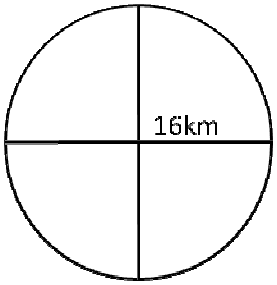
Msunduzi

km	14.22
km/h	60



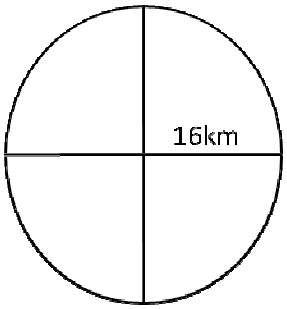
Travel Time	14.22
Total km's per Month	569
Total km's per Year	6,256
Fix Costs per km	3.38
Running Cost per km	1.22
Total Travel Costs	28,775

uMhlathuze



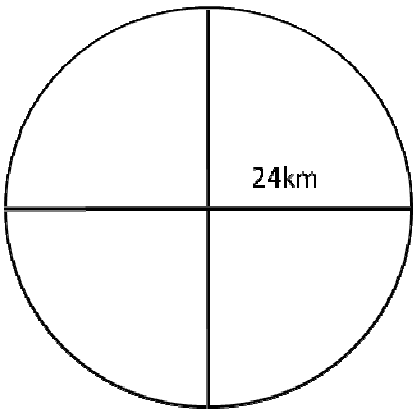
km	15.65
km/h	60
Travel Time	15.65
Total km's per Month	626
Total km's per Year	6,884
Fix Costs per km	3.38
Running Cost per km	1.22
Total Travel Costs	31,666

Port Shepstone



km	16.27
km/h	60
Travel Time	16.27
Total km's per Month	651
Total km's per Year	7,160
Fix Costs per km	3.38
Running Cost per km	1.22
Total Travel Costs	32,938

Newcastle



km	24.31
km/h	60
Travel Time	24.31
Total km's per Month	972
Total km's per Year	10,694
Fix Costs per km	3.38
Running Cost per km	1.22
Total Travel Costs	49,193

1cm = 1 km

(data supplied by Coetzee, own calculations)

The below table indicates the travel costs as calculated above as a per cent of total income per capita and the travel costs as a per cent of GDP per capita for each of the local economies. The per capita is not the total population put only the number of people formally employed. For example the travel costs in the Ethekwini economy accounts for almost 28 per cent of total personal income and just over 31 per cent of GDP per person. This seems significantly high.

Table 7.8: Travel Costs in Comparison

	Income Per Capita	GDP per Capita	Travel Cost at Edge	Travel Cost as a % of Income per Capita	Travel Cost as a % of GDP per Capita
Ethekwini	198,594	175,968	54,651	27.52	31.06
Msunduzi	233,453	139,464	28,775	12.33	20.63
Umhlathuze	249,006	139,241	31,666	12.72	22.74
Hibiscus Coast	250,409	114,093	32,938	13.15	28.87
Newcastle	184,876	118,748	49,193	26.61	41.43

(data supplied by Global Insight, own calculations)

7.3 Economic Structure Analysis

7.3.1 Economic Base Approach

The table below indicates the location quotients for the Ethekwini Local economy. The "benchmark" economy is taken to be the national economy as the closest available approximation to a self-sufficient economy. Assuming the national economy is self-sufficient, then a location quotient greater than one means that the local economy has more than enough employment in industry i to supply the local economy with its product. A location quotient less than one suggest that the local economy is deficient in industry i and must import its product if the area is to maintain normal consumption patterns. The location quotients for each industry can be estimated using the following equation:

$$b_i = [(e_i / E_i) - (e_t / E_t)] \times E_i \qquad \text{(eq 7.3)}$$

where:

b_i : basic employment in local economy industry i

e_i : total employment in local economy industry i

E_i : national employment in industry i

e_t : total local economy employment

E_t : total national employment

The table below clearly indicates the surplus and deficit industries in the Ethekwini economy and suggests that the Ethekwini economy has a comparative advantage in the manufacturing and transport industries. This is somewhat unsurprising given that the Ethekwini economy is home to the largest and busiest port in Africa.

Table 7.9: Ethekwini Location Quotients

Industry	1996	1998	2000	2004	2006	2008	Average	StDev
Agriculture, forestry and fishing	0.21	0.20	0.20	0.19	0.19	0.18	0.19	0.01
Mining and quarrying	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Manufacturing	1.78	1.77	1.81	1.81	1.73	1.70	1.77	0.05
Electricity, gas and water	0.88	0.88	0.86	0.84	0.82	0.81	0.85	0.03
Construction	0.93	0.93	0.92	0.94	0.93	0.92	0.93	0.01
Wholesale & retail trade; hotels & restaurants	0.89	0.89	0.87	0.89	0.89	0.88	0.89	0.01
Transport , storage and communication	1.36	1.37	1.33	1.34	1.33	1.32	1.34	0.02
Finance, real estate and business services	1.18	1.18	1.16	1.15	1.14	1.13	1.16	0.02
Personal and General Government Services	0.97	0.97	0.97	0.97	0.97	0.98	0.97	0.00
Average	0.91	0.91	0.90	0.90	0.89	0.88	0.90	

(data supplied by Global Insight and Coetzee, own calculations)

Surplus or export (deficit or shortage) employment in industry i for the Ethekwini economy is calculated and indicated in the table below. The values is simple the difference between the actual industry employment and the necessary employment. The minimum requirements for each industry can be estimated using the following equation:

$$b_i = [(e_i / e_t) - (em_i / em_t)] \times e_t \qquad \text{(eq 7.4)}$$

where:

b_i = basic employment in local economy industry i
e_i = total employment in local economy industry i
e_t = total local economy employment
em_i,em_t = share of industry i in minimum share area

The manufacturing and transport industry competitive advantage argument is also evident in the table 7.10 in that the manufacturing sector in the Ethekwini economy employed an average an additional 80 900 people per annum. This is because it's a major export industry. On the other hand it has to import agriculture related goods and services forfeiting on average about 50 400 jobs per annum. The manufacturing industry is said to be "basic" industry and is considered highly valuable for economic development compared to the agriculture industry which is said to be a non-basic industry.

Table 7.10: Ethekwini Minimum Requirements

Industry	1996	2000	2004	2008	Average	StDev
Agriculture, forestry and fishing	-52,960	-51,145	-49,627	-47,858	-50,398	2,173
Mining and quarrying	-42,293	-30,934	-33,701	-37,775	-36,176	4,953
Manufacturing	85,024	77,710	79,251	81,410	80,849	3,170
Electricity, gas and water	-689	-761	-1,019	-1,150	-905	216
Construction	-1,697	-2,075	-2,141	-3,370	-2,321	726

Wholesale & retail trade; hotels & restaurants	-9,201	-12,288	-12,113	-15,806	-12,352	2,703
Transport , storage and communication	13,012	11,186	10,994	11,996	11,797	919
Finance, real estate and business services	9,646	10,263	12,153	14,647	11,677	2,249
Personal and General Government Services	-3,979	-4,072	-4,888	-3,516	-4,114	570
Average	-349	-235	-121	-158	-216	

(data supplied by Global Insight and Coetzee, own calculations)

The economic base model says that there are some employment in a region which is serving the local market and some employment which is independent of the local market. This latter employment is called Basic Employment. The other employment is called Local-Market-Serving Employment. Local-Market-Serving Employment would include employment in the supermarkets, department stores, medical offices, movie theatres, local government offices and schools. Basic Employment includes, but is not limited to, employment in industries that exports their products outside of the region. An example of basic employment that is not an export industry per se is tourism. In a sense tourism is sort of a special type of export industry.

The economic base model can be formulated algebraically and is very similar to macroeconomic models. There is an employment multiplier analogous to the Keynesian multiplier in macroeconomic models. The economic base model is as follows:

$$\mathbf{T = B + L} \qquad \text{(eq 7.5)}$$

where:

T = total employment

B = Base employment

L = Local-market-serving employment

If local-market-serving employment is proportional to total employment then the formula can be rewritten as follows

T = kB (eq 7.6)

where the employment multiplier k=1/(1-c) and c = L/T

The average multiplier for the period is calculated to be 6.57. This suggests that for every new job in the basic sector there will be an additional 6.57 job created in the non-basic sector in the Ethekwini economy.

7.3.2 Economic Structure Approach

The concentration index, the diversity index and a sector competition index can be used to measure or determine the economic structure of a local economy. These indices require the use of employment data which will be sourced from Global Insight and Statistics SA. The data will be in yearly time series format ranging 1996 to 2008.

The concentration index is similar to the location quotients as calculated earlier, i.e., the same formula is used in both calculations. The concentration index measures how specialized a local economy is in an industry relative to what one would expect if employment in that industry was scattered randomly across the country. A value greater than 1 indicates that the particular industry is over represented in the local economy whereas a value less than 1 indicate under representation of the particular industry.

To address Jacobs's theory, according to Glaeser, et al, (1992:1144), we need a measure of a variety of industries in the local economy outside the industry in question. The measure used is the fraction of the local economies employment in the largest five industries other than the industry in question accounted for in 1996. The lower this ratio, the more diversified the local economy is and therefore the faster the industry in question should grow, according to Jacobs.

Diversity in a local economy can be measured by the following equation:

$$Diversity_{ic} = 1 - \sum_{k \neq i} s_{kc}^2$$ (eq 7.7)

where:

the dependent variable = diversity in industry i in city c

S_{kc} = the employment (or output) share of industry k in city c

The values of this ratio per industry for the Msunduzi economy are indicated in the table below and suggest amongst others that the Personal and General Government Services industry has a fairly high value indicating some concentration of activity towards the industry. This is unsurprising given that the Msunduzi economy incorporate the capital city of the province. However in general if the mentioned sector is excluded the local economy is fairly well diversified, i.e., it seems to have a variety of industries of similar size.

Table 7.11: Msunduzi Diversity

Industry	1996	1998	2000	2004	2006	2008	Average	StDev
Agriculture, forestry and fishing	0.04	0.03	0.03	0.03	0.03	0.02	0.03	0.00
Mining and quarrying	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manufacturing	0.29	0.25	0.22	0.20	0.19	0.18	0.22	0.04
Electricity, gas and water	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Construction	0.03	0.03	0.03	0.03	0.04	0.04	0.03	0.00
Wholesale & retail trade; hotels & restaurants	0.12	0.13	0.12	0.13	0.15	0.14	0.13	0.01
Transport , storage and communication	0.06	0.06	0.05	0.04	0.04	0.04	0.05	0.01
Finance, real estate and business services	0.11	0.12	0.12	0.15	0.16	0.17	0.14	0.02
Personal and General Government Services	0.35	0.41	0.47	0.48	0.46	0.47	0.44	0.05
Average	0.11	0.12	0.12	0.12	0.12	0.12		

(data supplied by Global Insight and Coetzee, own calculations)

The measure of local competition of an industry in a city is the number of firms per worker in this industry in this city relative to the number of firms per worker in this industry in the province. Unfortunately the number of firms in the city-industries and province-industries is not available. Because of the availability of only a limited number of variables, the "best" alternative to the number of firms with regard to the measuring of competition is gross operating surplus. Gross operating surplus (GOS) is defined by EuroStat as follows:

> Gross operating surplus is the surplus generated by operating activities after the labour factor input has been recompensed. It can be calculated from the value added at factor cost less the personnel costs. It is the balance available to the unit which allows it to recompense the providers of own funds and debt, to pay taxes and eventually to finance all or a part of its investment.

(Source: EuroStat, http://stats.oecd.org/glossary/detail.asp?ID=1178)

It represents to an extent economic or abnormal profit and thus the level of competition within the particular industry. The measure of the degree of competition in the city-industry is therefore the GOS per employee relative to the GOS per employee in the province. A value greater than 1 means that this city-industry generates more GOS per employee relative to its size in the city than it does in the province. One interpretation of the value greater than 1 is that the industry in the city is locally less competitive than it is elsewhere in the province. In a liberal interpretation of Porter a lower value of this measure of competition should be associated with faster growth.

$$\mathbf{comp_{ic} = (gos_{ic}/ump_{ic})/(gos_{in}/ump_{in})} \qquad \text{(eq 7.8)}$$

where:

gos_{ic} = gross operating surplus in industry i in local economy c
ump_{ic} = total employment in industry i in local economy c
gos_{in} = gross operating surplus in industry i in national economy

ump_{in} = total employment in industry i in national economy

The values per industry for the Umhlathuze economy are indicated in the table below suggesting amongst others that the local economy manufacturing industry is less competitive than the manufacturing industry nationally. In fact the fast majority of local economy industries are less competitive than on a national level. This could be because of the relative isolation of the local economy and also because of the presence of a very concentrated manufacturing industry.

Table 7.12: Umhlathuze Competition

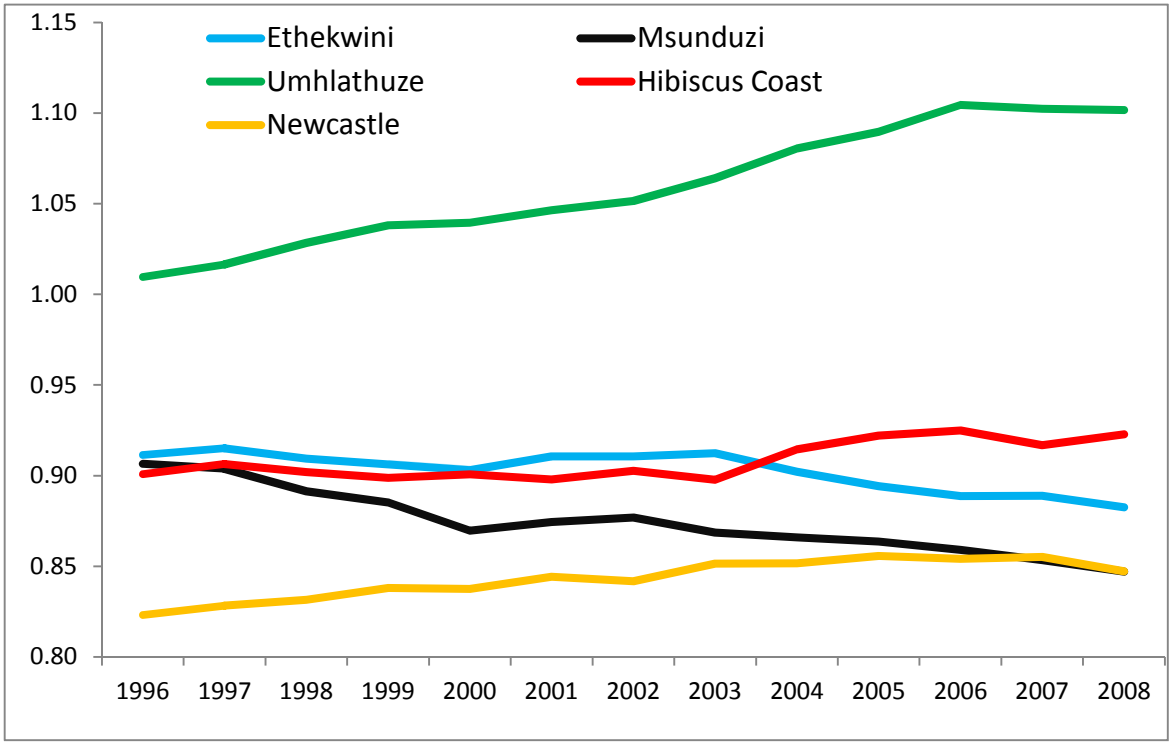
Industry	1996	1998	2000	2004	2006	2008	Average	StDev
Agriculture, forestry and fishing	1.07	1.08	1.00	0.77	0.80	0.57	0.88	0.20
Mining and quarrying	2.97	3.27	3.43	1.63	1.32	2.39	2.51	0.88
Manufacturing	6.17	5.77	5.21	4.00	3.37	2.85	4.56	1.35
Electricity, gas and water	0.41	0.40	0.38	0.29	0.25	0.23	0.33	0.08
Construction	1.48	1.34	1.23	1.26	1.23	1.21	1.29	0.10
Wholesale & retail trade; hotels & restaurants	1.30	1.19	1.18	1.01	0.96	0.95	1.10	0.15
Transport , storage and communication	1.68	1.43	1.30	1.02	1.08	1.29	1.30	0.24
Finance, real estate and business services	1.44	1.28	1.16	0.97	0.96	0.84	1.11	0.23
Personal and General Government Services	1.52	1.37	1.20	1.07	0.97	0.91	1.17	0.24
Average	2.01	1.90	1.79	1.34	1.22	1.25		

(data supplied by Global Insight and Coetzee, own calculations)

Graph 7.4 indicates the comparative location quotients for the five local economies from 1996 to 2008. The vertical axis represents the location quotients of the five local economies where values greater than 1 corresponding to highly concentrated or export economies and values less than 1 corresponding to less concentrated or

import economies. The location quotients are for the local economy as a whole. The graph shows that the location quotient for the Umhlathuze economy has increased robustly over the period suggesting that the Umhlathuze economy has become more specialized or concentrated over the period. This increased in specialization has supported growth and employment creation where as the opposite is true for the Ethekwini and Msunduzi economies which experienced decreasing location quotients over the period. These findings are very similar to the findings of Gleaser at all (1992) as discussed in chapter 3 and are based on that particular methodology.

