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AN ANALYSIS OF THE SHORT AND LONG-RUN EFFECTS OF ECONOMIC GROWTH ON EMPLOYMENT IN SOUTH AFRICA

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─Abstract ─

In any economy, employment growth at faster rates than economic growth is essential in reducing unemployment levels and facilitating economic development. Employment creation is one of the main cornerstones of any economy. Globally new employment has been difficult to achieve, especially within a low economic growth environment. High levels of sustained unemployment relate to structural weaknesses in an economy. South Africa has one of the highest rates of unemployment in the world of more than 27 percent, with associated low economic growth and relatively high levels of inflation and interest rates. The objective of this research was to analyse the status quo regarding employment and the relationship with economic growth measured as growth in gross domestic product (GDP) in South Africa. The study used econometric time-series methods to test for a long and short-run relationship between employment and economic growth by utilising quarterly data from 2002 to 2016. Variables included in the study consisted of employment, real GDP, inflation rate and the repo rate. The study found long-run cointegrating relationships amongst the variables. The analysis indicated that South Africa has experienced an employment coefficient of 0.96. In terms of Granger-causality analysis, the study found that economic growth and repo rate cause changes in employment. Recommendations were also made regarding solutions for job creation in South Africa which should have an impact on future policy formulation.

Keywords: Employment, economic growth, jobs, South Africa, unemployment.

JEL Classification: E23, E60

1. INTRODUCTION

On a global scale, employment and the creation of jobs, are still the foundation of economic and social development (World Bank, 2013). On the one hand creation and protection of jobs are both needed to ensure income and wealth creation. On

the other hand, growing levels of unemployment leads to socio-economic problems (Kitov & Kitov, 2011). According to Schussler (2013), a worrying statistic is that only 60 percent of all households in South Africa get an income through either formal or informal work, while up to 40 percent obtain income through social-welfare grants from government. South Africa has been at the forefront in the battle against high levels of unemployment. Unemployment rates have escalated to a new peak of 27.7 percent in the first quarter of 2017 from 26.7 percent in the first quarter of 2016 (Statistics South Africa, 2017). Only a few countries have unemployment rates above 25 percent and these include South Africa, Mauritania (30.6%), Lesotho (29.6%), Bosnia and Herzegovina (26.3%) and Spain (25.5%). On a global scale, the average unemployment rate is 5.6 percent for emerging economies, 6.6 percent for developed economies and a global average of 5.8 percent (International Labour Organization, 2016). With an unemployment rate of more than 27 percent, the creation of jobs is the most pressing economic policy challenge facing the South African government (Centre for Development and Enterprise, 2013).

The impact of high levels of unemployment is devastating, resulting in poverty, social exclusion, inequality, crime and social instability (Kingdon & Knight, 2004). Since the global financial crises in 2008, South Africa has been struggling with relatively low levels of economic growth. The average growth rate from 2008 to 2016 was just under 1.7 percent, while from 2015 to 2016 growth was below 1 percent (South African Reserve Bank, 2016). The low levels of growth has had a negative impact on job creation in South Africa (Maswanganyi, 2014). Hence the primary objective of the study is to analyse the relationship between employment and economic growth in South Africa and to find possible solutions to the problem of large scale employment creation. The study is significant in that its results may be used by government and practitioners to improve employment in South Africa, which is important for both the short and long-run economic growth of the country.

2. LITERATURE REVIEW

Both unemployment and job creation as economic concepts could be explained by means of supply and demand (SARB, 2013). According to Fourie and Burger (2009), unemployment is the situation where the supply of labour exceeds demand, or the price of labour is too high for firms to afford additional labour. In a developing economy such as South Africa, there is a possibility that significant employment vacancies can exist in tandem with high levels of unemployment. This is possible for example due a skills mismatch (King, 2009). Additional

employment is required to absorb unemployed people into the work force (Habanabakize & Muzindutsi, 2015). Unemployment is an important macro-economic variable, indicating the efficiency of use of economic resources (Dumitrescu et al., 2009). The total unemployment rate of a region is described as the total number of unemployed persons as a percentage of the total labour force (Fourie & Burger, 2009). According to Calvin and Coetzee (2010), various types of unemployment are possible, but South Africa is affected mostly by structural unemployment. This type of unemployment occurs where labour supplied exceeds the demand for labour and in many cases the unemployed lack the skills required (Biyase & Bonga-Bonga, 2015). Structural unemployment can only be addressed on the long-run, and will require structural change.

