



# The Nexus between Foreign Direct Investment and Electricity Consumption in South Africa

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**Received:** 12 April 2023

**Accepted:** 26 July 2023

**DOI:** <https://doi.org/10.32479/ijeep.14460>

## ABSTRACT

The study investigates the nexus between foreign direct investment inflows and electricity consumption in South Africa. The study utilized borrowed time series data sourced from the World Bank and South African Reserve Bank spanning from 1970 to 2020. The study employs a Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) models to investigate the nexus between foreign direct investment inflows and electricity consumption in South Africa. The results of the Johansen cointegration test revealed the presence of cointegration relationships between the variables in the study. The results of the FMOLS and DOLS revealed negative statistically significant and insignificant relationship between electricity consumption and foreign direct investment inflows in South Africa, respectively. Other results revealed that economic growth has a positive statistically significant relationship with foreign direct investment inflows. The Granger causality results revealed unidirectional causality running from economic growth to foreign direct investment inflows. The study recommends that the government and policymakers must revise policies on electricity consumption and economic growth to attract foreign direct investment inflows in South Africa.

**Keywords:** Foreign Direct Investment, Electricity Consumption, FMOLS, DOLS, South Africa

**JEL Classifications:** C32, G11, Q40, Q48

## 1. INTRODUCTION

South Africa's electricity consumption is viewed as an important requirement for economic development despite the curtailed electricity supply outages. Foreign Direct Investment (FDI) is also one of the major economic indicators influencing the country's economic growth and development. As a result, the study investigates the relationship between foreign direct investment (FDI) and South African electricity consumption. Firms invest abroad for a variety of reasons, the most important of which are the availability of natural resources, improved economic institutions, access to new markets, potential efficiency improvements, and strategy seeking (Dunning et al., 1996). In the literature, it has been argued that attracting foreign direct investment (FDI) is determined by the host country's conditions (Inglesi-Lotz and Ajmi, 2021).

Electricity is the quintessence of modern industrialised societies and is a catalyst for economic growth and social development. Suitable access to reliable and affordable electricity is essential for the electricity industry, supporting infrastructure development, and improving living standards (Jack, 2022). However, as FDI flows increase, the demand for energy-intensive activities increases, putting enormous pressure on existing energy infrastructures.

One can easily anticipate the burden placed on existing energy infrastructure can also increase electricity prices. When supply is struggling to meet demand, utilities may rely on increasing tariffs and taking load-shedding measures during peak hours. This adds additional financial burdens to consumers and businesses and can have a disproportionate impact on both households with low incomes and profits (Igamba, 2023).

The Russia's invasion of Ukraine has affected nations globally including South Africa. The conflict between Ukraine and Russia resulted in higher energy and fuel prices as well as an increase in the inflation rate (UNPD, 2022). Local electricity production in South Africa accounted for 91% of the total electricity supply in 2018 (DMRE, 2022). Furthermore, StatsSA (2022) reported that electricity production fell by 7.7% year on year in July 2022, while consumption fell by 6.2%. This was an attribute of the breakdowns of electricity infrastructures and the rapid curtailed electricity supply outages.

The conflict caused trade disruptions and increased investor uncertainty, which will weigh on asset prices and the rand's depreciation. Countries with more developed institutions in comparison to their peers benefit more from FDI in terms of growth (Joshua et al., 2022). According to the World-Bank (2014), South Africa is not only the largest recipient of foreign direct investment (FDI) but also a major source of FDI in Africa. South Africa's FDI, on the other hand, has been gradually declining, contributing to eroding investor confidence as a result of trade and investment policy uncertainty as well as slow economic growth. In addition to declining FDI, South Africa recently implemented new FDI screening measures for national security concerns (UNCTAD, 2019).

Several studies such by Salim et al. (2017), Khobai and Mavikela (2018), Grabara et al. (2021) have done studies on FDI and electricity consumption from various countries have been conducted. Since South Africa recently introduced new regulatory frameworks for FDI screening for national security concerns, this study is worth investigating to determine the long-term relationship between FDI and electricity consumption. Furthermore, the uniqueness of this study lies in the Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) econometrics techniques, which are generally underutilized in previous studies since majority of the studies employed VECM, Granger causality and ARDL model to analyse the relationships between the FDI and electricity consumption.

