

Growth in Cities: A KwaZulu-Natal Perspective

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INTRODUCTION

These cities and towns sustain development and growth in their immediate surrounding areas and the province as such and are an integral part of the national spatial economic system. Cities and towns thus do matter because it is where economic activity occurs, i.e., production and consumption and the allocation of resources predominantly takes place in towns and cities.

INTRODUCTION

Glaeser, et al (1992) states that cities create an opportunity to learn from others and thus improves one's own productivity and without such opportunities there would be little reason for people to pay high rents just to work in a city. They suggest that easy flow of ideas might explain how cities survive despite the high rents.

INTRODUCTION

It is based on the argument that if geographical proximity facilitates the transmission of ideas then it would be expected that knowledge spillovers to be particularly important in cities. Intellectual breakthroughs in most cases cross hallways and streets much more easily than oceans and continents.

INTRODUCTION

Numerous study, such as Chnitz (1962), Jacobs (1969) and Marshall (1890) focus on human capital as the determinant of city growth. Romer (1986) and Lucas (1988) support the argument that human capital is a significant determinant of growth in that they states that knowledge spillover is the "engine of growth".

INTRODUCTION

Bernstein and McCarthy (2005) argue that the localities that do grow do so due to natural resources, technology, lifestyles that attract entrepreneurs and effective local governance.

ECONOMIC THEORIES RELEVANT TO THE GROWTH OF CITIES

- Urban Economic Theory
- New Economic Geography Theory
- New Urban Economics

THEORIES OF DYNAMIC EXTERNALITIES

The Glaeser et al (1992) study focus on three theories, all which deals with technological externalities, whereby innovations and improvements occurring in one firm increase the productivity of the other firms without full compensation.

THEORIES OF DYNAMIC EXTERNALITIES

➤The Marshall-Arrow-Romer (MAR) externality concerns knowledge spillovers between firms and industry. The MAR theory also predicts that local monopoly is better for growth than local competition.

THEORIES OF DYNAMIC EXTERNALITIES

➤Porter supports the MAR theory and argue that knowledge spillovers in specialized, geographically concentrated industries stimulate growth. However, Porter insists that local competition, as opposed to local monopoly, fosters the pursuit and rapid adoption of innovation.

THEORIES OF DYNAMIC EXTERNALITIES

➤Jacobs, unlike MAR and Porter, believes that the most important knowledge transfers come from outside the core industry. As a result, variety and diversity of geographical proximate industries rather than geographical specialization promote innovation and growth.

THEORIES OF DYNAMIC EXTERNALITIES

$$\alpha \log\left(\frac{L_{t+1}}{L_t}\right) = -\log\left(\frac{w_{t+1}}{w_t}\right) + \log\left(\frac{A_{national,t+1}}{A_{national,t}}\right) + g(\text{specialization, competition, diversity, initial conditions}) + e_{t+1}$$

where L is the labour input at time t, w is wages at time t and where A represents changes in technology at time t measured nominally.

THEORIES OF DYNAMIC EXTERNALITIES

- Rapidly declining city-industries were more regionally concentrated than the rapidly growing ones,
- Industries grew faster in diversified cities than in specialized ones
- Fast-growing city-industries were more competitive than shrinking city-industries.

THE DATA

- The data set was constructed from the 1996 and 2008 editions of the Regional Explorer, produced by Global Insight Southern Africa and from the 1996 and 2001 Census data and the 2007 Community Census data, produced by Statistics SA.

THE DATA

- The data set contains the information on employment, labour remuneration and gross operating surplus by one-digit industry for every municipality in the province of KwaZulu-Natal.
- Wages was obtained by dividing labour remuneration by employment.

City	Employment		Six Largest Industries
	1996	2007	
	Six Largest Cities in 1996		
Durban	623,946	789,926	Textiles, clothing and leather goods, Education, Land and Water transport, Other business activities, Health and social work, Retail trade and repairs of goods
Pietermaritzburg	91,559	106,167	Education, Health and social work, Textiles, clothing and leather goods, Other business activities, Public administration and defence activities, Retail trade and repairs of goods
Newcastle	40,431	52,036	Metal products, machinery and household appliances, Textiles, clothing and leather goods, Education, Health and social work, Public administration and defence activities, Land and Water transport
Port Shepstone	28,764	37,645	Agriculture and hunting, Education, Public administration and defence activities, Health and social work, Hotels and restaurants, Textiles, clothing and leather goods
Ballito	28,185	33,945	Agriculture and hunting, Food, beverages and tobacco products, Education, Wood and wood products, Land and Water transport, Other business activities
Richards Bay	25,932	35,593	Agriculture and hunting, Education, Land and Water transport, Metal products, machinery and household appliances, Wood and wood products, Health and social work