Economic growth is a macro-economic variable used by economists to monitor economic progress (Dumitrescu et al., 2009). Economic growth is defined as the sustained increase in the aggregate production also known as Gross Domestic Product (GDP), which is a measurement of total output (Mankiw & Taylor, 2014). The relationship between economic growth and employment was first developed by Okun, known as Okun's Law in 1962 (Okun, 1962). Okun's Law describes a positive relationship between economic growth and employment or a negative relation between economic growth and the rate of unemployment. Okun's Law explains the theory behind the relationship between economic growth and employment growth, where the output is dependent on the quantity of labour used in the production process. This law states in its simplest form that a one percent increase in GDP will result in a 0.3-0.5 percent decrease in unemployment (Meyer & Tasci, 2012). The relationship could be affected by many factors including improvements in production capacity output by means of capital investment, leading to lower labour absorption rates. Traditionally, rapid and sustained economic growth has been seen as the solution to job creation. Economic growth, however, does not necessarily lead to a reduction in poverty levels and associated creation of new jobs. For this to happen, an economic development strategy is needed to ensure inclusive growth (World Bank, 2013).

In terms of macro-economic theory, Keynes (1936) states that changes in employment should result from changes in economic growth due to aggregate demand and low growth leads to an increase in unemployment. Economic growth therefore determines the level of employment regarding this theory. This theory indicates a positive relationship between the two variables and the direction of the causality flows from economic growth to employment (Dumitrescu et al., 2009).

Recent studies have indicated that jobless growth is the norm, especially if labour regulations are not flexible (Meyer, 2014). Jobless growth is defined as the phenomenon when an economy, during a period of recession, experience economic growth while only maintaining or in some cases, have decreasing levels of employment (World Economic Forum, 2015), or in the case of positive economic growth, leads to rising unemployment rates (Bhorat & Oosthuizen, 2006). The World Economic Forum (WEF) and supported by Grosham and Potter (2003), state that technology in the production process, skills mismatch and lack of capital investment are some of the main sources of jobless growth. Possible solutions proposed for this phenomena include increased skills development, innovation and government investment. Mahadea and Simson (2010), also discovered that South Africa could be experiencing "jobless" growth and this phenomenon is propelled mainly by aspects such as globalization with trade liberalization, strict labour legislation, crime and corruption. Altman (2003) indicates that additional employment could be created through a focus on labour intensive sectors such as tourism and construction, improved links between formal and informal sectors, skills development, and the implementation of public works projects.

In order to predict employment growth, the growth elasticity of employment theory was first developed by Keynes (Sheehan, 2009; Biyase & Bonga-Bonga, 2015). In simple terms this relates to the ratio between the percentage change in employment and the percentage change in economic growth (World Bank, 2013; Fuhrmann, 2013). Hodge (2009), provides the following formula for the employment coefficient (E):

E = change in employment growth (e) ÷ change in economic growth (g).

In the model, E represents the measurement of the responsiveness or elasticity of employment to growth. A value of less than 1 or a negative value relates to jobless growth. Hodge (2009), in an analysis in South Africa, found an average employment coefficient of 0.5 from 1947 to 2007, meaning that economic growth leads to employment growth in the formal sector of only half the real GDP growth rate. This also indicated that growth in the formal sector alone is not likely to absorb enough workers to reduce unemployment rates significantly. Fourie (2013) states that an employment coefficient of less than one means that the labour absorption will continue to decline relative to output. Fourie and Burger (2009) established a coefficient of between 0.4 and 0.7 for South Africa.

In a study by Kitov and Kitov (2011), the relationship between employment and economic growth were tested for developed countries such as Australia, Canada, France, the UK and the USA. The study found a significant relationship between the two variables, with a relatively high employment coefficient of between 0.84 and 0.95. Seyfried (2005) studied the employment coefficient from 1990 to 2003 in a number of states in the USA by using a time series regression. He found a coefficient ranging from 0.31 and 0.61. Dumitrescu et al., (2009) found a negative relationship in Romania between unemployment and economic growth with a coefficient of -0.5. In Malaysia, Noor, Nor and Ghani (2007), also investigated the relationship between the two variables from 1970 to 2004 using a regression method, resulting in a negative relationship between the variables. In India, Aggarwal (2014) found that increased labour productivity drives growth and employment had a small impact on growth. The research proposed the following for improved inclusive growth: infrastructure investment, improved policies to motivate business to expand with jobs by relaxing labour regulations, promotion of small business and technology, and strengthening the education system.