## 2. LITERATURE REVIEW

This section examines the empirical literature on FDI inflows and electricity consumption, focusing on the study's objectives, methodologies, and findings from various countries. Only a few studies have looked into the relationship between FDI and electricity or energy consumption. Among the studies, Salim et al. (2017) examined the long and short-run relationships between FDI and energy consumption in China from 1982 to 2012. The study used annual data and the Autoregressive Distributed Lag (ARDL) testing approach to test the long-term relationship between the variables. According to the findings of the study, FDI decreases energy consumption in the long run. Atchike et al. (2020) discovered similar results, demonstrating evidence of unidirectional causalities from electricity consumption to both economic development and foreign direct investment, as well as a long run relationship. In the short run, however, a positive relationship between FDI and energy consumption was discovered. Overall, the study suggests that the Chinese

government encourages inward FDI into the energy and tertiary sectors. Meanwhile, Khobai and Mavikela (2018) ARDL findings suggested a long run relationship between energy consumption, FDI, economic growth, and capital, whereas VECM test results established unidirectional causality from FDI and capital to energy consumption. Finally, a bidirectional causal relationship between energy consumption and economic growth was discovered.

Abdouli and Hammami (2017) used the Generalized Methods of Moments (GMM) to investigate the relationship between FDI inflows, energy consumption, and economic growth in 17 MENA countries from 1990 to 2012, namely Saudi Arabia, Qatar, Oman, Kuwait, Lebanon, United Arab Emirates, Iraq, Turkey, Iran, Syria, Jordan, Yemen, Egypt, Morocco, Tunisia, Algeria, and Libya. The findings revealed a bidirectional relationship between FDI inflows and economic growth as well as between energy consumption and economic growth. Meanwhile, some of the study's findings contradict those of Salim et al. (2017). The authors discovered a unidirectional relationship between energy consumption and FDI inflows for the entire panel, implying that energy consumption increases FDI inflows. While Salim et al. (2017) discovered that an increase in FDI inflows decreases energy consumption.

Olaoye et al. (2020) utilized the Dynamic Ordinary Least Squares (DOLS) estimator and the Granger causality test to determine the relationship between energy consumption and FDI in Nigeria from 1990 to 2017. According to the study's findings, energy consumption has a significant negative impact on FDI inflows. Additionally, it was found that there is a significant positive relationship between energy consumption and oil exports. These findings are consistent with those of Salim et al. (2017). Similarly, Polat (2018) contends that FDI reduces energy consumption in developed countries but has no effect on energy consumption in developing countries. Meanwhile, trade openness was found to have a negligible negative impact on energy consumption. In order to achieve the study's main objective, the findings show that FDI inflows granger cause energy consumption, whereas energy consumption granger causes trade openness in Nigeria. The authors proposed that Nigerian policymakers promote efficient initiatives to improve foreign investors' access to primary energy consumption. Finally, it was suggested that primary energy production be expanded in order for its consumption to be competitive in the global market.

Zeeshan (2021) applied the Structural Equation Modeling (SEM) approach to look into the relationship between FDI, energy consumption, natural resources, and economic growth in Latin American countries from 1990 to 2018. The findings revealed that FDI has a positive and significant effect on energy consumption. Overall, the findings show that FDI, energy consumption, and natural resources all have a significant and positive relationship with Latin American economic growth. These findings are similar to those of Zeng et al. (2020), who used a VAR estimation technique to determine the relationship between energy consumption, FDI, and economic growth in China between 1993 and 2017. The results also revealed a long run equilibrium relationship between the variables used in the study.

Rash et al. (2022) studied the relationship between FDI in the renewable electricity industry, renewable electricity production, and African economic growth from 2003 to 2019. The panel vector autoregression model and the Granger causality test were used in the study to investigate cointegration and causality among the variables included in the model. The study's findings were surprising, indicating that economic growth has no significant impact on African foreign direct investment. Economic growth, on the other hand, appears to have a positive impact on real electricity production. Similarly, Khandker et al. (2018) used a VECM estimation technique to examine the relationship between FDI and renewable energy consumption in Bangladesh from 1980 to 2015. For the period under consideration, the findings revealed a long-run relationship between FDI and renewable energy consumption in Bangladesh. Finally, it was discovered that there is no short-run causality between FDI and renewable energy consumption.

