A PANEL ARDL ANALSIS OF THE PRODUCTIVITY OF KEY ECONOMIC SECTORS CONTRIBUTING TO LOCAL ECONOMIC GROWTH IN AN EMERGING COUNTRY

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Abstract: It has become precise and indisputable that the South African economic growth has been stagnant. Despite this stagnant growth, the productivity of key sectors is supposed to alleviate some of the challenges of the South African economy. The aim of this study is to identify the key sectors that may assist in boosting economic growth at a local level. This study employed three estimators (PMG, MG and DFE) of a panel autoregressive distributed lag model (ARDL) to analyse the short- and long-run effects of various sectors' productivity on economic growth in a South African district. By employing annual data from 1996 to 2015, 6 sectors (construction, finance, trade, community service, manufacturing, transport, mining and tourism) from four municipalities in South Africa were analysed. Results show that the productivity of the construction, transport, trade, manufacturing and finance sectors influence economic growth positively in the long-run. However, the productivity of the mining and tourism sectors negatively affect economic growth in the long-run. Short-run results reveal that, in the short-run, the productivity of all sectors, except trade and transport, contribute positively to local economic growth. This study recommends that the government improves the production methods and invests in infrastructure and skills development to advance the productivity of the mining and tourism sectors.

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1. Introduction

In most emerging economies, the economic activities tend to be concentrated in major cities and urban areas, leaving small towns and rural areas with low economic growth. As a result, there is an unbalanced level of economic development across different regions of developing countries. To address, such disparity in regional development, Local Economic Development (LED) has been identified as one of the strategies that can be implemented to boost economic growth at a local level. One of the LED roles is to promote sustainable growth of the sectors that are considered to be important in contributing to local economic growth in a specific area. Thus, the identification of such key sectors requires a detailed analysis of the productivity of each sector. However, this may not be an easy task due to structural changes that require shifting the factors of production from sectors considered to be traditional to modern sectors that are characterised by high productivity (Todaro and Smith, 2006). Hence, this study aims to identify the effect of sectoral production on local economic growth in a South African district.

For the past few decades, South Africa has been faced with the conundrum of stagnant economic growth. The low average economic growth rate of 2 percent since independence in 1994 illustrates this assertion (Statistics South Africa, 2018). This average economic growth of 2 percent is below South Africa's prescribed economic growth target of 5 percent (Trading Economics, 2018). Thus, this stagnant growth has contributed to low investor confidence, subsequently, hindering the country's economic development. In a bid to solve this problem, the South African government has developed certain policies that seek to address this obstinate problem. These policies include the Reconstruction and Development Programme, the Growth, Employment, and Redistribution strategy and the Accelerated and Shared Growth Initiative (Karriem and Hoskins, 2016). However, these policies have not been effective as expected. Since these policies did not yield favourable results, researchers such as Marwa and Zhanje (2015) and Mongale (2017) were probed to investigate further on the possible causes of stagnant growth. These researchers reached a general consensus that stagnant growth has been mainly caused by the global financial crisis, depreciation of the rand and low productivity of the main economic sectors (National Treasury, 2018). Of particular interest is that policy partners identified the productivity of key economic sectors as one of the major solutions to South Africa's slow economic growth and urged all the stakeholders to take initiatives to improve the productivity of these sectors in the Capricorn District Municipality (Statistics South Africa, 2018). Firstly, the Capricorn District Municipality is one of the district municipalities with the worst economic growth in South Africa. In this light, World Insight (2018) reports an average economic growth of 0.8 percent in the district, which is below other municipalities and with a national average economic growth of 2 percent. Furthermore, there seems to be a lack of studies done in the study area, specifically on this topic. Given the stagnant economic growth in the region and the lack of econometric empirical studies in the region, this study seeks to conduct an econometric empirical analysis to identify the key economic sectors that can assist in boosting local economic growth in the Capricorn District Municipality.