Graph 7.4: Comparative Location Quotients

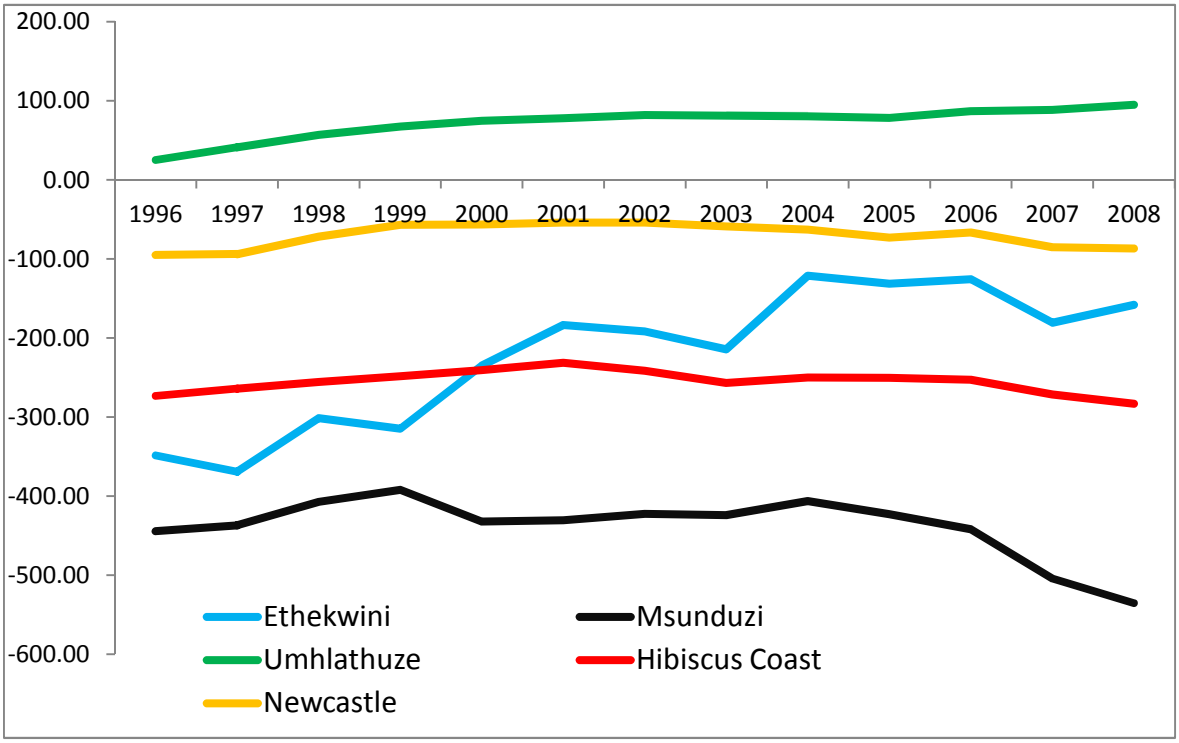


(data supplied by Global Insight and Coetzee, own calculations)

The location quotient findings are supported by the minimum requirement findings as displayed in graph 7.5. As indicated earlier the minimum requirements results represents the surplus or export (deficit or shortage) employment. The vertical axis represents the total additional employment for the local economy as a whole over the period. For example it is clear that the Umhlathuze economy added or created on average about 100 jobs per annum more or additional because of the increased specialization or concentration. One the other hand the Msunduzi economy on

average forfeited about 400 jobs because of the lack of specialization and concentration. The results also suggest that the Umhlathuze economy on average had greater exports relative to its imports. The opposite occurred in the Msunduzi local economy.

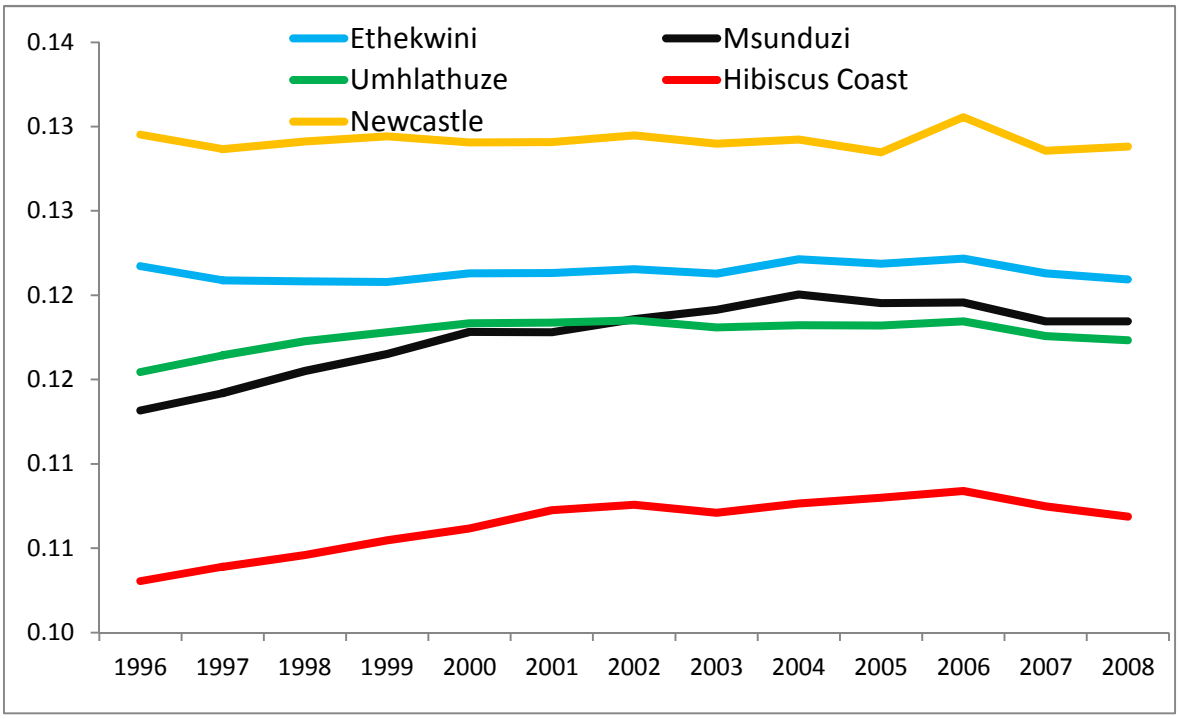
Graph 7.5: Comparative Minimum Requirements



(data supplied by Global Insight and Coetzee, own calculations)

Graph 7.6 indicates the diversity findings of the five local economies over the period using the Almeida (2006) methodology as discussed in chapter 3. The vertical axis represents the diversity values over the period for each local economy where values near zero corresponding to highly diverse or heterogeneous economies and values near one corresponding to more homogeneous economies. The findings suggest that there are various sectors of al approximately the same size in the Newcastle economy and that this stayed fairly constant over the period. On the other hand the level of diversity in the Hibiscus Coast economy is fairly high with the various industries varying in size. It also suggests that are a large number of very small firms in the Umhlathuze economy vis-à-vis the Newcastle economy for example.

Graph 7.6: Comparative Diversity

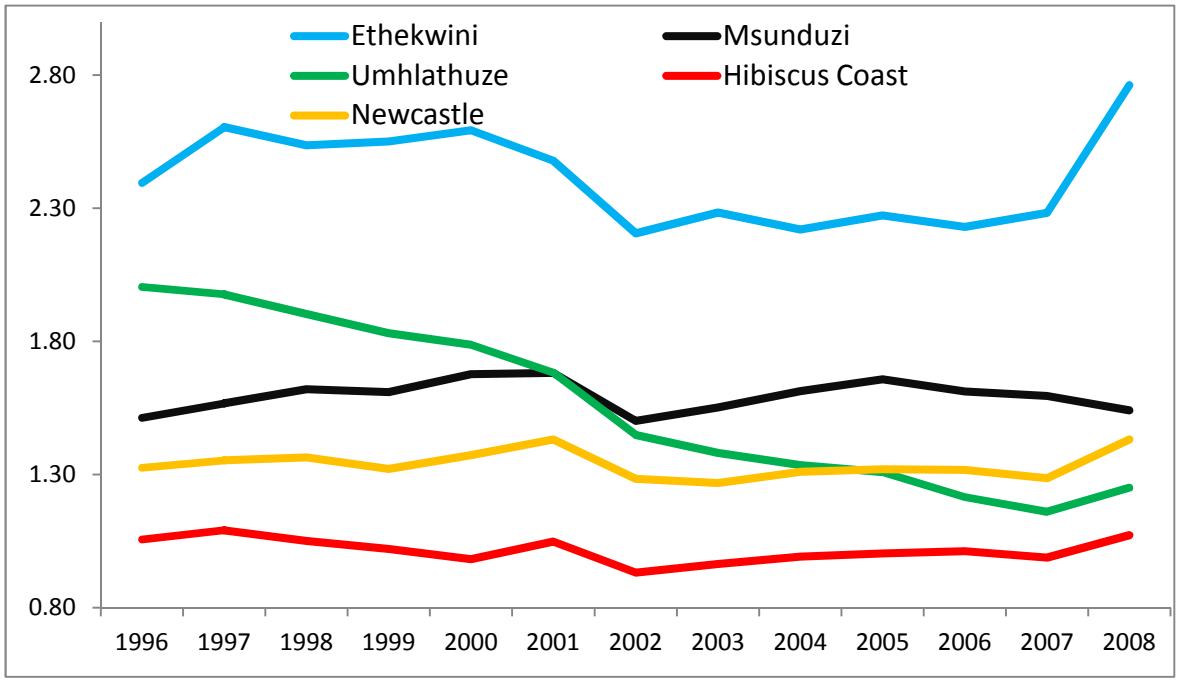


(data supplied by Global Insight and Coetzee, own calculations)

Graph 7.7 displays the competition values of the five local economies over the period. The vertical axis represents the competition values of the five local economies where values greater than 1 corresponding less competitive economies and values less than 1 corresponding to more competitive economies. The findings suggest that the Hibiscus Coast economy are characterised by high competitiveness compared to the national economy whilst the opposite is true for the Ethekwini economy. Increases in the values in generally indicate a decrease in competition and an increase of market power relative to the national economy, whereas decreases indicate the opposite.

The location quotient, diversity and competition approaches or methodologies can thus be used to derive and show each local economies unique structural dynamics and characteristics. These unique structural dynamics and characteristics in turn give some idea on the growth potential or internal growth dynamics of each local economy. It would also be very difficult or even counter productive to develop and implement policy without fully understanding and recognizing the structural dynamics and characteristics.

Graph 7.7: Comparative Competition



(data supplied by Global Insight and Coetzee, own calculations)

7.3.3 Input-Output Approach

The standard Input-Output approach as discussed in chapter 4 can be used to estimate how changes in one local economy affect the local economies linked to it, i.e., to estimate or model inter-regional interdependence It is therefore possible to construct a regional input-output table on the assumption that the required data is available. Bazzazan, et al (2005) states that constructing a survey based regional input-output table is a difficult task especially if the required data for certain regions have not been already prepared. Bazzazan, et al (2005) further states that according to the literature on the constructing a regional input-output table, three main methods have been established: survey base, semi-survey (hybrid or partial-survey) base, and non-survey base methods.

The purpose of a region input-output table is therefore to estimate of model the inter-relationships that exist between different local economies. It is based on the argument that the local economies are not closed economies but open economies. There is thus a constant flow of goods and services between the various local economies so each local economy buy and sell from each other local economy. The

output of any local economy (say, the Msunduzi economy) is needed as an input in many other local economies, or even for that local economy itself; therefore the "correct" (i.e., shortage-free as well as surplus-free) level of local economic output will depend on the input requirements of all the ***n*** local economies. In turn, the output of the many other local economies will enter into the Msunduzi economy as inputs, and consequently the "correct' levels of the other local economies will in turn depend partly upon the input requirements of the Msunduzi economy. This can be demonstrated by the following set of equations:

$$\mathbf{x_1 = \alpha_{11}x_1 + \alpha_{12}x_2 + \alpha_{13}x_3 + \alpha_{14}x_4 + \alpha_{15}x_5 + d_1} \qquad \text{(eq 7.9)}$$

$$\mathbf{x_2 = \alpha_{21}x_1 + \alpha_{22}x_2 + \alpha_{23}x_3 + \alpha_{24}x_4 + \alpha_{25}x_5 + d_2}$$

$$\mathbf{x_3 = \alpha_{31}x_1 + \alpha_{32}x_2 + \alpha_{33}x_3 + \alpha_{34}x_4 + \alpha_{35}x_5 + d_3}$$

$$\mathbf{x_4 = \alpha_{41}x_1 + \alpha_{42}x_2 + \alpha_{43}x_3 + \alpha_{44}x_4 + \alpha_{45}x_5 + d_4}$$

$$\mathbf{x_5 = \alpha_{51}x_1 + \alpha_{52}x_2 + \alpha_{53}x_3 + \alpha_{54}x_4 + \alpha_{55}x_5 + d_5}$$

where:

x is the five local economies

$\alpha_{1n}x_n$ is the input demand of the five local economies

d_n is the final demand for its output

After moving all terms that involve the variables x_n to the left of the equals signs, and leaving only the exogenously determined final demands d_n on the right, we can express the "correct" output levels of the *n* local economy by the following system of *n* linear equations.

$$(1-\alpha_{11})x_1 - \alpha_{12}x_2 - \alpha_{13}x_3 - \alpha_{14}x_4 - \alpha_{15}x_5 = d_1 \qquad \text{(eq 7.10)}$$

$$-\alpha_{21}x_1 + (1-\alpha_{22})x_2 - \alpha_{23}x_3 - \alpha_{24}x_4 - \alpha_{25}x_5 = d_2$$

$$-\alpha_{31}x_1 - \alpha_{32}x_2 + (1-\alpha_{33})x_3 - \alpha_{34}x_4 - \alpha_{35}x_5 = d_3$$

$$-\alpha_{41}x_1 - \alpha_{42}x_2 - \alpha_{43}x_3 + (1-\alpha_{44})x_4 - \alpha_{45}x_5 = d_4$$

$$-\alpha_{51}x_1 - \alpha_{52}x_2 - \alpha_{53}x_3 - \alpha_{54}x_4 + (1-\alpha_{55})x_5 = d_5$$

This can be written in matrix notation as follows:

$$\begin{bmatrix} (1-\alpha_{11}) & -\alpha_{12} & -\alpha_{13} & -\alpha_{14} & -\alpha_{15} \\ -\alpha_{21} & (1-\alpha_{22}) & -\alpha_{23} & -\alpha_{24} & -\alpha_{25} \\ -\alpha_{31} & -\alpha_{32} & (1-\alpha_{33}) & -\alpha_{34} & -\alpha_{35} \\ -\alpha_{41} & -\alpha_{42} & -\alpha_{43} & (1-\alpha_{44}) & -\alpha_{45} \\ -\alpha_{51} & -\alpha_{52} & -\alpha_{53} & -\alpha_{54} & (1-\alpha_{55}) \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{bmatrix} = \begin{bmatrix} d_1 \\ d_2 \\ d_3 \\ d_4 \\ d_5 \end{bmatrix}$$

If the 1s in the diagonal of the matrix on the left are ignored, then matrix is simply

$$\mathbf{-A = [-\alpha_{ij}]} \qquad \text{(eq 7.11)}$$

where:

α_{ij} = input coefficients

The matrix is the sum of the identity matrix I and the matrix –A. Thus the above equation can be written as:

$$\mathbf{(I - A)x=d} \qquad \text{(eq 7.12)}$$

where:

$(I - A)$ = the Leontief matrix
x = local economy vector
d = final demand vector

The annual local economic business confidence surveys that have been conducted since 2005 contain a question relating to the proportion of products and services sold by the local economy to the other local economies. The Newcastle respondents, for example, will therefore indicate the proportion of their total sales to the other four

local economies. The yearly proportions have been averaged in order to minimize the risk of outliers and are displayed in matrix format in the below table (table 7.13). The totals are not equal to a hundred because it excludes the proportions of the total sales that are sold outside the five local economies, for example to the rest of the province, etc.

Table 7.13: Production and Output Matrix

		Local economy of Production				
		Msunduzi	Ethekwini	Umhlathuze	Newcastle	Hibiscus Coast
Local economy of Residence	Msunduzi	0.400	0.080	0.010	0.010	0.010
	Ethekwini	0.100	0.400	0.050	0.020	0.120
	Umhlathuze	0.050	0.020	0.540	0.010	0.004
	Newcastle	0.010	0.010	0.010	0.650	0.001
	Hibiscus Coast	0.010	0.010	0.010	0.010	0.460
	Total	0.570	0.520	0.620	0.700	0.595

(own calculations)

For the above matrix the matrix I-A is as follows (table 7.14).

Table 7.14: I-A Matrix

0.60	-0.08	-0.01	-0.01	-0.01
-0.10	0.60	-0.05	-0.02	-0.12
-0.05	-0.02	0.46	-0.01	0.00
-0.01	-0.01	-0.01	0.35	0.00
-0.01	-0.01	-0.01	-0.01	0.54

(own calculations)

The inverse of the I-A matrix is indicated in the table below (table 7.15). These values are also known as multipliers. This means for example that when the demand for output in the Msunduzi economy increase by R1 the output in Msunduzi, Ethekwini, Umhlathuze, Newcastle and Hibiscus Coast economies will increase by R1.71, R0.31, R0.20, R0.06 and R0.04, respectively.

