# A CROSS-SECTOR ANALYSIS OF A DYNAMIC INTERACTION BETWEEN INVESTMENT SPENDING AND JOB CREATION IN SOUTH AFRICA: APPLICATION OF ARDL MODEL

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## ABSTRACT

This study analysed the dynamic relationship between investment spending and employment in different South African economic sectors. The sample period comprises 84 quarterly time series observations from 1994 to 2015. Five different auto regressive distributed lag (ARDL) models were used to determine the short- and long-run relationships between investment spending and employment in five economic sectors, namely business enterprises, construction, manufacturing, financial, and mining. A long-run relationship was found between investment spending and employment in two sectors, namely business enterprises and construction. Surprisingly, the relationship between investment spending and job creation in the manufacturing sector was not significant in the long run. Significant short-run relationships were found between investment spending and employment in the financial, manufacturing and mining sectors; suggesting that these sectors tend to shift to capital-intensive production, in the long-run. Furthermore, the Granger-causal relationship between jobs creation across sectors was established. This study concluded that more investment spending should be channelled to business enterprises and construction sectors, which create long-term employment.


## INTRODUCTION

If the major role of economic growth was to reduce poverty and inequality followed by a restoration of citizen's dignity by improving investment in human capital and different economic sectors, job creation should then be the engine of any economic activity (Khan *et al.,* 2008). To achieve this goal of job creation, different countries adopt various strategies, one of which is increasing the level of investment spending allocated for employment creation. This investment spending, however, should work in favour of human labour employment rather than technology use, since focusing investment spending on the latter could result in job losses as opposed to job creation.

A recent typical example of how investment spending sometimes destroys jobs can be taken from the South African financial sector, where the First National Bank (FNB), in 2016, had to lay down more than 600 jobs and close 40 branches due to their technological investments taking customers from office banking towards online and cell-phone banking channels (Bonorchis and Burkhardt, 2016). Therefore, when investment spending is oriented mainly to the use of technology, productivity is increased and in the process, jobs are destroyed. This resulted in share of technology with regard to competitiveness. Advanced technology leads to the higher level of competitiveness. Nevertheless,

investment spending on technology growth should not only be considered as harmful to employment growth, but it also tends to facilitate job creation in services industries (Miller and Atkinson, 2013). Technology improvement increases productivity as well as a country's wealth; allowing price reductions and new company formations. For example, in the service sector – which is labour intensive – the number of restaurants, hotels and beauty salons increases due to savings from lower prices of goods produced by machines. Thus, an increase in investment spending may create jobs in some sectors while destroying jobs in others.

Both the public and private sectors play an indispensable role in job creation. However, the contribution of each sector depends on the individual country's situations or economic positions. For instance, in developing countries such as South Africa, the private sector is a major driver of employment growth. According to the 2014 budget speech, the private sector was the biggest driver of job creation in South Africa (Gordhan, 2014). Additionally, the study by International Finance Corporation (2013) on job creation revealed that 90 percent of the total jobs created in developing countries are generated by the private sector. Yet in the South African context, it was stated that, in recent year, public sector created more jobs than private sector (Bhorat, Naidoo and Pillay, 2016). Therefore, it is beneficial to analyse how investment spending creates jobs in different economic sectors.

The objective of this study, therefore, was to determine the relationship between investment spending and job creation across different sectors of the South African economy. These sectors included mining, manufacturing, construction, business enterprises, and financial sectors. More specifically, this study intended to investigate how investment spending contributes to job creation in each of these sectors in the South African private sector.