Noteworthy is that the productivity of key sectors is the catalyst for economic growth. This notion is influenced by three main economic theories: the structural change model (Kacar et al., 2016), the neoclassical theory (Todaro and Smith, 2006) and Kaldor's theory (Kaldor, 1966). The aforementioned theories affirm that all the resources should be channelled to modern sectors to improve the productivity of the sectoral output, subsequently, influencing economic growth (Kaldor, 1966). One point to note is that economic growth can be better improved at a micro level as compared to a macroeconomic level. Therefore, municipalities need to identify the key sectors that improve local economic growth so as to channel resources to such key sectors. Furthermore, there are other studies that have investigated the impact of the productivity of the key economic sectors on economic growth at local/micro levels (Rodgerson, 1996; Sol Plaatje, 2008 and Musakwa, 2009). For example, Rogerson (1996) investigated the sectors that improved economic growth using interviews in the Free State province. The participants identified the manufacturing sector as the major contributor to economic growth in Mangaung local municipality. Furthermore, in the Sol Plaatje Local Municipality (2008), a survey was also carried out to identify the major sectors contributing to economic growth. The survey established the agriculture, manufacturing and tourism sectors as the major contributors to economic growth in Sol Plaatje Local Municipality.

Over the past two decades, the productivity of sectors has been fluctuating. Generally, sectors such as the community service sector, construction sector, tourism sector, manufacturing sector and transport sector have constantly shown an upward trend (Statistics South Africa, 2019). The growth in the aforementioned sectors has been attributed to several factors. Among the reasons for this growth are the grants given to firms in these sectors, the relatively lower borrowing rate, the increase in exports that was also used as inputs in other key sectors (National Treasury, 2019; Statistics South Africa, 2019). It is essential to note that these sectors have also experienced some downturn due to the weak demand for local goods and the depreciation of the South African Rand. On the other hand, the mining and tourism sectors have faced a downward trend due to load shedding and political uncertainty. These fluctuations have given researchers the latitude to analyse how productivity growths contribute to economic growth.

Notably, there is no consensus about which sectors should be regarded as important for economic growth. Instead, the studies conducted on the productivity of the key sectors promoting economic growth in South Africa have yielded mixed results (Baur, 2014; Gwenhure and Odhiambo, 2017; Machaka, 2012; Ndabeni et al., 2019). It is also important to note that all these studies employed qualitative research methods such as focus groups and interviews. As such, there is a limited empirical framework, especially one that is based on econometric analysis and the use of focused historical data towards the identification of these sectors. Therefore, this study aims to contribute to this research lacuna by analysing the productivity of key sectors and their contribution to economic growth using the panel analysis and more recent econometric techniques – panel autoregressive distributive lag (ARDL) model. This method of analysis allows researchers to analyse the impact of the productivity of sectors on economic growth both

in the short-run and long-run. The panel ARDL is beneficial because it simultaneously estimates short- and long-run dynamics; it accommodates different orders of integration namely, I(0), I(1) or a or mixture of I(0) and I(1) variables as long as none of the variables are I(2); and it also accommodates a different number of lags on each variable (Duasa, 2007; Pesaran et al., 2001).

The rest of the paper is organised as follows. Section two reviews the literature available in this discipline, and section three explains the methodology. Sections four and five discuss the empirical results and conclusions.

2. Literature review

The accessible writings on economic growth and the productivity of the key economic sectors provide profound insight into local development economics. The theories that link up the local economic growth and the productivity of key economic sectors are the neoclassical theory, structural change model and the Kaldor's theory. The neoclassical theories propose that all the factors of production should be invested in sectoral growth (Kacar et al., 2016). The theory experts propound the argument that labour and capital should be available in every sector to improve both productivity and local economic growth (Kacar et al., 2016). The central aim of this theory is to allow all the factors of production to flow without limitations so that the region's economic systems move to equilibrium. Therefore, growth in the local economy improves as the productivity of each sector in the municipality improves.

Contrary to the neoclassical theory, the structural change model's focal point is on modern sectors (Dang and Pheng, 2015). In other words, it shifts the focus from traditional sectors to modern sectors such as the manufacturing, service, tourism and trade sectors. Therefore, the structural change model calls for labour and capital to be shifted from traditional sectors to modern sectors. Todaro and Smith (2006) reinforce the idea of shifting the factors of production because modern sectors are characterised by high productivity. Thus, these sectors contribute more output to economic growth. It is important to note that the success of this theory depends on the capital accumulation of the modern sector (Todaro and Smith, 2006). In other words, for a municipal area to improve its sectors productivity, the modern sectors should invest in capital accumulation.

