Trade Openness, FDI and Exchange Rate Effects on Job Creation in South Africa's Tradable Sectors

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Abstract: Employment creation remains the pinnacle standard of sound social welfare and economic progress. It is a fundamental driver of economic development for any economy. However, such a pursuit faces tenacious challenges, especially amidst the growing global market integration. This study unravelled the effects of the underlying trade environment mechanisms such as trade openness, foreign direct investment(FDI) and the exchange rate on South Africa's job creation efforts within the tradable sectors. The study employed a quantitative analysis and included time series explanatory variables of trade openness, net-FDI flows and the real effective exchange rate. Employment series of both South Africa's mining and manufacturing tradable sectors served as the dependent variables. The study made use of quarterly observations starting from 1995 to 2016. In doing so, various econometric methods were utilised. These included descriptive analyses, the standard Autoregressive Distributed Lag (ARDL) model, and the Toda-Yamamoto Granger Non-Causality test. Empirical ARDL results of employment in the individual mining sector, established no long-run and short-run relationships with trade openness, the real effective exchange rate and net-FDI. Employment in the manufacturing tradable sector presented significant and negative long-run relationships with trade openness, the real effective exchange rate and net-FDI. Meanwhile, the short-run findings exhibited significant and positive relationships between employment in the manufacturing tradable sector with trade openness, and significantly negative for net-FDI. However short-run results of manufacturing employment and the real effective exchange rate were not significant. Based on these results, South Africa's mining sector seems unresponsive to mechanisms in the trade environment while these relationships are relatively dynamic in the manufacturing sector. Further recommendations were thus provided to improve these interrelationships in promoting job growth and its responsiveness to trade components.

Keywords: *Employment, foreign direct investment, job creation, non-tradable sector, real exchange rate, tradable sector, and trade openness.*

1. Introduction

Foreign trade has emerged as a driving force of various economies in the midst of intensifying globalisation processes. Its ability to maximise national and global welfare encapsulates the analytical advantages of free trade (Karunaratne, 2012). Economies such as the "Asian Tigers" have been characterised by ground-breaking economic breakthroughs, led by active foreign trade participation (Segerstrom, 2013). In spite of its profound acclamations, foreign trade presents potential economic challenges and uncertainty characterised by globalisation and trade liberalisation factors (Cetkovic & Zarkovic, 2012). Such negative effects are exacerbated amongst developing economies due to their lack of efficient and strong economic structures, thus lacking the capacity to manage globalisation (Fernández, 2017). Since the beginning of the post-apartheid regime, South Africa has witnessed more open trade policies. The country's mounting trade exposure has left the government compelled and pressurised to establish neoliberal macroeconomic policy. However, this has instilled the build-up of various ramifications in the form of intensifying unemployment, job insecurity and inequality (Mathekga, 2009). Particularly, South Africa has had a challenging employment sector where job creation patterns are incapable of sustaining the growing job-seeking population as indicated by the low labour absorption-rate (Rogan et al. 2013).

The present study examines the effects of trade-related factors, particularly trade openness, the real effective exchange rate and foreign direct investment (FDI), on South Africa's tradable sector job creation patterns. Theories of comparative and absolute advantage as opined by David Ricardo and Adam Smith, respectively advance the notion that countries can adopt trade welfare gains. The former emphasises that trade benefits may be acquired by a participating country through processes of resource specialisation, whereas the latter makes a case for mutually exclusive or beneficial trade irrespective of owning comparative cost advantages within production processes (Krugman et al., 2014; Schumacher, 2012). Piton (2017) however underscores

that a small open economy suffices as a price-taker in regards to its tradable sector. Thus industries which are less competitive may fail to compete in foreign trade.

Furthermore, the former industries may be forced to concede to prevailing global market prices within international markets. Highly productive export firms are likely to expand their establishment upon the opening of the domestic economy to the global market. Lower productive firms on the other hand, may eventually shut down while some may initiate labour cuts and remain in operation (Itskhoki & Helpman, 2015). Economies characterised by higher trade intensity or trade openness are traditionally viewed to be more receptive to free trade benefits (Squalli & Wilson, 2006). The growth trajectories of such economies are conceived to relatively outweigh those of inward orientated or closed economies (Yanikkaya, 2003). South Africa's unprecedented intensification of the post-apartheid era's foreign trade participate on relative to the apartheid-era necessitates the need to obtain an understanding of trade effects on South Africa's economic sectors. The tradable and non-tradable sectors underline the two dividing parts of job inhabiting economic sectors within the context of international economics (Frocrain & Giraud, 2017). Smith, Ricardo and Heckscher-Ohlin, amongst others, highlighted the importance of free trade in accelerating effective domestic and global market competition towards obtaining increased economic efficiency (Chinembiri, 2010). Nevertheless, the pragmatic effects of foreign trade amidst a country's intensified trade openness, fluctuating exchange rates and FDI inflow and outflow processes may lead to job creation, and/or job destruction in the form of job losses and company closures within economic sectors such as the tradable sector (Chinembiri, 2010).

2. Literature Review

Foreign trade or international economic integration constitutes a salient feature of globalisation (Selimi, 2012) which seeks to consolidate the varying global market entities (Taylor, 2001). Activities amassed within trade processes involve the trade in goods and services, the inflow and outflow of FDI, labour migration, and the growth in foreign multinationals (Margalit, 2012). Common markets, free-trade areas, economic unions and customs unions, account for the various characteristics of international integration (McCarthy, 1996). Accordingly, trade openness, the real effective exchange rate and FDI are just some of the underlying mechanisms encompassing free trade. The tradable sector's high export intensities and import penetration makes a case for being the sector with the most exposure to free trade or the global market (Ngandu, 2009). In the context of the South African economy, numerous scholars such as Mano & Castillo, 2015; Rodrik, 2008; Spence & Hlatshwayo, 2014, suggest that the country's tradable activities include agricultural, manufacturing, mining, hunting, forestry, fishing and energy activities. These activities are noted to have the high export intensity and import penetration and command their nature of tradability in terms of their positioning along the tradability continuum, which characterises activities from perfectly tradable to perfectly non-tradable positions (Ngandu, 2009). The manner in which free trade in regard to the aforementioned trade mechanisms affects job flows is a compelling issue especially in a country where dire unemployment patterns are a constant concern. The corresponding effects of free trade may be identified within job flow analyses, in terms of job creation rates or job destruction rates, which represent the demand-side or employment dynamics of the labour market (Fujita & Nakajima, 2016).