Table 7.15: Regional Economic Multipliers

		Msunduzi	Ethekwini	Umhlathuze	Newcastle	Hibiscus Coast
Inverse matrix	Msunduzi	1.71	0.23	0.07	0.07	0.08
	Ethekwini	0.31	1.72	0.21	0.12	0.39
	Umhlathuze	0.20	0.10	2.19	0.08	0.04
	Newcastle	0.06	0.06	0.07	2.86	0.02
	Hibiscus Coast	0.04	0.04	0.05	0.06	1.86

(own calculations)

The regional economic multipliers suggest that there is a fair bid of inter-regional interdependence. It is also possible to argue that regional distances are inversely related to the size of the regional multipliers. This argument can be supported with the use of a gravity model. Martinez-Zarzoso (2000) states that the gravity model has become a popular instrument in empirical foreign trade analysis. According to this model, exports from country i to country j are explained by their economic sizes (GDP or GNP), their populations, direct geographical distances, and a set of dummies incorporating some type of institutional characteristics common to specific flows.

The basic theoretical model for trade between two local economies (i and j) takes the form of:

$$F_{ij} = G\frac{M_i M_j}{D_{ij}} \qquad \text{(eq 7.13)}$$

where

F = trade flow between the two local economies
M = mass of each local economy (total population)
D = distance (km)
G = constant (assumed to be 1)

The results of the gravity model application are presented in the table below. The value itself does not really mean anything. It only means something on a

comparative basis for example trade between the Ethekwini and Msunduzi economies should be far greater than trade between any of the other local economies, especially between the Newcastle and Hibiscus Coast economies. This corresponds very nicely to the size of the regional multipliers as indicated in table 7.

Table 7.16: Gravity Model

	Msunduzi	Ethekwini	Umhlathuze	Newcastle	Hibiscus Coast
Msunduzi	-	361	39	10	57
Ethekwini	361	-	3	3	5
Umhlathuze	39	3	-	1	1
Newcastle	10	3	1	-	0
Hibiscus Coast	57	5	1	0	-

(data supplied by Global Insight, own calculations)

7.3.4 Shift Share Approach

The ability to separate local growth factors from national growth factors is an important aspect of understanding a local economy. Shift-share analysis as mentioned in heading 4.3.5.3 is used to account for the competitiveness of local economies industries and to analyze the local economic base. The analysis is primarily used to decompose employment changes within an economy over a specific period of time into three contributing factors:

- Growth that is attributable to growth of the national economy
- Growth that is attributable to the mix of faster or slower average growing industries
- Growth that is attributable to the competitive nature of the local industries

The table below indicate the results of the various shift-share calculations for the five local economies. The first row indicates the total increase in the number of people formally employed in each local economy for the period. The National share row indicates the number of jobs created locally due to national economic trends and

growth. The national component shows that if the local economy was identical to the national economy, then the local economy should have grown by the indicated number of jobs .For example, the total number of jobs in Msunduzi economy should have increased by 23 303 jobs or 253.51 per cent. The Industry mix row allows one to determine if the local industry is weighted toward industries that are growing faster or slower than the national average. The overall industrial growth component of -1 678 (Umhlatuze economy) means that the particular local economy has 1 678 jobs less than it would have if its structure were identical to the national economy. The local share row determines whether the local industries are growing faster or slower than similar industries at the national level. According to the table below, the local share component, 1 331 of all new jobs in Hibiscus Coast economy are attributable to its relative competitive position. The table indicates, amongst others, that the Ethekwini and Msunduzi economies are relatively less competitive or that their unique local factors have been constraining growth compared to the national economy where as the Umhlathuze, Hibiscus Coast, Newcastle economies supported growth because of their unique local comparative advantages.

Table 7.17: Shift Share Analysis, 1996 to 2008

	Ethekwini	Msunduzi	Umhlathuze	Hibiscus Coast	Newcastle
Total Employment Added	179,249	9,192	27,717	8,831	13,480
National Share	186,352	23,303	11,540	8,101	12,471
Industry Mix	17,158	3,278	-1,678	-601	-1,435
Local Share	-24,260	-17,388	17,855	1,331	2,444
As a % of Total Employment Added					
National Share	103.96	253.51	41.64	91.73	92.51
Industry Mix	9.57	35.66	-6.05	-6.80	-10.65
Local Share	-13.53	-189.17	64.42	15.07	18.13

(data supplied by Global Insight and Coetzee, own calculations)

The table below indicates the degree to which each local economic sector performed relative to the relevant national sector. For example the agriculture sector in Hibiscus Coast economy performed very well (value > 1) in that it added more jobs than if it were identical to the national agriculture sector. None of the local economies performed well in the mining and quarrying sector (values = 0). The

Msunduzi economy added much more jobs in the Personal and General Government Service's sector than if it were identical to the national Personal and General Government Service's sector.

Table 7.18: National Share as a % of Total Employment Added per Sector, 1996 to 2008

Industry	Ethekwini	Msunduzi	Umhlathuze	Hibiscus Coast	Newcastle
Agriculture, forestry and fishing	0.17	0.74	0.45	1.57	0.26
Mining and quarrying	0.00	0.04	0.21	0.10	0.03
Manufacturing	2.54	4.18	0.74	0.97	3.02
Electricity, gas and water	0.07	0.33	0.03	0.10	0.08
Construction	0.43	0.80	0.20	0.40	0.19
Wholesale & retail trade; hotels & restaurants	1.43	2.99	0.40	1.49	0.81
Transport , storage and communication	0.63	1.10	0.30	0.29	0.40
Finance, real estate and business services	1.35	3.16	0.36	0.86	0.77
Personal and General Government Services	2.04	7.78	0.77	1.86	2.14

(data supplied by Global Insight and Coetzee, own calculations)

The table below indicates the degree to which each local economic sector is weighted or similar towards its national counterpart. The sectors with a negative sign indicate those sectors that are growing slower than the national average, whilst the sectors with a positive sign indicate those sectors that are growing faster than the national average.

Table 7.19: Industry Mix Share as a % of Total Employment Added per Sector, 1996 to 2008

Industry	Ethekwini	Msunduzi	Umhlathuze	Hibiscus	Newcastle

				Coast	
Agriculture, forestry and fishing	-0.23	-1.03	-0.62	-2.17	-0.36
Mining and quarrying	-0.01	-0.06	-0.13	-0.11	-0.09
Manufacturing	-1.92	-3.65	-0.42	-0.69	-2.13
Electricity, gas and water	-0.06	-0.26	-0.02	-0.08	-0.07
Construction	0.31	0.55	0.15	0.28	0.14
Wholesale & retail trade; hotels & restaurants	0.95	2.24	0.22	0.93	0.52
Transport , storage and communication	-0.53	-1.01	-0.22	-0.23	-0.34
Finance, real estate and business services	1.97	4.80	0.50	1.24	1.12
Personal and General Government Services	0.32	1.39	0.05	0.27	0.32

(data supplied by Global Insight and Coetzee, own calculations)

The table below indicates the degree to which each local economic sector are more or less competitive than it's national counterpart. The results indicate that the majority of sectors in the Ethekwini and Msunduzi economies are less competitive than their national counterparts. On the other hand, all of the sectors in the Umhlathuze, Hibiscus Coast, and Newcastle economies has positive local shares, i.e., relatively more competitive.

Table 7.20: Local Share as a % of Total Employment Added per Sector, 1996 to 2008

Industry	Ethekwini	Msunduzi	Umhlathuze	Hibiscus Coast	Newcastle
Agriculture, forestry and fishing	-0.07	-0.39	0.51	-0.61	-0.06
Mining and quarrying	0.00	-0.01	0.75	0.14	-0.19
Manufacturing	-0.50	-4.86	1.27	0.37	1.13
Electricity, gas and water	-0.02	-0.21	0.03	-0.05	0.00

Construction	-0.05	-0.84	0.26	0.17	0.02
Wholesale & retail trade; hotels & restaurants	-0.10	-3.10	0.56	0.71	0.18
Transport , storage and communication	-0.09	-1.21	0.44	0.18	0.11
Finance, real estate and business services	-0.27	-3.44	0.46	0.32	0.01
Personal and General Government Services	-0.01	-1.70	1.09	0.02	0.30

(data supplied by Global Insight and Coetzee, own calculations)

7.4 Economic Performance Analysis

7.4.1 Local Gross Domestic Product (GDP)

Gleaser (unknown) states that a fundamental issue when thinking about growth is, how does one measure growth? He argues that increases in per capita GDP seem to be a very natural way to measure the economic growth of countries. But across cities the choice is much less obvious because any real differences between cities should be quickly eliminated. General equilibrium models show that any real differences in income across cities should be quickly eliminated by migration, and any differences that remain simply reflect negative amenities—such as higher rents in the higher wage city. Employment or population growth is, in fact, the more natural unit for looking at growth across States or cities with free migration, but these measures rarely resemble the wealth (or welfare) increases that we are ultimately interested in examining. Gleaser (unknown) suggests that employment or population growth is the more natural unit for looking at growth across cities with free migration. However these measures rarely resemble the wealth increases that one is ultimately interested in examining. Gleaser (unknown) suggests a number of alternative methods of measuring growth, including looking more closely at the housing and real estate markets.

This observation that GDP is not the obvious measure of growth is supported by the different economic theories relevant to the local economy. In fact, very few of the theories use GDP as a measure of local economic growth. The literature also supports this view and employs a number of alternative measures of local economic growth. Ledyaeva and Sirkjärvi (2008) use real income and specifically the year-on-year change in real income as the dependent variable in their forecasting of the Saint-Petersburg regional economy. Thomas (2004) argues that the attractive power of a city can be estimated by the increase or decrease of its population. Da Mata, et al (2005) argues that urban growth can best be represented by both individual city productivity growth and city population growth, which are different indicators of city success" and represent two interconnected dimensions of successful urban growth. West and Fullerton (1996) indicates that the regional economic forecasting models used by the different regional economies in the USA make use of the following measures of regional growth:

- total employment (nonagricultural, civilian)
- unemployment rate
- two components of personal income (adjusted labor earnings and non labor income)
- net migration
- taxable sales
- single and multifamily housing starts

The above arguments and methodologies do not intuitively suggest that the use of GDP is discouraged or not preferred. The truth of the matter is that GDP data for a local economy is simply not readily available. This is especially true for SA, where no official GDP data on a sub-national level is available. The fact that no primary GDP data for a local economy is available does not suggest that it is impossible to derive GDP data for a particular local economy. It should intuitively be possible to estimate the GDP for a local economy from the national GDP because the production of goods and services or value added occurs in these local economies, i.e., the national economy can be thought of as a composite of its geographic

subparts. The biggest challenge, however, is to determine the proportional relationship between the national economy and the local economy.

Intuitively it is possible to estimate an unknown structural relationship from a known structural relationship but only if there is a statistically significant relationship between the two relationships i.e., the two variables has a long run and short run statistical, significant relationship. One such variable where there is a known structural relationship is fuel consumption in that the national and local economy fuel consumption is known, i.e., the proportion or structural relationship of the local fuel consumption to the national fuel consumption is known. However there must be a statistically significant relationship between GDP and fuel consumption in order to derive the unknown GDP structural relationship from the know fuel consumption structural relationship.

The table below indicates the quarterly fuel consumption (in millions of litres) for the national economy and the five local economies. The second part of the table indicates the structural relationships between each of the five local economies and the national economy based on fuel consumption. For example during the 1st quarter of 2008 fuel consumption in the Ethekwini economy accounted for about 9.53 percent of the national fuel consumption. What is also striking is the relative stability in the proportions or structural relationships, i.e., the proportions are not characterised by major fluctuations.

Table 7.21: Structural Relationships Based on Fuel Consumption

Fuel Consumption	National	Ethekwini	Msunduzi	Umhlathuze	Hibiscus Coast	Newcastle
2008q1	5,544	528	74	57	27	26
2008q2	5,266	521	67	61	25	25
2008q3	5,202	505	67	59	25	24
2008q4	5,460	507	73	56	29	26
2009q1	5,083	465	68	47	27	23
2009q2	4,995	469	69	47	26	25
2009q3	5,003	471	69	49	26	24
2009q4	5,075	504	83	53	28	25
As a % of National						

2008q1	9.53	1.34	1.03	0.48	0.46
2008q2	9.90	1.28	1.16	0.48	0.47
2008q3	9.71	1.29	1.13	0.47	0.46
2008q4	9.28	1.34	1.03	0.54	0.48
2009q1	9.15	1.33	0.93	0.53	0.46
2009q2	9.39	1.38	0.94	0.53	0.49
2009q3	9.41	1.38	0.99	0.53	0.47
2009q4	9.94	1.63	1.05	0.55	0.50

(data supplied by SAPIA and Coetzee, own calculations)

The descriptive statistics of the fuel consumption proportions of the five local economies are displayed in the table below. The normality test indicates that he proportions or structural relationships of the five local economies are indeed normally distributed ($p>0.05$). This suggests that the structural relationships between the national fuel consumption and local fuel consumption have indeed been fairly constant or stable over the period. This is very important because the application of a proxy structural relationship that is not stable will either over or under estimate the unknown structural relationship.

Table 7.22: Descriptive Statistics of the Fuel Consumption Proportions

	Ethekwini	Msunduzi	Umhlathuze	Hibiscus Coast	Newcastle
Mean	9.538750	1.371250	1.032500	0.513750	0.473750
Median	9.470000	1.340000	1.030000	0.530000	0.470000
Maximum	9.940000	1.630000	1.160000	0.550000	0.500000
Minimum	9.150000	1.280000	0.930000	0.470000	0.460000
Std. Dev.	0.287275	0.110639	0.081897	0.031595	0.015059
Skewness	0.227184	1.792676	0.294642	-0.397230	0.658181
Kurtosis	1.723546	5.012281	1.965544	1.420467	2.075082
Jarque-Bera	0.611929	5.634676	0.472452	1.042030	0.862761
Probability	0.736413	0.059765	0.789602	0.593917	0.649612
Observations	8	8	8	8	8

It has therefore been determined that the fuel consumption structural relationship is indeed known and stable and therefore may be a reliable proxy for the unknown

structural relationship, i.e., the structural relationship between the national economy and the five local economies.

Therefore the first step is to determine if there indeed exists a long run and short run statistically significant relationship between GDP and fuel consumption. This relationship will be tested using the Engle-Granger cointegration and error correction procedure on a national level. National GDP data is obtained from Statistics South Africa and the fuel consumption data from the South African Petroleum Industry Association (SAPIA). The GDP data is quarterly unadjusted data in constant 2005 prices and the fuel consumption data is actual litres of consumption from 2001 to 2009.

The assumed cointegrated relationship can be expressed as follows:

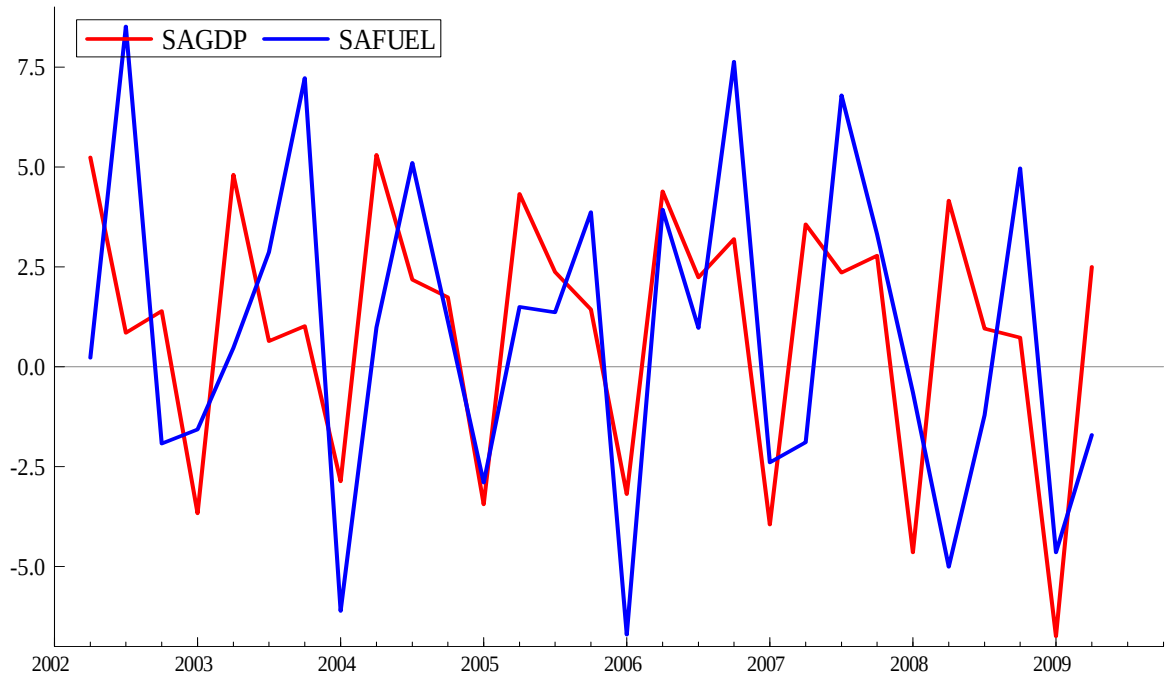
$$\mathbf{Y_t = \alpha + \beta X_t + \varepsilon_t} \qquad \text{(eq 7.14)}$$

where:

Y_t = log GDP
X_t = log fuel consumption
ε_t = error term

The below graph illustrates the long run behaviour of both the national GDP and national fuel consumption. The graph intuitively seems to suggest that there indeed exists a long run statistical relationship between the two variables because of the apparent co-movement over the period.

Graph 7.8: National GDP and Fuel Consumption – Level Format



In order the test if the assumed cointegrated relationship indeed exists it is crucial that the variables be integrated to the same order and that the error terms are stationary. Consider that the two variables Y_t and X_t are both $I(d)$ (i.e., they have compatible long-run properties). In general, any linear combination of Y_t and X_t will be also $I(d)$. However, if there exists a vector $(1, -\beta)'$, such that the linear combination $\boldsymbol{\varepsilon_t = Y_t - \alpha - \beta X_t}$ is indeed $I(d - b)$, $d \geq b > 0$, then, following Engle and Granger (1987), Y_t and X_t are defined as cointegrated of order (d , b).

