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The relationship between foreign direct investment and economic growth in SADC region from 2000 to 2019: An econometric view

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Abstract: This study investigates the relationship between foreign direct investment and economic growth in SADC region from 2000 to 2019. The study utilises panel data spanning from 2000 to 2019 sourced from the World Bank. The study employs a panel ARDL and panel Error Correction Model to analyse the relationship between foreign direct investment and economic growth in SADC region. The statistical results revealed a positive statistically significant short run relationship and negative statistically significant long run relationship between foreign direct investment and economic growth.

Keywords: *Foreign Direct Investment (FDI), Economic Growth, Error Correction Model, SADC, Panel ARDL model*

JEL Specifications: *C01, C22, E41, F15, F43*

1 Introduction

Many Southern African Development Community (SADC) member states rely on foreign investment to help them achieve their long-term economic goals. As a result, the SADC has developed policies and procedures to encourage such Foreign Direct Investment, rather than accumulating funds through stock and bond sales. Foreign Direct Investment (FDI) directly supports projects that create jobs and develop the infrastructure and industry needed to grow the economy in the region (SADC 2012). The larger SADC goal of increased regional integration benefits from these cooperative activities as well. The significance of the study is to analyse the relationship between foreign direct investment and economic growth in SADC region to reveal the panel effect as well as the comparison of individual effects and appropriate policy recommendations.

Overview of the study:

The Southern African Development Community (SADC) is a Regional Economic Community comprising 16 member states: Angola, Botswana, Comoros, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia, and Zimbabwe. The global economic downturn, which began in 2008, has had a significant impact on foreign direct investment in the SADC region. Between 2009 and 2010, the region's total foreign direct investment fell by nearly half. However, not all Member states are created equal in terms of market size, political stability, infrastructure quality, or natural resource availability, all of which influence international investment. As a result, some Member States have been able to maintain higher levels of foreign direct investment than others. Foreign direct investment has historically been higher in South Africa and Angola, and the Democratic Republic of Congo increased its net foreign direct investment inflow to nearly \$3 billion in 2010 (SADC 2012).

Mozambique's post-war reconstruction was heavily reliant on aid flows. It is also Africa's largest recipient of overseas development assistance (ODA), with ODA funding accounting for roughly half of all government spending. Large-scale projects aimed at rebuilding the country's infrastructure dominated post-war economic reconstruction efforts. Most of these projects were financed with foreign debt and equity, with assistance from multilateral and regional development banks. As a result, large FDI projects became a key driver of economic growth, particularly in the extractive industries and supporting infrastructure sectors (Talitha 2018).

SADC recognizes the success of public-private partnerships in attracting foreign direct investment into regional infrastructure through the recently established Regional Infrastructure Development Master Plan. Member states have successfully enlisted private sector support for critical roads, railways, and ports along the Maputo Corridor and elsewhere, as well as petroleum and gas development and telecommunications services across the region, thanks to these partnerships (SADC 2012). In addition, several member states have found investors for tourism infrastructure, including border post upgrades in Lesotho and park lodge construction in Botswana and Mozambique.

While all SADC members encourage FDI, each has its own regulatory framework and degree of economic liberalization. Even though many member states are open to foreign investment in a variety of sectors, foreign investment is still restricted in certain strategic sectors. Many member states impose restrictions on foreign ownership of extractive industries, such as mining, oil and gas, transportation and telecommunications, banking and insurance, and the

media. These industries are governed by specific policies and programs aimed at economically empowering the people of the region while also ensuring regional sovereignty (SADC 2012).

The Port of Walvis Bay and its associated transport corridors have been identified as a priority for inclusive economic growth in Namibia. The port and corridors were built and operated with the help of foreign direct investment. The Namibian government needs to be flexible when it comes to foreign direct investment. The government has more negotiating power in extractive industries than it does in manufacturing, for example, in terms of joint ventures and skill development. Because infrastructure is such an important development enabler, Namibia should not lose sight of the long-term development benefits that could be hampered if investors are discouraged by strict FDI legislation (Talitha 2018).

Only Mauritius and Zambia allow 100 percent foreign ownership in telecommunications, while Madagascar and Mozambique restrict foreign investment in fixed line telecommunications but allow foreign ownership of mobile services (SADC 2012). Angola limits foreign ownership in banking to ten percent, insurance to fifty percent, and transportation to eighty percent. Only Madagascar and Zambia allow 100 percent foreign ownership in the media sector. Tanzania restricts foreign investment in insurance to 66 percent, and most SADC countries restrict foreign ownership of media, particularly television broadcasting.