On the African continent, Moosa (2008) analysed the employment coefficient in Algeria, Egypt, Morocco and Tunisia. The study found that economic output growth did not significantly translate into employment growth. In Botswana, Ajilore and Yinusa (2011), found that increases in output was mostly as a result of improved productivity rather than through an increase in employment. This indicates jobless growth with a coefficient of 0.01. Ajakaiye, Jerome, Nabena and Alaba (2016), analysed the relationship between growth and employment in Nigeria from 2005 to 2014. The results indicated that Nigeria has also experienced jobless growth since 2005. Labour has moved from sectors such as agriculture and manufacturing to the low productive service sector. The employment coefficient was positive but very low (coefficient of 0.11) indicating poor job generating ability especially in manufacturing. According to Ancharaz (2010), Africa has experienced rapid growth over the last decade, but this did not translate to significant job creation. The reason for this phenomenon is that growth was mostly achieved by means of the export of commodities. Export-driven growth without value added activities, does not translate into large scale job opportunities.

In South Africa, a number of research projects have been completed with a focus on the relationship between employment and economic growth. Biyase and Bonga-Bonga (2015), found a low employment coefficient of 0.10 between 1970 and 2008. This result demonstrates a weak reaction of employment to growth in

output, indicating jobless growth and weak labour absorption capacity for that period. Possible solutions include policy reaction to structural unemployment, promotion of low skilled industries, and the relaxation of labour regulations. According to Bhorat and Oosthuizen (2006), the demand for labour in South Africa is derived from economic growth, while Leshore (2013), also found that economic growth causes employment and not the other way round. Proposed interventions include small business development, reduction of taxes, employment subsidies, relaxing of labour regulations and skills development. A study conducted by Mkhize (2016), found an employment coefficient of 0.44 from 2000 to 2012, indicating jobless growth in South Africa. Vermeulen (2015) found that some sectors including manufacturing, transport and utilities are employment intensive with a long-run relationship and that employment growth is primarily driven by output and that a strong long and short-run relationship exists between output and employment in South Africa with an employment coefficient of 0.52.

According to Mahadea and Simson (2010), solutions to the creation of jobs in South Africa include entrepreneurship development with small business development, public works programmes, and a focus on labour absorbing sectors. Fourie (2013) states that labour absorbing sectors could include infrastructure, manufacturing, mining, agriculture and services. The McKinsey Global Institute (2015) analysed the South African economy taking into account growth and employment. The Institute listed five solutions to the problem of low growth with low job creation including innovative value added production; infrastructure development with sufficient capacity; the exploration of natural gas; exports of services such as financial services to Africa and lastly, the revitalization of the agricultural sector through agro-processing and export. The International Monetary Fund (2013), proposed that structural reforms in the economy are required to facilitate growth and employment creation. Reforms should be channelled towards improved education, reduction in transport costs, enhanced competitiveness and labour regulations.

This study has as its primary focus the relationship between employment and economic growth. However, inflation and interest rates were added as control variables. The relationship between GDP, employment and inflation in South Africa is explained by Vermeulen (2015). Inflation has a negative impact on output, and the output is assumed to drive employment growth. In this relationship, it is assumed that inflation tends to slow down employment growth. On the short-run, however, inflation could have a positive impact on output and employment. Vermeulen (2015) further found that employment growth is

primarily driven by output and a strong long and short-run relationship exists between output and employment in South Africa. He also found high levels of inflation is associated with lower levels of employment and output. Regarding the relationship between economic growth and interest rates, Hansen and Ananth (2013) found a negative correlation between the two variables. According to Sinclair (2016), a positive relation exists between unemployment and interest rates while a negative relation exists between employment and interest rates.

3. METHODOLOGY

The methodology of this study is in support of the functionalist paradigm, and it follows a quantitative approach by means of an econometric analysis.