The two variables or time series therefore need to be tested for stationarity to determine their order of integration. To perform the Unit Root test on a AR(p) model the following regression will be estimated:

$$y_t = \alpha + \delta t + \beta y_{t-1} + \sum_{j=1}^{k} \theta_j \Delta y_{t-j} + u_t \qquad \text{(eq 7.15)}$$

where:

y_t = variable to be tested (national GDP and national fuel consumption)

α = constant

t = trend

Δ = lag operated of the dependent variable

u_t = white noise innovation

The ADF Unit Root Test is based on the following three regression forms:

- with constant and trend (τ_τ)
- with constant (τ_μ)
- without constant and trend (τ)

and the testable hypothesis is $\beta = \mathbf{0}$ (i.e., p = **1**, y_t has a unit root).

The time series will consist of 29 observations and four lags will be included in the test procedures. The Schwarz Info criteria are used to determine the number of lags. The results are displayed for each variable in the below table. Comparing the ADF test statistics with the critical test values at 1 percent, 5 percent and 10 percent levels (tau values) and the F-statistics at the 1 percent, 5 percent and 10 percent levels (phi values) suggest that both the variables or time series are non-stationary in level format.

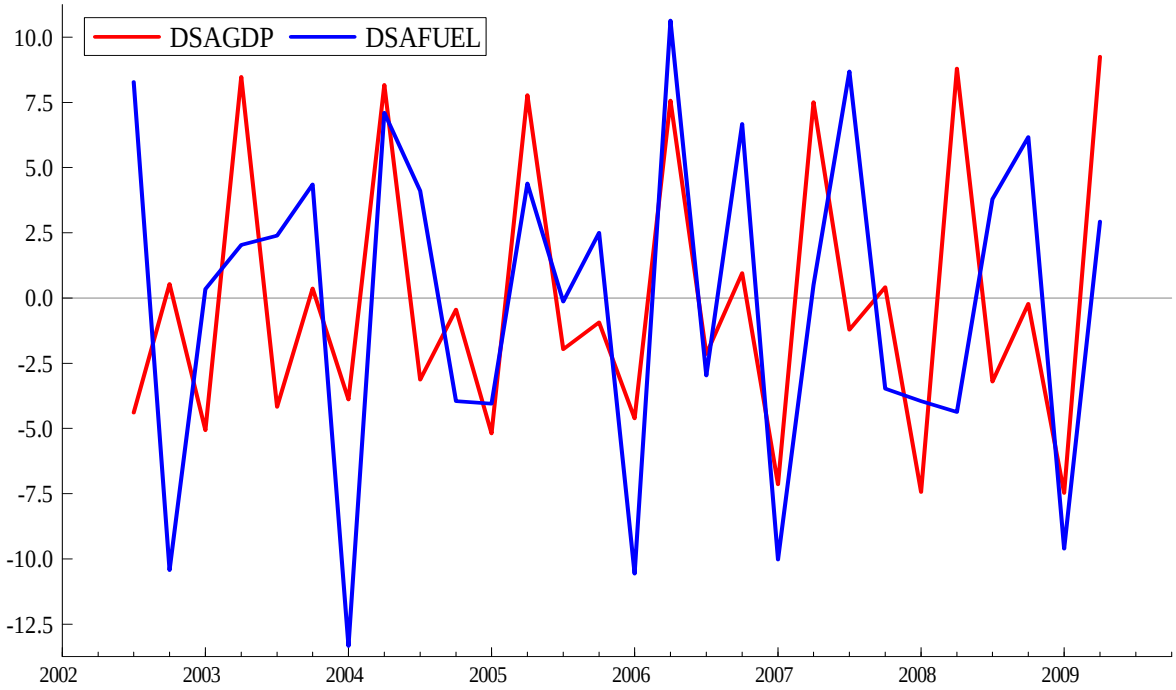
Table 7.23: Augmented Dickey-Fuller on Level Data

Series	Model	ADF		
		Lags	$\tau_\tau\tau_\mu\tau$	$\varphi_3\varphi_1$
SA GDP	τ_τ	4	0.884362	180.7147
	τ_μ	4	1.217844	181.4963
	τ	4	-0.755706	
		Lags	$\tau_\tau\tau_\mu\tau$	$\varphi_3\varphi_1$
SA Fuel	τ_τ	4	-2.95403	16.22041***
	τ_μ	4	-3.073153**	19.70844***
	τ	4	-0.970849	

(** significant the 5 percent level, *** significant at the 1 percent level)

Given that the results clearly show that either variables or time series are non-stationary in level format, the variables need to be transformed in order to determine their level of integration. The non-stationary data therefore needs to be differenced. The below graph indicates the variable or time series in differenced format.

Graph 7.9: National GDP and Fuel Consumption – 1st Difference Format



The regression equation and methodology as set out above will also be applied in order to determine whether or not the variables or times series in differenced format is stationary. The below table display the results of the unit root tests using the augmented Dickey-Fuller (ADF) test procedure for the data in 1st difference format. Comparing the ADF test statistics with the critical test values at 1 percent, 5 percent and 10 percent levels (tau values) and the F-statistics at the 1 percent, 5 percent and 10 percent levels (phi values) suggest that both the variables or time series are indeed stationary in the differenced format. The results suggest that both the variables are stationary and thus integrated to the order of 1 or I(1).

Table 7.24: Augmented Dickey-Fuller on 1st Difference Data

Series	Model	ADF		
		Lags	$\tau_\tau\tau_\mu\tau$	$\varphi_3\varphi_1$
ΔSA GDP	τ_τ	4	-33.83531***	734.2917***
	τ_μ	4	-2.575249	575.084***
	τ	4	-2.49149**	
		Lags	$\tau_\tau\tau_\mu\tau$	$\varphi_3\varphi_1$
ΔSA Fuel	τ_τ	4	-8.645334***	52.60969***

	τ_μ	4	-8.520767***	64.62235***
	τ	4	-8.567741***	

(** significant the 5 percent level, *** significant at the 1 percent level)

It is now possible to estimate (using OLS) the possible cointegrating relationship between the two variables using the following equation (equation 7.16):

$$Y_t = \alpha + \beta X_t + \varepsilon_t \qquad \text{(eq 7.16)}$$

The results of the regression is indicated in the below table, suggesting that fuel consumption is statistically significant (t>2). However the adjusted R statistic is fairly low but could be because the data contains significant cyclical patterns.

Table 7.25: Cointegration Relationship

Dependent Variable: SAGDP
Method: Least Squares
Sample: 2002Q2 2009Q2
Included observations: 29

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SAFUEL	0.345982	0.137354	2.518918	0.0180
C	0.732106	0.567365	1.290361	0.2079

R-squared	0.190282	Mean dependent var	1.020345
Adjusted R-squared	0.160293	S.D. dependent var	3.265726
S.E. of regression	2.992566	Akaike info criterion	5.096612
Sum squared resid	241.7972	Schwarz criterion	5.190908
Log likelihood	-71.90087	Hannan-Quinn criter.	5.126144
F-statistic	6.344948	Durbin-Watson stat	2.727870
Prob(F-statistic)	0.018000		

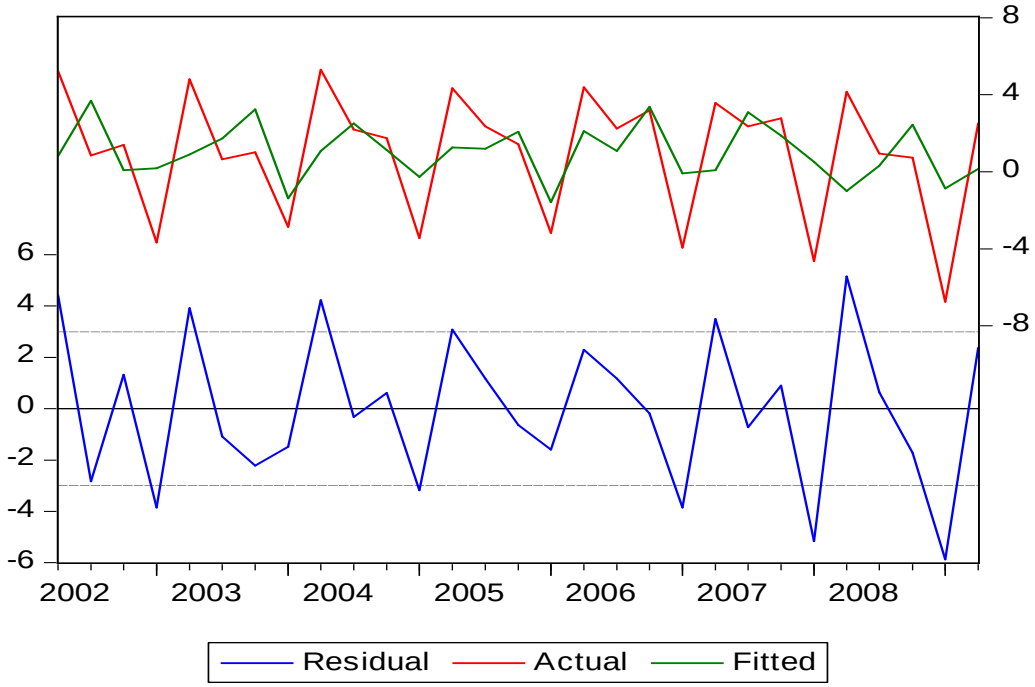
The cointegrating equation is as follows

SAGDP = + 0.732 + 0.346*SAFUEL

(SE) (0.567) (0.137)

and is graphically illustrated in the graph below. The residuals are indicated by the blue line and intuitively seem stationary because it seems to exhibit a zero mean and a constant variance.

Graph 7.10: Cointegration Relationship



The residual are derived by estimating the following equation:

$$\varepsilon_t = Y_t - \alpha - \beta X_t \qquad \text{(eq 7.17)}$$

The correlogram of the residual are displayed in the table below.

Table 7.26: Correlogram of the Residuals

Date: 08/03/11 Time: 12:44
Sample: 2002Q2 2009Q2
Included observations: 29

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
***| . |	***| . |	1	-0.416	-0.416	5.5514	0.018
. | . |	.**| . |	2	-0.028	-0.242	5.5766	0.062
***| . |	*****| . |	3	-0.393	-0.653	10.920	0.012

. |***** |	. |**. |	4	0.665	0.252	26.830	0.000
.**| . |	. |* . |	5	-0.217	0.104	28.597	0.000
. *| . |	. *| . |	6	-0.080	-0.150	28.846	0.000
.**| . |	. *| . |	7	-0.311	-0.137	32.797	0.000
. |**** |	. |* . |	8	0.538	0.126	45.188	0.000
. *| . |	. | . |	9	-0.153	-0.034	46.235	0.000
. | . |	. | . |	10	-0.043	0.015	46.322	0.000
.**| . |	. | . |	11	-0.284	0.019	50.364	0.000
. |*** |	. *| . |	12	0.389	-0.078	58.353	0.000

The results of the Augmented Dickey-Fuller (ADF) test procedure are displayed in the below table. It must be emphasised that only the results of the regression that include a constant and a trend are presented in the table simply because the results for the constant only and no constant and no trend regressions are very similar.

Table 7.27: Augmented Dickey-Fuller of the Residuals

Null Hypothesis: RESID02 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic based on SIC, MAXLAG=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.25619	0.0000
Test critical values:	1% level	-4.356068	
	5% level	-3.595026	
	10% level	-3.233456	

The correlogram and the ADF test indicating that the residual are indeed stationary and therefore cointegration exists amongst the variables at a 1 per cent level of significance.

Once it has been established that there indeed exists a long run relationship between the two variables, it is possible to construct an error correction model to simulate the short run relationship between the two variables. In general the error correction model is specified as follows:

$$\Delta y_t = \beta_0 + \beta_1 \Delta x_t + \gamma(x_{t-1} - y_{t-1}) + u_t \qquad \text{(eq 7.18)}$$

where:

Δy_t = change in the dependent variable (national GDP in this in this case)

Δx_t = change in the independent variable (national fuel consumption in this in this case)

β = cointegrating coefficient

ν = coefficient on the lagged gap or residuals

u_t = white noise innovation

In this form β is called the long-run parameter and ν are called the short-run parameter. The residuals that has been calculated using equation 7.5 and that has been tested for stationarity is incorporated in equation 7.6 to derive the error correction model. The proposed error correction model is displayed in the table and graph below. Intuitively, the error correction term seems to be statistically significant given that the coefficient of the lagged residual is negative and significant.

Table 7.28: Error Correction Model

Dependent Variable: DSAGDP				
Method: Least Squares				
Date: 10/23/09 Time: 13:46				
Sample (adjusted): 2002Q3 2009Q2				
Included observations: 28 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DSAFUEL	0.546053	0.070204	7.778083	0.0000
RESID01(-1)	-1.555280	0.155863	-9.978511	0.0000
R-squared	0.828393	Mean dependent var		-0.097562
Adjusted R-squared	0.821793	S.D. dependent var		5.429709
S.E. of regression	2.292131	Akaike info criterion		4.565590
Sum squared resid	136.6005	Schwarz criterion		4.660748
Log likelihood	-61.91826	Hannan-Quinn criter.		4.594681
Durbin-Watson stat	2.206372			

Graph 7.11: Error Correction Model

The error correction equation is as follows:

DSAGDP = + 0.5461*DSAFUEL - 1.555*residuals_1

The below table summarizes the results of the different tests conducted on the error correction model. The error correction model is statistical significant because the null hypothesis is accepted for all of the tests.

Table 7.29: Error Correction Model Test Statistics

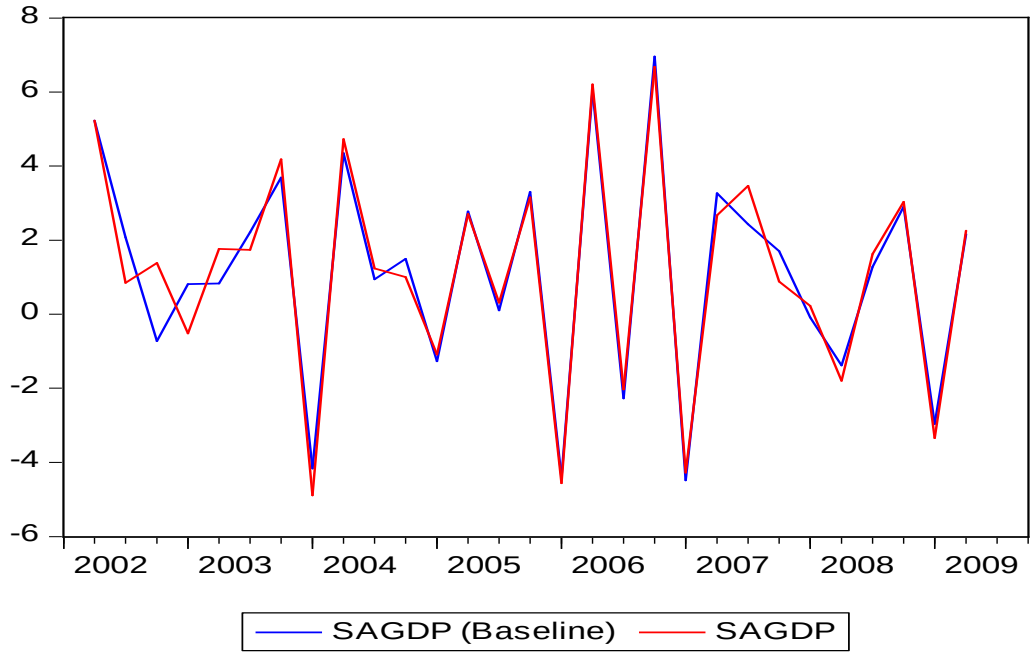
Test	H*0*	Test Statistic	p-Value	Conclusion
Jarque-Bera	Normality	JB=1.27	0,53	Residual Are Normal
Ljung-Box Q	No Serial Correlation	LBq=0.53	0.468	No Serial Correlation
ARCH LM	No Autoregressive Conditional	nR^2=0.297	0.86	No ARCH

	Hetroscedasticity			
White	No Hetroscedasticity	nR^2=01.46	0.69	No ARCH
Ramsey RESET	No Misspecification	LR(2)=2.98	0.22	Correct Specification

It is therefore possible to conclude that there indeed exists a short and long run statistically significant relationship between national GDP and national fuel consumption as indicated in the graph below (graph 6.12).

It must however be emphasized that the above relationship is at a national level which does not simply imply that the relationship is also statistically significant at the local economic level. However, intuitively there is no reason to believe that the relationship between local GDP and local fuel consumption will not be statistically significant, and therefore it is assumed that the national relationship is also statistical significance at the local economic level. It then becomes possible to estimate the unknown GDP structural relationship from the known fuel consumption structural relationship.