## LITERATURE REVIEW

The term job creation is not new and has various definitions from different researchers' views. According to Cray, Nguyen, Pranka, Schildt, Sheu, and Whitcomb (2011), job creation is a provision of new employment without displacing any other economy activity. This definition refers to the number of people from labour force into the workplace; meaning that an increase of labour force requires a corresponding increase in spending to create jobs for new job seekers. Hence, the number of new jobs created reduces the rate of unemployment and increases the employment rate. Although Wagner's law postulated that public expenditure should not be considered as a policy lever, Keynesian economists highlight the importance of public spending in determining income levels and its distribution (Afonso, Schuknecht and Tanzi, 2010). Consequently, full-employment achievement cannot be left only to the automatic market mechanism without the participation of public sector (Maisonnave, Mabugu, Chitiga and Robichaud, 2013). As such, job creation becomes a result of good cooperation between the public and private sectors. Given that an economy can reach equilibrium even when it is not operating at full capacity, Keynesian theory attested that the only strategy to balance economic equilibrium and full-employment should be better management of aggregate expenditure; hence constant total spending leads to a steady state of employment and/or unemployment (Levine, 2009). Therefore, investment spending, being one of the aggregate expenditure's components, plays an indispensable role in job creation.

Investment spending should not be treated as just a process of improvement in capital accumulation, but rather as one of the aggregate expenditure components, which is effective to job creation in terms of resources and productivity growth (Munnell, 1992). This suggests that there is a positive correlation between job creation and investment spending. Investment spending is used to provide necessities for the production of goods and services, which eventually leads to labour demand. The earned income can be used for future investment spending as well as employment (Heintz, 2000).

This hypothesis of a positive correlation between job creation and investment also was supported by the study of Psaltopoulos, Skuras, and Thomson (2011) on investment and job creation in the European Union (EU). Their study found that more jobs were created in the EU rural regions through private investments spending than using other aggregate spending components. Consequently, there is a close link between investment spending and job creation.

There is a statistically strong and significant cause-effect relationship between investment spending and job creation. The alteration of each (employment and/or investment) causes a direct mutual effect. In other words, an increase in investment spending allows firms and companies to create new jobs; and likewise, when more people are employed, a share of income is invested for future employment (Brun, Jolley, Hull and Frederick, 2014). The study conducted by Iacovoiu (2012) on investment fluctuation in Romania, between year 2004 and 2012, found a two-way causal relationship between employment rate and investment spending. In addition, Adelino, Ma, and Robinson (2014) attested that a better way to create more and durable jobs was to invest in new or starting-up firms. New firms come with innovation within enterprises and create new opportunities for the labour markets, although they require high levels of investment spending in research and development.

In the South African context, Habanabakize and Muzindutsi (2015) found that investment spending contributes to creation of jobs in the local economy. However, the identification of appropriate sectors in which investment can boost job creation was not addressed by this study. In this regard, Heintz *et al.* (2000) recommended that investment in infrastructure would be a good strategy to overcome the issue of joblessness in South Africa. It is not only infrastructures that have effects on job creation but different economic sectors also have the ability to create jobs through investment spending.

Various studies  (Birch, 1979; Aschauer,1989; Malherbe, 2000; Saks, 2008; Cray *at al.*, 2011; South Africa, 2011; Dlamini, 2012; Ratushenko, 2012; Maisonnave *at al.*, 2013; Shi and Michelitsch, 2013; Carew and Mandel, 2014; Criscuolo and Menon, 2014; International Labour Conference, 2015;  Kerr, Wittenberg and Arrow, 2014) on the effect of investment spending and job creation, found a positive relationship between investment spending and job creation in infrastructure, manufacturing, mining, business enterprises and financial sectors. These findings suggest that, investment spending in these sectors can improve direct employment by hiring and indirect employment by stimulating jobs in other sectors.

However, other studies (Munnell 1992; ILO, 2009; Haltiwanger and Miranda, 2010; Freund, 2011; Gavin, 2013; Federica and Bernt, 2013; Makgetla, 2014; Levinson, 2016) found an inverse relationship between investment spending and job creation. This negative relationship is sometimes due to the fact that investment spending can promote capital intensive rather than labour intensive production. Thus, the role of investment spending in job creation cannot be standardised as it can create jobs in some sectors while destroying jobs in other sectors.

## METHODOLOGY

### Data and sample period

The study adopted a quantitative research approach to determine the dynamic relationship between investment spending and job creation in different economic sectors. The sample period consisted of 84 quarterly time series observations from 1994 to 2015. Variables used include investment spending (known as capital formation in the South African context) and employment (index of job created) in each of selected economic sectors. The selected five sectors were business enterprises, construction, manufacturing, mining, and financial sectors. The time period and variables were chosen based on the availability of data and the role played by the selected sectors in the South African economy. Data

were acquired from the South African Reserve Bank (SARB). Table 1 exhibits the variables and their representations.