3.1 Data and variable description

In achieving the objective of the study, E-views 9 was utilized and the data used in the study is based on 60 quarterly observations from the first quarter of 2002 until the fourth quarter of 2016. The study is based on the South African context, and the data were drawn from 2002 when Statistics South Africa amended the way they reported employment and labour statistics. The variables used in the study include; Total employment index (EMP), real Gross Domestic Product (GDP), inflation rate (INF) and repo rate (RR). The data of the designated variables were derived from the South African Reserve Bank (SARB) and Statistics South Africa (StatsSA). To avoid the outcome of the study model being rendered spurious, data used in the study were transformed to a natural logarithmic for all variables. This ensured that the data had reduced variation. The model of this study expresses total employment index (LEMP) as the dependent variable. Thus, the model can be expressed as follows:

LEMP= f(LGDP, LINF, LRR)……..(1)

3.2 Model identification

According to Brooks (2014), a Vector Autoregressive (VAR) model should be the first step in conducting a multivariate analysis that involves investigating the relationship between variables. In examining the relationship between the variables, the Augmented Dickey Fuller (ADF) test (1979) was deployed to assess the integration orders of the designated variables (unit root test for stationarity). This is followed by a Johansen Co-integration test, to investigate any evidence of a long-run relationship between the designated variables. If there is evidence of a long-run relationship between designated variables, a Granger causality test will be estimated to identify the direction of the relationship. To assess how

employment (LEMP) responds to shocks in Gross Domestic Product (LGDP), inflation (LINF) and repo rate (LRR) over time, variance decompositions are estimated. Lastly, residual diagnostic tests are estimated in order to assess the stability of the model and ensure viable results.

The study employed the Vector Auto-regression (VAR) approach. VAR is a system of dynamic linear equations where all the variables in the system are treated as endogenous. In general, a VAR model describes the evolution of a set of *k* variables (endogenous variables) over the same sample period (t = 1,….,T) as a linear function of their past evolution. Each variable in the model is regressed on both its lagged values and the lagged values of other variables in the system. The benefit of this approach is its ability to model all endogenous variables jointly as opposed to one equation at a time. If Johansen co-integration test results are statically significant at less than 5 per cent significance level, the null hypothesis is then rejected. This implies that there is an existence of a long-run equation between the designated variables. Next, the VECM model shows the Error Correction Term (ECT), and the ECT indicates the speed of adjustment to re-establish equilibrium in the model. From ECT it can be deduced how slowly or fast a designated variable re-establish equilibrium, and it should be noted that the ECT must be negative and significant at less than 5 per cent significance level (Brooks, 2014).

4. RESULTS AND DISCUSSION

4.1 Descriptive statistical analysis

Table 1 provides a summary of employment data for South Africa from 2002 to 2016. The table indicates that growth in formal employment was at 1.8 percent per annum, while informal employment growth was relatively low at 1.4 percent. Total unemployment has a high growth rate of 4.5 percent per annum with a constant increase in the level of the unemployment rate.

Table 1: Employment data for South Africa: 2008 to 2016

Variable	2008 (Q1)	2010 (Q1)	2012 (Q1)	2014 (Q1)	2016 (Q1)	% growth
Total employed (x 1000)	13 623	13 076	13 422	15 055	15 663	1.8
Formal sector employed (x 1000)	9 342	9 198	9 509	10 780	10 693	1.8
Informal sector employed (contribution to total employment in brackets)(x 1000)	2 319 (17.0%)	2 054 (15.7%)	2 106 (15.7%)	2 336 (15.6%)	2 573 (16.4%)	1.4
Total unemployed (x 1000)	4 191	4 395	4 526	5 067	5 714	4.5
Official unemployment rate	23.5%	25.2%	25.2%	25.2%	26.7%	1.7
Labour absorption rate	44.5%	41.1%	40.9%	42.8%	43.0%	-0.4
Labour force participation rate	58.2%	54.9%	54.7%	57.2%	58.7%	0.1

Source: StatsSA, various Quarterly Labour Force reports from 2008 to 2016.

Table 2 presents the correlation analysis including correlation coefficients and p-values. Positive and significant relationships exist between total employment and GDP, between employment and inflation and between GDP and inflation. The strong positive correlation between total employment and GDP justifies the outcomes observed in previous empirical literature reviewed in the study (Thirlwall, 2011).