Job Dynamics and Trade Openness: Trade openness reflects the degree of interactions between the domestic economy and the rest of the world (Selimi, 2012). It speaks to the relaxation or removal of trade restrictions to foreign trade (Ulasan, 2012). These include quotas and tariffs amongst others, which serve to hinder or lessen the degree of participation in international trade (Mushtaq et al., 2014). A common measure of trade openness has often been exclusively measured as exports plus imports as a share of GDP (or X+M/GDP). Such a measurement accounts for the share of actual trade activities, classified as imports and exports, in the domestic economy's aggregate output or GDP levels (Arribas et al., 2006). The latter classification expounds the traditional measure of trade openness which has been employed by many researchers (such as Adamu, 2014; Adhikary, 2011). Amongst the studies on job creation effects of trade openness, various studies (such as Ferreira et al., 2010; Menezes-Filho & Muendler 2011; Wacziarg & Wallack, 2004) have conveyed a negative impact of greater trade openness on job creation, particularly towards low-skilled labour within the tradable sector such as manufacturing, and a transfer of highly-skilled labour to non-tradable sectors. Such findings include results by Gaddis and Pieters (2014) who investigated

the impact of trade openness on the labour market in the case of Brazil. Results revealed a loss of employment in the tradable sector, albeit having no effect on total employment as a result of the re-allocation of highly-skilled labour from the tradable to the non-tradable sectors. However, low-skilled labour was negatively affected. In retrospect, trade openness plays a seemingly important role on the re-allocation of labour and other factors of production.

The study by Haltiwanger et al. (2004) in Latin American economies using harmonised measures on job creation and destruction revealed that increased trade openness via tariff reduction is associated with a decrease in net employment growth. Similarly, the study by Menezes-Filho and Muendler (2011) suggested labour displacement effects of trade openness within Brazil's labour market, such that comparative advantage-driven sectors were unable to absorb displaced workers resulting in the loss of employment. Janiak (2006) further associates the failure to absorb labour by remaining firms being a result of the firm's incentive to profit from market power within the goods market, which permits them to absorb higher rent. A further analysis by Asghar et al. (2014) on countries within the South Asian Association for Regional Cooperation (SAARC), namely Sri Lanka, Pakistan, India and Bangladesh, revealed a loss of employment in the manufacturing sector for Pakistan, India, and Bangladesh due to greater trade openness. Meanwhile, the agricultural and informal sectors faced underemployment and low wages. Sri-Lanka, on the one hand, experienced export-led growth, and these results were substantiated by a lack of a competitive advantage in Pakistan, India and Bangladesh within the manufacturing sector as alluded to in the theory of comparative advantage.

In stark contrast to the above findings, various scholars such as Hasan et al., 2012, attribute employment generation as induced by greater trade openness. An empirical examination by Hasan et al. (2012) based on India's labour force survey data, revealed a reduction in unemployment resulting from trade openness within flexible labour market abundant states, including states with high export share sectors. Additionally, results revealed that existing jobs within industries exposed to increased trade liberalisation or openness were less likely to be lost primarily within net export industries and those with flexible labour regulations. The study further provides reinforcement for trade openness alongside domestic policy complementary reforms. A cross-sectional study by Dutt et al. (2009) was conducted on a model where unemployment was conveyed as being a result of search induced principles. On the other hand, trade was considered to be led by relative technological variations proposed by the Ricardian comparative advantage framework and international differences in the Heckscher-Ohlin's (H-O) comparative advantage factor endowments. For both countries, results revealed strong and significant findings of steady-state driven trade estimates led by David Ricardo's comparative advantage. Upon which, unemployment responsiveness to increased trade openness reflected an increase in short-run unemployment and a reversal of a decrease in unemployment in the long-run along a new steady-state.

Following the opening of the Uruguayan economy to foreign trade, Casacuberta et al. (2004) assert that the country's manufacturing sector adopted more capital-intensive technological modifications, accounting for increased average labour and total factor productivity, while gaining exposure to cheaper and enhanced inputs and capital goods. Consequently, the general economy experienced increased net job destruction explained by the downsizing and exiting of firms, nevertheless, this effect was offset by unions as they attempted to mitigate the effects of trade exposure albeit having a negative effect on productivity. Haouas et al. (2005) use industry-level data and panel data estimation techniques in assessing the responsiveness of the labour market to trade liberalisation in Tunisia. Results revealed an increase in the export sector's employment and wages within the short-run, and a decrease of the former and latter within the long-run. The reason for the decrease was substantiated as resulting from "learn-by-doing" and enhanced organisational and production capacity.

Job dynamics and the exchange rate: The exchange rate is a crucial economic mechanism (Rose, 2011) and a potent trade component able to affect the labour market based on appreciation and depreciation channels (Nucci & Pozzolo, 2010). Potential fluctuations present implicating effects on domestic production costs (Ngandu, 2009). Likewise, such effects are perceived to affect the tradable sector based on cost mechanisms (Bhorat et al., 2014). According to Bhorat et al. (2014), relative production costs involved in either the tradable and non-tradable sector impacts the allocation of labour across and within the two sectors. For the

tradable sector, these decisions revolve around production processes and their role in importing production inputs as well as export purposes. Insinuations on labour effects of the exchange rate suggest that a domestic currency appreciation evokes a decrease in demand for local exports and an increase in import absorption leading to costly exports and thus reduced competitiveness in the global market, vice versa (Ribeiro et al., 2004). The issue of extreme exchange rate volatility is often believed to discourage job creation efforts (Belke & Kaas, 2004) due to the high costs of reversing decisions of hiring a worker within the rigid corporate structure (Pindyck, 1990). Exchange rate volatility may interrupt investment flows causing delayed employment decisions by firms (Mpofu, 2013).