Grabara et al. (2021) investigated a similar topic to Khandker et al. (2018), examining the relationship between FDI in Kazakhstan and Uzbekistan and economic growth and renewable energy consumption from 1992 to 2018. To investigate the relationship between the variables, the study used a Granger causality and Johansen cointegration test. Some of the study's findings contradict those of Khandker et al. (2018), who discovered a bidirectional relationship between FDI and renewable energy consumption in the two countries studied, whereas Khandker et al. (2018) discovered no bidirectional relationship between FDI and renewable consumption. Furthermore, the results of the Johansen Cointegration test confirm the existence of cointegration between the variables included in the model. The main variables influencing renewable energy are economic growth and electricity consumption. As a result, the study concludes that, in order to reduce reliance on fuel-based energy sources, Kazakhstan and Uzbekistan should attract energy from renewable energy sources and implement energy efficiency measures based on rapid progress.

Hussain and Yu (2021) used a VECM estimation technique to investigate the relationship between power energy consumption, foreign direct investment, and economic growth in Pakistan from 1965 to 2019. The Johansen cointegration was used to test the long-run relationship, and Granger causality was used to determine the direction of causality among the variables. The results of the Granger causality test revealed a unidirectional causality relationship running from FDI to economic growth; a unidirectional causality relationship running from GDP growth to power energy consumption; and a unidirectional causality relationship running from FDI to economic growth. On the other hand, Latief and Lefen (2019) discovered a bidirectional short-run causal relationship between economic growth and energy consumption in Pakistan. Overall, evidence of a positive relationship between economic growth and FDI was discovered; additionally, economic growth increased energy consumption in Pakistan during the period under review. These findings are consistent with those of Long et al. (2018), who discovered evidence that electricity consumption and foreign direct investment have a significant impact on economic growth in Pakistan. As a result, the study recommends increasing energy production in order to accelerate Pakistan's economic growth.

Salahuddin et al. (2018), conducted a study on the effects of electricity consumption, economic growth, FDI and financial development on carbon dioxide emissions in Kuwait using ARDL and VECM tests for the period 1980 to 2013. According to the findings, electricity consumption, economic growth, and FDI stimulate carbon dioxide in both the short and long run. On the other, VECM Granger causality test results revealed that FDI, economic growth, and electricity consumption granger cause carbon dioxide emissions. Similarly, Hassan et al. (2021), also found similar results, which negates an evidence of causality from energy consumption per capita, GDP per capita, and FDI to greenhouse gas emissions in both the short and long run. Parveen et al. (2021) also conducted a similar study by using Canonical cointegrating regression (CCR) method which is generally underutilized in previous studies. Their findings are consistent with those of (Hasan et al., 2021 and Salahuddin et al., 2018).

Paul et al. (2021) employed various estimation techniques, namely Ordinary Least Square (OLS), Pooled Ordinary Least Squares (POLS), two-stage least square model (2SLS), and Generalized Method of Moments (GMM) to analyse the effects of electricity, energy, and natural resource rent on FDI from 1980 to 2018. The findings showed that in all models, access to energy has a positive impact on FDI. Similarly, Cao, Chen and Huang also conducted a panel study by utilizing a Panel regression model and, panel smooth transition regression (PSTR) model for the period 1990-2014 and the results contradicts those of Paul et al. (2021) which suggested that FDI influence insignificant impact on energy intensity in developing countries.