On the other hand, Kaldor's approach focuses on the positive relationship between the productivity of the manufacturing sector and economic growth in a region. Such a relationship branches into three laws. The first law pertains to a positive relationship between manufacturing and economic growth (Kaldor, 1966). The second law stipulates that an increase in the productivity of the manufacturing sector increases employment and the third law stipulates that the manufacturing growth positively affect other economic sectors. However, for the purposes of this study, attention will be given to the first and third laws only as these laws are directly linked to economic sectors and economic growth. The first law emphasises that the productivity of the manufacturing sector influences local economic growth positively (Kaldor, 1966). The Kaldor approach has received wide attention from researchers as they share the same sentiments that

manufacturing is the engine for economic growth (Garidzirai et al., 2019 and Zhanje, 2018). Thus, the increase in the productivity of the manufacturing sector also increases local economic growth. The third law outlines that the growth of the manufacturing sector will eventually positively influence other key economic sectors and improve local economic growth. Hence, Kaldor's theory is one of the relevant theories for the region as there are many manufacturing activities in the Capricorn District Municipality.

The effect of the productivity of key economic sectors on economic growth cannot be isolated from the previous empirical literature. It is important to note that there is a scarcity of empirical literature on the subject under investigation. The few studies on this topic include Department of Social Welfare (2003), Stiftung (1999), Rogerson (1996), Musakwa (2009) and Sol Plaatje Local Municipal (2008). For example, a study done in a municipality in Europe investigated the relationship between tourism and local economic growth in Consiglio municipality (Pedrana, 2013). The author used a unique Pike, Pose and Tomaney development model and found that tourism is the major contributor to local economic growth. In South Africa, similar results were found by Stiftung (1999) who conducted a similar study but focused on the Mangaung municipality. The major difference between these studies was the methodology used as the latter used a survey as opposed to the Pike, Pose and Tomaney development model used by the former.

Another study on a local municipality was conducted by Nel and McQuaid (2002). The authors investigated the impact of key economic sectors on economic growth in the Stutternheim local community. They used formal interviews and found that the service and the Small-Medium Micro-Sized Enterprises sectors were the major contributors to local economic growth. Other sectors that contributed to improving economic growth included the trade and tourism sectors. In Mogalakwena Local Municipality (2006), a study was undertaken to investigate sectors that improve the living conditions in the area. The study used a Local and found that the finance sector, trade sector, government sector and mining sector were the major contributors to economic growth. Another study that used the same topic and methodology but found different results was that of the Molemole Local Municipality (2011). This study used a Local Economic Potential Analysis and found that the agriculture sector is the vehicle to local economic growth. The aforementioned studies produced different results due to different sizes of the municipalities and the different economic structures.

A study by Musakwa (2009) employed a questionnaire to identify the key economic sectors contributing to the local economic growth in the Clarens and Smithfield community. The study identified the tourism and agriculture sector as the main contributors to economic growth in those municipal areas. Lastly, Sol Plaatje Local Municipality (2008) used a survey to investigate the major sector contributors to local economic growth. The study found that manufacturing, agriculture and tourism were major contributors to local economic growth.

From the empirical literature, studies conducted on the impact of the productivity of key economic sectors on local economic growth have grown significantly, and the effect tends to differ across the different areas. Despite this growth, all these studies are based on a qualitative technique, which is mainly surveys, focus groups and interviews. It is important to note that the research methods used were subjective and based on

perception rather than reality. To limit the subjectivity, this study introduced a historical data-driven empirical analysis to shed more light on the topic. Specifically, the current study bridges this gap by providing a quantitative approach using a panel ARDL model. Pesaran et al. (1999) mention that the panel ARDL is consistent and produces robust results compared to other research methodologies.