Graph 7.12: National GDP and Fuel Consumption Model

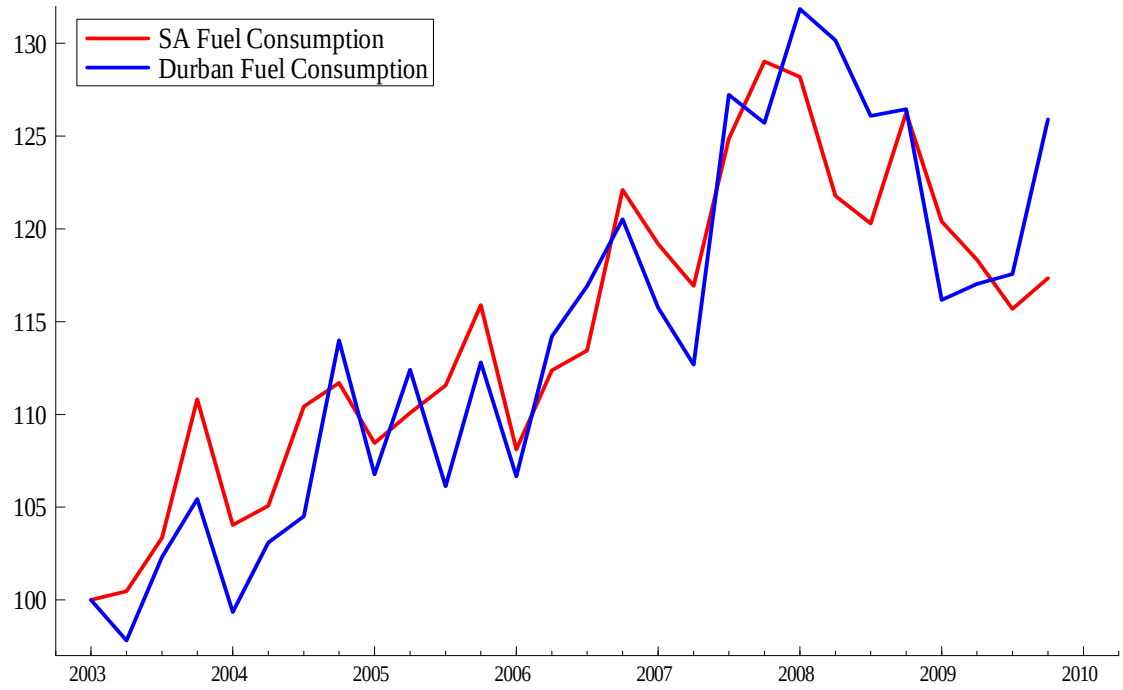


The known structural national and Etkewini fuel consumption relationship is indicated in the below two graphs. Graph 7.13 suggests that the national fuel consumption and fuel consumption in the Ethekwini economy (the local economy in this example) behaved very similar over the period.

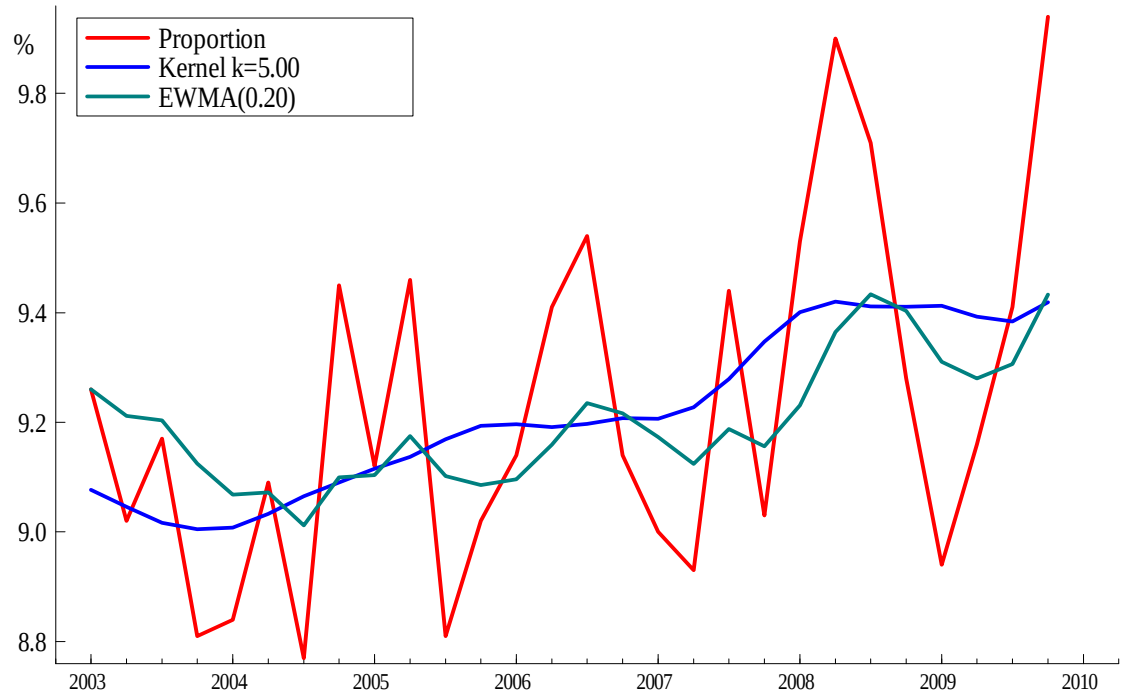
Graph 7.14 indicates that the structural relationship between national fuel consumption and fuel consumption in the Ethekwini economy has stayed fairly constant over the period in terms of its long term trend. There has been a slight increase in the proportion but only marginally. The long term structural relationship therefore does seem to have a constant mean and variance equal to zero.

The histogram and normality statistics also indicates that the structural relationship follows a normal distribution (graph 7.15).

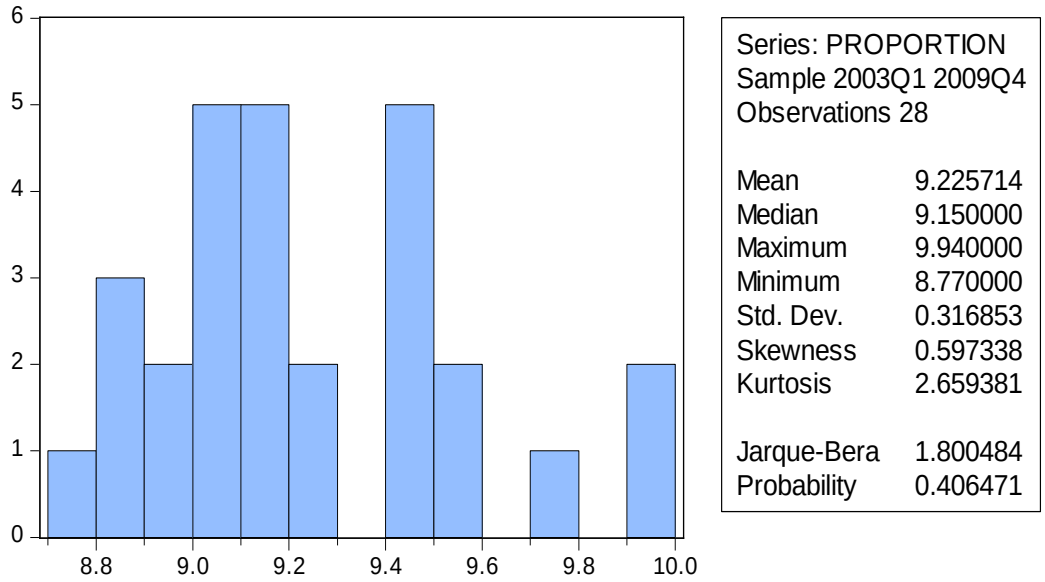
Graph 7.13: National and Ethekwini Fuel Consumption, Index format



Graph 7.14: Structural Relationship between National and Ethekwini Fuel consumption

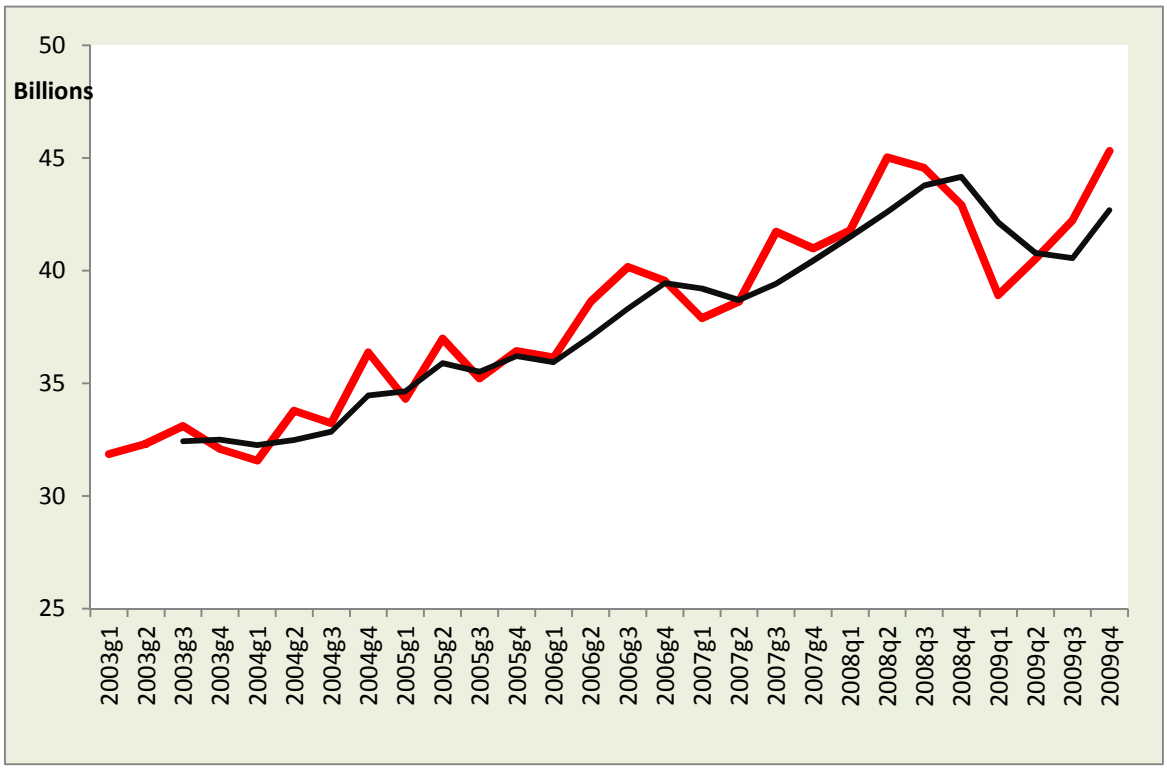


Graph 7.15: Test for Normality in the Structural relationship



The known fuel consumption structural relationship can now be applied to the national GDP to derive the GDP for the Ethekwini economy. The derived GDP for the Ethekwini economy is displayed in the graph below. The solid black line is a 3 period moving average.

Graph 7.16: Ethekwini GDP



The above method is a fairly complex and involved method of estimating and deriving the economic performance of a local economy. The method below is a much more simplified method but potentially a less reliable method and is based on the assumption that value added is a good approximation for GDP, i.e., change in value added = change in GDP as suggested by Baudewyns (2005) and discussed in chapter 3 p 59.

The below table indicates the per annum change in value added (VA) for each local economy for the periods. The value added is simply the sum of the per annum change in employment as supplied by Global Insight, plus the change in the apparent productivity of labour, as supplied by the SA Reserve Bank.. The value added per worker or apparent productivity of labour, according to Baudewuns (2005), is not a perfect measure of labour productivity, none the less given that its the only measure of labour productivity available it will be assumed that it is. It's also further assumed that the labour productivity in each local economy is similar and equal to the national labour productivity. The table also indicates the per annum change in gross value added (GVA) as supplied by Global Insight. However there seems to be fairly big differences between the two value added indicators.

The difference in the two value added calculations for each local economy are also indicated in the table. The correlation coefficient indicates the size and direction of the relationship between the two value added indicators, i.e., VA and GVA. There seems to be a strong positive relationship between the Ethekwini Msunduzi and Hibiscus Coast value added indicators, whereas the other two local economies seems to have no or a weak relationship. The autocorrelation statistics indicate that the difference in the two value added indicators do not suffer from serial autocorrelation, suggesting the difference in the two value added indicators follows a random walk. It therefore seems that it would thus be possible to use the value added method as a proxy for the economic performance of the local economy, however it is by no means a perfect method and thus it has to be applied and interrelated with care.

Table 7.30: A Comparison between Value Added and Gross Value Added

Year-on-Year (%)	1997	1999	2001	2003	2005	2007	2008
Ethekwini							
Value Added (VA)	4.66	3.30	4.47	7.22	7.28	7.49	6.89
Gross Value Added (GVA)	2.05	2.39	5.65	3.33	5.62	5.92	3.64
Difference in GVA and VA	-2.61	-0.90	1.18	-3.89	-1.66	-1.57	-3.24
Correlation	**0.64**						
Autocorrelation of Differential		Sample correlogram (ACF) from lag 1 to 2:					
			-0.15391	-0.30527			
Msunduzi							
Value Added (VA)	4.48	2.93	2.36	6.23	5.29	6.53	6.72
Gross Value Added (GVA)	1.28	1.64	2.68	3.84	4.36	3.67	3.12
Difference in GVA and VA	-3.20	-1.29	0.32	-2.39	-0.93	-2.86	-3.60
Correlation	**0.65**						
Autocorrelation of Differential		Sample correlogram (ACF) from lag 1 to 2:					
			-0.12600	-0.11957			
Umhlathuze							
Value Added (VA)	11.77	9.57	7.91	12.98	9.68	9.56	8.36
Gross Value Added (GVA)	9.08	3.73	2.96	0.43	4.87	3.64	0.33
Difference in GVA and VA	-2.69	-5.84	-4.94	-12.55	-4.81	-5.93	-8.03
Correlation	**0.28**						
Autocorrelation of Differential		Sample correlogram (ACF) from lag 1 to 2:					
			0.084649	-0.20269			
Hibiscus Coast							
Value Added (VA)	4.45	3.81	5.24	8.35	7.00	8.85	6.48
Gross Value Added (GVA)	3.94	1.45	4.53	4.24	6.99	7.63	7.88
Difference in GVA and VA	-0.50	-2.37	-0.71	-4.10	-0.01	-1.22	1.40
Correlation	**0.58**						
Autocorrelation of Differential		Sample correlogram (ACF) from lag 1 to 2:					
				0.12336	-0.22661		
Newcastle							
Value Added (VA)	5.51	5.79	4.08	7.81	5.70	6.45	7.15
Gross Value Added (GVA)	3.22	4.83	3.65	2.53	4.33	3.29	0.67
Difference in GVA and	-2.29	-0.95	-0.42	-5.28	-1.37	-3.16	-6.48

VA		
Correlation	**-0.32**	
Autocorrelation of Differential		Sample correlogram (ACF) from lag 1 to 2:
		-0.011671 0.085098

(data supplied by SA Reserve Bank and Global Insight, own calculations)

7.5 Local Economic Indicators

The Local Macroeconomic Data Model as developed in chapter 5 allows anyone to automatically and efficiently produce customized socioeconomic indicators or profiles for a particular local economy. The data model contains economic statistics or data in tables and figures format that illustrate long-term trends on many socioeconomic variables and provides a snapshot of current socioeconomic information for a particular local economy. The data model therefore is simple a collection of information on various important aspects of a local economy. The data model also allows for basic descriptive statistics and analysis to be performed in order to keep abreast of the evolution of the economic activity of the particular local economy.

An economic indicator or profile is simply any economic statistic or marker, such as the unemployment rate, GDP, or the inflation rate, which indicate how well the economy is doing and how well the economy might do in the future. Thus, in order to stay informed of the economic conditions of a particular local economy you require economic statistics to enable you to construct or develop economic indicators or profile of the particular local economy. An economic indicator or profile helps to determine the state of the economy or gives information about the economy, being either the national, provincial or local economy.

St. Joseph County, for example has published a series of economic profile reports that include housing costs, cost of living, top employers, health care and general demographics. The reports also contain information on the ten largest employers and on tertiary institutions with the St Joseph economy (St. Joseph County, Economic profile).

Vancouver publishes a very detailed economic profile publication stating that it has a dynamic, highly diversified urban economy with growing knowledge-based sectors and strong global linkages. The publication focuses specifically on the following:

- Physical Characteristics
- Government
- Business Climate
- Demographics
- Economic Structure
- Economic Performance
- Cost Comparisons

(Vancouver, Economic Profile)

The City of Monash produces an economic identification publication to address the following questions:

- What is the size of the local economy?
- How is the local economy performing?
- What is the economic base of the local economy and how is it changing?
- What is the contribution of each industry sector to the local economy?
- How many businesses are in each industry sector and what is their size?
- Where are jobs in each industry sector located?
- What are the characteristics of the workers in each industry sector?
- Where do the workers come from and how do they travel?
- Where do the residents work and how do they travel?
- What are the local labour force characteristics?
- What potential skills and knowledge can be drawn from the regional labour force?
- What are the infrastructure and asset advantages of the local area?

(City of Monash, Economic Profile)

The Dubbo LGA economic and demographic profile report is intended to provide a summary of economic and demographic information about the Dubbo Local Government Area (LGA). The report presents comprehensive coverage and analysis of economic and business conditions for Dubbo and aims to provide timely and accurate economic data to be used by government and business organizations for planning and decision-making purposes as well as promoting the region as a place to invest and do business (diagram 7.2).

Diagram 7.2: Economic and Demographic Profile for Dubbo

(City of Dubbo, Economic statistics and profile)

The City of Tea Tree Gully Economic Profile provides a snapshot of how the local economy is performing, identifies the major local industries and who works in those industries, as well as profiling the local and regional labour force. It also provides information about where residents go to work and identifies where workers in the City of Tea Tree Gully come from (City of Tea Tree Gully website, http://www.teatreegully.sa.gov.au/site/page.cfm?u=1049).

