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Chapter

An Analysis of Drivers of International Investment Decisions in South Africa

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Abstract

The study investigated the drivers of international investment decisions in South Africa. As part of its investment drive, the government has embarked on a series of activities to lure investors. That been the case it appears that most of the empirical studies focused mainly on the relationship between investment and economic growth, hence very little seems to be known about the empirical evidence of other drivers of international investment decisions and their impact on the South African economy. The findings are envisaged to provide information and to add policy formulation to attract the much needed foreign investment. The autoregressive distribution lag approach was chosen to analyse the long and the short run relationships amongst the variables of interest and Granger Causality analysis was also employed to determine causal relationships between dependent variable and its regressors. The results indicated that a stronger statistical and economic basis for empirical error correction model was established by the presence of cointegration amongst the variables and all the regressors were found to have a positive effect in the stock of foreign direct investment. Empirical findings suggest that government should ensure stable macroeconomic policies and labour disputes that result into prolonged strike actions must be minimised.

Keywords: foreign direct investment, productivity, infrastructure investment, labour unrest, cointegration

1. Introduction

Most of the developing countries seek to maximise the benefits of foreign direct investments (FDI) to improve economy growth and to encourage foreign investment in both the public and private sectors. As a result, policymakers' direct resources at incentives aimed at attracting FDI flows because according to [1], FDI quality is also associated with positive and economically significant growth effects. The other perception is that FDI inflows will significantly improve technology and management practices as well as increase capital formation in a host country. As part of its investment drive, the South African government has embarked on a series of activities which include trips to Europe, Asia and across Africa to build an "investment book" to help plug a substantial shortfall of foreign and local direct investment. The purpose was to unlock a $100-billion investment plan to stimulate

economic growth which was plummeted as a result of political and policy uncertainty which damaged both the investment and business confidences during the previous regime when the country's credit rating was slashed to junk by two of the top three agencies and economic growth slowed to a crawl [2, 3].

Such an initiative is anchored on the notion that foreign investment can enable the growth of businesses and creation of job opportunities that would not arise if reliant only on domestic investment. The idea is that the increase in foreign investment can have a spillover effect on the domestic firms, stimulates the economy and positively impacts the economic growth [4]. Therefore, attracting and encouraging FDI and domestic investments remain one of the priority goals of governments in most developing countries including South Africa.

Amongst the characteristics of globalisation is the unrestricted capital flow and access to world market. It has been established that the global FDI stocks have been on the increase (see [5, 6]). Many more African countries are becoming more open to FDI; however, it still remains low [7]. South Africa is amongst the top three countries within the sub-Saharan region which is taken as favourable destinations for FDI. That been the case, the country continues to promote FDI through its various investment promotion strategies. One such initiative is the Promotion and Protection of Investment Bill of 2013, which is the new effort to improve the quality of FDI flowing to South Africa.

The idea of the new administration to scour the globe for $100 billion in investment is that very same goal of attracting and increasing FDI into South Africa which was set in the past seems to be far from being realised because the government may not have done enough to promote it [8]. One of the reasons behind all these is that South Africa remains heavily dependent on foreign investment because of the lower domestic savings between 1994 and the first quarter of 1998 [9]. A total net inflow of capital of R57.4 billion, was realised between 1994 and the first quarter of 1998. However, since then, the long-term capital flows have slowed, and short-term capital has flowed out of the economy, contributing to the depression of the currency (Rand). In 2007, the National Treasury stated that policy reforms would raise investment growth rates, pulling in higher FDI [10].

Despite efforts to attract more FDI into South Africa and other African countries, the [11] global investment trend monitor reports that FDI flow to Africa dropped significantly (31%) in 2015 to an estimated US$38 billion from US$53.9 billion in 2014. This was a result of the largest decline seen by sub-Saharan Africa and Central and Southern Africa. For instance, in 2015, the flow to Mozambique dropped by 21% to US$4.9 billion but notably remains at an estimated US$3.8 billion; Nigeria recorded a reduction by 27% hit by drop in oil price to an estimated US $3.4 billion from US$4.7 billion. South Africa, with its more diversified economy and reputation as an investor-friendly business environment, achieved the highest FDI inflows in Africa during 2014 and 2013, although it should be noted that FDI inflows declined by 33% in 2014 from US$8.3 billion during 2013 to US$5.7 billion during 2014. In addition, South Africa has experienced low projected gross domestic product (GDP) growth rates in the past few years and often faces issues such as prolonged industrial actions, policy uncertainty relating to the mining industry and power shortages which make investors weary of the future of the economy.