Burgess and Knetter (1998) argue that the labour market's responsiveness towards exchange rate movements also relies on the market and regulatory forces. Catão (2007) however outlines that much of the variations in real effective exchange rates across countries are presented by price variations in the tradable goods relative to non-tradable goods. Campa and Goldberg (2001) further propose three channels in which exchange rate movements may affect employment or job flows. These include, firstly; an increase in demand shocks caused by enhanced local market competitiveness leading to an increase in import penetration. Secondly; shocks to competitiveness amid export orientation resulting from an increase in export shares in sector output. Lastly; the utilization of imported inputs, in a manner that any changes in the costs of inputs may cause domestic price and cost changes, where a depreciated currency will thereby raise the cost of inputs or factors of production. Findings by Chen and Dao (2011) suggest that an appreciating real exchange rate corresponds with contracting Chinese employment rate within its tradable and non-tradable sectors.

The former insinuations correspond with findings by Huang et al. (2014) who suggested that a real appreciation of the Canadian dollar led to a decrease in the country's manufacturing sector's employment patterns, whereas employment in non-manufacturing sectors where not affected, thereby suggesting a negative relationship. In contrast to these findings, Rodrik (2008) revealed that Korea's overall employment is positively associated with the real exchange rate. Based on the computable general equilibrium method, findings by Ngandu (2009) exhibited the reallocation of employment from the tradable to the non-tradable sector. Simply, there was a negative association between employment in the tradable sector and a real appreciation in the exchange rate. Lost tradable jobs were however observed to be absorbed within non-tradable sectors and thus a sustained aggregate employment level. Using Autoregressive Distributed Lag (ARDL), Mpofu (2013) established that a real exchange rate appreciation promotes a decrease in the manufacturing sector's employment growth. Based on the stylised model, Bhorat et al. (2014) however established negative effects a real appreciation in the exchange rate towards South Africa's tradable sector employment during the years 1975 to 2009.

Job Dynamics and FDI: Numerous scholars (including Joshi & Ghosal, 2009; Kurtishi-Kastrati, 2013) ascertain the importance of FDI in acceleration processes of economic growth and development. Studies encompassing FDI and employment series have largely sought to unravel the net-employment effects of the former. Kurtishi-Kastrati (2013) opines that FDI tends to stimulate employment mostly within countries with scare capital resources and abundantly labour intensive. In such conditions employment effects can be directly or indirectly induced. The evidence established within empirical findings as presented in the study highlights that the effects of FDI on employment may not be mutually accrued across economic sectors and different countries, such as South Africa. Subsequent to the former assumption, empirical results by Wei (2013) based on time series regression models outlined opposing evidence upon investigating the effects of FDI on employment within China's primary, secondary and tertiary sectors during the period 1985 to 2011. Results established significantly positive employment effects of FDI within the primary sector. Findings in China's tertiary sector were deemed to be negative and significant. However, employment effects of FDI within the secondary sector were found to be non-significant. Using the T-Y procedure, Strat et al. (2015) conducted a study focussing on the short-term causal effects of FDI and unemployment within thirteen European Union (EU) member states during the period 1991 to 2012. Findings suggested causality from FDI to unemployment amongst four countries, and causality from unemployment towards FDI for three other countries. However, the remaining countries established no existing relationship. Meanwhile, Nyen Wong and Cheong Tang (2011) used the Granger-causality test which suggested the occurrence of a bidirectional relationship between employment in Singapore's manufacturing sector and FDI inflows. These results

correspond with findings conducted on the Nigerian economy by Inekwe (2013), whole suggested the presence of unidirectional causality from FDI to manufacturing employment.

3. Methodology

The empirical analysis of the study was estimated based on a quantitative approach and included a quarterly series of two of South Africa's tradable sectors' employment (EMP_t) patterns, namely; mining and manufacturing sectors, as the dependent variable. The study regressors included series of trade openness ($TOPEN_t$), the real effective exchange rate ($REXR_t$) and net-FDI inflows ($NFDI_t$). Employment series and the seasonally adjusted time-series of the real effective exchange rate and net-FDI were retrieved from the South African Reserve Bank (SARB).

The dataset used in gauging South Africa's trade openness included series of real exports, real imports and real GDP and were also obtained from the SARB. The sample period employed a series of 88 quarterly observations ranging from 1995Q1 to 2016Q4. The rationale for the chosen sample period was driven by South Africa's political and economic structures as well as the exclusion of economic embargo's which characterised South Africa's apartheid era. Upon achieving the central objective of the study, various econometric models were employed to establish the short-run and long-run movements. The study estimated the Autoregressive Distributed Lag (ARDL) model to determine the cointegrating vectors amongst the study regressors and the dependent variables. The ARDL model was estimated to capture non-agricultural employment effects within the tradable sectors of the manufacturing and mining sectors. The use of robust time-series econometric models, such as the ARDL approach, is particularly essential in estimating series pertaining to vast econometric landscapes and a changing economy. It was originally presented by Pesaran et al. (1999) and further extended by Pesaran et al. (2001). Unlike the conventional cointegration procedures, the ARDL approach can be a useful means of econometric testing where all variables are considered as endogenous variables and as explanatory variables (Dritsakis, 2011). The model can be employed in conducting econometric estimations irrespective of the variables' order of integration, as either $I(0)$ or $I(1)$ variables (Dube & Zhou, 2013). Further tests employed in the study included the Toda and Yamamoto (1995) Granger non-causality tests, as well as tests for normality, autocorrelation, heteroscedasticity and parameter stability, as means of capturing the diagnostic and stability analyses of the considered model. To establish the bounds testing method, the study employed the ARDL model for the five individual private sectors and thereby expressed in Equation (1) as follows:

$$\Delta LY_t = \alpha_0 + \sum_{i=1}^{k} \beta_i \Delta LY_{t-i} + \sum_{i=0}^{k} \delta_i \Delta LTOPEN_{i-i} + \sum_{i=0}^{k} \sigma_i \Delta LREXR_{t-i} + \sum_{i=0}^{k} \gamma_i \Delta LNFDI_{i=1}$$
$$+\eta_1 LNEMP_{t-1} + \eta_2 LTOPEN_{t-1} + \eta_3 LREXR_{t-1} + \eta_4 LFDI_{t-1} + \varepsilon_t (1)$$

Where: Δ denotes the first difference operator of the variables, ΔLY_t indicates the natural log of employment in each individual private sector and expressed separately as the dependent variable. Such that ΔLY_t is repeatedly expressed as employment in the manufacturing sector and employment in the mining sector (tradable sectors). Moreover, $LTOPEN$ denotes the natural log of trade openness, $LREXR$ denotes the natural log of the real effective exchange rate, and $LNFDI$ indicates the natural log of net-FDI. Notwithstanding, the latter variables ($LTOPEN$, $LREXR$ and $LNFDI$) stay the same in each of the repeated employment equations. Also, e_t indicates the white noise error term, the series $\beta_i, \delta_i, \sigma_i, \gamma_i$ denotes the coefficients for the measurement of the short-run relationships amongst the dependent and explanatory variables, while $\eta_1 \dots to.. \eta_4$ denotes the measurement of the long-run relationships amongst the dependent and explanatory variables. For each of the dependent employment variables of tradable sectors, Equation 1 is repeatedly estimated to conduct the test for co-integration amongst the variables based on the following hypotheses:

$H_0: \eta_1 = \eta_2 = \eta_3 = \eta_4 = 0$ (Null; co-integration or long-run relationship does not exist)
$H_1: \eta_1 \neq \eta_2 \neq \eta_3 \neq \eta_4 \neq 0$ (Alternative; co-integration or long-run relationship exists)

The null hypothesis (H_0) indicates the non-existence of co-integration or a long-run relationship amongst the variables. This is estimated by means of conducting the Bounds test where the F-statistic value (coefficient restriction test) is compared to the critical values of the lower and upper bound as established by Pesaran et

al. (2001). If the F-statistic is greater than the critical values of the upper bound, co-integration is deemed present, and therefore the null hypothesis of no co-integration is rejected in favour of the alternative hypothesis. On the contrary, the incidence of a lower F-statistic value than the critical values of both the upper and lower Bound suggests the absence of co-integration amongst the underlying variables, the null hypothesis of no co-integration is therefore not rejected. Nevertheless, having an F-statistic value that lies between the upper and lower bound critical values suggests inconclusive estimations (Dube & Zhou, 2013). Table 1 is a summary of variables as included in the model.

4. Empirical Results

Table 2 reports the correlation analysis of employment in the selected tradable sectors and the considered regressors. Results indicate that employment within the manufacturing tradable sector has a moderately negative and significant relationship with trade openness, while employment within the mining sector exhibits a weak positive and non-significant relationship. Moreover, the results indicate that there is a positive yet weak relationship between the real effective exchange rate and employment within the manufacturing and mining tradable sectors. Lastly, employment within the manufacturing sector is associated with a significant and weak negative relationship, while the relationships established in the mining sector was positive but not significant.

Table 1: Summary of Variable Representation

Logged Variables	Representation
Log of employment in the manufacturing sector	LEMAN
Log of employment in the mining sector	LEMIN
Log of trade openness	LTOPEN
Log of the real effective exchange rate	LREXR
Log of net FDI	LNFDI

Table 2: Correlation Analysis

Variable	Manufacturing	Mining
Trade Openness	(-0.5357) [0.0000]**	(0.0618) [0.5675]
Real Effective Exchange Rate	(0.4406) [0.0000]**	(0.4735) [0.0000]**
Net-FDI	(-0.3177) [0.0026]**	0.0276 [0.7987]

Notes: ( ) denotes correlation coefficient, [ ] denotes P-value, & ** denotes significant at 1 percent.

The ARDL approach produces consistent estimators regardless of whether the variables under consideration are of I (0) or I (1) order of integration. However, such a model is not receptive to variables integrated at I (2) or higher series. Prior to estimating cointegration tests, the Augmented Dickey-Fuller (ADF) test was employed to establish the order of integration or the presence of unit root for the series LEMAN, LEMIN, LTOPEN, LREXR and LNFDI. Results are showcased in Table 3 below. The ADF test is based on the null hypothesis of a presence of unit root relative to the alternative hypothesis of a stationary series.