3. Data and Model specification

This study followed a quantitative approach and employed secondary annual data from the Global Insight database. The data was for the Capricorn District Municipality that is composed of four municipalities, namely: Blouberg, Molemole, Lepelle-Nkumpi and Polokwane. This paper used a balanced panel data approach that consisted of two dimensions, namely, four cross-sectional dimension and twenty time-series dimension making a total of eighty observations. Panel data was employed as it gives precise results of the parameters under investigation (Hsiao et al., 2006). In the study, economic growth was used as a dependent variable, while the productivity of key economic sectors were independent variables. Economic growth was measured by GDP per capita, which is the aggregate number of goods and services in each municipality after taking into consideration the population of that municipality (Boulhol, 2008). On the other hand, independent variables include the productivity of community service, trade, manufacturing, construction, transport, finance, mining and the tourism sectors, measured using gross value added. Gross value added is the contribution measure of the economy in a city or region (Frechtling, 2013). This relationship can be expressed mathematically following the economic growth theoretical framework, and the model is specified as follows:

$$lgrowth = f(lcomus, ltrade, lmanuf, lconstr, lfin, ltour, lmin, ltrans) \ (1)$$

Where *lgrowth* is the natural log of economic growth in the municipality, *lcomus* is the natural log of productivity in the community service in the municipality, *ltrade* is the natural log productivity in trade in the municipality, *lmanuf* is the natural log of productivity in manufacturing in the municipality, *lconstr* is the natural log of productivity in construction in the municipality, *lfin* is the natural log of productivity in finance in the municipality, *ltour* is the natural log of productivity tourism in the municipality, *lmin* is the natural log of productivity mining in the municipality, and *ltrans* is log of productivity in transport. All the variables in this study were expressed in logarithm form in order to estimate growth or elasticities. The next section discusses the method of estimation used in this study.

The method of estimation in this study includes a panel ARDL model. Before other econometric techniques, the unit root should be tested to check if the variables are stationary or not. For panel data, the Levin, Lin and Chu (2002), Breitung (2000), Perasan and Shin (2003), Maddala and Wu (1999) and Hadri (2000) panel unit root tests were recommended by the empirical literature. Noteworthy is that, the panel unit root tests outline the methodology to be used. For example, when one has a mixture of variables that are stationary at level (I(0)) and at the first difference (I(1)),

the panel ARDL is a suitable model to be employed. Three alternative panel ARDL approaches were estimated, namely; the Mean Group (MG), Pooled Mean Group (PMG) and Dynamic Fixed Effects (DFE). For robustness check, these approaches were compared to identify the best panel ARDL that accounts for the efficiency and consistency of the estimators. The best estimator among the three approaches was selected based on Hausman MG test. The estimated panel ARDL model estimation is shown in equation 2:

$$\Delta lgrowth_{i,t} = \emptyset_i\big(lgrowth_{i-t} - \beta_i X_{i,t-j}\big) + \sum_{j=1}^{p-1} \gamma\ _j^i \Delta\ (lgrowth_{i,t-j}$$
$$+ \sum_{j=0}^{q-1} \delta\ \Delta(X_i)_{t-j} + \mu_i + \varepsilon_{it}\quad (2)$$

Where *lgrowth* is economic growth in the Capricorn District Municipality Area, *X* denotes all the productivity of the key economic sectors in the Capricorn District Municipality Area while δ and γ represent the short-run coefficients of dependent and independent variables, respectively. The subscripts *i* and *t* stand for cross-section and time respectively, β stands for long-run coefficients while *u* stands for fixed effect and *e* is the error term. The last test to be conducted is the residual diagnostic test. The residual test confirms if the results are not spurious through the cross dependency. To test for cross-dependency, literature has prescribed the Pearson CD, Breusch-Pagan Chi-square and the Pearson LM normal tests (Ertur and Musolesi, 2017; Xu et al., 2016).

4. Results and Discussions

4.1 Panel Unit Root Results

The results of the unit root tests (in Table 1) show that the p-values of *lmin, lgrowth, ltour* and *ltrans* are less than 0.05, indicating that the null hypothesis for non-stationarity is rejected at a 0.05 significance level. Thus, it is concluded that economic growth, mining, tourism and transport sector are integrated of order zero or I(0). Since other variables were not stationary at levels, these variables were first differenced. The results for first difference show that *lcomus, lconstr, lfin, lmanuf* and *ltrade* p-values are less than 0.05, suggesting that these variables are stationary at first difference. The results of the panel unit root tests, therefore, show that there is mixture I(0) and I(1) but none of the variables is I(2). This confirms the use of panel ARDL model which is appropriate for a mixture of I(0) and I(1) variables. Muchapondwa and Pamhidzai (2011) emphasised the panel ARDL model as a new cointegration procedure. This is because, the panel ADRL model allows for the estimation of both the short-run and long-run relationships between the productivity of key economic sectors and local economic growth.