Table 2: Correlation analysis

Variable	Employment	GDP	Inflation	Repo rate
Employment	1.0000			

GDP	0.9650	1.0000		
	(0.0000)*	-----		
Inflation	0.3397	0.2593	1.0000	
	(0.0079)	(0.0454)*	-----	
Repo rates	-0.5709	-0.6885	0.3078	1.0000
	(0.0000)*	(0.0000)*	(0.0167)*	-----

*Note: * Correlation at the 5% significance level. ( ) indicates p-value.*

4.2 ADF Unit root test and Lag – length selection criteria

Table 3 shows the ADF Unit root test results of the study, and it can be deduced that at the level I(0) the p-values remained insignificant (P-value>0.05), indicating that the variables are not stationary (has unit root). However, at I(1) it can be deduced that the p-values are significant (P-value<0.05), indicating that at first difference without trend all variables are stationary (no unit root). Since all

variables are stationary at I(1), this suggests that the long-run relationship between designated variables should be tested using the Johansen co-integration test. Optimum lags need to be determined, where the lags are used to estimate a Johansen co-integration test and if there is at least one co-integrating equation. A Vector Error Correction (VEC) model will be estimated using the same selected lags. The results of the lag-length selection criteria indicate two (2) lags as the optimum number of lags to be used in the model.

Table 3: ADF Unit root test results

Variable	Levels (ADF test) (p-value in brackets)	First Difference (ADF test)(p-value in brackets)	Result
LEMP	-0.1732 (0.4119)	-4.6893* (0.0067)	I (1)
LGDP	-0.4317 (0.1662)	-3.5352* (0.0030)	I (1)
LCPI	-0.1971 (0.2630)	-7.5570* (0.0215)	I (1)
LRR	-2.4263 (0.1391)	-4.2342* (0.0013)	I (1)

Note: (*) The rejection of the null hypothesis of unit root at the 5% significance level

4.3 Johansen co-integration test

Since the variables used in the study are stationary at I(1), the next step is to estimate a Johansen co-integration test in order to determine if there is a long-run relationship between the designated variables. If there is evidence of a long-run linkage between the designated variables, a restricted VAR (VECM model) be estimated (Brooks, 2014). However, if there is no evidence of a long-run relationship between designated variables, an unrestricted VAR will be estimated (Brooks, 2014). Table 4, reflects the Johansen co-integration results of the study. Both Trace and Max-Eigen test statistic are greater than their respective critical values, and the p-values of both tests are significant at 5 per cent significance level. This implies that there is one co-integrating equation, and thus conclude that there is a long-run relationship between the variables.

Table 4: Johansen co-integration results

Hypothesized No. Of ce(s)	**Trace Test**			**Maximum Eigen Test**		
	Trace statistic	**t- critical values**	**P-value**	**Max-Eigen Statistic**	**t- critical values**	**P-value**
None*	60.1394	47.8561	**0.0023***	25.7266	27.5843	**0.0482***
At most 1	34.4127	29.7970	0.0526	18.2441	21.1316	0.1210
At most 2	7.4554	9.1645	0.1044	12.6563	14.2646	0.1044

*Note: *denotes the rejection of the null hypothesis at the 0.05 level.*

Furthermore, the long-run relationship between the variables is expressed by equation (2). The equation indicates that there is a positive relationship between employment and GDP and with inflation but a negative relationship between employment and repo rate. The results, therefore, implies that a unit change (1%) in GDP will lead to an increase of 0.96% in employment. This outcome is in line with the findings of studies by Mkhize (2016) and Kitov and Kitov (2011), although the coefficient differs.

$$LEMP = 9.6548 + 0.9574LGDP + 0.0271\ LINF - 0.1192LRR \ldots\ldots\ldots\ldots \quad (2)$$

5.4 Vector Error Correction Model (VECM)

Since the Johansen co-integration results indicate the existence of a co-integrating equation, a VECM model was estimated. VECM allows the long-run behaviour of the endogenous variables to achieve long-run equilibrium while allowing a wide range of short-run dynamics. Thus it can be noted that the error correction term (ECT) coefficients represent the speed of adjustment to long-run equilibrium. The variables achieve equilibrium, only if ECT coefficients are negative in sign and with significant t-values. Table 5 shows the ECT from the VECM results of the study, and it can be deduced that Cointegration Equation 1 constitutes two significant equations which explain the existence of short-run adjustment towards the long-run equilibrium in LEMP and LRR. The LEMP equation has a negative ECT coefficient that is significant at 5 per cent significance level. This implies that a short-run shock to LEMP will adjust to equilibrium taking approximately 12 quarters to move back to equilibrium. In addition, Table 5 also shows that LGDP and LINF equations do not have negative ECT coefficients or do not have significant t-values. This outcome indicates no significant short-run relationship between employment and GDP.