The city economic indicators show the economic performance of the City of Tea Tree Gully within a national and regional context and include the following:

- Population Size
- Gross Product
- Unemployment
- Building Approvals
- Retail Trade
- Consumer Prices
- Disposable Income

The City also publishes indicators that show the City of Tea Tree Gully's economic base for example, employment by industry sector and value added per industry sector. The City economic profile also gives statistics and information on the size and location of employers within each industry sector.

It is also possible to produce economic indicators or profiles similar to the above mentioned for the five local economies. In order to get a more accurate picture of the economy, it is important to consider a variety of economic indicators that touch on all sorts of segments of economy, environment and society. However the range or number of indicators or accuracy of the economic profile will be dependent on the availability and reliability of the sourced economic statistics or data. The below table provide an overview of recent economic developments through the presentation of a wide range of short-term economic indicators. The table displays the monthly averages for each of the indicated years.

Table 7.31: Economic Profile of Msunduzi Local Economy

	Average 2003	Average 2004	Average 2005	Average 2006	Average 2007	Average 2008	Average 2009	Average 2010
Number of Claims for Unemployment Benefits	1,050	1,289	1,277	1,101	1,085	1,155	1,297	1,200
Index of New Job Postings	110	107	155	150	160	127	133	
Average Salary per Placement			8,025	6,620	10,305	12,132	10,250	
Number of Building Plans Approved	81	85	93	113	161	107		
Value of Building Plans Approved *	19,690,605	24,557,862	39,341,500	53,491,570	52,807,323	51,022,515		
Value per Building Plans Approved *	239,306	292,181	383,365	469,655	363,414	510,554		
Expansion of Commercial Space m²		1,609	1,307	1,363	2,068	719		
Expansion of Industrial Space m²		187	1,643	1,543	4,529	3,105		
xpansion of Office and Banking Space m²					1,502	779		
Expansion of Shopping space m²					567	200		
Long-term Interest Rate	9.54	9.50	8.02	8.00	8.16	9.09	8.22	8.17
Prime Interest Rate	14.96	11.29	10.63	11.17	13.17	15.08	11.33	10.33
Number of Civil Cases for Debt	2,513	1,610	1,674	1,508	1,452	1,607	1,802	2,077
Number of Insolvencies (Persons)	14	11	4	4	2	3	6	
Number of Liquidations (Businesses)	28	19	11	8	8	7	14	
CPI (PMB)	5.70	1.38	3.53	6.02	7.98	13.61	7.30	5.05
CPI (SA)	5.97	1.39	3.40	4.64	7.08	11.69	7.23	5.33
Food Inflation (PMB)	7.63	1.29	0.95	6.83	10.25	17.42	9.62	0.10
Food Inflation (SA)	8.26	2.28	2.23	7.21	10.28	16.48	10.12	2.05
New Vehicle Sales (Passenger)	180	252	350	424	388	260	167	
New Vehicle Sales (Commercial)	114	133	171	193	209	161	103	
Live Vehicle Population (Heavy & Light load Vehicles)	29,151	30,174	31,916	34,509	37,266	39,307		
Live Vehicle Population (Passenger and Minibus Vehicles)	64,570	66,136	69,808	74,830	79,896	82,017		
Vehicle Traffic (Durban RD)	966,859	1,036,732	1,046,248	1,072,287	1,118,136			
Vehicle Traffic (N3)	1,013,012	1,062,281	1,151,417	1,139,232	1,188,484			
SA Leading Indicator	99	109	113	119	120	111	105	119
SA Coincident Indicator	100	109	118	129	140	142	125	128
SA Lagging Indicator	101	99	100	105	109	119	109	99
Economic Performance Index	151	219	286	323	351	314	244	
Number of Electricity Consumption Households					48,090	48,558	48,544	
Number of Electricity Consumption Businesses					8,815	9,045	8,976	
Number of Electricity Consumption Industry					514	534	558	
Electricity Consumption (Total by Municipality, Index)	1.08	1.12	1.14	1.18	1.20	1.15	1.13	
Electricity Consumption (Total by Household, Index)	1.05	1.01	1.07	1.19	1.15	1.15	1.14	
Electricity Consumption (Total by Commercial, Index)	1.16	1.22	1.23	1.32	1.35	1.43	1.48	
Total Water Consumption (kl/d)	116,802	127,737	135,689	139,983	142,706	153,644		
Retail Activity (Index)	193	400	391	431	453	442	429	
Total Spend per Head		90	105	117	134	136	143	
Total Retail Expenditure Index		117	134	164	197	196	199	
Total Retail Expenditure		579,115,687	660,213,829	811,083,402	973,992,170	967,220,287	980,938,332	
Number of Houses Sold	88	95	80	71	62	47	46	
Average Selling Price (Houses)	315,295	430,313	605,240	815,834	892,835	862,460	842,968	
Number of Sectional Title Sold	70	87	74	82	62	35	35	
Average Selling Price (Sectional)	212,842	300,402	465,254	536,684	627,827	669,398	707,871	
Number of Vacant Land Sold	9	15	12	13	11	6	5	
Average Selling Price (Land)	96,782	200,395	300,875	398,156	533,384	437,151	388,445	
Sales of Business Property Concluded (log)	4	5	6	4	3	4	4	
Annuity Value of Leases Concluded (log)	6	6	6	6	7	6	6	

Casino Visits (PMB Residents, Index)	87	109	174	231	241	181	258	
Casino Visits (Non-PMB Residents, Index)	144	126	97	107	146	150	154	
Air Passenger Arrivals	2,441	2,441	2,441	3,068	3,328	3,233	2,488	1,412
Aircraft Arrivals	585	588	471	484	496	465	420	430
Air Passenger Departures	2,807	2,374	2,386	3,143	3,216	3,046	2,735	1,548
RV Sugar Cane Prices	1,401	1,290	1,338	1,607	1,636	1,854	2,222	
Timber Prices - Wattle	394	374	360	427	430	648	645	
Timber Prices - Gum	248	245	230	325	312	444	435	
Timber Prices - Pine	156	180	190	244	250	334	340	
Producer Price - Beef	1,206	1,327	1,428	1,851	1,952	2,196	2,278	
Producer Price - Mutton	1,913	2,065	2,213	2,737	2,884	3,122	3,167	
Producer Price - Poultry	974	1,076	1,237	1,282	1,452	1,613	1,970	
Producer Price - Pork	1,109	1,167	1,183	1,176	1,348	1,538	1,679	
White Maize Prices	974	1,022	689	1,230	1,714	1,834	1,569	
Producer Price - Cabbage	199	573	751	886	1,262	1,126	1,556	
Producer Price - Carrots	1,373	1,157	1,482	1,771	2,142	2,022	2,910	
Producer Price - Onions	1,870	1,269	1,344	1,544	2,962	2,293	3,304	
Number of Current and Late Birth Registrations	1,869	2,066	1,828	1,795				
Number of Car Rentals (Index)		115	132	190	226	218	165	
Number of Bank Teller Transactions (Index)	92	107	116	127	137			
Number of Bank ATM Transactions (Index)	94	99	111	118	98			
Value of Bank Transactions (Index)	100	114	112	112	115			
Rand Value per Bank Transaction	349	373	328	308	390			
Agriculture Price Index	106	106	113	135	159	166	198	
Average Daily Maximum Temperature (C)	26.25	26.32	24.71	25.28	26.06	26.49	25.48	
Average Daily Minimum Temperature (C)	13.28	13.23	12.92	12.57	12.81	13.47	13.17	
Monthly Daily Rain (mm)	51.13	75.50	57.01	82.50	69.95	65.02	66.01	
Average Wind Gust Speed (m/s)	7.83	8.04	11.18	14.58	15.08	13.46	14.68	
Total Number of Bank Loan Approvals (log)	1.00	0.41	0.30	0.32	0.40	0.44	0.39	
Total Value of Bank Loan Approvals (log)	1.00	2.23	5.11	4.81	6.40	6.05	6.02	
Total Value per Bank Loan Approvals (log)	1.00	2.07	4.81	4.49	6.00	5.61	5.63	
Total Diesel Consumption (L)	11,245,547	12,505,444	12,391,634	12,634,593	12,743,751	10,858,178	11,049,189	
Total Petrol Consumption (L)	14,271,647	15,240,978	15,851,673	15,998,200	15,887,730	12,644,939	13,144,978	
Diesel Consumption per Commercial Vehicle (L)	386	414	387	366	342			
Petrol Consumption per Passenger Vehicle (L)	221	230	226	214	199			
Average Residential Property Rentals *	1,886	2,058	2,242	2,705	3,025	3,137	3,475	
Hulamin Share Price					24.25	19.14	12.18	11.83

(various data sources, own calculations)

The above presentation of the data for each indicator is a very basic display, but it allows for a much greater number of statistical and mathematical analyses to be performed for example year-on-year percentage change, etc. The time series data will typically be displayed using a line graph whilst the yearly monthly and year-on-year percentage change data will be displayed using column graphs.

The entire process of developing indicators, despite the numerous statistical procedures, boils down to a very simple strategy. First, we decide what economic activity we want to mimic with indicators. Second, a decision is made as to what data best characterize the activity to be modeled. Third, the data chosen in the previous step are aggregated if necessary, and turning points are identified. Fourth, other data are collected and tested to examine the degree to which they match the

turning points from step three. Fifth, the data from step four are combined into composite indices and turning points are revealed. Finally, the turning points of the indicators are compared to the turning points of the baseline (GDP of the local economy).

The composite leading, coincident and lagging indicators are a times series produced by the SARB. The Economic Performance Index (EPI) is similar and is formed by aggregating a variety of component indicators. The EPI for the particular local economy is designed to provide qualitative and quantitative information on short-term economic movements, especially at the turning points, and long-term trend movements in the local economy. The EPI comprises a set of component series selected from a wide range of key short-term economic indicators. These key short-term economic indicators are weighted in terms of their relative importance in influencing the economic activity of the local economy. The relative importance is derived from its correlation to the GDP or baseline of the local economy. The EPI is thus a weighted economic performance indicator.

The formula for the Ethekwini EPI is as follows:

B*4+C*2+D*2+E*4+F*3+G*3+H*3+I+J*2+K*2+L+M+N+O+P*2+Q*3+R
+T+U+V*2+W*3+X+Y*2+Z*2+AA*2 (eq 7.19)

where B to AA is the different variables included and the values indicates the relative weights of the included variables. The table below (table 7.25) indicates the variables included in the Durban EPI and its unit of measurement. The variables are therefore collected and captured in their original unit of measurement but are first transformed into an index format (January 2003 = 100) before included in the EPI. This is done in order to ensure uniformity amongst the variables.

Table 7.32: EPI Variables for the Ethekwini Local Economy

Letter	Variable	Measurement Unit
B	Provincial Government Current Expenditure	R'billons
C	Provincial Government Capital Expenditure	R'billons

D	Number of Claims for Unemployment Benefits	Quantity
E	Number of New Job Postings	Quantity
F	Value of New Building Plans Approved	R'millons
G	Additions to Non-Residential Space	Square meters
H	Long-term Interest Rate	Percentage
I	Number of Civil Cases for Debt	Quantity
L	Total Number of New Vehicle sales	Quantity
K	Total Bulk & Break-bulk Cargo Movement at Harbour	Tons
L	Entertainment Sector Index (Number of Visitors to Casino's and Entertainment Venues)	Quantity
M	Total Number of Delegates to the ICC	Quantity
N	Average Hospitality Occupancy Rate	Bed Nights Sold
O	Electricity Consumption by Households	Units Sold
P	Electricity Consumption by Non Households	Units Sold
Q	Total Retail Sales	Feet count
R	Live Vehicle Population	Quantity
T	Total Airport Passenger Movements	Quantity
U	Sugar Cane RV Price	R
V	Value of Bank ATM Transactions	R'millions
W	Total Fuel Consumption	Liters
X	Number of Vehicle Rentals	Quantity
Y	Shares Price Index	Cents
Z	Value of Residential House Prices	R'000
AA	Total Value of Bank Loan Approvals	R'millions

The allocated weights are not based on any specific scientific methodology but rather based on what is known about the structure of the particular local economy because it's not possible to apply any of the scientific approaches. For example intuitively retail sales in the Msunduzi economy will have a higher weight than retail sales in the Ethekwini economy because of the structural characteristics of the two local economies. In all instances the weights ranges from 1 to 4. However and unfortunately the allocation of the weights is a major limitation and therefore requires much more work.

Although the weights have somewhat arbitrarily been allocated for each local economy great care has been taken to include the same variables with the exception of the harbour activity for obvious reasons. Again this has been done to ensure comparative compatibility amongst the EPI's of the various local economies. The EPI variables for the different local economies are therefore similar (with the one

exception), however the weightings may are may not be similar depending on the structural characteristics of the particular local economy.

It must be stated that given the inability to apply any scientific methodologies in deriving the allocated weights various weights have been applied for each local economy in order the determine the appropriate weights. The allocated weight for each included variable for each local economy are therefore the result of a trail and error process which does lend some reliability but as stated it is a serious limitation.

It, however, must be emphasized that the majority of economic statistics or data on a local economy is not readily or cost effectively available. A primary data gathering process will be the only method of obtaining the majority of local economic statistics or data. The table below gives a summary of the source or sources, methodology, frequency and publication format of the data per economic indicator. Economic indicators provide statistical data both in tabular and graphic form.

Table 7.33: Sources for Local Economic Indicators

Indicators	Source/s	Methodology	Frequency	Publication Format
Labour Market				
Number of Claims for Unemployment Benefits	Dept of Labour	Sole Supplier	Monthly	Quantity
New Job Postings	Personnel Agencies	Sample of at least 3 agencies	Monthly	Quantity
Average Salary per Placement	Personnel Agencies	Sample of at least 3 agencies	Monthly	Rand
Construction Sector				
Number of Building Plans Approved	Municipality	Sole Supplier	Monthly	Quantity
Value of Building Plans Approved	Municipality	Sole Supplier	Monthly	Rand
Value per Building Plans Approved		Calculation	Monthly	Rand
Expansion of Commercial Space	Municipality	Sole Supplier	Monthly	m^2
Expansion of Industrial Space	Municipality	Sole Supplier	Monthly	m^2
Expansion of Office and Banking Space m^2	Municipality	Sole Supplier	Monthly	m^2
Expansion of Shopping space	Municipality	Sole Supplier	Monthly	m^2
Cementitious Sales	Cement and Concrete Institute	Sole Supplier	Monthly	Tons

Monetary Sector				
Long-term Interest Rate	SA Reserve Bank	Sole Supplier	Monthly	%
Prime Interest Rate	SA Reserve Bank	Sole Supplier	Monthly	%
CPI (Local)	Statistics SA	Sole Supplier	Monthly	%
CPI (SA)	Statistics SA	Sole Supplier	Monthly	%
Food Inflation (Local)	Statistics SA	Sole Supplier	Monthly	%
Food Inflation (SA)	Statistics SA	Sole Supplier	Monthly	%
Financial Stress				
Number of Civil Cases for Debt	Statistics SA	Sole Supplier	Monthly	Quantity
Number of Insolvencies (Persons)	Master of the High Court	Sole Supplier	Monthly	Quantity
Number of Liquidations (Businesses)	Master of the High Court	Sole Supplier	Monthly	Quantity
Retail Trade				
New Vehicle Sales (Passenger)	National Association of Automobile Manufacturers	Sole Supplier	Monthly	Quantity
New Vehicle Sales (Commercial)	National Association of Automobile Manufacturers	Sole Supplier	Monthly	Quantity
Retail Activity (Index)	Local Shopping Centers	Population	Monthly	Feetcount
Total Spend per Head	Local Shopping Centers	Calculation	Monthly	Rand
Total Retail Expenditure	Local Shopping Centers	Calculation	Monthly	Rand
Municipal Produce Market Turnover	Municipality	Sole Supplier	Monthly	Rand
Transport Sector				
Live Vehicle Population (Heavy & Lightload Vehicles)	Provincial Dept of Transport	Sole Supplier	Monthly	Quantity
Live Vehicle Population (Passenger and MiniBus Vehicles)	Provincial Dept of Transport	Sole Supplier	Monthly	Quantity
Vehicle Traffic (Main Road)	Mikros Traffic Monitoring	Sole Supplier	Monthly	Quantity
Vehicle Traffic (Outside Road)	Mikros Traffic Monitoring	Sole Supplier	Monthly	Quantity
Total Bulk & Breakbulk Cargo	National Ports Authority	Sole Supplier	Monthly	Quantity
Number of Vessels Moves	National Ports Authority	Sole Supplier	Monthly	Quantity
Number of Vessels Moves: GT of Vessels	National Ports Authority	Sole Supplier	Monthly	Quantity
Air Passenger Arrivals	Local Airport , ACSA	Sole Supplier	Monthly	Quantity
Air Passenger Departures	Local Airport , ACSA	Sole Supplier	Monthly	Quantity