## TABLE 1

### VARIABLE REPRESENTATION

| Variables | Representation |
|-----------|----------------|
| Investment spending | INVES |
| Employment in business enterprises | EBUS |
| Employment in constriction | ECON |
| Employment in financial sector | EFIN |
| Employment in Manufacturing sector | EMAN |
| Employment in mining sector | EMIN |

**Model specification**

Given the existence of diverse ways of determining the linkage between employment and investment spending within various countries, with different estimation approaches, this paper investigated the Keynes theory of employment and investment spending using econometric techniques. First, descriptive statistical analysis was used to provide a simple and meaningful representation of data. Secondly, an autoregressive distributed lag (ARDL) model was used to establish the long- and short-run relationships between investment spending and employment rate in each sector. Granger's (1969) causality tests were employed to establish the causal relationships between job (employment) creation and investment spending in South Africa. Given that the ARDL model can produce unreliable results when variables are stationary at the second difference I(2) (Ouattara, 2004); the unit root test was conducted, using the augmented Dickey-Fuller (ADF), to ensure that none of the variables is I(2). To determine the relationship between employment and investment spending, the following ARDL model was estimated:

$$\Delta LEMP_t = \propto_0 + \sum_{j=1}^{k} \beta_j \Delta LEMP_{t-j} + \sum_{j=1}^{k} \lambda_j \Delta LINVES_{t-j} + \varphi_1 LEMP_{t-1} + \varphi_2 LINVES_{t-1} + u_t \qquad (1)$$

Where $\Delta LEMP_t$ stands for the change in natural log value of total employment at time t and $\Delta LINVES_t$ represents the natural log of investment spending at time t. $\propto_0$ represents the intercept, k denotes number of lags, whilst $u_t$ designates white noise error term. $\beta_j$ and $\lambda_j$ indicate the short-term dynamics of the model, whereas $\varphi_1$ and $\varphi_2$ represent the long-run coefficients. Equation (1) was estimated for each of the five sectors; meaning that five different ARDL models were estimated. From Equation 1, the following hypotheses were set to test for co-integration:

- Null hypothesis (H₀) for no co-integration: $\varphi_1 = \varphi_2 = 0$
- Alternative hypothesis (H₁) for co-integration: $\varphi_1 \neq \varphi_2 \neq 0$

To test the above null hypothesis, bounds or F-tests were conducted where the calculated F-statistic was compared to the critical value from the Pesaran, Shin and Smith (2001) table (with unrestricted intercept and without trend). If the calculated F-value was greater than the upper critical value from the table, the null hypothesis was rejected and the conclusion was that there is a co-integrating relationship between the variables. However, if the tabulated lower critical value was greater than the estimated F-value, the null hypothesis could not be rejected, implying that there was no co-integration

between the variables. Lastly, unless there was additional information, the result remained inconclusive if the calculated F-statistics lay between the upper and lower critical values (Dube and Zhou, 2013). The occurrence of co-integration between variables denotes a long-run relationship between employment and investment spending. If the results prove the existence of co-integration among variables, then the ECM is estimated. For this study, the following ECM equation was derived from the ARDL model in Equation (1):

$$\Delta EMP_t = \alpha_1 + \sum_{j=1}^{k} \beta_{1j} \Delta EMP_{t-j} + \sum_{j=1}^{k} \lambda_{1j} \Delta INVESP_{t-j} + \delta ECT_{t-1} + u_t \qquad (2)$$

Where the error correction term is represented by ECT. The ECT measures quickness of adjustment towards equilibrium. The ARDL model estimation was preceded by a statistical analysis, followed by Granger causality tests to determine the causal relationship between variables. The optimal number of lags (k) was determined using the information criteria, namely the Schwarz Bayesian information criterion (SBIC), Akaike information criterion (AIC), and Hannan–Quinn information criterion (HQIC) (Brooks, 2014). In addition, some diagnostic tests such as normality, parameter stability, autocorrelation and heteroscedasticity tests were conducted to ensure the reliability of obtained results (Maddala, 2001).