The decline and relatively weak performance in FDI attraction happened during the period where the potential attractiveness of South Africa is regarded as high in comparison to other countries in the region and despite progress owing to investment potential in infrastructure [12]. Based on the Global Foreign Direct Investment Country Attractiveness (GFICA) Index, the country is ranked at position 45 out of 109 countries with a 50.5% GFICA index value. This puts it on the second

position after Mauritius amongst its peers. The GFICA ranking history shows that it was ranked at number 48 in 2015, number 50 in 2016, number 44 in 2017 and number 45 in 2018 [13].

Furthermore, South Africa has experienced a decelerated growth for a longer time. This is attributed to several factors such as the declining global competitiveness, growing political instability and a weakened rule of law that in 2017 contributed to the country's investment-grade credit rating to be downgraded to junk status and denting the investor confidence. The government is thus confronted with the challenge of maintaining macroeconomic stability whilst facing a combination of rising public debt, inefficient state-owned enterprises and spending pressures [14]. The other school of thought argues that the weakened growth has been exacerbated by low commodity prices and the allegations of extreme corruption which contributed to political turmoil that helped to plunge the economy into recession in 2017. Furthermore, the situation was worsened by the fact that the economy slipped into a technical recession during the second quarter of 2018 where GDP shrank by 0.7% quarter on quarter (seasonally adjusted and annualised) after a revised 2.6% contraction in the first quarter of 2018 [14].

Just like any other developing country, South Africa is desperately in need of more investments in order to achieve some of its macroeconomic objectives. Even though several such studies such as [15–17] focused on several determinants of FDI, it appears that very little seems to be known about the drivers of international investment decisions in the South African context. Apart from contributing to policymaking and contribution to the existing body of knowledge, this study might benefit several stakeholders such as academia, government institutions and the policymakers.

As indicated by [18], South Africa, just like the rest of the world, is still in the formative stage of coming to grips with analytical challenges and policy quandaries associated with today's much more complicated realm of trade and investment. Bailey [19] also made suggestions for future research that stress a call for further contextualisation of the relationship. Moreover, this study is influenced by [20] who pointed out that there has been little investigation of FDI decision processes, most of which focused on strategic decision processes, although some research takes the neoclassical economic approach to microeconomic rational choice and behavioural FDI decision-making. Therefore, the purpose of this study was to investigate drivers of international investment decisions in South Africa. In order to achieve its objectives, several proxies for drivers of international investment decisions were used to determine the impact of investment drivers on FDI.

The chapter is planned as follows: Section 2 presents literature review, whilst research methodology and model are discussed in Section 3; the empirical results and discussions are presented in Section 4 and conclusion of the study summarised in the last section.

2. Literature review

The empirical literature produces divided views about the contribution of FDI in the host countries. Those who support the view that it has a positive impact on economic growth consider that there are different ways that produce positive contribution. Ndiaye and Xu [21] contended that FDI comes along with increased competition which will lead to increased productivity, efficiency and investment in human or physical capital. Such a competition can also lead to changes in the industrial structure through more competitive and more export-oriented activities.

Another advantage is the benefit the training, which may lead to increased workforce training and managerial skills and thirdly the connection, where foreign investments are often accompanied by technology transfer. Finally, there is a possibility for domestic firms to mimic advanced technologies used by foreign firms.

On the other hand, some scholars have questioned the role of FDI in the host country's economy. A study by [22] argued that the deterioration of external imbalances is one of the unfavourable effects of FDI inflows in developing countries. Other researchers such as [23, 24] postulated that the damaging and undesirable effects of FDI may be worsened if the technology transferred is inappropriate for developing countries and if FDI crowds out local investors. Others argued that its impact growth can be limited by the local conditions existing in the host developing countries such as the levels of human capital, financial development and institutional quality.