Table 3: Results of the ADF Unit Root Tests

RESULTS OF THE AUGMENTED DICKY FULLER (ADF) TEST							
	Level				First Difference		
	With intercept & without trend		With intercept & trend		Without trend		Order of Integration
VARIABLES	t-stat	P-value	t-stat	P-value	t-stat	P-value	
LEMAN	-1.703	0.426	-1.8707	0.6611	-8.344	0.000***	I(1)
LEMIN	-2.375	0.152	-2.4598	0.3470	-5.107	0.000***	I(1)
LTOPEN	-2.754	0.069	-3.4779	0.0482**	-11.19	0.0001	I(0)
LREXR	-2.442	0.134	-2.5414	0.3080	-8.598	0.000***	I(1)
LNFDI	-9.399	0.000***	-9.3443	0.0000	-8.982	0.000	I(0)

Findings revealed a rejection of the null hypothesis (H_0) of a unit root at first differences with intercept for the series LEMAN, LEMIN and LREXR of order I (0) of integration at level with intercept. Series such as LTOPEN and LNFDI were suggested to be integrated at $I(0)$ processes. The established results present a mixed set of variables deemed to be stationary and integrated at either I (0) or I (1) processes, thereby rejecting the null hypothesis of a unit root in both cases. The ARDL approach was considered the best model in testing the current study's established mixed order of integration. Selecting optimal lags based on a suitable information criterion proves crucial when testing for short-run and long-run cointegration. The study was therefore governed by the selection of a homoscedastic model free from serial correction. Accordingly, the Eviews statistical software was utilised in the analysis of long-run and short-run parameters based on the ARDL bounds test in line with the Ordinary Least Squares (OLS) method. According to Narayan (2004), four lags are optimally suitable as the maximum lag specification in the modelling of quarterly data series. The study employed four lags as the maximum lag specification based on the latter narrative for both the dependent variables and study regressors in estimating ARDL (p,q,r,s). Each model was tested by means of the ARDL approach with the Schwarz information criterion (SIC) -based method for the log of employment in the manufacturing sector (1,2,0,0) and the log of employment in the mining sector (2,0,0,0) against the study regressors, taking into account underlying diagnostics in selecting the optimal lag structure. The former specified model was reinforced by Akaike information criterion (AIC) and Hannan-Quinn (HQ) criterions, whereas the latter model was also suggested to be the optimal model by the HQ criterion. A high R-square in each of the ARDL estimations based on the SIC suggests the high explanatory power of the specified model in explaining the extreme variability between the log of employment in both individual tradable sectors against trade openness, the real effective exchange rate and net-FDI. Results of the Bounds test to cointegration are further provided in Table 4 for the long-run ARDL estimations, coupled with corresponding upper and lower bounds critical values for each test. It follows that F-statistic values exceeding lower and upper bounds critical values results in the rejection of the null hypothesis of no cointegration. Findings revealed in testing for employment in the manufacturing sector presents evidence of the rejection of the null hypothesis at 0.05 significance level. This suggests the presence of co-movement or existing long-run relationships between employment in the manufacturing sector and the set independent variables trade openness, the real effective exchange rate and net-FDI.

However, the null cannot be rejected for the log of employment in the mining sector and its independent variables following its lower F-statistic value (1.768689) than the lower and upper bounds critical values, at both 0.05 and 0.1 significance levels. These results therefore present evidence of cointegration for individual tradable sectors only for employment within South Africa's manufacturing sector, whereas results of employment in the mining sector indicate the absence of co-movement with the considered study regressors. Findings of existing relationships between the study regressors and tradable employment in the manufacturing sector correspond with the economic theory of a change in tradable employment resulting from a change in trade openness, the real effective exchange rate and FDI (Alexandre et al., 2011). Alexandre et al. (2011) contend that underlying economic foreign trade factors such as the exchange rate are known to present idiosyncratic effects on each industry based on the manner in which resources are re-allocated. Nonetheless, this is in contrast to employment in the mining sector which did not present any evidence of cointegration with the study regressors.

Table 4: Results of the Bounds Test and F-Statistic Estimation

Estimated models	F-Stat	I0 Bound	I0 Bound	Outcome
(Eq.1) F_{LEMAN}(LEMAN/LTOPEN, LREXR, LNFDI)	4.875**	2.79	3.67	Cointegration
(Eq.2) F_{LEMIN}(LEMIN/LTOPEN, LREXR, LNFDI)	1.769	3.38	4.23	No cointegration

Note: ** denotes significant at 5 percent.

The rejection of the null hypothesis for the log of employment in the manufacturing sector prompts the estimation of short-run analysis based on the Error Correction Model (ECM). Prior to the ECM estimation, the corresponding coefficient of the long-run equation for manufacturing employment is presented in Equation2as follows: LEMAN= 5.7653 - 0.266234*LTOPEN - 0.260954*LREXR - 0.027360*LNFDI+ 0.079942*DUMMY01 (2). In furtherance to the suggested long-run relationship between employment in the manufacturing sector and the study regressors, Equation 2 suggests that the log of employment in the manufacturing sector is negatively associated with the log of trade openness in the long-run. Therefore, a one percent increase in South Africa's trade openness exerts a decrease in employment by 0.2662 percent within the manufacturing sector. These results correspond with the findings by Casacuberta et al. (2004) who found a decrease in Uruguay's manufacturing employment levels due to trade openness.

These results also resonate with findings by Asghar et al. (2014) focusing on Pakistan, India, and Bangladesh. Asghar et al. (2014) explain that the loss of employment was configured by a lack of comparative advantage in these countries. Furthermore, findings of the current study also revealed that a one percentage increase in the real exchange rate of the Rand corresponds with a 0.2609 percent decrease in manufacturing employment, vice versa. These findings however resonate with the assumed negative trade openness effects based on the implied vulnerability of domestic industries exposed to the foreign market as explained by Cavallo and Frankel (2008). These results also correspond with findings by Chipeta et al. (2017) who established that the real exchange rate is negatively associated with South Africa's overall employment patterns.

Moreover, the implied negative association between South Africa's net FDI and employment in the manufacturing sector assumes that a one percent increase in the inflow of FDI leads to a decrease in employment by 0.0271 percent within the manufacturing sector. This is contrary to the implied employment increase led by a potential boom in the tradable sector's FDI patterns as anticipated by economic theory (Kosteletou & Liargovas, 2000). South Africa's negative FDI effects on employment may be explained by its costs to the host economy as outlined by Kurtishi-Kastrati (2013) and Sauvant (2013). The included dummy following any likely instantaneous positive change in the manufacturing sector will induce a 0.0799 percent increase in employment within the manufacturing sector. Evidence of long-run cointegrating vectors suggests a potential existence of short-run adjustment processes which inhibits potential errors or deviations from becoming larger. The suggested long-run cointegration within the manufacturing sector leads to the estimation of further short-run relationships by means of the Error Correction Model (ECM).