## EMPIRICAL ANALYSIS

### Descriptive Statistics

Data of investment spending and employment was converted into natural logarithms; the aim of this transformation (logs) was to determine the growth rates of the variables. Table 2 presents the results of the descriptive statistics. Observing data represented in Table 2, it is shown that when the average of investment spending is 103884.7 Rands, more jobs are created in business enterprises than other sectors of the economy, as assessed from the average employment in business enterprises (134.7), construction (90.5), financial sector (62.7), manufacturing (109.2) and mining (98.0), respectively. If the maximum investment spending is 162515 Rands corresponding indices of jobs created in business enterprises, construction, financial sector, manufacturing and mining is 202.8, 125.6, 112.9, 130.3 and 122.8 respectively, whilst for the minimum 51289 Rands in investment made, corresponding index jobs in business enterprises is 94.8, construction 52.0, financial sector 10.5, manufacturing 96.6 and mining 80.6.

### TABLE 2

### DESCRIPTIVE STATISTICS

|           | LEBUS    | LECON  | LEFIN  | LEMAN  | LEMIN  | LINVES    |
|-----------|----------|--------|--------|--------|--------|-----------|
| Mean      | 134.7    | 90.5   | 62.7   | 109.2  | 98.0   | 103884.7  |
| Median    | 121.8    | 91.3   | 81.6   | 108.1  | 98.3   | 98569.0   |
| Maximum   | 202.8    | 125.6  | 112.9  | 130.3  | 122.8  | 162515.0  |
| Minimum   | 94.8     | 52.0   | 10.5   | 96.6   | 80.6   | 51289.0   |
| Std. Dev. | 37.8     | 22.8   | 43.4   | 9.7    | 11.4   | 36379.02  |
| Skewness  | 0.68     | -0.26  | -0.21  | 0.63   | 0.40   | 0.18      |
| Kurtosis  | 1.86     | 1.77   | 1.23   | 2.48   | 2.42   | 1.40      |
| Jarque-Bera | 11.52  | 6.54   | 12.07  | 6.78   | 3.52   | 9.74      |
| Sum       | 11718.00 | 7872.4 | 5458.6 | 9498.7 | 8526.5 | 9037968.  |

The fluctuation of employment is higher in the financial sector than in other sectors, as evidenced by the standard deviation of employment in the business enterprises, construction, financial, manufacturing and mining sectors, respectively. Data in Table 2 exhibits that employment in all selected sectors is moderately skewed as the skewness lies between -0.21 and 0.63, and all distributions are platykurtic. Employing probability and Jarque Bera statistics together, the results illustrate that the only sector in which employment is well distributed is mining. Lastly, the highest number of people is employed in the business enterprises sector, while the financial sector employs the least.

## Unit root test and lag selection

The ARDL model is used only if none of the variables under study is I(2). All variables under the study must be either I(0) or I(1), otherwise the ARDL approach is not applicable (Arshed, 2014). Therefore, an ADF unit root test was used to check that the data fulfils ARDL model requirements. As exhibited in Table 3, none of the variables was I(2); all variables were I(1). Therefore, ARDL could be used to test for co-integration between employment and investment spending.

### TABLE 3
### ADF UNIT ROOT TESTS

| Level without trends | | | Level with trend | | $1^{st}$ Difference without trend | | Order of integration |
|---|---|---|---|---|---|---|---|
| Variable | t-stat. | P-value | t-stat. | P-value | t-stats | P-value | |
| LEBUS | -1.812 | 0.3721 | -0.098 | 0.372 | -3.383 | 0.014** | I(1) |
| LECON | -0.969 | 0.761 | -2.076 | 0.551 | -8.378 | 0.000* | I(1) |
| LEFIN | -1.086 | 0.718 | -1.811 | 0.690 | -9.538 | 0.000* | I(1) |
| LINVES | -0.511 | 0.882 | -1.915 | 0.637 | -3.730 | 0.005* | I(1) |
| LEMAN | -1.357 | 0.599 | -2.070 | 0.554 | -8.783 | 0.000* | I(1) |
| LEMIN | -2.243 | 0.192 | -2.180 | 0.494 | -5.075 | 0.000* | I(1) |