Despite the dichotomy about the contributions of FDI on the economy, its underlying drivers differ according to countries' locations. However, it is evident that a minimum set of factors must be present in the location for FDI to flow [17]. It could be assumed that investors would select an economy where profitability is expected to be high. However, in an extensive study on the factors influencing FDI, [16] posited that investors not only consider profitability when making investment decisions; other critical factors are taken into consideration such as availability of natural resources, institution environment, country risk, infrastructure availability, costs and the skills of workers. Empirical studies have tested various variables that can potentially attract or repel FDI. Such variables include market-driven variables such as rate of return and labour cost; structural variables, such as infrastructure development and political stability; and macroeconomic policies formulated to achieve economic growth, taxation and price stability.

A study by [25] found that FDI liberalisation is amongst the factors that affect FDI in Africa especially in the long term. Asiedu [26] argued that a good investment framework contributes to higher FDI for African countries. Hooda [15] studied the effects of FDI on the Indian economy between 1991 and 2008 using multiple regression models. The results indicated that the significant factors that determine FDI in developing countries are corporate taxes, labour costs, interest rates, stable political environment, exchange rates, infrastructural facilities and inflation.

As pointed out by [12], South Africa has many attractive assets for investors such as an important demography; a diversified, productive and advanced economy; abundant natural resources; a transparent legal system; and a certain political stability. In addition to the level of attractiveness, it is ranked number 82nd out of 190 economies in [27]'s Ease of Doing Business Score and Ease of Doing Business Ranking. However, as pointed out by [12], the country suffers from a high crime rate, increasing social unrest (strikes and demonstrations), high levels of corruption and structural issues in electricity supply and logistics.

3. Research methodology

The study employed the bound testing autoregressive distributed lag (ARDL) approach proposed by [28] to investigate drivers of international investment decisions in South Africa.

3.1 Data and model specification

This study used a quarterly time series data covering the period 2007–2017 obtained from the South African Reserve Bank and Quantec EasyData. FDI which a

is net foreign direct investment as a percentage of GDP is a function of income levels (disposable income of households), labour productivity, infrastructure investment (measured by the gross fixed capital formation) interest rates (prime lending rates) and labour unrest.

Labour unrest was used as a dummy variable to capture the effects of labour unrests (strikes) which is a common phenomenon in the South African economy. For the period 2007–2011, the dummy variable will have a value of 0 which signifies the negligible incidents of labour unrest, and a value of 1 is used for the period between 2012 and 2017 due to the rise in the number of industrial actions. This is based on [29]'s report that a total of 99 strike incidents were recorded in 2012 as compared to 67 in 2011, 74 in 2010, 51 in 2009 and 57 in 2008. Working days lost amounted to about R3.3 million in 2012 (involving 241,391 employees) as compared to 2.8 million in 2011 (involving 203,138 employees). In terms of wages lost, R6.6 billion was lost in wages of striking workers during 2012.

The assumption is that foreign investors are sceptical to invest in nations where there is widespread industrial action. Santander Trade Portal [12] also noted that there were more concerns with the increased labour strikes in recent years because it is one of the points which rating agencies have warned could further lower South Africa's credit rating.

The functional form of the regression model is presented as follows:

$$FDI = f(IL, PL, InfInv, Intr, LU) \tag{1}$$

where *FDI*, foreign direct investment, *IL*, income levels; *PL*, productivity of labour; *InfInv*, infrastructure investment, *InfI*, interest rate; *LU*, labour unrests (dummy variable).

The decision to use FDI as a proxy for international investment decisions in Eq. (1) was based on [20]'s notion that the FDI decision-making process is influenced by the multinational enterprises' context in which decision-makers are situated, the type of a decision, and the investment project are situated.

Furthermore, Eq. (1) is expressed in a linear form with some of the variables being expressed as logarithms presented as follows:

$$InFDI_t = \alpha + \beta_1 InIL_t + \beta_2 InPL_t + \beta_3 InInfInv_t + \beta_4 Intr_t + \beta_5 LU_t + \varepsilon_t \tag{2}$$

where α is a constant, β_1 to β_5 are the coefficients to be estimated and ε_t is the error term representing the influence of the omitted variables in the model.