Table 1: Panel Unit Root Tests Results (P-values)

Variables	Level & 1st Diff.	Intercept/trend	LLC	IPS	ADF	Decision
Lcomus	Level	Intercept	0.6830	0.9723	0.8838	I(1)
		Interc. & trend	0.7991	0.3650	0.3627	
	1st diff.	Intercept	0.0000***	0.0000***	0.000***	
		Interc. & trend	0.0000***	0.0000***	0.000***	
Lconstr	Level	Intercept	0.9175	0.9929	0.978	I(1)
		Interc.& trend	0.2618	0.1432	0.2030	
	1st diff.	Intercept	0.0837*	0.0000***	0.000***	
		Interc. & trend	0.7147	0.0003***	0.002***	
Lfin	Level	Intercept	0.6964	0.9596	0.6766	I(1)
		Interc. & trend	0.0549	0.0823*	0.1274	
	1st diff.	Intercept	0.0023***	0.0047***	0.0122**	
		Interc. & trend	0.0149**	0.0571*	0.0996*	
Lmanuf	Level	Intercept	0.2365	0.9129	0.9102	I(1)
		Interc. & trend	0.0219**	0.1659	0.2302	
	1st diff.	Intercept	0.0000***	0.0000***	0.000***	
		Interc. & trend	0.0000***	0.0000***	0.001***	
Ltrade	Level	Intercept	0.1158	0.7332	0.4023	I(1)
		Interc. & trend	0.0044***	0.0423**	0.0510**	
	1st diff.	Intercept	0.0000***	0.0000***	0.000***	
		Interc. & trend	0.0032***	0.0000***	0.000***	
Lgrowth	Level	Intercept	0.070**	0.6443	0.6908	I(0)
		Interc. & trend	0.0000***	0.0000***	0.004***	
Lmin	Level	Intercept	0.0009***	0.0092***	0.0213**	I(0)
Ltour	Level	Intercept	0.0000***	0.0002***	0.000***	I(0)
Ltrans	Level	Intercept	0.0000***	0.000***	0.000***	I(0)

*Note: *, **, *** indicates 10%, 5% and 1% respectively*

4.2 Long-run Analysis

The panel ARDL results were estimated from the best model, ARDL (1, 1, 1, 1, 1, 1, 1, 1, 1), selected based on Akaike info criterion (AIC). Table 2 presents the long-run relationship between the productivity of key economic sectors and

economic growth (lgrowth) as estimated by the three estimators (PMG, MG and DFE). The panel ARDL model was estimated with intercept and trend. The Hausman test was used to test the null hypothesis (H_0) that the PMG estimator is efficient and consistent. The Chi-square p-value (0.326) from the Hausman test is greater than 0.05, meaning the H_0 cannot be rejected; implying that PMG is a more efficient estimator than MG and DFE. However, it should be noted that there seems to be no major difference between the results on these estimators, which confirms the robustness of the estimated results. Thus, the PMG long-run results are interpreted and discussed.

Table 2: Long-run Results

	MG		**PMG**		**DFE**	
Variables	**Coefficient**	**P-values**	**Coefficient**	**P-values**	**Coefficient**	**P-values**
Lcomus	0.2762	0.0002*	0.2959	0.0000*	0.1876	0.0016*
Lconstr	0.0629	0.0000*	0.0546	0.0000*	0.0397	0.0101**
Lfin	0.2896	0.00019*	0.3107	0.0000*	0.3107	0.0000*
Lmanuf	0.0731	0.2683	0.0404	0.3379	0.1052	0.1079
Lmin	-0.1503	0.0000*	-0.1314	0.0000*	-0.1293	0.0000*
Ltour	-0.0181	0.0004*	-0.0273	0.0000*	-0.0206	0.0001*
Ltrade	0.1745	0.0019*	0.1890	0.0002*	0.1801	0.0006*
Ltrans	0.2089	0.0028*	0.3160	0.0000*	0.3722	0.0000*
C	-4.26	0.0000*	-5.5	0.0000*	-4.09	0.0000*
Hausman test: Chi-square p-value = 0.326						