* denotes the rejection of the null hypothesis of unit root at the 1% significance level of significance
** denotes the rejection of the null hypothesis of unit root at the 5% significance level of significance

The number of optimum lags to be used by the model was identified before the model (ARDL) estimation. The SBIC, AIC and HQIC were used to determine the number of lags to include in each of the five models, and a similar process was followed to select the best ARDL model to be estimated. For all five models, the maximum number of lags selected was four. The best model found for employment in business enterprises was ARDL (2, 0), ARDL (2, 2) for employment in construction, ARDL (1, 1) for employment in financial sector, ARDL (1, 0) for employment in manufacturing, and ARDL (2, 0) for employment in mining sector.

**TABLE 4**

**LAG LENGTH AND SECTION OF THE BEST ARDL MODEL**

|  | Model 1: LEBUS vs. LINVES | Model 2: LECON vs. LINVES | Model 3: LEFIN vs. LINVES | Model 4: LEMAN vs. LINVES | Model 5 LEMIN vs. LINVES |
|---|---|---|---|---|---|
| Max. no. lags | 4 | 4 | 4 | 4 | 4 |
| ARDL model | ARDL(2,0) | ARDL(2,2) | ARDL(1,1) | ARDL(1,0) | ARDL(2,0) |

**Analysis of long-run relationships**

Results from diagnostic tests proved the accuracy of the estimated ARDL models. In other words, the models met the econometric criteria as no serial autocorrelation or heteroscedasticity were found in the model. The parameters stability test also showed that all five models were stable.

**TABLE 5**

**BOUNDS TEST FOR CO-INTEGRATION**

| Model | Estimated F-value | Pesaran critical value at 5% | |
|---|---|---|---|
|  |  | Lower bound | Upper bound |
| ARDL(2,0) : business | 6.17 | 4.94 | 5.73 |
| ARDL(2,2): construction | 5.81 | 4.94 | 5.73 |
| ARDL(2,1): financial | 2.11 | 4.94 | 5.73 |
| ARDL(3,1): manufacturing | 2.1 | 4.94 | 5.73 |
| ARDL(2,0): mining | 3.68 | 4.94 | 5.73 |

Note: The unrestricted intercept without trend table was used for critical values (Pesaran *et al.,* 2001).

The lower and upper bound critical value (Pesaran *et al*., 2001:300) and their corresponding estimated F-value are illustrated in Table 5. The estimated F-value of employment in business enterprises and employment in construction was 6.17 and 5.81, respectively; and these were greater than the upper bound at the 5 percent level of significance of 5.73. Therefore, the null hypothesis that there is no co-integration is rejected, suggesting that there is a long-run relationship between investment spending and employment in both sectors (business enterprises and construction). The existence of co-integration required the estimation of the ECM in these two sectors to determine the speed of adjustment towards long-run equilibrium. The findings from this study are in line with earlier empirical studies (Birch, 1979; Neumark, Wall and Zhang, 2008; Saks, 2008; Freund, 2011; Dlamini, 2012; Kerr *et al.,* 2014:2; OECD, 2015), which found a positive, long-run relationship between investment spending and job creation in the business enterprises and construction sectors.

However, for employment in the financial, manufacturing and mining sectors, the null hypothesis could not be rejected at the 5 percent level of significance because the estimated F-values (2.11; 2.10; 3.68) were less than the lower bound (4.94), confirming the absence of long-run relationship between investment spending and employment in those three sectors of the economy. Therefore, there was no need to estimate the ECM. These findings were not surprising because the current technology improvement in the financial, manufacturing and mining sectors makes them more capital intensive than labour intensive. Other scholars (ILO, 2009; Gavin, 2013; Rotman, 2013; Bonorchis and Burkhardt, 2016) also reached similar conclusions that investment spending in the abovementioned sector does not create jobs in the long-run.