Stungwa et al. (2022) investigated the impact of electricity consumption and supply on economic growth in South Africa. The study employed ARDL model on time series data spanning for the period from 1971 to 2014. Empirical results revealed that there is a positive statistically significant relationship between the variables in both short and long run period. The study recommends that the government should promote renewable electricity generation to stimulate economic growth in South Africa. From the literature above, majority of the studies employed VECM, Granger causality and ARDL model to analyse the relationships between the FDI and electricity consumption. Most of these studies such as Khobai and Mavikela (2018) used electricity consumption as dependent variables while others utilised electricity consumption as an explanatory variable. This study, however, will utilise foreign direct investment inflows as dependent variable to see how electricity consumption can influence FDI in South Africa with recent continuous loadshedding as adopted in the study of Rashed et al. (2022).

### 3. METHODOLOGY

#### 3.1. Model Specification

The study investigates the relationship between electricity consumption and foreign direct investment in South Africa from 1970 to 2020. The study employs GDP per capita, taxes on international trade and gross fixed capital formation as intermittent variables to formulate a multivariate model. The variables come in natural logarithms and electricity consumption is transformed into logarithm to have the same unit of measurement. The FMOLS and

DOLS techniques will allow for robust and dynamic modelling of the long-run relationship that exists in the variables (Yahyaoui, 2019). The study utilises FDI as the dependent variable adopted in the study of Rashed et al. (2022). The equation for the model is given below:

$$LFDI_t = \alpha_1 + \alpha_{LEC} LEC_t + \alpha_{LGDP} LGDP_t + \alpha_{LTAX} LTAX_t + \alpha_{LKF} LKF_t + \varepsilon_t \tag{1}$$

Where  $\alpha_1$  is an intercept, LFDI represents natural logarithm of foreign direct investment inflows, LEC represent electricity consumption, LGDP represents natural logarithm of gross domestic product per capita (annual %), LTAX represents natural logarithm of taxes on international trade (% of revenue), LKF represents gross fixed capital formation (% of GDP),  $\varepsilon_t$  represents error term and  $t$  represents the period.

### 3.2. Data Sources

The study utilises borrowed time series annual data from 1970 to 2020 for foreign direct investment inflows, electricity consumption, taxes on international trade and gross fixed capital formation are sourced online from the World Bank and Gross domestic product per capita sourced from the South African Reserve Bank.

### 3.3. Data Analysis

The study employs Augmented Dickey-Fuller and Phillips-Perron unit root test to check for stationarity of the variables and help solve issues of spurious regression. This will also help the study to determine the order of integration of the variables. The study further employs VAR optimal lag length criterion to employ the recommended number of lags for the study. The study also employs the Johansen cointegration test to check for presence of cointegration among the variables in the study. Studies conducted by Amoako and Insaadoo (2021), Khobai and Mavikela (2018), Kang et al. (2021) and Mohanty and Sethi (2022) utilised electricity consumption as a depended variable, the significant of this study however lies in employing the FMOLS and DOLS by utilising electricity consumption as an explanatory variable in attracting foreign direct investment inflows. The study also utilises

the Granger causality test to check for causal relationships among the variables in the study.

## 4. RESULTS

The study performed the ADF, and PP unit root test and the results are presented in Table 1 above. The results reveal that LFDI, LEC and LKF are significant at 1% level of significance having employed the first order of integration. LTAX is significant at 1% level of significance at both level and first difference, while LGDP is significant at 5% at level form and 1% at first difference. The study will however utilise all the variables at first difference since the coefficients are more efficient. The study continues to perform the VAR optimal lag criterion to reveal the ideal number of lags to employ in the model as shown in Table 2 below.

Table 2 above presents the results of the VAR optimal lag length criterion. The HQ, LR, FPE and AIC criterion reveals that the study is recommended to utilise 1 lag. However, the SC criterion reveals that zero lag is recommended for the study. The study will however employ one lag as recommended by the majority criterions for the study.

As evidenced by the results in Table 3 above, the Johansen cointegration approach was employed in the study to check for cointegration relationships. The results of the Trace test indicate five cointegration equations at 0.05 level of significance, whereas the Maximum-Eigen test indicates one cointegration equation at 0.05 level of significance. According to Lütkepohl and Saikkonen (2000), the Maximum-Eigen value is more potent than the Trace statistic, consequently, this study concludes that the variables in this study have a long run relationship (Hlongwane and Daw, 2022). The study continues to estimate the relationship between foreign direct investment inflows and electricity consumption in South Africa as shown in Table 4 below by employing the Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) models.