Table 5: VECM results (Cointegration Equation 1)

Error correction	LEMP	LGDP	LINF	LRR
ECT Coefficients	-0.0821	0.0492	-2.0819	-0.5757
Standard error	(0.0278)	(0.0230)	(1.2586)	(0.2477)
T-statistic	[2.9454]*	[2.1356]*	[-1.6541]	[2.3237]*

*Note: * denotes significance at 5%.*

5.5. Variance decomposition

The results of Variance Decomposition is indicated in Table 6. The results indicate that LEMP is affected by its own shocks and employment shocks are also caused by shocks in LGDP and LRR. In period 1, 100 percent of shocks to LEMP

is caused by LEMP. By the 10th period, however, 36.9 percent of shocks to LEMP is caused by LGDP, and 10.2 percent of chocks are caused by LRR. Thus the existence of the linkage between employment, GDP and repo rate is confirmed.

Table 6: Variance decomposition results of LEMP

Period	S.E.	LEMP	LGDP	LINF	LRR
1	0.0061	100.000	0.0000	0.0000	0.0000
2	0.0096	88.8638	9.5182	0.9194	0.6983
3	0.0141	72.4859	24.5160	0.4659	2.5320
4	0.0180	63.9501	32.4080	0.4615	3.1803
5	0.0215	58.9168	36.4195	0.3374	4.3261
6	0.0245	56.1895	38.1375	0.2942	5.3786
7	0.0272	54.6375	38.5547	0.2559	6.5518
8	0.0296	53.6675	38.3515	0.2358	7.7449
9	0.0318	53.0639	37.7487	0.2195	8.9677
10	0.0338	52.6513	36.9301	0.2079	10.2105

5.6 Granger Causality test

In addition, the Granger causality tests are presented in Table 7, by using the Block Exogeneity Wald Tests to determine the direction of causality between the designated variables. The Granger causality test indicates that changes in both economic growth and repo rate cause movements in employment at a statistical significance level of 5%. This result is confirmed by Bhorat and Oosthuizen (2006) and Leshoro (2013). Furthermore, a change in employment causes movement in inflation and a change in economic growth causes movement in the repo rate.

Table 7: Granger Causality tests

Null Hypothesis	F-statistic	P-value
LGDP does not Granger Cause LEMP	26.7886	0.0001*
LINF does not Granger Cause LEMP	2.2194	0.3296
LRR does not Granger Cause LEMP	7.1467	0.0280*
LEMP does not Granger Cause LGDP	0.2228	0.8945
LINF does not Granger Cause LGDP	0.6301	0.7297
LRR does not Granger Cause LGDP	1.7157	0.4240
LEMP does not Granger Cause LINF	11.2406	0.0036*
LGDP does not Granger Cause LINF	1.4466	0.4851

LRR does not Granger Cause LINF	0.0793	0.9611
LEMP does not Granger Cause LRR	5.6479	0.0593
LGDP does not Granger Cause LRR	7.2602	0.0265*
LINF does not Granger Cause LRR	3.4100	0.1817

*Note: *reject the null hypothesis of no Granger Causality at 0.05 significant level.*

5.7 Residual diagnostic tests

In order to ensure that the model used in the study is reliable and to verify that results are robust, residuals diagnostics tests were completed. Table 8 shows the consolidated diagnostic tests results of the study. It can be deduced that the model does not have a serial correlation, no heteroscedasticity and the residuals are normally distributed.

Table 8: Consolidated diagnostic tests

Test	Hypothesis	Probability	Decision
Breusch-Godfrey test	No serial correlation	0.5239	No serial-correlation.
White (CT) test	No heteroscedasticity	0.2887	No Heteroscedasticity
Jarque-Bera test	Residuals are normally distributed	0.1909	Normally distributed

6. CONCLUSIONS AND RECOMMENDATIONS

In South Africa, and in most developing countries, the lack of employment opportunities leads to unacceptable high levels of poverty and inequality. The primary aim of the research was to analyse the relationship between employment and economic growth. Results of the econometric analysis are interesting in that the employment coefficient from this study was higher than previous studies. The study achieved a coefficient of 0.96 compared with other findings of studies in South Africa with coefficients closer to 0.5 (Mkhize, 2016; Vermeulen, 2015). These studies used data only up to 2012 while this study utilized more recent data up to 2016. The possible reason for this relatively higher coefficient could be due to the relatively low economic growth compared to employment growth over the last number of years. As with most macro-economic studies, the limitation of the study is that alternative variables could have been used in the model. Future research on this topic and relationship could have a sectoral focus in order to determine the impact of various economic sectors on growth and employment.