**Analysis of short-run relationships**

The results from the ECM for employment in the business enterprises and construction sectors are presented in Table 6. The analysis of these results was based on the corresponding upper and lower bound critical values in Table 5 as stated by Pesaran *et al.* (2001). To ensure that the ECM results were accurate, diagnostic tests were conducted and both models passed all the tests. For both ECMs, the needed negative sign was present and the ECTs were statistically significant at the 5 percent level of significance. The coefficient of -0.921748 meant that around 92 percent of any disequilibrium between employment in business enterprises and investment spending was corrected each quarter. In other words, the alterations in investment spending take approximately 1.08 (1/0.921748) quarters to impact on employment in business enterprises. On the other hand, it takes about 1.65 (1/0.606858) quarters for the changes in investment spending to have an effect on job creation in the construction sector. The lag coefficients for both models were significant, implying that there is a short-run relationship between employment and investment spending in both sectors.

**TABLE 6**

**ECM RESULTS FOR BUSINESS ENTERPRISES AND CONSTRUCTION SECTOR**

A. Model for business enterprises

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| D(EBUS(-1)) | 0.717394 | 0.029169 | 24.59442 | 0.0000 |
| D(EBUS(-2)) | 0.203939 | 0.011235 | 18.15285 | 0.0000 |
| ECT(-1) | -0.921748 | 0.032336 | -28.50494 | 0.0000 |
| C | 0.032564 | 0.058345 | 0.558129 | 0.5784 |

B. Model for construction sector

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| D(LECON(-1)) | 0.477562 | 0.114164 | 4.183130 | 0.0001 |
| D(LECON(-2)) | 0.233491 | 0.102202 | 2.284609 | 0.0252 |
| D(LINVES(-1)) | -2.65E-06 | 7.25E-07 | -3.656908 | 0.0005 |
| D(LINVES(-2)) | -1.07E-06 | 6.85E-07 | -1.565319 | 0.1218 |
| ECT(-1) | -0.606858 | 0.121912 | -4.977850 | 0.0000 |
| C | 0.002710 | 0.001750 | 1.548852 | 0.1257 |

The outcome of short-run relationships between investment spending and employment in three sectors among the selected five is exhibited in Table 7. As can be seen from this table, investment spending was significant at the 5 percent level; meaning that investment spending increases employment in the financial sector in the short-run. However, there were no short-run relationships between investment spending and employment in the other two sectors of manufacturing and mining. Looking at the lags in each model, mining is the only sector with significant lag coefficients. This means that growth in previous employment affect the current job creation in mining sector.

**TABLE 7**
**SHORT-RUN RELATIONSHIP**

| | Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|---|
| Model for financial sector | D(LEFIN(-1)) | -0.053413 | 0.115152 | -0.463851 | 0.6440 |
| | D(LINVES) | 56.560280 | 24.020668 | 2.354651 | 0.0210 |
| | | | | | |
| Model for mining sector | D(LEMIN(-1)) | 0.463460 | 0.096466 | 4.804409 | 0.0000 |
| | D(LEMAN(-1)) | 0.027930 | 0.112383 | 0.248527 | 0.8044 |
| | D(LINVES) | 0.046341 | 0.059792 | 0.775043 | 0.4406 |
| | | | | | |
| Model for manufacturing sector | D(LEMAN(-1)) | 0.027131 | 0.113256 | 0.239554 | 0.8113 |
| | D(LEMAN(-2)) | 0.075081 | 0.112366 | 0.668185 | 0.5060 |
| | D (LINVES) | 0.042868 | 0.061185 | 0.700619 | 0.4857 |

**Analysis of causal relationships**

Short-run relationships amongst variables were determined using pairwise Granger-causality tests. It was concluded that there were five bi-directional, and five unidirectional Granger-causality relationships amongst our variables of interest. Although most of the variables had bi-directional causal relationships, it was found that unidirectional causality between jobs created in the financial sector and jobs created in construction, between the mining and financial sectors, between investment and the financial sector, between investment and the mining sector and between the manufacturing sector and investment. Moreover, as exhibited in Table 8, there is Granger-causality between the manufacturing and business enterprise sectors, between mining and construction job creation, between the manufacturing and financial sectors, and between jobs created in the mining and manufacturing sectors, respectively. This means that growth in jobs created in one sector tends to lead to growth in jobs created in other sectors.