City	Employment		Six Smallest Cities in 1996
	1996	2007	
Tugela Ferry	2,221	2,645	Education, Health and social work, Agriculture and hunting, Public administration and defence activities, Other business activities, Land and Water transport
Ezingoleni	2,141	2,760	Agriculture and hunting, Education, Wood and wood products, Forestry and logging, Retail trade and repairs of goods, Wholesale and commission trade
Melmoth	1,766	1,989	Agriculture and hunting, Forestry and logging, Wood and wood products, Education, Land and Water transport, Health and social work
Mtubatuba	1,509	1,507	Agriculture and hunting, Education, Food, beverages and tobacco products, Public administration and defence activities, Forestry and logging, Land and Water transport
Hluhluwe	1,003	1,065	Agriculture and hunting, Education, Health and social work, Public administration and defence activities, Other service activities, Food, beverages and tobacco products
St Lucia	762	806	Agriculture and hunting, Education, Health and social work, Public administration and defence activities, Other service activities, Food, beverages and tobacco products

Industry	Total Employment per Sector		Relative Employment per Sector	
	1996	2007	1996	2007
Textiles, clothing and leather goods	75,794	59,650	21.41%	13.07%
Education	58,163	82,437	16.43%	18.06%
Health and social work	48,130	63,065	13.60%	13.82%
Other business activities	44,318	97,301	12.52%	21.32%
Land and Water transport	42,664	38,411	12.05%	8.42%
Retail trade and repairs of goods	33,626	56,905	9.50%	12.47%
Agriculture and hunting	23,948	21,743	6.77%	4.76%
Metal products, machinery and household appliances	9,779	12,819	2.76%	2.81%
Public administration and defence activities	9,092	12,900	2.57%	2.83%
Food, beverages and tobacco products	3,842	4,166	1.09%	0.91%
Wood and wood products	2,860	4,000	0.81%	0.88%
Hotels and restaurants	1,136	2,251	0.32%	0.49%
Forestry and logging	425	497	0.12%	0.11%
Other service activities	90	120	0.03%	0.03%
Wholesale and commission trade	83	162	0.02%	0.04%
Total Employment for the 12 Municipalities	353,950	456,427		
Total Provincial Employment	1,153,296	1,388,675		
Municipal Employment as a % of Total KZN Employment	30.69%	32.87%		

Economic Sector	Number of Sectors
	1996
Education	12
Agriculture and hunting	9
Health and social work	9
Land and Water transport	7
Public administration and defence activities	7
Food, beverages and tobacco products	4
Other business activities	4
Textiles, clothing and leather goods	4
Wood and wood products	4
Forestry and logging	3
Retail trade and repairs of goods	3
Metal products, machinery and household appliances	2
Other service activities	2
Hotels and restaurants	1
Wholesale and commission trade	1

City- 1996	Industry- 1996	Growth Rate	Diversity	Competition	Concentration
Six Fastest-Growing City-Industries					
Ballito	Other business activities	16.164	0.033	0.721	0.447
Durban	Other business activities	10.372	0.184	1.086	1.242
Port Shepstone	Hotels and restaurants	8.187	0.098	0.621	2.202
Ezingoleni	Wholesale and commission trade	7.899	0.073	0.586	1.967
Ezingoleni	Retail trade and repairs of goods	7.775	0.086	0.790	1.189
Pietermaritzburg	Other business activities	6.831	0.184	0.671	1.334

City- 1996	Industry- 1996	Growth Rate	Diversity	Competition	Concentration
Six Slowest-Growing City-Industries					
Hluhluwe	Food, beverages and tobacco products	-5.155	0.067	0.473	1.041
St Lucia	Food, beverages and tobacco products	-4.777	0.080	0.331	1.175
Mtubatuba	Food, beverages and tobacco products	-4.637	0.113	0.947	1.602
Mtubatuba	Land and Water transport	-4.491	0.068	1.441	0.776
Tugela Ferry	Land and Water transport	-4.391	0.049	0.529	0.665
Pietermaritzburg	Textiles, clothing and leather goods	-2.986	0.201	0.140	0.879

RESULTS ON THE GROWTH OF INDUSTRIES ACROSS CITIES

➤ If externalities are important for growth as suggested by the discussed economic theories on cities, then the clearest way to find these effects is by looking at the growth of the same sectors in different cities and checking in which cities these sectors grow faster (Glaeser, et al, 1992).