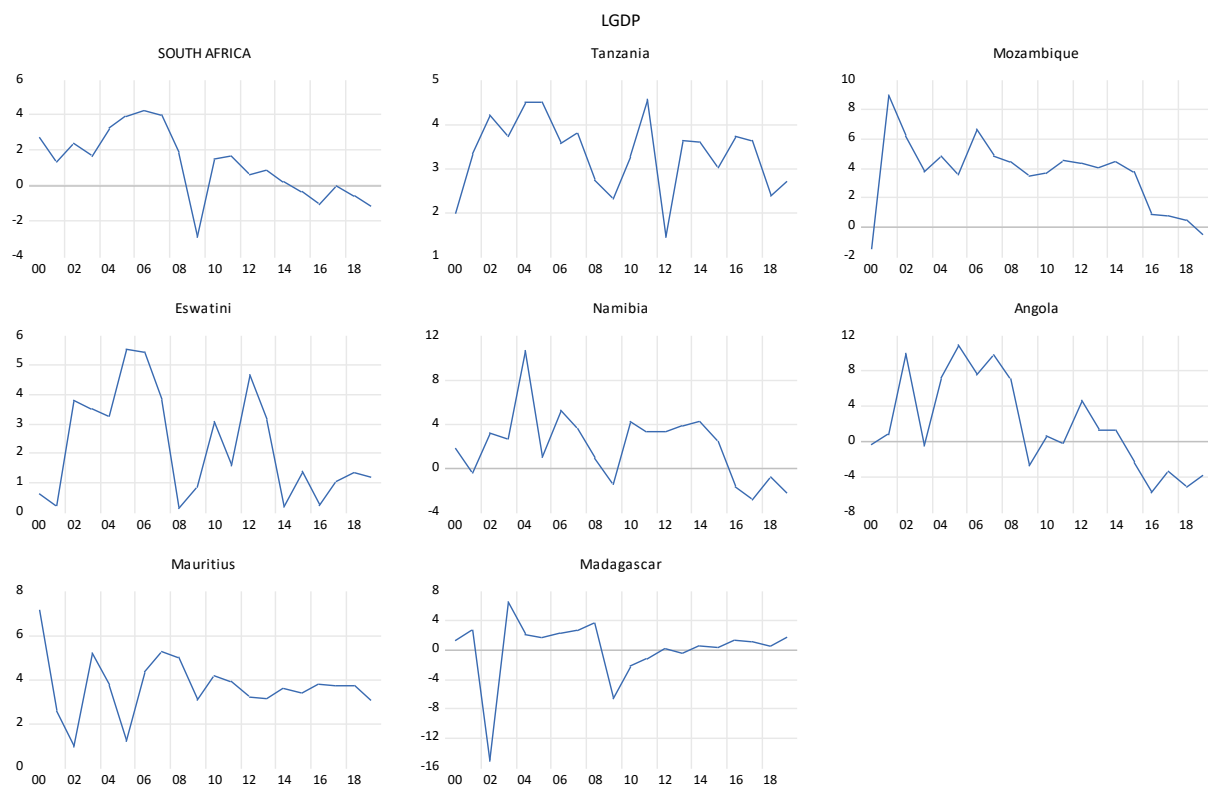
Angola's regulatory environment is unpredictably unstable, and foreign investors disclose high levels of inefficiency in the implementation of various investment policies. As a result, Angola is regarded as one of the least welcoming places to do business, due to corruption, bureaucracy, and poor transportation infrastructure. Foreign investment outside of the oil and mineral sectors has been severely hampered because of this. Following the global drop in oil prices, the Angolan government is in desperate need of FDI to promote economic diversification and broad-based development (Talitha 2018).

The challenge of ensuring that FDI has positive spill over effects for South Africans in the context of increasingly globalized production chains was demonstrated by Walmart's acquisition of Massmart (Talitha 2018). The researcher further investigated other initiatives to promote sustainable FDI, such as a one-stop shop for investors and new public interest competition guidelines, as well as the possibility of a mechanism to support small, medium, and micro-sized enterprise suppliers. The author concludes that South Africa's bold approach

to stricter investment regulation, in the hopes of ensuring more inclusive growth in the country, had raised serious concerns among potential investors about certainty and transparency.

Talitha (2018) review Tanzania's current transportation infrastructure, with a special focus on the port and rail sectors, which can facilitate both national and regional trade. The difficulty of raising funds to construct this infrastructure, as well as examining public–private partnerships (PPPs) in the context of attracting FDI and considering how such investments could be long-term in terms of their ability to build local capacity and support equitable growth. The researchers also review how the energy sector gap can be closed by attracting FDI in to solve the generation, transmission, and distribution of energy.