The ECM is a convenient method utilised in measuring the correction from disequilibrium of the earlier period, towards potential long-run equilibrium (Brooks, 2014). For such an adjustment to take place, the ECM's error correction term (ECT) needs to be negative and significant (Mukhtar & Rasheed, 2010). The ECT serves as the "equilibrating" error term which corrects the current study's short-run deviations within the employed models from their equilibrium value, given the cointegrated Equation 1 (Gujarati, 2011). Table 5 reports results of the ECM with short-run coefficients of employment in the manufacturing sector and the underlying study regressors. According to Banerjee et al. (1998), a highly significant ECT affirms the suggested long-run cointegration. Accordingly, results reveal a negative ECT of -0.020391 which is highly significant at 0.01 significance level. These results suggest that it takes approximately 49 quarters (1/0.020391) to reach full equilibrium, such that approximately 0.02 percent of the deviations from the long-run equilibrium in trade openness, the real effective exchange rate and net-FDI are corrected / adjusted in each quarter.

Table 5: Results of the ECM of employment in the Manufacturing Sector

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTOPEN)	-0.008062	0.025745	-0.313138	0.7550
D(LTOPEN(-1))	0.073276	0.024950	2.936924	0.0044***
D(LREXR)	-0.010197	0.016341	-0.623990	0.5345
D(LNFDI)	-0.000879	0.000514	-1.707850	0.0916*
D(DUMMANU)	0.003464	0.002977	1.163500	0.2482
CointEq(-1)	-0.020391	0.003645	-5.594209	0.0000***

Note: * and ** denotes significant at 10% and 1%, respectively.

Despite the ARDL's projection of existing or non-existing long-run cointegration amongst variables, it does not establish causality relationships. The Toda-Yamamoto non-causality test was used to analyse causality between the log of employment in the manufacturing and mining sectors against trade openness, the real effective exchange rate and net-FDI. Results of such estimates are provided in Table 6 below. Under the null-hypothesis of non-causality, the Toda-Yamamoto non-causality test operates under the alternative hypothesis of an existing causal relationship. Based on the established causality estimates, there is an existing bi-directional causal relationship between the log of trade openness and the log of employment in the manufacturing sector. This assumption is supported by a significant p-value in both cases. Results suggest that short-run changes in manufacturing employment cause changes in trade openness, and vice versa. In this case, the null hypothesis non-causality is rejected.

However, results of employment in the manufacturing sector against the real effective exchange rate and net-FDI are not significant at both 0.05 and 0.1 significance levels. These results are contrary to findings by Inekwe (2013) and Nyen Wong and Cheong Tang (2011) conducted in Nigeria and Singapore, respectively. Results by Inekwe (2013) suggested evidence of the existence of a unidirectional relationship from FDI to employment in Nigeria's manufacturing sector. Nyen Wong and Cheong Tang (2011) found a bidirectional causal relationship between employment in the manufacturing sector and FDI in Singapore. Furthermore, the current study's overall results in employment in the mining sector and the regressors are not significant.

Table 6: Results of the Toda-Yamamoto Granger Non-Causality Test

Employment in Manufacturing (Tradable sector)		
Direction of causality	**P-value**	**Decision**
LTOPEN ⟶ LEMANU	**0.0107***	**Causal relationship exists**
LREXR ⟶ LEMANU	0.6751	Causal relationship does not exist
LNFDI ⟶ LEMANU	0.7108	Causal relationship does not exist
LEMANU ⟶ LTOPEN	**0.0002***	**Causal relationship exists**
LEMANU ⟶ LREXR	0.5670	Causal relationship does not exist
LEMANU ⟶ LNFDI	0.8314	Causal relationship does not exist
Employment in Mining (Tradable Sector)		
Direction of causality	**P-value**	**Decision**
LTOPEN ⟶ LEMIN	0.8188	Causal relationship does not exist
LREXR ⟶ LEMIN	0.1582	Causal relationship does not exist
LNFDI ⟶ LEMIN	0.7106	Causal relationship does not exist
LEMIN ⟶ LTOPEN	0.2340	Causal relationship does not exist
LEMIN ⟶ LREXR	0.3761	Causal relationship does not exist
LEMIN ⟶ LNFDI	0.8057	Causal relationship does not exist

Note: ** and *** indicates significant at 5% and 1%, respectively.

As a prerequisite towards avoiding traditional problems to econometric testing which violate classical linear assumptions, the previously established models need to meet stochastic properties. Such properties include,

amongst other, autocorrelation, heteroscedasticity and parameter stability (Takaendesa, 2006). Table 7reports residual diagnostic test results. Findings suggest that the study's underlying models passed diagnostic tests for autocorrelation and heteroscedasticity as indicated by the respective p-values which are above 0.05 significance levels. However, normality tests in all models were not passed, represented by the Jarque-Bera 0.05 significance level.

Table 7: Diagnostic Test Results

	LM Test			White (CT)		Normality Test (Jarque-Bera)
	H0= No serial correlation			H0= heteroscedasticity	No	H0= Normally distributed
(Eq.1) LEMAN	(0.4444)			(0.0589)		(0.0137)*
(Eq.2) LEMIN	(0.4329)			(0.1889)		(0.0000)**
(Eq.3) LETRAD	(0.2379)			(0.1940)		(0.0000)**
(Eq.4) LEFIN	(0.5866)			(0.9688)		(0.0000)**
(Eq.5) LECONS	(0.2280)			(0.6648)		(0.0000)**

Note: ( ) indicates the P-value, * and **denotes significant at 5% and 1% respectively.