Note: *, **, *** indicates 10%, 5% and 1% respectively

The PMG results in Table 2 show both a positive and negative relationship between the productivity of the economic sectors and economic growth in the Capricorn District Municipal area. The study found that the productivity of the community service, construction, finance, transport and trade sectors have a positive effect on local economic growth. Thus, a 1 percent increase in the productivity of the community service sector, construction sector, finance sector, transport sector and trade sector leads to a 0.296 percent, 0.055 percent, 0.312 percent, 0.316 percent and 0.189 percent increase in economic growth, respectively. It is important to note that the transport sector and the finance sector were the most contributing sectors in the region. These empirical findings were consistent with the structural change model theory, which stipulates that modern sectors are ideal to economic growth (Todaro and Smith, 2006). Furthermore, the results are in line with the empirical literature by Mogalakwena Local Municipality (2006), which also found all these sectors to be positively related to economic growth.

On the other hand, the productivity of the tourism and mining sector showed an inverse relationship with economic growth. Quantitatively, if the productivity of the tourism sector increases by 1 percent, economic growth will decrease by 0.027

percent. This result was also concluded by Musakwa (2009). In addition, a 1 percent increase in the productivity of the mining sector leads to a 0.131 percent decrease in economic growth. The results show that mining productivity does not translate into local economic growth because such growth may not be reinvested locally. Furthermore, the growth of the mining sector may not lead to local employment as most of the growth may be generated through capital intensive production. In addition, the tourism sector factors of production may not be locally owned; hence any growth in tourism nay have benefited international owners instead of the locals. Noteworthy is that, the result of the manufacturing sector was not statistically significant. This means growth in the manufacturing sector does not contribute to local economic growth in long-run due to the fact that the sector is not well structured and the selected district is not a manufacturing hub. Noteworthy is that this finding is inconsistent with the first law of Kaldor (1966) that the productivity of the manufacturing sector influences local economic growth positively. Therefore, the long-run results support the structural change model (Dang and Pheng, 2015). This suggests that the focal point in the Capricorn District Municipality should be on modern sectors such as trade, transport and financial services.

4.3 Short-run Analysis

Having established the long-run relationship between the productivity of economic sectors and economic growth in the selected District, this section discusses the short-run results of the study. Thus, table 3 illustrates the short-run results of the Error Correction Model, estimated by the PMG, MG and DFE estimators. Following the selection of the PMG estimator in the previous section, the PMG short-run results are discussed and compared to the MG results for robustness check. The PMG results show a significant and negative error correction term (ECT) of -0.4879 and this is confirmed by the MG and DFE results that also report a significant negative ECT. This means that 48.79 percent of disequilibrium in the district municipal area is restored in the upcoming years provided the productivity of sectors respond positively. Thus, it takes 2.05 (1/0.4879) years for economic growth to move back to equilibrium (Bannerjee et al., 1998). This high Error Correction Term (ECT) shows that there is a stable relationship between economic growth and key economic sectors in all the municipalities. In the short-run, the tourism, mining, finance and manufacturing sectors were significant at one percent and positively related to economic growth. Noteworthy is that tourism and mining sector have a positive relationship with economic growth in the short-run but not in the long-run. This means that the two sectors contribute to economic growth in the short-run but not in the long-run. Manufacturing also has a short-run positive effect on economic growth and this result is different from the long-run. On the other hand, trade and transport sectors positively affect the economic growth in the long-run but do not have a significant short-run effect. The short-run results seem to be almost similar across the three estimators (PMG, MG and DFE) and this confirms that the estimated results are robust.