RESULTS ON THE GROWTH OF INDUSTRIES ACROSS CITIES

➤ The unit of observation is then an industry in a city, and we look the growth rates of these industries as a function of our measures of knowledge spillovers. The sample includes 72 observations on the top six 1996 industries in 12 cities (municipal regions).

Variable	Mean	Standard Deviation	Median	Min	Max	Kurtosis
Employment in the city-industry in 1996	4,916	11,481	660	35	63,478	11.56
Employment in the city-industry in 2007	6,339	15,255	914	15	84,594	12.12
Log(employment in 2007/employment in 1996) in city-industry	0.07	0.16	0.12	-0.42	0.47	2.00
Log(employment in 2007/employment in 1996) in KZN	0.03	0.06	0.03	-0.17	0.15	1.96
Wage in the city-industry in 1996 per annum ('000)	232,781	589,482	13,130	300	3,385,067	13.61

Variable	Mean	Standard Deviation	Median	Min	Max	Kurtosis
Wage in the city-industry in 2007 per annum ('000)	606,560	1,603,526	54,468	842	8,056,736	10.87
Log(wage in 2007/wage in 1996) in the city-industry	0.38	0.18	0.39	-0.47	0.84	5.51
City-industry's share of city employment relative to KZN industry's share of KZN employment in 1996	1.83	1.47	1.40	0.45	8.65	7.30
GOS per employee in the city industries relevant to GOS per employee in the KZN industries 1996	0.94	0.73	0.72	0.14	4.85	14.98
City's other top five industries' share of 1996 total city employment	0.24	0.28	0.16	0.03	1.77	13.26

The measure of specialization of an industry in a city is the fraction of the city's employment that this industry represents in that city, relative to the share of the whole industry in provincial employment (Glaeser, et al, 1992).
Specialization therefore is =

$$\frac{\text{industry employment in city}/\text{total employment in the city}}{\text{industry employment in KZN}/\text{total employment in KZN}}$$

The variable measures how specialized a city is in an industry relative to what one would expect if employment in that industry was scattered randomly across the province. The mean of this variable is **1.83** indicating that the top industries in the sample cities are overrepresented relative to what one would expect if they were randomly scattered over the province.
The prediction according to both MARS and Porter is that high specialization of an industry in a city should speed up growth of that industry in that city

It represents to an extent economic or abnormal profit and thus the level of competition within the particular industry. For the purpose of this article it will be assumed that the larger the GOS the less competitive that particular industry and visa-versa.
Competition therefore is =

$$\frac{\text{GOS in the city-industry}/\text{employment in the city-industry}}{\text{GOS in the province-industry}/\text{employment in the province-industry}}$$

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. The mean of this variable is **0.94**.
A lower value of this measure of competition should be associated with faster growth

To address Jacobs's theory, according to Glaeser, et al, (1992), we need a measure of a variety of industries in the city outside the industry in question. The measure used is the fraction of the city's employment in the largest five industries other than the industry in question accounting for in 1996.

The mean of this ratio is **0.24** suggesting that cities are not well diversified. The lower this ratio, the more diversified the city is and therefore the faster the industry in question should grow, according to Jacobs.

RESULTS ON THE GROWTH OF INDUSTRIES ACROSS CITIES

The mean values of the three measures thus suggest the following:

- ✓ The top city-industries are over concentrated in the relevant cities
- ✓ The top city-industries are less competitive than what is expected
- ✓ Cities are not well diversified

RESULTS ON THE GROWTH OF INDUSTRIES ACROSS CITIES

The average non-diversity, competition and concentration values for the listed fast and slow growing city-industries seem to suggest the following:

- ✓ Industries grow fast in well diversified cities
- ✓ Industries grow fast in competitive cities
- ✓ Industries grow fast in less concentrated cities

RESULTS ON THE GROWTH OF INDUSTRIES ACROSS CITIES

The average non-diversity, competition and concentration values for the listed fast and slow growing cities in the provincial economy seem to suggest the following:

- ✓ Diversity seems to be the same across cities, i.e., diversity does not appear to have a significant impact
- ✓ Fast growing cities are less competitive than slow growing cities
- ✓ Less concentrated cities grow faster than more concentrated cities