Frain (2007) contends that large data samples are not characteristic of an "α-stable" distribution and therefore it is natural for the null hypothesis of a normal distribution to be rejected within large samples. Suggesting that some regressions may be inconsistent over time. The test for normality is also said to be sensitive to large sample sizes (Kundu et al., 2011). As a result, the null hypothesis of normality testing may be rejected more frequently than it should (Chen & Kuan, 2003). A failed normality test accentuates the testing of further stability tests. Parameter stability testing is thus needed to avoid the misspecification encountered in time series volatility (Zanini et al., 2000). The Cumulative Sum of Recursive Residuals (CUSUM) was conducted as a means of model stability testing to confirm the study's parameter stability as encouraged by Lee and Strazicich (2004). Figure 1 of the CUSUM results reveals that the study's models do not give rise to model instabilities. The plots in these graphical representations remain within the 0.05 significance level, which is the uncritical region, and thus confirms the models' parameter stability. This suggests that these models' parameters are stable over time and therefore present robust findings of the short- and long-run estimations of the study's regressands and regressors. This follows suit with the classical theory's argument which asserts that changes in technology and structural changes in final output and consumption act as offsetting factors in the theory's long-run full employment assumption of the labour market equilibrium model. Keynes (1936) however associates the drop-in employment conditions with institutional or legal market constraints as well as the decrease in demand or consumption (Galí, 2013).

Figure 1: CUSUM Test ResultsManufacturing Mining
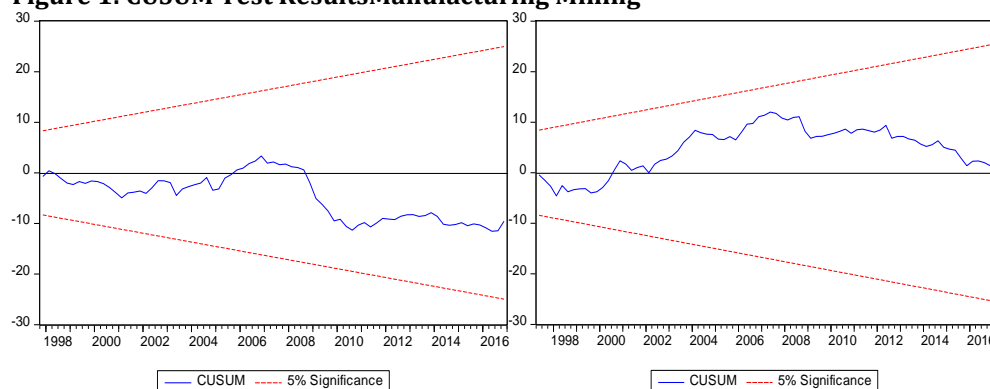
Discussion of Results: The negative long-run relationship between employment in the manufacturing sector and trade openness resonates with findings by various scholars (such as Ferreira et al., 2010; Menezes-Filho & Muendler 2011) who identified a decline in low-skilled manufacturing employment due to increased external competition. Based on Michael Porter's five forces model, price competition is increasingly high in

the face of low barriers to entry as is the case with increased trade openness or free trade. In such a case the least competitive tradable sectors may thus face intensified competition. Considering South Africa's relatively intense exposure to the global market, the observed long-run findings between trade openness and employment in the manufacturing sector also correspond with the observed employment decline within South Africa's exporting industries during the periods 1999 to 2001. According to Venter (2009), this was led by the export industry's pressure and focus on more capital-intensive inputs rather than formal-labour inputs in efforts to achieve a more competitive base in the foreign market. Alexandre et al. (2011) assert that fluctuations in the exchange rate largely affects sectors which are most exposed to foreign competition or trade openness, particularly the tradable sector. The associated long-run effects of the real effective exchange rate and employment in the manufacturing sector only accounted for a 0.26 percent decrease (increase) in employment following a real appreciation (depreciation) in the effective exchange rate.

The negative patterns of the real effective exchange rate versus manufacturing employment levels correspond with the general exchange rate and employment theory for the tradable sector. Most scholars (Bhorat et al., 2014; Huang & Tang, 2015) reveal that a real depreciation in the exchange rate is the most suitable mechanism for employment growth especially in the export-driven Economy's tradable sector. The analysis by Chipeta et al. (2017) ascertains that a real domestic currency appreciation makes the domestic economy's exports more expensive relative to exports from the foreign global market. Foreign demand for such export commodities thus decreases, whereas a real depreciation holds opposite effects. Kohler et al. (2014) extend that the domestic economy's export competitiveness in the global market tends to heighten amid a depreciation in the real exchange rate, while imports may be less competitive and thereby lead to an increase in demand and consumption of domestic goods and services. Notwithstanding, Hodge (2005) cautions that a significant Rand weakening can potentially cause inflationary pressures to the detriment of the long- run growth prospects. Furthermore, Alexandre et al. (2011) opine that a potential Rand appreciation implies the reduction in foreign prices relative to the domestic currency and may therefore lead to a decrease in the competitiveness of domestic exporters.

Competitiveness in the tradable sector can be lost either externally relative to the foreign market's tradable output, or internally relative to the non-tradable sector, or in terms of both circumstances. Internal competitiveness can therefore be lost when prices in the domestic tradable market declines relative to non-tradable prices, while external competitiveness can be lost when prices in the domestic tradable sector rises relative to the foreign market's tradable goods prices, and these may consequently lead to the appreciation in the real effective exchange rate (Bose, 2014). The loss of competitiveness and the drop in exports may hamper investment decisions concerning the firing and hiring of workers as well as impede profit margins (Alexandre et al, 2011). Although a real depreciation is assumed to be most favourable for the tradable sector's export competitiveness, Onselen (2016) however argues that the dangers of a weak currency may arise in the form of expensive imports.