The estimation technique followed a three-step modelling procedure, namely, testing for order of integration by means of unit root tests, the bounds cointegration test and Granger causality analysis. In addition, the model was taken through a battery of diagnostic and stability tests also known as stability testing to assist in deciding whether or not it has been correctly specified. The modelling procedure is as follows:

3.2 Unit root tests

The procedure was employed to examine the order of integration of variables which is a crucial step for setting up an econometric model and to do inference. The stationarity or otherwise of a series can strongly influence its behaviour and property. A time series data is stationary if it has a constant mean, constant variance and constant auto-variance for each given lag [30]. The unit root analysis was done by means of a commonly used augmented Dickey-Fuller (ADF) and, in addition, the Dickey-Fuller generalised least squares (DF-GLS) test applied as a confirmatory

test. The DG-GLS test formulated by [31] is a modification of the ADF unit root test, and it transforms the time series such that the trend is removed. It involves a two-step process, in which the time series is estimated by generalised least squares in the first step before a normal Dickey-Fuller test is used to test for a unit root in the second step. This process improves the power of a regular ADF test when the autoregressive parameter is near one.

3.3 Cointegration analyses

The bound test analyses were done to model the long-run relationship between sets of variables. This procedure was preferred over the [32] cointegration procedure because it can be applied when series have different orders of integration. Following [28] the bound test procedure is applied by modelling the long-run equation as a general vector autoregressive (VAR) model of order p, in Z_t:

$$Z_t = c_0 + \beta_t + \sum_{i=1}^{p} \Phi_i z_{t-i} + \varepsilon_t t = 1, 2, 3, ..., T \tag{3}$$

with c_0 representing a (k + 1) vector of intercepts (drift) and β denoting a (K + 1) vector of trend coefficients. From Eq. (3) [28] derived the following vector error correction model (VECM):

$$\Delta Z_t = c_0 + \beta_t + \Pi z_{t-1} + \sum_{i=1}^{p} \Gamma_i \Delta z_{t-1} + \varepsilon_t t = 1, 2, 3, ..., T \tag{4}$$

where the (k + 1) × (k + 1) are matrices.

$$\Pi = I_{k+1} + \sum_{t=1}^{p} \Psi_i \text{ and } \Gamma = -\sum_{j=i+1}^{p} i = 1, 2, 3, ..., p-1 \tag{5}$$

contain the long-run multipliers and short-run dynamic coefficients of VECM. Z_t is the vector of variables y_t and x_t. Y_t is an I(1) dependent variable defined as FDI, and $x_t = \left[IL_t, PL_t, InflInv_t, Intr_t, LU_t\right]$ is a vector matrix of "forcing" I(0) and I(1).

In case we established a long-run relationship amongst the variables, the conditional VECM is specified as follows:

$$\Delta y_t = c_{yo} + \beta_t + \delta_{yy} y_{t-1} + \delta_{xx} x_{t-1} + \sum_{i=1}^{p=1} \lambda_i \Delta y_{t-1} + \sum_{i=0}^{p-1} \zeta_i \Delta X_{t-1} \varepsilon_{yt} \tag{6}$$

and the conditional VECM of the interest can be specified as:

$$\begin{aligned} \Delta InFDI_t &= c_0 + \delta_1 InFDI_{t-1} + \delta_2 InIL_{t-1} + \delta_3 InPL_{t-1} + \delta_4 InInfInv_{t-1} + \delta_5 Intr_{t-1} + \delta_6 LU_{t-1} \\ &+ \sum_{i=1}^{p} \phi_i \Delta InFDI_{t-i} + \sum_{j=1}^{q} \varpi_j \Delta InIL_{t-j} + \sum_{j=1}^{q} \varphi_j \Delta InPL_{t-j} + \sum_{m=1}^{q} \gamma_m \Delta InInfInv_{t-m} \\ &+ \sum_{o=1}^{q} \tilde{\lambda}_o \Delta Intr_{t-o} + \eta LU_t + \varepsilon_t \end{aligned} \tag{7}$$

where δ_1 is the long-run multiplier, c_0 is the drift and ε_t is the white noise error.