Figure 1: Overview of gross domestic product from 2000 to 2019

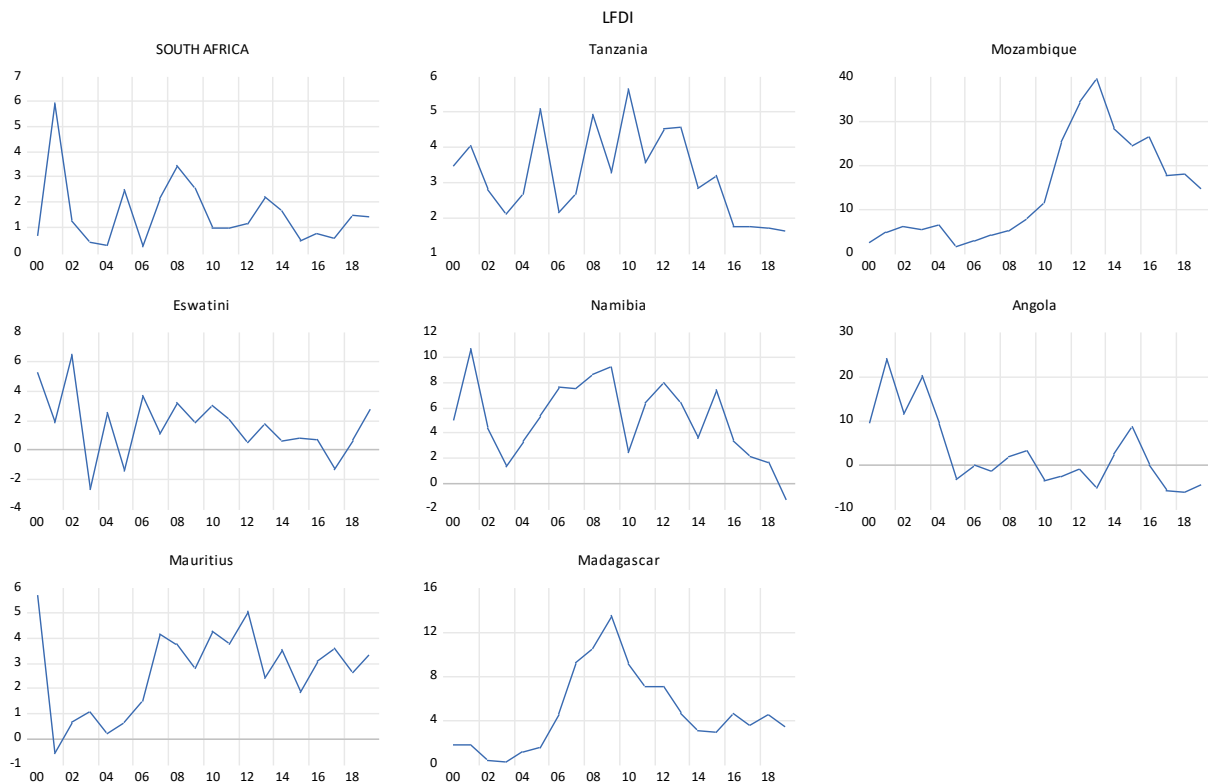


Source: Author's compilation

From figure 1 above it can be noted that the average economic growth for the 8 selected SADC countries is below 10% for the period from 2000 to 2019. It can be noted that in 2008 and 2009, their economic growth has declined below 0%, which is very worrying except for Mauritius and Mozambique which their growth is above 0% for that period.

Figure 2: Overview of foreign direct investment from 2000 to 2019

Figure 2 below show the trend of foreign direct investment of the selected 8 SADC countries for the study for the period from 2000 to 2019. The foreign direct investment for South Africa has steeply increased to approximately from the year 2000 to 2001 and then steeply declined from 2001 to 2002. From 2001 to 2019, the trend has been fluctuating between 0% and 1,5% on average. Tanzania foreign direct investment for 2019 was \$0.99 billion, a 1.96% increase from 2018, for 2018 was \$0.97 billion, a 3.3% increase from 2017, 2017 was \$0.94 billion, a 8.85% increase from 2016 and for 2016 was \$0.86 billion, a 42.63% decline from 2015. It can be noted from figure 2 that foreign direct investment for Tanzania from 2010 to 2018 on average it has been gradually declining.



Source: Author's own compilation

Mozambique and Madagascar foreign direct trend are much similar except that it had reached a peak of 40% for Mozambique in 2014 and a peak of 13% for Madagascar in 2008 and thereafter gradually declined respectively. Difficulties times for Mauritius can be noted with its foreign direct investment trend dimly declining from 6% to a -0.5% between 2000 and 2001, and thereafter it has been fluctuating on average 3% from 2003 to latest 2019. Eswatini has the lowest foreign direct investment of 3% on average compared to its SADC counterparts and it is the country that seems to not has its foreign direct investment affected in 2018 and

2019 as its curve steeply increases. Namibia and Angola have their foreign direct investment fluctuating below 0% from the period of late 2016. On average, it can be noted that foreign direct investment of 8 of the selected SADC countries has been decreasing on average from 2010 to 2019.