Policy recommendations include the following macro-economic proposals in order to promote employment creation and protection of existing jobs. Government policy should focus on economic development and inclusive growth

with the structural change to the current socio-economic system. The current socio-welfare system does not create wealth and should be replaced by a system where beneficiaries have access to jobs and skills development (Schussler, 2013). Skills development should be implemented only after research to ensure that skills mismatches are limited (Grosham & Potter, 2003). In the current South African situation, with generally low skills levels, sectors and industries which require such workers should be promoted, including the development of the informal sector through entrepreneurial development and training (Altman, 2003; Leshoro, 2013). In addition, research has proven that strict labour regulations limits rapid employment creation and therefore should be relaxed (Mahadea & Simson, 2010). Lastly, the manufacturing sector needs to be the focus of development with the promotion of value-added production and export (Ancharaz, 2010).

REFERENCES

Aggarwal, A. (2014). *New insights into the relationship between employment and economic growth in India.* Working paper 002, Wadhani Foundation Policy Research Centre, New Delhi, India.

Ajakaiye, O., Jerome, A.T., Nabena, D., & Alaba, O.A. (2016). *Understanding the relationship between growth and unemployment in Nigeria.* UNU-WIDER, Brookings Institution.

Ajilore, T., & Yinusa, O. (2011). An analysis of employment intensity of sectoral output growth in Botswana. *Southern African Business Review*, 15(2), 26-42.

Altman, M. 2003. *Jobless or job creating growth? Some preliminary thoughts*. HSRC. Paper presented at the TIPS/DPRU Annual Forum. Pretoria.

Ancharaz, V. (2010). *Trade, jobs and growth in Africa: An empirical investigation of the export-led jobless growth hypothesis*. Presented at the ICITE 3rd Regional Conference on 'Trade, Jobs and Inclusive Development', September 22, 2011, Gammarth.

Bhorat, H., & Oosthuizen, M.J. (2006). *The post-apartheid labour market*. In Bhorat, H and Kanbur, R. (eds), Poverty and policy in Post-apartheid South Africa.

Biyase, M., & Bonga-Bonga, L. (2015). The relationship between growth and employment in South Africa: Structural Vector Autoregressive analysis. *Environmental Economics*, 6(2), 54-58.

Brooks, C. (2014). *Introductory econometrics for finance*. Cambridge. University Press.

Calvin, B., & Coetzee. G. (2010). *A review of the South African micro-finance sector volume II*. Centre for micro-finance, University of Pretoria, Pretoria.

Centre for Development and Enterprise (CDE). (2013). *Rethinking South Africa's labour market*. www.cde.org.za. Accessed: 2016/09/07.

Dumitrescu, B.A., Dedu, V., Enciu. (2009). The correlation between unemployment and real GDP growth: A study case on Romania. *Annals of Faculty of Economics*, 2(1), 317-322.

Fourie, F.C. (2013). *Reducing unemployment: Waiting for high growth? Waiting for Godot?* http://www.econ3x3.org/article/reducing-unemployment-waiting-high-growth-waiting-godot. Accessed: 2016/09/01.

Fourie, F.C., & Burger, P. (2009). *How to think and reason in Macroeconomics*. Third Edition. Cape Town. Juta.

Fuhrmann, R.C. (2013). *Okun's law: Economic growth and unemployment*. www.investopedia.com/articles/economics/12/okun-law.asp. Accessed: 2016/08/25.

Grosham, E.C., & Potter, S. (2003). Has structural change contributed to jobless recovery. Federal Reserve Bank of New York, 8(3).

Habanabakize, T., & Muzindutsi, P.F. (2015). Time series analysis of interaction between aggregate expenditure and job creation in South Africa. *Journal of Governance and Regulation*, 4(4), 649-657.

Hansen, B.E., & Ananth S. (2013). *Uncovering the Relationship between Real Interest Rates and Economic Growth.* Ann Arbor MI: University of Michigan Retirement Research Center (MRRC) Working Paper, WP 2013-303. http://www.mrrc.isr.umich.edu/publications/papers/pdf/wp303.pdf. Accessed 2017/10/07.