Table 3: Short-run results

Variable	MG Coefficient	MG P-values	PMG Coefficient	PMG P-values	DFE Coefficient	DFE P-values
ECT	-0.3782	0.0401**	-0.4879	0.0330**	-0.4265	0.0372**
Δlcomus	0.0401	0.5112	0.0323	0.7665	0.1069	0.0912***
Δlconstr	0.0563	0.0000*	0.0404	0.0000*	0.0472	0.0000*
Δlfin	0.2019	0.0001*	0.2301	0.0000*	0.2183	0.0000*
Δlmanuf	0.0931	0.0000*	0.0727	0.0000*	0.1028	0.0000*
Δlmin	0.0873	0.0002*	0.0960	0.0000*	0.1102	0.0000*
Δltour	0.0109	0.0000*	0.0117	0.0000*	0.0136	0.0000*
Δltrade	0.2031	0.5213	0.1890	0.8500	0.3704	0.4813
Δlntrans	0.5098	0.2989	0.3160	0.3916	0.4875	0.3074
C	-4.875	0.0451**	-5.4991	0.0434**	-3.9687	0.0481**
@Trend	-0.0081	0.1201	-0.0093	0.1077	-0.0079	0.1232

*Note: *, **, *** indicates 10%, 5% and 1% respectively*

In addition to the comparison of the PMG, MG and DFE results for robustness check, the cross-section dependency test was used to check whether the study did not produce spurious results. This test also examines the presence of serial correlation. The diagnostic tests employed in this study were the Breusch-Pagan Chi-Square, Pearson LM normal and the Pearson CD tests. The results of all the diagnostics tests, in table 4, confirm that the model is stable and has not produce spurious results.

Table 4: Cross-sectional Dependency results

Test	Probability
Breusch-Pagan Chi-Square	0.0585*
Pearson LM	0.5328
Pearson CD	0.0772*

Note * represents 1 percent level of significance

5. Conclusion

This study investigated the productivity of key economic sectors as vehicles to local economic growth. The central aim of the study was to identify sectors contributing to local economic growth in the South African District Municipality of Capricorn. This study therefore aims to contribute to the diverse literature of economic growth and productivity of the key economic sectors at a local level and broaden the latitude for policymakers in the region. To achieve this objective, the study employed a panel ARDL model as the variables were integrated at order zero and order one. It is important to note that economic growth was used as a dependent variable while the productivity of the transport, finance, community service, mining, manufacturing, tourism and trade sectors

were used as independent variables. The results of the study showed that the transport sector, finance sector and community service sector contributed significantly to sustainable economic growth in the region. Thus, the region is moving from traditional sectors to modern sectors supporting the structural change model. It is important to note that only few studies found such relationship as many studies still subscribe to traditional theories, which support the traditional sectors. Since the results of the study are more inclined to the traditional sectors, it is important for authorities to adapt to change and focus on modern sectors for better local economic growth. Thus, local authorities should transfer factors of production from traditional sectors to modern sectors.

Conversely, the productivity of the mining and tourism sectors did not positively influence economic growth in the long-run. The study expected these two sectors to contribute to local economic growth significantly since there are some of the stronghold sectors in the region. Surprisingly, these two sectors influenced the economic growth in the short-run. The possible reason is that the mining sector and the tourism sector could have provided employment for a short period of time and failed to sustain employment in the long-run. Since tourism and mining influence economic growth in the short-run, policymakers should come up with the policies that govern the activities of the mining and tourism sectors. For instance, the government can consider subsiding firms in these sectors and also creating policies that encourage the reinvestment of mining proceeds to the local communities in order to promote local economic growth in the long-run. Furthermore, the government should invest in local skills development since economic sectors are constantly changing towards modern sectors that require capital accumulation. Moreover, the fiscal authorities may engage in infrastructure development to capitalise on the contribution of trade, transport and finance sectors, which require infrastructural investment. This is very important as the infrastructural development creates income, employment and improve economic growth through the multiplier process.

Even though the study achieved its aim, it has some limitations that should be noted. The study only focused on four municipalities of one district and this can be extended to more districts. Data availability also limited the sample period. Furthermore, the study did not include the qualitative aspect that can assist in identifying the challenges faced by key sectors in the selected district. Thus, future research can address these limitations in order to shed more light on the effect of sectoral production on local economic growth in South Africa.

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