**TABLE 8**

**PAIRWISE GRANGER CAUSALITY TEST RESULTS**

| Null Hypothesis | Probability | Causality | Direction of causality/ flow |
|---|---|---|---|
| LECON does not Granger Cause LEBUS | 0.0004 | Yes at 1% | |
| LEBUST does not Granger Cause LECON | 0.0658 | Yes at 10% | ⟺ |
| LEFIN does not Granger Cause LEBUS | 0.0041 | Yes at 1% | |
| LEBUS does not Granger Cause LEFIN | 0.0277 | Yes at 5% | ⟺ |
| LEMIN does not Granger Cause LEBUS | 0.0002 | Yes at 1% | |
| LEBUS does not Granger Cause LEMIN | 0.0821 | Yes at 10% | ⟺ |
| LINVES does not Granger Cause LEBUS | 0.0209 | Yes at 5% | |
| LEBUS does not Granger Cause LINVES | 0.0738 | Yes at 10% | ⟺ |
| LMAN does not Granger Cause LEBUS | 0.9249 | No | |
| LEBUS does not Granger Cause LMAN | 0.8449 | No | |
| LEFIN does not Granger Cause LECON | 0.0717 | Yes at 10% | ⟹ |
| LECON does not Granger Cause LEFIN | 0.2334 | No | |
| LEMIN does not Granger Cause LECON | 0.1507 | No | |
| LECON does not Granger Cause LEMIN | 0.1173 | No | |
| LINVES does not Granger Cause LECON | 0.0918 | Yes at 10% | |
| LECON does not Granger Cause LINVES | 0.0623 | Yes at 10% | ⟺ |
| LMAN does not Granger Cause LECON | 0.1000 | No | |
| LECON does not Granger Cause LMAN | 0.7820 | No | |
| LEMIN does not Granger Cause LEFIN | 0.0648 | Yes at 10% | ⟹ |
| LEFIN does not Granger Cause LEMIN | 0.1277 | No | |
| LINVES does not Granger Cause LEFIN | 0.8608 | No | |
| LEFIN does not Granger Cause LINVES | 0.0050 | Yes at 1% | ⟹ |
| LMAN does not Granger Cause LEFIN | 0.1866 | No | |
| LEFIN does not Granger Cause LMAN | 0.8541 | No | |
| LINVES does not Granger Cause LEMIN | 0.3607 | No | |
| LEMIN does not Granger Cause LINVES | 0.0126 | Yes at 5% | ⟹ |
| LMAN does not Granger Cause LEMIN | 0.4885 | No | No relationship |
| LEMIN does not Granger Cause LMAN | 0.3821 | No | |
| LMAN does not Granger Cause LINVES | 0.0963 | Yes at 10% | ⟹ |
| LINVES does not Granger Cause LMAN | 0.3531 | No | |

**CONCLUSION**

In most cases, employment in different sectors was affected by the disposable level of investment spending. This can be proven by the empirical evidence used by this paper to determine the relationship between investment spending and employment within South Africa's different economic sectors. Using five ARDL models, this study found a positive and long-run relationship between investment spending and employment in the construction and business enterprise sectors. This implies that more investment spending on new and old, and small and large businesses can be one of the long-run solutions to unemployment in South Africa. Construction also created jobs during the erection and maintenance of buildings, which justify the long-run relationship between investment spending and job creation in that sector. The short-run relationships were found between investment spending and employment in the manufacturing, mining and financial sectors, implying that in the long run, these sectors employ more machineries and advanced technology than human labour. Thus, investment spending led to the shift towards capital-intensive production in these sectors. Furthermore, a causal relationship between sectors implied that growth in job creation in one sector led to growth in jobs

created in other sectors. Overall, findings of this study suggest that lasting employment can be created by channelling investment spending to the business enterprises and construction sectors.

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