**Table 1: Augmented Dickey-Fuller and Phillips-Perron unit root test**

Variables	ADF unit root test				PP unit root test			
	Constant		Trend and intercept		Constant		Trend and intercept	
	Level	$\Delta$	Level	$\Delta$	Level	$\Delta$	Level	$\Delta$
LFDI	-1.5308	-8.8635***	-5.8949***	-8.7580***	-5.0183***	-19.116***	-5.8602***	-19.028***
LEC	-0.4129	-7.0098***	-1.4313	-7.1281***	-0.4006	-7.0113***	-1.4313	-7.1888***
LGDP	-3.6543**	-6.6699***	-3.5777**	-6.6367***	-3.6332**	-9.0677***	-3.5581**	-9.3004***
LTAX	-4.4585***	-8.4051***	-4.7876***	-8.4444***	-4.4504***	-9.2518***	-4.7191***	-9.2315***
LKF	-1.3450	-4.8409***	-2.2916	-4.7965***	-0.9215	-4.5886***	-1.9867	-4.5531***

Source: Authors' own computation

**Table 2: VAR optimal lag length criterion**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-358.2477	NA	7.063865	16.14434	16.34508*	16.21918
1	-322.7266	61.56984*	4.460852*	15.67674*	16.88118	16.12574*
2	-314.3522	12.65469	9.745240	16.41565	18.62380	17.23883
3	-300.7528	17.52817	18.08881	16.92234	20.13419	18.11969
4	-290.1535	11.30586	43.13482	17.56238	21.77792	19.13389

Source: Authors' own computation

**Table 3: Cointegration results**

Hypothesised No. of CE (s)	Trace statistic	0.05 critical value	Max-Eigen statistic	0.05 critical value
None	107.6066***	69.81889	51.96158***	33.87687
At most 1	55.64497**	47.85613	21.91458	27.58434
At most 2	33.73039**	29.79707	15.30329	21.13162
At most 3	18.42710**	15.49471	12.96465*	14.26460
At most 4	5.462442**	3.841465	5.462442**	3.841465

Source: Authors' own computation

**Table 4: FMOLS and DOLS results**

Variables	FMOLS		DOLS	
	Coefficient	Probability	Coefficient	Variable
DLEC(-1)	-0.259788	0.0839	-0.166192	0.5126
DLKF(-1)	-0.060744	0.3917	-0.193659	0.1761
LTAX(-1)	-0.027799	0.6706	0.025406	0.7778
LGDP(-1)	0.102596	0.0189	0.237526	0.0065
C	0.096871	0.7207	-0.197023	0.6002

Source: Authors' own computation. FMOLS: Fully modified ordinary least squares, DOLS: Dynamic ordinary least squares

The study employed the FMOLS and DOLS models to investigate the nexus between foreign direct investment inflows and electricity consumption as shown in Table 4 above. The results of the FMOLS reveals that there is a negative statistically significant relationship between electricity consumption and foreign direct investment inflows in South Africa. A 1% increase in electricity consumption significantly result in foreign direct investment inflows declining by 0.25%, ceteris paribus. The DOLS results, however, reveal that there is a negative statistically insignificant relationship between electricity consumption and foreign direct investment inflows. A 1% increase in electricity consumption insignificantly results in foreign direct investment declining by 0.17 percent, ceteris paribus. These results are inconsistent with the studies of Long et al. (2018), Hussain and Nor (2011), and Ibrahiem (2015), which indicated a negative relationship between the variables, while being significant with the results of Olaoye (2020). These results entail that electricity consumption has not been good enough to attract foreign direct investment inflows in South Africa for the period understudy. This may have been caused by the recent load shedding that has been crippling South Africa for almost a decade. The government, Eskom and policymakers therefore need to revise policies on electricity consumption so it can be able to attract foreign direct investment ideal needed in the economy's survival.