Aircraft Arrivals	Local Airport , ACSA	Sole Supplier	Monthly	Quantity
Aircraft Departures	Local Airport , ACSA	Sole Supplier	Monthly	Quantity
Resource Use				
Number of Electricity Consumption Households	Municipality	Sole Supplier	Monthly	Quantity
Number of Electricity Consumption Businesses	Municipality	Sole Supplier	Monthly	Quantity
Number of Electricity Consumption Industry	Municipality	Sole Supplier	Monthly	Quantity
Electricity Consumption (Total by Municipality, Index)	Eskom	Sole Supplier	Monthly	kW
Electricity Consumption (Total by Household, Index)	Eskom	Sole Supplier	Monthly	kW
Electricity Consumption (Total by Commercial, Index)	Eskom	Sole Supplier	Monthly	kW
Electricity Supply by Municipality to Businesses	Municipality	Sole Supplier	Monthly	kW
Electricity Supply by Municipality to Business>800	Municipality	Sole Supplier	Monthly	kW
Electricity Supply by Municipality to Households	Municipality	Sole Supplier	Monthly	kW
Total Water Consumption	Local Water Authority	Sole Supplier	Monthly	Kiloliters
Total Diesel Consumption	South African Petroleum Industry Association	Sole Supplier	Monthly	Liters
Total Petrol Consumption	South African Petroleum Industry Association	Sole Supplier	Monthly	Liters
Diesel Consumption per Commercial Vehicle	South African Petroleum Industry Association	Calculation	Monthly	Liters
Petrol Consumption per Passenger Vehicle	South African Petroleum Industry Association	Calculation	Monthly	Liters
Property Sector				
Number of Houses Sold	Institute of Estate Agents	Sole Supplier	Monthly	Quantity
Average Selling Price (Houses)	Institute of Estate Agents	Sole Supplier	Monthly	Rand
Number of Sectional Title Sold	Institute of Estate Agents	Sole Supplier	Monthly	Quantity
Average Selling Price (Sectional)	Institute of Estate Agents	Sole Supplier	Monthly	Rand
Number of Vacant Land Sold	Institute of Estate Agents	Sole Supplier	Monthly	Quantity
Average Selling Price (Land)	Institute of Estate Agents	Sole Supplier	Monthly	Rand

Sales of Business Property Concluded	Commercial Property Agents	Population	Monthly	Rand
Annuity Value of Leases Concluded	Commercial Property Agents	Population	Monthly	Rand
Average Residential Property Rentals	Rental Property Agents	Sample of at least 3 agencies	Monthly	Rand
Agriculture Sector				
Sugar Cane Prices	SA Canegrowers Association	Sole Supplier	Monthly	Rand
Timber Prices - Wattle	NCT	Sole Supplier	Monthly	Rand
Timber Prices - Gum	NCT	Sole Supplier	Monthly	Rand
Timber Prices - Pine	NCT	Sole Supplier	Monthly	Rand
Producer Price - Beef	FNB	Sole Supplier	Monthly	Rand
Producer Price - Mutton	FNB	Sole Supplier	Monthly	Rand
Producer Price - Poultry	FNB	Sole Supplier	Monthly	Rand
Producer Price - Pork	FNB	Sole Supplier	Monthly	Rand
White Maize Prices	FNB	Sole Supplier	Monthly	Rand
Producer Price - Cabbage	FNB	Sole Supplier	Monthly	Rand
Producer Price - Carrots	FNB	Sole Supplier	Monthly	Rand
Producer Price - Onions	FNB	Sole Supplier	Monthly	Rand
Money Demand				
Number of Bank Teller Transactions	Commercial Banks	Population	Monthly	Rand
Number of Bank ATM Transactions	Commercial Banks	Population	Monthly	Rand
Value of Bank Transactions	Commercial Banks	Population	Monthly	Rand
Rand Value per Bank Transaction	Commercial Banks	Population	Monthly	Rand
Total Number of Bank Business Loan Approvals	Commercial Banks	Population	Monthly	Quantity
Total Value of Bank Business Loan Approvals	Commercial Banks	Population	Monthly	Rand
Total Value per Bank Business Loan Approvals	Commercial Banks	Population	Monthly	Rand
Hospitality Sector				
Total Number of Rental Check-Ins	SA Vehicle Rental and Leasing Association	Sole Supplier	Monthly	Quantity
Total Number of Rental Days	SA Vehicle Rental and Leasing Association	Sole Supplier	Monthly	Quantity
Average Number of Hospitality Rooms Sold	Three Cities	Sole Supplier	Monthly	Quantity
Average Occupancy Rate	Three Cities	Sole Supplier	Monthly	%

Total Number of Conference Delegates	Local Conference Center	Sole Supplier	Monthly	Quantity
Delegates Duration in Days	Local Conference Center	Sole Supplier	Monthly	Days
Total Number of Delegate Days	Local Conference Center	Sole Supplier	Monthly	Days
Casino Visits	Local Casino	Sole Supplier	Monthly	Vehicles
Entertainment Numbers	Local Entertainment Establishments	Sample of at least 5 establishments	Monthly	Visitors
Composite Indicators				
SA Leading Indicator	SA Reserve Bank	Sole Supplier	Monthly	Index
SA Coincident Indicator	SA Reserve Bank	Sole Supplier	Monthly	Index
SA Lagging Indicator	SA Reserve Bank	Sole Supplier	Monthly	Index
Local Economic Performance Index	Derived	Calculation	Monthly	Index
Stock Price				
Share Price	JSE or Sharenet	Sole Supplier	Monthly	Cents
Climate				
Average Daily Maximum Temperature	SA Weather Service	Sole Supplier	Monthly	Celsius
Average Daily Minimum Temperature	SA Weather Service	Sole Supplier	Monthly	Celsius
Monthly Daily Rain	SA Weather Service	Sole Supplier	Monthly	mm
Average Wind Gust Speed	SA Weather Service	Sole Supplier	Monthly	m/s
Business Environment				
Businesses per Economic Classification	Chamber of Business	Sole Supplier	Yearly	Members
Businesses per Economic Classification	Cipro	Sole Supplier	Yearly	Registrations
Business Confidence	Survey	Calculation	Yearly	Index
Local and Provincial Government				
Local Operational Expenditure	MFMA, National Treasury	Sole Supplier	Yearly	Rand
Local Capital Expenditure	MFMA, National Treasury	Sole Supplier	Yearly	Rand
Provincial Operational Expenditure	PFMA, National Treasury	Sole Supplier	Yearly	Rand
Provincial Capital Expenditure	PFMA, National Treasury	Sole Supplier	Yearly	Rand

It is very important that the data adheres to the following characteristics and as recommended by Baumohl:

- economic importance,
- statistical adequacy,
- consistency of business cycle
- expansion conformity

The data, irrespective of whether the data is new or existing data, therefore needs to be continuously tested against the stated characteristics. If any of the data are contravening or are not fitting the characteristics, the resulting indicator or indicators or profile will not be reliable or valid.

7.6 Local Business Confidence

Business confidence is a useful indicator of expected economic trends in the short to medium term. Business confidence is determined in most cases via a structured survey and published on a monthly or quarterly basis. However this seems not to be feasible at a local economic level simply because of the costs involved and the time needed to get sufficient responses. From experience the most optimistic frequency to conduct such surveys seems to be yearly and the best route to conduct the surveys seems to be via the local chamber of business and other local business organizations. The survey is an online anonymous business survey designed specifically to generate data and information on a number of local economic characteristics and trends and the general level of business confidence in the particular local economy.

It is important to note that the surveys are conducted at the same time each year, i.e., March and April of each year in order to ensure consistency. The survey as mentioned is conducted using the World Wide Web (web) through a survey company located in Cape Town. Once the questionnaire has been finalized it is then given to this company to upload on the web and a web address or link is generated. Although the questionnaire is reviewed every year very little changes has been made

since 2005 again to ensure consistency. The web link is then send to the various chambers of business and other business organizations so that they can then distribute the web link to all their members. After the two months the survey is closed and the data is collated by the web base software that underpins the survey and a report and excel database is generated.

In general the response rate is between 1 per cent and 2 per cent of the total membership of the various chambers of business and business organizations. However there can be questions about the number of responses and thus its level of inference. This is not an ideal situation and therefore needs further work for example and incentive scheme can potentially be develop to increase the response rate.

The table below gives the results of the Ethekwini business confidence surveys that have been conducted since 2005. The fist column indicates the questions and the different options associated and the second, fourth, sixth, eight and tenth columns give the relative percentage response of each option in the various questions and for each of the periods. The third, fifth, seventh, ninth and eleventh columns give the cumulative percentage distribution for each question and for the relative periods.

Table 7.34: Ethekwini Business Confidence Survey

Question & Responses	2010		2009		2008		2007		2005	
	As a % Total	Less than Ogive	As a % Total	Less than Ogive	As a % Total	Less than Ogive	As a % Total	Less than Ogive	As a % Total	Less than Ogive
Industry by sector in which your business operates?										
Agriculture, Forestry, Hunting (Processing of Farm Products) Farming (Basic production of agri products) Mining			3.4		1.1					
Quarrying										
Manufacturing	24		21.7		27.5		30.0		21.4	
Electricity, Gas & Water					1.1		1.0			
Construction	8		2.8		3.3		4.0		7.1	
Educational Institutions	4		1.9		3.3		3.0			
Tourism, Catering & Accommodation	3		2.9		6.6		4.0			
Wholesale & Retail	9		14.3		7.7		8.0		21.4	
Vehicle Sales			1		1.1		1.0			
Transport, Storage & Communications	2		9.6		11.0		11.0			
Banks & Financial	7				2.2		4.0		7.1	

Legal					0.0					
Insurance , Pension & Medical Aid Funds	1				3.3		1.0			
Real Estate	3						6.0			
Business Services	12		14.3		7.7		5.0			
Central Government										
Local Government										
Provincial Government										
Social & Personal Services			2.9		1.1					
IT	4				4.4		5.0			
Taxis										
Other	23	100	25.3	100.1	18.7		16.0		35.7	
How many employees do you have?										
0 - 10	37	37.0	14.3	14.3	34.1	34.1	39.0	39.0	33.0	33.0
11. - 30	30	67.0	0	14.3	33.0	67.1	29.0	68.0	17.0	50.0
31 - 50	7	74.0	28.6	42.9	4.4	71.5	10.0	78.0	10.0	60.0
51 - 100	8	82.0	14.3	57.2	8.8	80.3	6.0	84.0	7.0	67.0
101 - 200	1	83.0	14.3	71.5	8.8	89.1	9.0	93.0	20.0	87.0
> 200	17	100.0	28.6	100.1	11.0	100.1	6.0	99.0	13.0	100.0
Labour Relations? (1= least important & 10 = critical important)										
1	7.0	7.0	5.3	5.3	7.7	7.7	8.0	8.0	7.1	7.1
2	6.0	13.0	6.1	11.4	8.8	16.5	10.0	18.0	21.4	28.6
3	7.0	20.0	4.3	15.7	7.7	24.2	9.0	27.0	12.0	40.6
4	4.0	24.0	5.5	21.2	5.5	29.7	1.0	28.0	0.0	40.6
5	12.0	36.0	2.3	23.5	6.6	36.3	10.0	38.0	7.1	47.7
6	4.0	40.0	0.0	23.5	0.0	36.3	6.0	44.0	2.0	49.7
7	14.0	54.0	6.6	30.1	6.6	42.9	11.0	55.0	0.0	49.7
8	18.0	72.0	33.2	63.3	24.2	67.1	23.0	78.0	14.3	64.0
9	16.0	88.0	15.8	79.1	13.2	80.3	9.0	87.0	7.1	71.1
10	12.0	100.0	21.7	100.8	19.8	100.1	13.0	100.0	28.6	99.7
Crime and Violence? (1= least important & 10 = critical important)										
1	4.0	4.0	3.3	3.3	3.3	3.3	3.0	3.0	7.1	7.1
2	4.0	8.0	6.4	9.7	8.8	12.1	0.0	3.0	7.1	14.3
3	5.0	13.0	6.6	16.3	6.6	18.7	4.0	7.0	0.0	14.3
4	6.0	19.0	2.4	18.7	3.3	22.0	4.0	11.0	7.1	21.4
5	8.0	27.0	6.9	25.6	9.9	31.9	5.0	16.0	7.1	28.6
6	7.0	34.0	4.3	29.9	3.3	35.2	5.0	21.0	7.1	35.7
7	8.0	42.0	12.4	42.3	12.1	47.3	10.0	31.0	0.0	35.7
8	14.0	56.0	16.2	58.5	16.5	63.8	15.0	46.0	21.4	57.1
9	15.0	71.0	18.8	77.3	15.4	79.2	14.0	60.0	21.4	78.6
10	29.0	100.0	22.6	99.9	20.9	100.1	41.0	101.0	21.4	100.0
Political Stability? (1= least important & 10 = critical important)										
1	1.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0
2	1.0	2.0	0.0	0.0	2.2	2.2	3.0	4.0	0.0	0.0
3	3.0	5.0	1.2	1.2	5.5	7.7	4.0	8.0	0.0	0.0
4	3.0	8.0	3.2	4.4	4.4	12.1	1.0	9.0	0.0	0.0
5	3.0	11.0	7.8	12.2	6.6	18.7	5.0	14.0	7.1	7.1

6	7.0	18.0	2.7	14.9	2.2	20.9	4.0	18.0	0.0	7.1
7	9.0	27.0	3.8	18.7	5.5	26.4	8.0	26.0	7.1	14.3
8	27.0	54.0	22.7	41.4	18.7	45.1	23.0	49.0	50.0	64.3
9	20.0	74.0	22.9	64.3	22.0	67.1	20.0	69.0	14.3	78.6
10	26.0	100.0	36.0	100.3	33.0	100.1	29.0	98.0	21.4	100.0
New technology/R&D/Training? (1= least important & 10 = critical important)										
1		0.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0
2	2.0	2.0	1.9	1.9	1.1	1.1	1.0	4.0	7.1	7.1
3	3.0	5.0	4.4	6.3	6.6	7.7	4.0	8.0	7.1	14.3
4	7.0	12.0	5.1	11.4	5.5	13.2	5.0	13.0	7.1	21.4
5	19.0	31.0	4.9	16.3	6.6	19.8	13.0	26.0	21.4	42.9
6	2.0	33.0	5.9	22.2	7.7	27.5	10.0	36.0	7.1	50.0
7	12.0	45.0	21.5	43.7	19.8	47.3	9.0	45.0	7.1	57.1
8	30.0	75.0	23.7	67.4	26.4	73.7	24.0	69.0	14.3	71.4
9	5.0	80.0	4.1	71.5	13.2	86.9	14.0	83.0	14.3	85.7
10	20.0	100.0	28.6	100.1	13.2	100.1	18.0	101.0	14.3	100.0
Rates and Taxes? (1= least important & 10 = critical important)										
1	4.0	4.0	0.0	0.0	1.1	1.1	3.0	3.0	0.0	0.0
2	3.0	7.0	0.0	0.0	0.0	1.1	1.0	4.0	0.0	0.0
3	5.0	12.0	12.6	12.6	6.6	7.7	3.0	7.0	0.0	0.0
4	7.0	19.0	3.1	15.7	7.7	15.4	1.0	8.0	0.0	0.0
5	14.0	33.0	0.0	15.7	4.4	19.8	16.0	24.0	7.1	7.1
6	5.0	38.0	8.4	24.1	6.6	26.4	9.0	33.0	14.3	21.4
7	13.0	51.0	12.8	36.9	9.9	36.3	24.0	57.0	28.6	50.0
8	24.0	75.0	15.4	52.3	17.6	53.9	15.0	72.0	14.3	64.3
9	10.0	85.0	19.5	71.8	18.7	72.6	13.0	85.0	7.1	71.4
10	15.0	100.0	28.2	100.0	27.5	100.1	15.0	100.0	28.6	100.0
Cost of money? (1= least important & 10 = critical important)										
1	2.0	2.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0
2	1.0	3.0	0.0	0.0	0.0	0.0	3.0	6.0	0.0	0.0
3	4.0	7.0	0.0	0.0	2.2	2.2	3.0	9.0	7.1	7.1
4	2.0	9.0	0.0	0.0	2.2	4.4	1.0	10.0	14.3	21.4
5	9.0	18.0	3.1	3.1	4.4	8.8	11.0	21.0	14.3	35.7
6	17.0	35.0	2.8	5.9	8.8	17.6	8.0	29.0	0.0	35.7
7	13.0	48.0	9.6	15.5	6.6	24.2	16.0	45.0	7.1	42.9
8	21.0	69.0	18.7	34.2	14.3	38.5	16.0	61.0	7.1	50.0
9	11.0	80.0	21.8	56.0	19.8	58.3	13.0	74.0	21.4	71.4
10	20.0	100.0	44.0	100.0	41.8	100.1	27.0	101.0	28.6	100.0
National economy? (1= least important & 10 = critical important)										
1		0.0	0.0	0.0	0.0	0.0	0.0	0.0		
2	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0		
3		3.0	0.0	0.0	0.0	0.0	0.0	0.0		
4	1.0	4.0	0.0	0.0	2.2	2.2	3.0	3.0		
5	4.0	8.0	19.7	19.7	2.2	4.4	3.0	6.0		
6	3.0	11.0	3.2	22.9	1.1	5.5	6.0	12.0		