3.4 Causality testing

The purpose of this test is to examine the cause and effect relationship between variables. This investigates whether the direction of causality is from economic growth to credit extension, economic growth to household savings or household savings leading to credit extension and vice versa. Granger causality test can be described as the relationship between cause and effect. Basically, the term "causality" suggests a cause and effect relationship between two sets of variables, say, Y and X. Recent advances in graphical models and the logic of causation have given rise to new ways in which scientists analyse cause-effect relationships. Causality is tested amongst the variables that are found to be cointegrated [33]. In econometrics sense, causality is somewhat different to the concept in everyday use; it refers more to the ability of one variable to predict the other. The relationship between variables can be captured by a VAR model. The problem is to find an appropriate procedure that allows us to test and statistically detect the cause and effect relationship amongst the variables. [34] developed a relatively simple test that defined causality as follows: A variable is said to Granger-cause if it can be predicted with greater accuracy by using past values of the variable rather not using such past values, all other terms remaining unchanged.

The purpose of this test was to examine the cause and effect relationship between variables. Based on [33] the hypothesis is that variable y_t Granger-causes x_t if x_t can be predicted by using past values of y_t, and it is expressed as follows:

$$y_t = a_1 + \sum_{i=1}^{n} \beta_i x_{t-1} + \sum_{j=1}^{m} \gamma_j y_{t-j} + e_{1t} \tag{8}$$

$$x_t = a_2 + \sum_{i-1}^{n} \theta_i x_{t-i} + \sum_{j=1}^{m} \delta_j y_{t-j} + e_{2t} \tag{9}$$

It is assumed that both ε_{yt} and ε_{xt} are uncorrelated white noise error terms. If the lagged x term in Eq. (8) is statistically different from zero as a group, the lagged y term is not statistically different from zero, then x_t causes y_t. If the lagged y term in Eq. (9) is statistically different from zero as a group, the lagged x term is not statistically different from zero, then y_t causes x_t. If both x and y terms are statistically different from zero, then there is two-way direction causality. If both x and y terms are not statistically different from zero, then x_t is independent of y_t [33].

3.5 Diagnostic and stability testing

Diagnostic testing was used to determine whether any of the assumptions of the classical normal linear regression model are violated, in other words to examine the goodness of fit of the model. The study engaged a battery of residual tests such as normality test, serial correlation, and heteroskedasticity.

As far as stability testing is concerned, the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests for parameter stability were first introduced into the statistics and econometrics literatures by [35]. The test is based on the analysis of the scaled recursive residuals and has the significant advantage over the Chow tests for not requiring prior knowledge of the point at which the hypothesised structural break takes place [36]. In addition, the Ramsey's "regression specification test" (RESET) tests for misspecification of the functional form. This test helps to investigate the possibility that the dependent variable may be of a non-linear form [37].

4. Empirical results and discussions

This section presents the results of all the empirical tests performed towards the investigation of drivers of international investment decisions in South Africa.

4.1 Unit root test results

The ADF and DG-GLS unit root tests were carried out at level and at first differences using intercept and intercept and trend. The results are presented in **Tables 1** and **2** as follows:

The unit root results in **Tables 1** and **2** indicate a mixture of I(0) and I(1) variables because FDI and income levels were found to be stationary at level, whilst all others became stationary at first difference.