Furthermore, the FMOLS and DOLS results reveal that there is a positive statistically significant relationship between economic growth and foreign direct investment inflows in South Africa for the period understudy. The FMOLS reveal that a 1% increase in economic growth will significantly result in foreign direct investment inflows rising by 0.10%, ceteris paribus. The DOLS results reveal that a 1% increase in economic growth will significantly result in foreign direct investment inflows rising by 0.24%, ceteris paribus. These results entail that economic growth is very crucial for attracting foreign direct investment inflows in South Africa. This calls for the government and policy makers to promote and implement policies that results in an increase in economic growth as this attracts foreign direct investment inflows that is needed for the ailing South African economy. These results are consistent with the studies of Ibrahiem (2015)

and Long et al. (2018), while inconsistent with the results of Hlongwane and Daw (2021a).

Moreso, the results of the FMOLS and DOLS in Table 4 above shows that there is a negative statistically insignificant relationship between gross fixed capital formation and foreign direct investment inflows in South Africa for the period understudy. These results are consistent with the studies of Ibrahiem (2015) and Long et al. (2018), while inconsistent with the results of Hlongwane and Daw (2021a). The FMOLS results reveal that a 1% increase in gross fixed capital formation in South Africa will insignificantly result in foreign direct investment inflows declining by 0.06%, ceteris paribus. The DOLS results reveal that a 1% increase in gross fixed capital formation in South Africa will insignificantly result in foreign direct investment inflows declining by 0.19%, ceteris paribus. These results entail that gross fixed capital formation in South Africa has not been able to positively attract foreign direct investment inflows. This calls for the government and policy makers to revise policies on gross fixed capital formation so it can prevent crowding out effect of foreign direct investment inflows. Both domestic and foreign direct investment are much needed to help the South African economy recover from macroeconomic challenges it is currently facing.

Finally, the results of both the FMOLS and DOLS reveal a negative and positive statistically insignificant relationship between taxes on international trade and foreign direct investment inflows in South Africa for the period understudy. The FMOLS results reveal that a 1% increase in taxes on international trade in South Africa insignificantly result in foreign direct investment inflows declining by 0.03%, ceteris paribus. However, the DOLS model reveal that a 1% rise in taxes on international trade in South Africa insignificantly result in foreign direct investment inflows rising by 0.03%, ceteris paribus. Based on the DOLS model, since it is assumed (Yahyaoui, 2019) to be superior to the FMOLS, these results entail that taxes on international trade have been able to boost foreign direct investment inflows for the period understudy. These results call for the department of trade and policymakers to revise policies regarding taxes on international trade so it can be able to significantly boost the inflow of foreign trade in South Africa while maintaining the balance with outflows to avoid trade imbalances. Taxes on international trade should be reduced on electricity trade so that the consumption of electricity can be able to boost trade inflows.

The study conducted Granger causality test as presented by the results in Table 5 above to reveal causal relationships between the variables. The results reveal unidirectional causality running

**Table 5: Granger causality test**

Pairwise granger causality test

Sample: 1970-2020

Lags: 1

Null hypothesis	F-statistic	Probability
DLEC(-1) does not Granger Cause DLFDI(-1)	0.02135	0.8845
DLFDI(-1) does not Granger Cause DLEC(-1)	0.21363	0.6462
DLKF(-1) does not Granger Cause DLFDI(-1)	0.01309	0.9094
DLFDI(-1) does not Granger Cause DLKF(-1)	0.98168	0.3271
LTAX(-1) does not Granger Cause DLFDI(-1)	0.27819	0.6005
DLFDI(-1) does not Granger Cause LTAX(-1)	0.00550	0.9412
DLGDP(-1) does not Granger Cause DLFDI(-1)	2.84727	0.0985
DLFDI(-1) does not Granger Cause DLGDP(-1)	2.37002	0.1307

Source: Authors' own computation

from economic growth to foreign direct investment inflows at 0.10 level of significance. This is consistent with the results of the FMOLS and DOLS models presented in Table 4 above that revealed a positive relationship of economic growth on foreign direct investment inflows. These results are consistent with the studies of Ibrahiem (2015) and Hussain and Nor (2011), while inconsistent with the study of Rashed et al. (2022). These results entail that policies that affect economic growth in South Africa will have a causal effect on foreign direct investment inflows. The government and policy makers therefore need to devise and implement policies that boost economic growth to attract foreign investment in South Africa that's much needed for recovery of the ailing economy. However, other results by Omari and Kahouli, (2014), Acaravci, Erdogan and Akalin (2015) and Nupehewa, (2022) reveal non causal relationships of gross fixed capital formation, electricity consumption, and taxes on international trade on foreign direct investment inflows. This entails that policies that affect those variables does not have causal effect on foreign direct investment inflows in South Africa. The study continues to discuss policy recommendations and conclusion as given in Section 5 below of the study.