Hodge, D. (2009). Growth, employment and unemployment in South Africa. *South African Journal of Economics.* 77(4), 488-504.

International Labour Organization (ILO). (2016). *World Employment and Social Outlook - Trends 2016. International Labour Office.* Geneva.

International Monetary Fund (IMF). (2013). *South Africa searches for faster growth and more jobs.* IMF survey. www.imf.org/external. Accessed: 2016/09/04.

Keynes, J.M. (1936). *The general theory of employment, interest and money.* London. Macmillan.

King, I. (2009). Search for a theory of unemployment. *Insights*, 6, 23-27.

Kingdon, G., & Knight, J. (2004). Unemployment in South Africa: The nature of the beast. *World Development*, 32(3), 391-408.

Kitov, I., Kitov, O. (2011). *Employment, unemployment and real economic growth.* MPRA Paper 32404. https://mpra.ub.uni-muenchen.de/32404/1/MPRA_paper_32404.pdf. Accessed: 2016/08/13.

Leshoro, T.L.A. (2013). Does economic growth lead to employment in South Africa? *Journal of Economics and Behavioral Studies*. 5(6), 336-345.

Mahadea, D., & Simson, R. (2010). The challenge of low employment economic growth in South Africa: 1994 – 2008. *South African Journal of Economic Management Sciences*, 13(4), 1-13.

Mankiw, N.G., & Taylor, M.P. (2014). *Economics, South African Edition*. 1st Edition. Hamshire, UK. Cengage Learning.

Maswanganyi, N. (2014). *Job creation lags behind SA's economic growth rate*. http://www.bdlive.co.za/national/labour/2014/03/19/job-creation-lags-behind-sas-economic-growth-rate. Accessed: 2016/09/10.

McKinsey Global Institute. (2015). *South Africa's big five: Bold priorities for inclusive growth.* Johannesburg.

Meyer, B., & Tasci, M. (2012). An unstable Okun's Law, not the best rule of thumb. *Economic Commentary*, 8, 1-5.

Meyer, D.F. (2014). Job Creation, a Mission Impossible? The South African Case. *Mediterranean Journal of Social Sciences. 5(16), 65-75.*

Mkhize, N. (2016). *The sectoral employment intensity of growth in South Africa: 2000-2012.* Economic Research Advisory Network Conference, East London, 10 March 2016.

Moosa, I. (2008). *Economic growth and unemployment in Arab countries: Is Okun's Law valid?* Proceedings of the international conference on the unemployment crises in the Arab Countries. March 17 to 18. Cairo, Egypt.

Noor, Z.M., Nor, N., & Ghani, M.A.A. (2007). The relationship between output and unemployment in Malaysia: Does Okun's law exist? *International Journal of Economics and Management*. 1, 337-344.

Okun, A.M. (1962). *Potential GNP, its measurement and significance*. Cowles Foundation. Yale University.

Schussler, M. (2013). *Gehamer op armoede kan boomerang.* Sake24. 14 October 2013. Johannesburg.

Seyfried, W. (2005). Examining the relationship between employment and economic growth in the ten largest states. *Southwestern Economic Review*, 32(1), 13-24.

Sheehan, B. (2009). *Understanding Keynes general theory.* Hampshire. Palgrave McMillan.

Sinclair, T. (2016). *The Relationship Between Job Creation and Interest Rates, Explained.* http://blog.indeed.com/2016/06/01/job-creation-interest-rates/. Accessed: 2017/06/07.

South African Reserve Bank (SARB). (2013). *Achieving higher growth and employment: Policy options for South Africa.* Working Paper 13/3. https://www.resbank.co.za/Lists/News%20and%20Publications.pdf. Accessed: 2016/08/30.

South African Reserve Bank (SARB). (2016). *Rates.* http://www.resbank.co.za/Research/Rates.aspx. Accessed: 2016/08/31.

Statistics South Africa. (2017). *Quarterly employment statistics.* June 2017. Pretoria, Government printer.

Vermeulen, C. (2015). Inflation, growth and employment in South Africa: Trends and trade-offs. ERSA. Working paper 547.

World Bank. (2013). *World development report, 2013*. Washington, DC.

World Economic Forum (WEF). (2015). *Outlook on the global agenda 2015*. Geneva.