7	6.0	17.0	0.0	22.9	4.4	9.9	11.0	23.0		
8	30.0	47.0	13.8	36.7	19.8	29.7	37.0	60.0		
9	18.0	65.0	20.2	56.9	30.8	60.5	18.0	78.0		
10	35.0	100.0	43.0	99.9	39.6	100.1	23.0	101.0		
Competition -National? (1= least important & 10 = critical important)										
1	3.0	3.0	0.0	0.0	3.3	3.3	4.0	4.0		
2	6.0	9.0	1.2	1.2	4.4	7.7	3.0	7.0		
3	6.0	15.0	1.2	2.4	5.5	13.2	9.0	16.0		
4	6.0	21.0	4.8	7.2	7.7	20.9	4.0	20.0		
5	7.0	28.0	13.3	20.5	9.9	30.8	6.0	26.0		
6	4.0	32.0	6.2	26.7	7.7	38.5	13.0	39.0		
7	22.0	54.0	19.9	46.6	17.6	56.1	16.0	55.0		
8	19.0	73.0	27.9	74.5	23.1	79.2	19.0	74.0		
9	12.0	85.0	12.6	87.1	8.8	88.0	15.0	89.0		
10	15.0	100.0	13.0	100.1	12.1	100.1	11.0	100.0		
Competition -Foreign? (1= least important & 10 = critical important)										
1	17.0	17.0	0.0	0.0	17.6	17.6	22.0	22.0	7.1	7.1
2	14.0	31.0	12.1	12.1	12.1	29.7	5.0	27.0	7.1	14.3
3	7.0	38.0	7.5	19.6	8.8	38.5	11.0	38.0	7.1	21.4
4	8.0	46.0	9.5	29.1	7.7	46.2	9.0	47.0	7.1	28.6
5	13.0	59.0	10.8	39.9	8.8	55.0	6.0	53.0	21.4	50.0
6	5.0	64.0	10.3	50.2	7.7	62.7	13.0	66.0	0.0	50.0
7	8.0	72.0	16.2	66.4	6.6	69.3	11.0	77.0	7.1	57.1
8	11.0	83.0	19.3	85.7	12.1	81.4	10.0	87.0	14.3	71.4
9	8.0	91.0	14.3	100.0	8.8	90.2	9.0	96.0	14.3	85.7
10	9.0	100.0	0.0	100.0	9.9	100.1	4.0	100.0	14.3	100.0
Infrastructure/Electricity, Water, Roads etc? (1= least important & 10 = critical important)										
1	1.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	7.1	7.1
2	4.0	5.0	0.0	0.0	1.1	1.1	0.0	1.0	0.0	7.1
3	4.0	9.0	0.0	0.0	0.0	1.1	1.0	2.0	7.1	14.3
4	4.0	13.0	0.0	0.0	1.1	2.2	3.0	5.0	0.0	14.3
5	11.0	24.0	0.0	0.0	7.7	9.9	9.0	14.0	0.0	14.3
6	8.0	32.0	14.7	14.7	4.4	14.3	6.0	20.0	7.1	21.4
7	9.0	41.0	4.8	19.5	8.8	23.1	13.0	33.0	0.0	21.4
8	17.0	58.0	22.1	41.6	19.8	42.9	22.0	55.0	21.4	42.9
9	19.0	77.0	18.6	60.2	19.8	62.7	18.0	73.0	28.6	71.4
10	23.0	100.0	39.9	100.1	37.4	100.1	28.0	101.0	28.6	100.0
How long has your business operated in the area (years)?										
less than 1 year	0	0.0		0.0	1.1	1.1				
1	0	0.0	14.3	14.3	3.3	4.4				
2	0	0.0		14.3	1.1	5.5				
3	0	0.0		14.3	3.3	8.8				
4	1	1.0		14.3	1.1	9.9				
5	1	2.0		14.3	7.7	17.6				
6	5	7.0	14.3	28.6	0.0	17.6				

7	6	13.0	28.6	57.2	3.3	20.9				
8	1	14.0		57.2	3.3	24.2				
9	1	15.0		57.2	2.2	26.4				
more than 9 years	83	98.0	42.9	100.1	73.6	100.0				
Is your business locally owned?										
Yes	89		85.7		81.3					
No	11		14.3		18.7					
Is your business predominantly a Product or Service Business?										
Product	42		28.6		41.8					
Service	58		71.4		58.2					
The primary market for your product and/or service is?										
Local consumers	12	12.0	18.1	18.1	14.3	14.3	14.0	14.0		
Local businesses	21	33.0	28.6	46.7	17.6	31.9	28.0	42.0		
Provincial consumers	6	39.0	8.7	55.4	2.2	34.1	4.0	46.0		
Provincial businesses	10	49.0	14.3	69.7	8.8	42.9	9.0	55.0		
National consumers	12	61.0	12.5	82.2	17.6	60.5	46.0	101.0		
National businesses	29	90.0	10	92.2	33.0	93.5	0.0	101.0		
Export market	10	100.0	7.8	100.0	6.6	100.1	0.0	101.0		
Has the business expanded in terms of its operations over the last 5 years?										
Yes	73		80.3		76.9					
No	27		19.7		23.1					
The profitability objectives of the business for 2007 were achieved?										
Yes, much better	7		14.3		7.7					
Yes	39		61.4		50.5					
No	37		14.3		34.1					
No, much worse	17		10		7.7					
What are the % labour costs to total costs of your company?										
0 - 15	7	7.0	0	0.0	8.8	8.8	9.0	9.0	0.0	0.0
16 - 25	10	17.0	0	0.0	11.0	19.8	19.0	28.0	14.3	14.3
26 - 35	17	34.0	28.6	28.6	20.9	40.7	27.0	55.0	14.3	28.6
36 - 45	20	54.0	14.3	42.9	22.0	62.7	20.0	75.0	14.3	42.9
46 - 55	12	66.0	31.8	74.7	17.6	80.3	13.0	88.0	7.1	50.0
56 - 65	17	83.0	10.6	85.3	7.7	88.0	1.0	89.0	7.1	57.1
66 - 75	9	92.0	6.8	92.1	6.6	94.6	4.0	93.0	28.6	85.7
76 - 85	8	100.0	7.9	100.0	4.4	99.0	8.0	101.0	7.1	92.9
86 - 100		100.0	0	100.0	1.1	100.1	0.0	101.0	7.1	100.0
Your company is currently operating on …% capacity?										
0 - 15	2	2.0	0	0.0	1.1	1.1	6.0	6.0	0.0	0.0
16 - 25	4	6.0	0	0.0	3.3	4.4		6.0	7.1	7.1

26 - 35	8	14.0	0	0.0	3.3	7.7	4.0	10.0	0.0	7.1
36 - 45	8	22.0	14.3	14.3	4.4	12.1	5.0	15.0	7.1	14.3
46 - 55		22.0	6.8	21.1	3.3	15.4	5.0	20.0	0.0	14.3
56 - 65	13	35.0	13.1	34.2	11.0	26.4	10.0	30.0	28.6	42.9
66 - 75	26	61.0	14.3	48.5	19.8	46.2	27.0	57.0	21.4	64.3
76 - 85	23	84.0	28.6	77.1	22.0	68.2	23.0	80.0	28.6	92.9
86 - 100	16	100.0	22.9	100.0	31.8	100.0	20.0	100.0	7.1	100.0
As a percentage, what wage/salary increases do you expect for the year (nominal terms)?										
4% and Less than	9	9.0	0	0.0	6.6	6.6	5.0	5.0	7.1	7.1
5%	9	18.0	0	0.0	5.5	12.1	15.0	20.0	21.4	28.6
6%	15	33.0	14.3	14.3	12.1	24.2	15.0	35.0	50.0	78.6
7%	14	47.0	12.8	27.1	11.0	35.2	24.0	59.0	14.0	92.6
8%	21	68.0	12.9	40.0	22.0	57.2	14.0	73.0	0.0	92.6
9%	9	77.0	18.7	58.7	12.1	69.3	8.0	81.0	0.0	92.6
10%	17	94.0	21.3	80.0	19.8	89.1	18.0	99.0	7.1	99.7
11%	1	95.0	20.1	100.1	5.5	94.6	1.0	100.0	0.0	99.7
12% and Greater than	5	100.0	0	100.1	5.5	100.1	0.0	100.0	0.0	99.7
As a percentage, what turnover increases do you expect for the year (nominal terms)?										
Less than 4%	24.5	24.5	14.3	14.3	15.4	15.4	10.0	10.0	28.6	28.6
4%	5.3	29.8	14.3	28.6	6.6	22.0	0.0	10.0	0.0	28.6
5%	19.1	48.9	13.8	42.4	14.3	36.3	6.0	16.0	7.1	35.7
6%	7.4	56.3	0	42.4	6.6	42.9	4.0	20.0	0.0	35.7
7%	5.3	61.6	17.6	60.0	5.5	48.4	4.0	24.0	0.0	35.7
8%		61.6	6.2	66.2	6.6	55.0	10.0	34.0	0.0	35.7
9%	3.2	64.8	4.3	70.5	2.2	57.2	5.0	39.0	0.0	35.7
10%	12.8	77.6	0	70.5	13.2	70.4	24.0	63.0	28.6	64.3
11%		77.6	9.1	79.6	1.1	71.5	3.0	66.0	0.0	64.3
12%		77.6	20.6	100.2	4.4	75.9	6.0	72.0	35.7	100.0
More than 12%	22.3	99.9	0	100.2	24.2	100.1	28.0	100.0	0.0	100.0
Present business/trading conditions are?										
Excellent	4	4.0	2.8	2.8	3.3	3.3	10.0	10.0	14.3	14.3
Good	22	26.0	28.6	31.4	27.5	30.8	42.0	52.0	28.6	42.9
Fair	48	74.0	37.1	68.5	46.2	77.0	42.0	94.0	35.7	78.6
Poor	23	97.0	14.3	82.8	15.4	92.4	3.0	97.0	21.4	100.0
Very poor	3	100.0	17.2	100.0	7.7	100.1	4.0	101.0	0.0	100.0
Your expected sales performance over the next year?										
Much better	12	12.0	0	0.0	9.9	9.9	13.0	13.0	42.9	42.9
Better	38	50.0	22.9	22.9	37.4	47.3	59.0	72.0	28.6	71.4
Same	29	79.0	42.9	65.8	25.3	72.6	20.0	92.0	21.4	92.9
Worse	19	98.0	24.3	90.1	23.1	95.7	8.0	100.0	7.1	100.0
Much worse	2	100.0	9.9	100.0	4.4	100.1	0.0	100.0	0.0	100.0
I am expecting to expand my business operations during the year?										
Yes, definitely	11	11.0	0	0.0	11.0	11.0	19.0	19.0		

Yes	30	41.0	18.4	18.4	36.3	47.3	37.0	56.0
Maybe	31	72.0	42.9	61.3	19.8	67.1	27.0	83.0
No	25	97.0	29.6	90.9	23.1	90.2	15.0	98.0
Downsizing	3	100.0	8.9	99.8	9.9	100.1	3.0	101.0
I am expecting to expand my workforce during the year?								
Yes, definitely	8	8.0	0	0.0	5.5	5.5	9.0	9.0
Yes	21	29.0	12.7	12.7	20.9	26.4	35.0	44.0
Maybe	23	52.0	38.4	51.1	22.0	48.4	27.0	71.0
No	43	95.0	32.8	83.9	44.0	92.4	25.0	96.0
Downsizing	5	100.0	17	100.9	7.7	100.1	4.0	100.0
I have experienced an increase in economic activity in the local economy during the past year?								
Yes, definitely	5	5.0	0	0.0	3.3	3.3	8.0	8.0
Yes	21	26.0	42.9	42.9	39.6	42.9	48.0	56.0
Maybe	13	39.0	14.3	57.2	17.6	60.5	24.0	80.0
No	51	90.0	42.9	100.1	30.8	91.3	20.0	100.0
No, definitely	10	100.0	0	100.1	8.8	100.1	0.0	100.0

(own calculations)

The values highlighted in yellow are rough estimates of the average response for each question. Using the responses of the survey it is possible to make a number of inferences and interpretations regarding the past, current and future economic and business conditions of the particular local economy. For example during 2010 56 percent of the respondents in the Ethekwini economy indicated that they expected their turnover to increase by 6 or less percent compared to 35 percent in 2005. Therefore turnover expectations decreased dramatically in the Ethekwini economy from 2005 to 2010 suggesting that business conditions worsened significantly over the period.

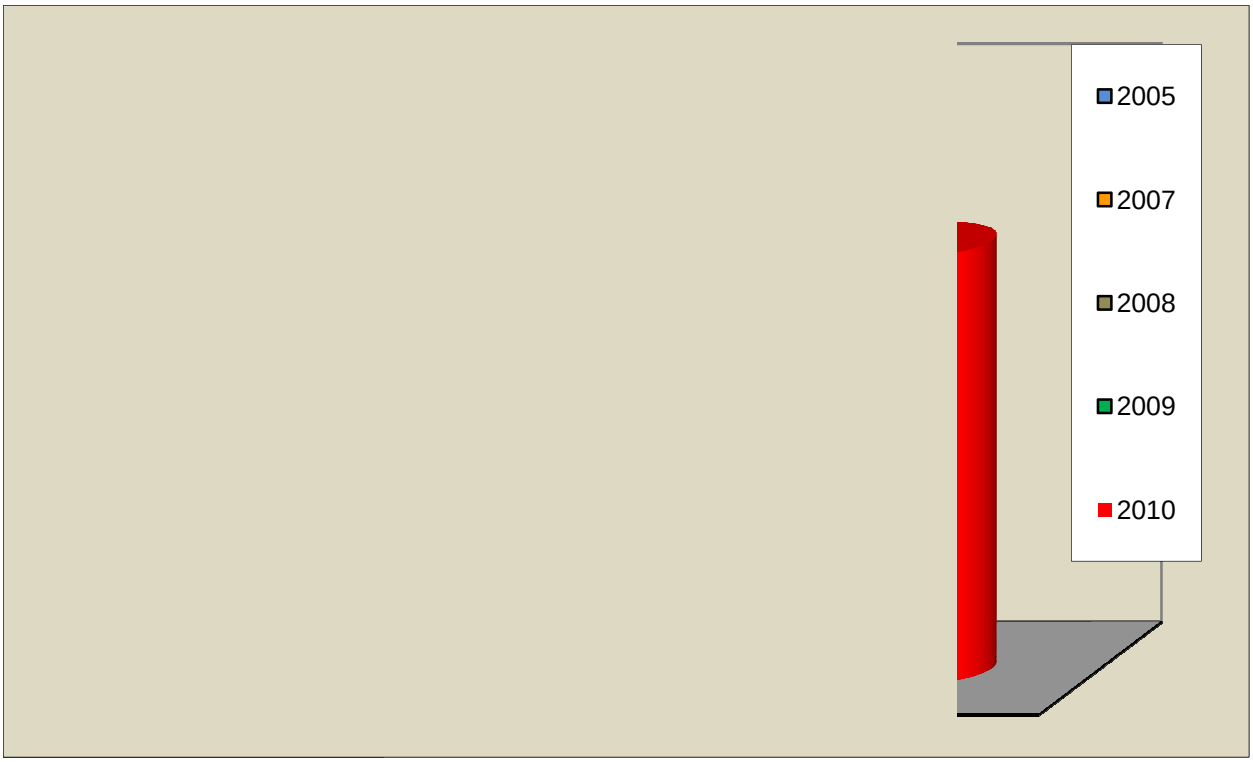
Conducting these surveys for each of the local economies also opens to possibilities for comparisons. It becomes therefore possible to compare past and current economic behaviour and trends and business expectations amongst the five local economies. These business surveys thus not only give some insight into the internal economic and business dynamics of each local economy but also as a collective give insight into the economic and business dynamics of the province as a whole.

Business confidence measures how confident businesses feel about the state of the local economy and their investment power. The idea is that the more confident businesses feel about the stability of their revenues, the more likely they are to make investments. The survey also takes this into account by including questions that are specifically designed to elicit responses that gauge the confidence levels of business owners and/or managers. The

The business confidence index is calculated or derived as the gross percentage of respondents responding Good, Fair, Better and Same to the questions Present business/trading conditions are? and Your expected sales performance over the next year?. The responses of the fourth and fifth last questions are thus used to calculate the business confidence index for the particular year. The business confidence index varies between 0 and 100. The business confidence index should therefore be interpreted as follows, i.e. a value of 50 is indicative of neutrality, 100 indicate extreme confidence and 0 indicates extreme lack of confidence.

The below graph indicates the business confidence index for the Umhlathuze economy for the period. The vertical axis represents the index where 0 indicates extreme lack of confidence and 100 extreme optimism. Business confidence in the Umhlathuze economy during 2005 was extremely high but decreased fairly dramatically during 2007 and 2008. Business confidence has since then recovered but only marginally.

Graph 7.17: Umhlathuze Business Confidence Index



(own calculations)

7.7 Summary

If the aim is to understand, explain or have some positive impact on the local economy, one needs to find, and make sense of pertinent economic data and information. As a local economic practitioner or researcher, ones effectiveness is fairly limited unless one can frame what's going on in the local economy, and the basic tool for framing is some level of data analysis. Anecdotes and stories from the field, while useful, can take one only so far.

Past studies of the local economy have been limited to only the development of socioeconomic statistical profiles. Such profiles are sufficient from a descriptive point of view but are totally ineffectual from an analytical and empirical point of view. The availability of data and information through the development of an appropriate economic data model to a large degree allows for the analysis of the local economy through the application of the various local economic approaches and methods.

This chapter is intended to provide a summary of economic and demographic information about the mentioned local economies. The chapter presents comprehensive coverage and analysis of economic and business conditions and aims to provide timely and accurate economic data to be used by government and business organizations for planning and decision-making purposes as well as promoting the local economies as a place to invest and do business.

The results are both surprising and robust. The most important finding is the fact that the first priority must be to develop the appropriate data model. Secondly there are numerous approaches, techniques and methods to analysis the local economy. Thirdly the analysis put emphasis on the importance of the broad regional differences. The fact that the geographic differences become insignificant when the economic variables are included in the analysis suggests that these economic variables are in fact capturing the impact of regional differences as individuals respond to those differences in their locational decisions. Fourthly, national factors do play a significant role in the economics of the local region in most cases outweighs the importance of the regional and local factors. Fifthly, there are a number of variables that potentially can be used to analysis the performance of the local economy, i.e., one need not necessary focus on gross domestic product. However what is very evident is that the growth experiences of the local economies have varied widely. Sixthly, conducting business confidence survey's can substantially improve the understanding of the past, current and future behaviour of the local economy or to cross reference the data model.