## 5. CONCLUSION AND RECOMMENDATIONS

The study's main objective is to examine the nexus between foreign direct investment and electricity consumption in South Africa. For the objective to be attained, the study utilised borrowed time series data spanning from 1970 to 2020. The study performed ADF and PP unit root tests to avoid problems of spurious regression and determine the order of integration of variables. The study conducted the VAR optimal lags criterion to determine the optimal number of lags needed in the model. The study performed the Johansen cointegration test to check for long run relationships among the variables in the study and it was found that there is presence of long run relationships among the variables. The study employed the Fully Modified Ordinary

Least Squares and Dynamic Ordinary Least Squares models as well as the Granger causality model to reveal the nexus between foreign direct investment inflows and electricity consumption in South Africa.

Based on the empirical results of the study, it can therefore bring the following policy recommendations: Firstly, the policy makers, Eskom and the South African government need to revise policies on electricity consumption and load shedding as it was found to be detrimental to attracting foreign direct investment inflows in the economy. There is no international investor who can be interested in investing in a country that has been marred with constant load shedding and blackouts for the longest periods as happening in South Africa for almost a decade. Stable electricity supply is needed to guarantee the reduction of load shedding and enable smoothed electricity consumption that can be able to attract foreign direct investment inflows into South Africa.

Secondly, the government must implement policies that boost economic growth as it was found to be contributing positively to attracting foreign direct investment inflows into the economy. The South African special economic zones such as Makhado need to be promoted and brought to the attention of potential international investors so they can boost gross domestic product in the economy to improve economic growth. Investors' confidence can also help top investors such as Beijing Automotive Industry holding, BMW, Nissan, Toyota, and Mainstream Renewable Energy to boost the investment in South Africa thereby improving economic growth that is key to attracting international or foreign investors.

Thirdly, the government and Department of Trade needs to revise policies on gross fixed capital formation such as Protection of Investment Act 2015 (Act and Parliament, 2015). The gross fixed capital formation has not been favourable to attracting foreign direct investment inflows that is needed in South Africa. The government and policymakers should consider opening room for infrastructure development and capital formation in electricity. There is a need of more investment in electricity environment so the South African economy can be able to reduce load shedding and have stable electricity consumption that can attract foreign direct investment inflows. Hlongwane and Daw (2021b) alludes that most of the electricity infrastructure in South Africa needs proper maintenance as they have reached their lifetime and increased investment in such would help capital formation.

Fourthly, the South African Revenue Service also need to revise policies pertaining taxes on international trade of goods and services. The more taxes charged, the less it attracts foreign direct investment inflows into the country. A competitive tax therefore needs to be implemented so that it does not ward off foreign investors. Though the tax policy can make South African economy a favourable ground for attracting foreign investment, it also should be implemented with great care to prevent dumping and trade imbalances that may result in trade deficits. The more investors can find South Africa attractive for their investments, the more chances the policymakers and government can be able to put solutions to macroeconomic problems that the country is currently facing.

The study would have liked to analyse the nexus between foreign direct investment inflows and electricity consumption in South Africa until 2022, but there was not sufficient data observation for the period 2021 and 2022 for the variables utilised in the study. In conclusion, the study analysed the nexus between foreign direct investment inflows and electricity consumption in South Africa from 1970 to 2020 and found that there is negative statistically insignificant relationship between the variables. The Granger causality confirmed the validity of the results due to lack of causal relationships between electricity consumption and foreign direct investment inflows. Studies in the future can consider utilising other variables and other models when analysing the nexus between foreign direct investment inflows and electricity consumption to reveal new insights and knowledge in the field.

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