Variables at level	Model level		Lag length	Variables at 1st difference		Lag length	Order of integration
LFDI	Intercept	−6.909 (−2.937)**	0	*ΔInFDI*	−7.057 (−2.946)**	3	I(0)
	Trend & Intercept	−7.044 (−3.527)**	0		−7.002 (−3.540)**	3	I(0)
LiL	Intercept	−1.120 (−2.943)**	3	*ΔInIL*	−30.037 (−2.943)**	2	I(1)
	Trend & Intercept	−8.035 (−3.527)**	0		−10.155 (−3.529 **	0	I(0)
LPL	Intercept	−1.082 (−2.937)**	0	*ΔInPL*	−4.786 (−2.939)**	0	I(1)
	Trend & Intercept	−2.231 (−3.527)**	0		−4.024 (−3.540)**	3	I(1)
LInfInv	Intercept	−1.560 (−2.937)**	1	*ΔInInfInv*	−4.655 (−2.939)**	1	I(1)
	Trend & Intercept	−2.9379 (−3.527)**	1		−4.680 (−3.530)**	1	I(1)
Intr	Intercept	−1.371 (−2.960)**	9	*ΔIntr*	−2.974 (−2.964)**	9	I(1)
	Trend & Intercept	−2.731 (−3.563)**	9		−5.798 (−3.553)**	6	I(1)
LD	Intercept	−1.000 (−2.937)**	0	*ΔLU*	−6.245 (−2.939)**	0	I(1)
	Trend & Intercept	−1.973 (−3.527)**	0		−6.161 (−3.530)**	0	I(1)

*0.10 significance level.

**0.05 significance level, Indicates critical value at 5% significance level.

***0.01 significance level.

Notes: I(1) Indicates unit root at first difference being stationary.
I(0) Indicates unit root in level being stationary.
ΔIndicates changes in first difference.

Table 1.
ADF Unit root test results.

Variables at level	Model level		Lag length	Variables at 1st difference		Lag length	Order of integration
InFDI	Intercept	−6.999 (−1.949)	0	*ΔInFDI*	−10.790 (−1.949)	0	I(0)
	Trend & Intercept	−7.175 (−3.190)	0		−6.587 (−3.190)	3	
InIL	Intercept	2.786 (−1.950)	3	*ΔInIL*	−9.199 (−1.950)	0	I(0)
	Trend & Intercept	−7.576 (−3.190)	0		−9.287 (−3.190)	0	
InPL	Intercept	−0.859 (−1.949)	0	*ΔInPL*	−4.704 (−1.950)	0	I(1)
	Trend & Intercept	−2.166 (−3.190)	0		−4.820 (−3.190)	0	
InfInv	Intercept	−0.061 (−1.95)	1	*ΔInInfInv*	−3.288 (−1.950)	0	I(1)
	Trend & Intercept	−2.597 (−3.190)	1		−3.339 (−3.190)	0	
Intr	Intercept	−1.965 (−1.951)	5	*ΔIntr*	−2.272 (−1.951)	5	I(1)
	Trend & Intercept	−2.178 (−3.190)	5		−3.319 (−3.190)	2	
LU	Intercept	−0.661 (−1.949)	0	*ΔLU*	−6.294 (−1.950)	0	I(1)
	Trend & Intercept	−1.965 (−3.190)	0		−6.321 (−3.190)	0	

Notes: The values in brackets are the t-statistics of corresponding estimated coefficients.
I(1) Indicates unit root at first difference being stationary.
I(0) Indicates unit root in level being stationary.
Δ Indicates changes at first difference.

Table 2.
DG-GLS unit root tests results [38, 43].

4.2 Cointegration analysis results

Since the order of integration was found to be mixed and the fact that there was no I [2] variable, the bound test to cointegration was performed, and the results are presented in **Table 3**. Based on [28] significant levels for lower bound and upper bound are shown as follows:

Our results indicated that the calculated F-statistic of 9.10 is higher than the upper bound critical value 3.38 at the 5% level of significance. Thus, the null hypothesis of no cointegration is rejected, implying the presence of a long-run cointegration relationship amongst the variables. The next step was to examine the expected marginal impacts of the drivers of international investment decisions on international investment decisions in South Africa.

Our empirical evidence in **Table 4** reveals that the relationship between all the regressors and FDI is positive but not statistically significant with the exception of the dummy with the p-value of 0.0020 which means it is statistically significant.

Test statistic	Value	K
F-statistic	9.101	5
Critical value bounds		
Significance (%)	**I0 Bound**	**I1 Bound**
10	2.26	3.35
5	2.62	3.79
2.5	2.96	4.18
1	3.41	4.68

Table 3.
Bound test results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IL	0.254	7.948	0.032	0.975
PL	0.086	14.345	0.006	0.995
LGFCF	0.049	12.837	0.004	0.997
INTR	0.026	0.376	0.069	0.945
DUMMY	11.921	3.452	3.453	0.002
C	161.554	91.932	1.757	0.091
R-squared	0.733			
Durbin-Watson stat	2.192			
F-statistic	6.237			

Table 4.
Estimated Long run results.