Potential interest rate hikes, rising and faster domestic prices, business cost pressures, overall labour market insecurity, and retrenchments. Even so, South Africa's tradable sectors, such as the manufacturing industry, have however failed to capitalise on the country's prolonged weak Rand. Moreover, the limited reaction of South Africa's exporting tradable sectors to increased trade openness and the weak Rand can be explained by the country's structural constraints. Anand et al. (2016) contend that South Africa's critical production factors, such as market rigidities, labour supply and electricity, correspond with the slow response of the tradable sector's exports to the Rand depreciation. These factors may have likely prevented the exporting tradable sector from stimulating domestic exports and absorbing the comparative advantage presented by the weak Rand. General economic theory upholds that FDI has the potential to promote the formation of human capital, as well as the creation of employment opportunities and training (Sauvant, 2013). Nevertheless, the positive employment effects of FDI however rely on the manner in which FDI is utilised. This depends on whether the financing of investment decisions is accompanied by the utilisation of either capital inputs or labour inputs in production processes provided sufficient infrastructure (Kosteletou & Liargovas, 2000). In order to capture the comparative cost advantages, for most entities, the quest to reducing production costs and increasing efficiency and productivity implies the hiring of more capital equipment other than labour inputs within the production processes. In such a case, this evokes a negative implication on job creation patterns as indicated in the above findings of the manufacturing sector. Venter (2009)

discusses that the offset to employment benefits in South Africa's export sectors during a period such as 1999-2001 was driven by the pressure by export industries to become more competitive in the global market by means of employing capital intensive equipment rather human labour resources in order to cut costs.

The increase in South Africa's trade openness has witnessed high levels of unemployment since the onset of the post-apartheid regime. As opposed to alleviating South Africa's employment crisis, the country's manufacturing sector has heightened the problem. According to Jenkins & Edwards (2012), the latter sector has experienced a drop in employment opportunities of over 350 000 following the year 1990. Meanwhile, the year 2010 encountered a decline in manufacturing jobs from 1.5 million to less than 1.2 million. The manufacturing sector's declining share in employment and GDP and the sector's output composition partly resonates with increased import competition, such as the rise in China's highly competitive and increased import penetration (Jenkins & Edwards, 2012). Based on the suggested results of FDI and employment implications in the manufacturing sector, the suggested nexus effects are larger for the manufacturing employment sector relative to all other sectors. As indicated in the results of the current study, FDI affects employment in the manufacturing sector by 0.0274 percent. Henceforth this implies that FDI in South Africa largely affects employment in the manufacturing employment sector more than any other sector, thus a positive utilisation of FDI by means of employing more labour-intensive inputs relative to the non-tradable sector corresponds with higher employment benefits or increases. Similarly, an analysis by Demertzis and Pontuch (2013) suggests that FDI in the tradable sector likely presents more potential benefits to the trade balance and current account of the host economy. Demertzis and Pontuch (2013) further assert that countries, such as South Africa, which consider addressing current account balances to be an essential concern must therefore develop policies triggered to attract FDI to facilitate the current account rebalancing process. However, Kosteletou and Liargovas (2000) argue that the sustenance of current account deficits is only significant when future capital inflows are larger than initial inward capital flows.

5. Conclusion and Recommendations

Efforts in curbing South Africa's high unemployment rate, low economic growth and continued trade deficits potentially revolve around the enhancement of the tradable industry's competitiveness and its policies. This is significantly required in boosting South Africa's sectoral employment trajectories within domestic and international markets, particularly the tradable sector. The pursuit of the study objectives identified potent guidelines for providing a job enabling tradable environment based on the premise of established empirical and conceptual analyses of tradable employment. To secure the country's local and foreign demand for its export commodities, the study identifies the promotion of labour to capital ratio as an important factor along investment decisions. Specifically making sure that the financing of the tradable industry's investment decisions is not overseen by the deployment of extreme capital intensification relative to labour resources within productive ventures. The state may seek to provide cost-cutting incentives in the form of tax relief, to ensure enhanced labour absorption within economic sectors. This goes along with the significant establishment of an enabling and conducive FDI attracting environment.

The concentration of FDI within the tradable sector holds the potential to promote comparative advantage within the sector and improve the country's trade account driven by increased tradable goods production and productivity. Increased FDI within the tradable industry may fasten the absorption of economic benefits (Demertzis & Pontuch, 2013). Further local economic development (LED) solutions may be sought to oversee the support and strengthening of the manufacturing sector, making provision for suitable and sustainable linkages towards the mining and manufacturing tradable sectors towards stimulating job creation. This may also be accompanied by the monitoring of multinational enterprise (MNEs) for the bolstering of South Africa's small and medium-sized enterprises (SMMEs) towards sustaining the country's inexperienced and less-funded business ventures. Together with potential local entrants into the market while providing required training and support. Considering South Africa's failing tradable sectors such as the mining sector, the country's focus on globalisation has been unable to address the growing unemployment challenges. To absorb the poor and unemployed community, strategies to uplift localisation may be addressed to support the underprivileged society to participate in economic activities. This may be overseen by strengthening and supporting the unemployed and poor communities to engage in the production of goods or services most required by the local communities.

This may also be done by localising public works initiatives and social welfare as well as other government transfers. Based on Michael Porter's diamond model, productivity is crucial for establishing and sustaining competitiveness, amongst which, the government is a major determining participant which can affect the primary determinants of industry competitiveness, such as factor endowments. Given the rising labour costs in the country's production sector, as well as increasing cost of electricity, cost relief measures in the form of multifaceted state support (i.e. industrial subsidies, infrastructure support, affordable electricity, land and water) may be provided to tradable industries to encourage increased productivity and competitiveness particularly in tradable industries such as the manufacturing industry. This may prevent the tradable industry from exercising labour retrenchments by means of cost-cutting measures. In the long-run, increased exports resulting from higher productivity may also increase workers' living standards. Provision for infrastructural development may also be made to sustain the operations of both the tradable and non-tradable sectors.

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