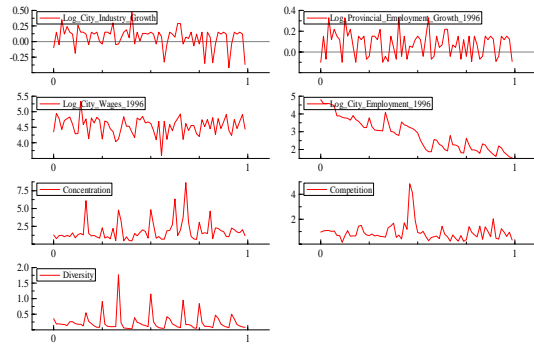
RESULTS ON THE GROWTH OF INDUSTRIES ACROSS CITIES

The variable values for the six fastest growing and six slowest growing city-industries per the relevant city seem to suggest the following:

- ✓ Fast growing city industries are more diversified, but only marginal
- ✓ Fast growing city-industries are less competitive than slow growing city-industries
- ✓ More concentrated city-industries grow faster than less concentrated city-industries

The city should consist of a **diversity** of industry types, i.e., the city should have a well diversified economic structure, and each industry type should be **fairly well represented** in that city (optimal level and not maximum level). The occurrence of diversity will support **greater competition** where as the occurrence of concentration will support imperfect competition, thus the combination of the two perceived opposing forces will most probably be supporting a **monopolistic competitive** market structure, to a greater or lesser degree, within the city.

PRELIMINARY ECONOMETRIC ANALYSIS AND RESULTS



RESULTS ON THE GROWTH OF INDUSTRIES ACROSS CITIES

The first difference of city employment is indeed stationary as indicated by the unit root test. Therefore, as indicated by the results of the unit root tests, all of the variables are I(0) except city employment which is I(1).

RESULTS ON THE GROWTH OF INDUSTRIES ACROSS CITIES

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Log(employment in 2007/employment in 1996) in city-industry					
Equation	1	2	3	4	5
Log(employment in 2007/employment in 1996) in the province	1.1005 (12.00)**	1.1169 (12.20)**	1.0985 (12.10)**	1.1082 (11.70)**	1.1108 (12.00)**
Log Wage in the city-industry in 1996 per annum ('000)	0.0106 (0.4)	0.0081 (0.3)	0.0025 (0.1)	0.0115 (0.4)	-0.0012 (-0.04)
Log Employment in the city-industry in 1996	0.0348 (2.82)**	0.0356 (2.92)**	0.0322 (2.61)**	0.0335 (2.60)**	0.0341 (2.60)**
City-industry's share of city employment relative to KZN industry's share on KZN employment in 1996		0.0113 (1.59)^			0.0128 (1.55)^
GOS per employee in the city industries relevant to GOS per employee in the KZN industries 1996			0.0212 (1.43)^		0.0215 (1.45)^
City's other top five industries' share of 1996 total city employment				0.0146 (0.36)	-0.0116 (-0.25)
R ²	0.71	0.72	0.72	0.71	0.73
F	55.03 [0.000]**	42.84 [0.000]**	42.44 [0.000]**	40.77 [0.000]**	29.1 [0.000]**
DW	1.58	1.58	1.61	1.57	1.63

RESULTS ON THE GROWTH OF INDUSTRIES ACROSS CITIES

Equation 5 in the table uses all three measures of externalities simultaneously. The results, except for city-wages and diversity, remain statistically significant. They confirm the finding that industry overrepresentation supports growth. They also confirm the view that fewer competition is more supportive of growth than more competition, because of the ability to generate positive returns to scale.

RESULTS ON THE GROWTH OF INDUSTRIES ACROSS CITIES

Diversity is supported by equation 5 compared to non-diversity in equation 4, suggesting that both external and internal knowledge spillovers are supportive of growth. The overall results are favourable to MAR and Porter but mixed on Jacobs.

RESULTS ON THE GROWTH OF INDUSTRIES ACROSS CITIES

The regression model, equation 5, as per the table, suggests that there exists a co-integration relationship, i.e., there is some long-run equilibrium relationship linking the dependent variable and independent variables so that relationship is stationary.

The empirical and preliminary econometric results suggests that at the city-industry levels, specialization, but only at an optimal level, supports employment growth, that less competition rather than more competition is good and that diversity within the structure of the city economy is desirable.

The findings suggest that inter-industry knowledge spillovers are more significant for growth than spillovers across industries. The MAR and Porter models seems to be the most consistent with the findings of the study.