Additionally, in **Table 4** the coefficient of determination (R^2) is 0.732920. The implication is that about 73% of variation in international investment decisions in South Africa is caused by variations in the explanatory variables. The Durbin-Watson statistics of 2.19 shows the absence of serial correlation.

The short-run relationship analysis results in **Table 5** show that cointegration is strongly confirmed given that the coefficient of the error correction term (−1.351344) has a negative sign. In line with [38], it shows that any deviation from the long-run equilibrium is corrected at the rate 135% for each period to return to the long-run equilibrium after a shock.

4.3 Causality test results

Since cointegration has been established, the study proceeded with Granger causality test, and the pairwise Granger causality test results are presented at the Appendix section. It was established that there was no causality between income level and FDI and between interest rate and FDI. Similarly, productivity of labour does not Granger-cause FDI; however, the null hypothesis of granger causality could not be rejected between FDI and labour unrests. A bidirectional causality between them was found. Likewise, Granger causality was established between productivity of labour and the labour unrest.

4.4 Diagnostic and stability test results

The results of both diagnostic and stability tests based on statistical estimations are presented in **Tables 6** and 7 and **Figure 1**, respectively.

The residuals are normally distributed, and there is no serial correlation. In the presence of heteroskedasticity, the null hypothesis is rejected (homoscedasticity), and the alternative is accepted.

The results of stability test are presented in **Table 7** and **Figure 1**, respectively.

Based on the summary of results presented in **Table 7**, the null hypothesis of Ramsey RESET test shows that the model is correctly specified. In tandem with the Ramsey RESET test, the stability test results reveal that after incorporating the CUSUM and CUSUM of squares tests, ARDL model was found to be stable throughout the period of study.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IL)	0.343	10.739	0.032	0.974
D(PL)	0.121	32.574	0.004	0.997
D(LGFCF)	0.066	17.348	0.004	0.997
D(INTR)	0.035	0.509	0.069	0.945
D(DUMMY)	0.009	4.048	0.002	0.998
D(DUMMY(-1))	−0.313	4.864	−0.064	0.949
D(DUMMY(-2))	−0.342	4.923	−0.069	0.945
D(DUMMY(-3))	−13.909	4.181	−3.327	0.002
CointEq(-1)	−1.351	0.168	−8.049	0.000
Cointeq = FDI−(0.254 × IL + 0.086 × PL + 0.049 × LGFCF + 0.026 × INTR + 11.921 × DUMMY + 161.555).				

Table 5.
Estimated short run analysis results.

Test	Null hypothesis	Test statistic	P-Value	Conclusion
Jarque-Bera	Residuals are normally distributed	98.724	0.000	We do not reject the H_0 because the P-value is greater than the LOS at 5%, hence the residuals are normally distributed.
Breusch Pargan-Godfrey	No serial correlation	1.522	0.467	We do not reject the reject H_0 because the P-value is greater than LOS at 5%, hence there is no serial correlation.
Arch	No heteroscedasticity	0.031	0.859	We do not reject H_0 as P- value is greater than LOS at 5%, hence there is no heteroscedasticity

Table 6.
Diagnostic tests results.

	Value	DF	Probability
t-statistic	3.994	24	0.001
F-statistic	15.948	(1, 24)	0.001

Table 7.
Ramsey RESET test results.

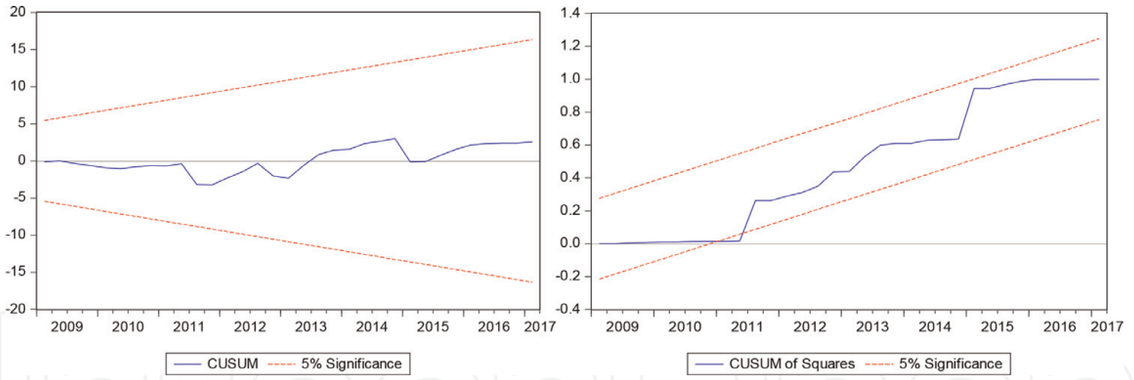


Figure 1.
Stability test results.

The plot of the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares recursive residuals (CUSUMQ) of the model presented in **Figure 1** indicates stability in the coefficients over the sample period as they fall within the critical bounds indicated by the 5% significance parameters.

5. Conclusions

The study investigated drivers of international investment decisions in South Africa by means of time series secondary data from the South African Reserve Bank and Quantec EasyData. The bound testing autoregressive distribution lag approach and the Granger causality analysis were employed to achieve the aim of the study.

The long-run analysis revealed that all the regressors have a positive relationship with FDI, but they were not statistically significant with the exception of the dummy with the p-value of 0.0020 which means it is statistically significant. Whilst the outcomes of this study about a positive association between FDI and some of the regressors like labour productivity, interest rates and infrastructural investment seem to be in line with studies such as [39–41], respectively, the findings of a positive relationship between FDI and labour unrest seem to be in inconsistent with [42] who found that labour unrest has a negative impact on FDI. The presence of cointegration was confirmed by the short-run analysis which also confirmed that any deviation from the long-run equilibrium is corrected to return to the long-run equilibrium after a shock. On the other hand, the pairwise Granger causality test results showed bidirectional causality between FDI and labour unrests.

Empirical findings suggest that government should ensure stable macroeconomic policies. Likewise, policies which promote increase in labour productivity should be encouraged, and labour disputes that result into prolonged strike actions must be minimised; hence consideration of modifying labour laws and regulations is submitted.

Appendices and nomenclature

Null Hypothesis	Obs	F-Statistic	Prob.
IL does not Granger Cause FDI	39	1.019	0.371
FDI does not Granger Cause IL		0.098	0.907
PL does not Granger Cause FDI	39	0.882	0.423

FDI does not Granger Cause PL		1.3819	0.265
InfInv does not Granger Cause FDI	39	0.461	0.635
FDI does not Granger Cause InfInv		0.256	0.776
Intr does not Granger Cause FDI	39	1.477	0.243
FDI does not Granger Cause Intr		0.446	0.644
LU does not Granger Cause FDI	39	0.414	0.6645
FDI does not Granger Cause LU		9.883	0.0004
PL does not Granger Cause IL	39	1.512	0.235
IL does not Granger Cause PL		3.347	0.047
InfInv does not Granger Cause IL	39	0.918	0.409
IL does not Granger Cause InfInv		0.513	0.603
Intr does not Granger Cause IL	39	0.597	0.556
IL does not Granger Cause Intr		1.743	0.190
LU does not Granger Cause IL	39	1.923	0.162
IL does not Granger Cause LU		2.543	0.094
InfInv does not Granger Cause PL	39	1.116	0.339
PL does not Granger Cause InfInv		9.164	0.001
Intr does not Granger Cause PL	39	6.003	0.006
PL does not Granger Cause Intr		3.472	0.043
LU does not Granger Cause PL	39	1.784	0.183
PL does not Granger Cause LU		1.221	0.308
Intr does not Granger Cause InfInv	39	5.156	0.011
InfInv does not Granger Cause Intr		1.114	0.339
LU does not Granger Cause InfInv	39	4.243	0.023
InfInv does not Granger Cause LU		1.274	0.293
LU does not Granger Cause Intr	39	0.168	0.846
Intr does not Granger Cause LU		1.563	0.224

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