There is a problem of low economic growth in SADC region and low foreign direct investment inflow associated with the country specific regulations that limit the inflow of foreign direct investment in certain sectors. The significance of this study is to analyse the relationship between foreign direct investment and economic growth in SADC region for the period from 2000 to 2019 incorporating gross capital formation, labour force participation rate and exchange rate as one of the major variables that contributes to economic growth and flow of foreign direct investment. This study is structured in the following format: section two provides the theoretical and empirical literature, section three provides the data analysis and model specification, section four provides the discussion of results from the study and finally section five provides conclusion, policy recommendation and limitations of the study.

2 Literature Review

This section examines the impact of foreign direct investment on economic growth in developed, developing, and finally recently emerging economies. Theoretical considerations will be given to theories of foreign direct investment and economic proximity. The empirical review will present the findings of various scholars as well as their implications for economic growth.

Theoretical literature

The Currency Areas Hypothesis and the Effect of the Exchange Rate: According Moosa (2002), the Currency Area Hypothesis and the Effect of Exchange Rate was developed by Aliber (1970,1971) where he argued foreign direct investment in terms of relative currencies. Aliber (1971) argues that firms in a strong currency country they tend to invest abroad, while those in weak currency countries do not have the same tendency. Alibers argues that the firms from strong countries are the sources of foreign direct investment while the recipients are the ones from weak currency countries. The theory is based on foreign exchange risk, capital market relationship and the market's preference for holding assets denominated in strong currencies.

A multinational corporation from a hard currency region, according to Aliber (1970), can borrow at a lower rate in a soft currency zone due to its reputation. The central premise is that a capital market bias exists due to an income stream originating in a country with a weak currency, which is linked to foreign exchange risk. As a result, it's possible that a business with a strong currency will be more effective at hedging foreign exchange risk. This can be tested experimentally by looking at the relationship between currency value and foreign direct investment flows. FDI outflows are linked to currency overvaluation, while FDI inflows are linked to currency undervaluation. Exports are seen as a viable alternative to exchange rates.

The Industrial Organization Hypothesis: According to Moosa (2002) this theory was developed by Hymer (1976) and later extended by Kindleberger (1969), Caves (1982) and Dunning (1988). The authors argues that when a multinational corporation (MNC) establishes another subsidiary in another country it faces disadvantages of language, culture, legal system, and inter-country differences. Multinational corporations must pay higher wages than local firms for example, because employment with them is regarded as risky.

An MNC has advantages in terms of a well-known brand name, patent-protected technology, managerial skills, and certain firm-specific factors, despite its disadvantages. Capital, management, technology, marketing, access to raw materials, economies of scale and bargaining, and political power, according to Kindleberger. Commitment, information, and uncertainty, according to Aharoni (1966), are limitations to initial investment decisions.

Empirical literature

Studies that found a positive relationship: For the years 1996 to 2005, Anwar and Nguyen (2010) conducted a panel data analysis to determine the relationship between foreign direct investment and economic growth in Vietnam. They found that foreign direct investment boosts economic growth. Using a panel model for the years 1980 to 2007, Ndambendia and Njoupouognigni (2010) discovered a positive relationship between foreign direct investment and economic growth in 36 Sub-Saharan African countries and recommended relying on internal factors of foreign direct investment rather than external factors.

Wan (2010) looked at the literature on foreign direct investment and economic growth in various countries and discovered that many studies show a positive relationship between the two. By employing a Vector Error Correction Model for the period 1970 to 2009, Lean and Tan (2011) discovered a positive relationship between foreign direct investment and economic growth in Malaysia. The South African government, according to Mabule (2012), should

encourage capital-intensive foreign direct investment because it boosts economic growth by developing a skilled workforce and building capacity.

By using a panel data analysis for the period 1977 to 2009, Behname (2012) discovered a positive relationship between foreign direct investment and economic growth in Southern Asia and recommended that policymakers focus on infrastructure and capital formation. Using a panel data analysis for the period 1995 to 2008, Leitão and Rasekhi (2013) conducted a study on foreign direct investment and Portugal's economic growth and discovered a positive relationship. The researchers also suggested that future analyses of the two variables include the exchange rate and the budget deficit.

Focusing on the literature available from 1994 to 2012 across the globe, Almfraji and Almsafir (2014) discovered that foreign direct investment boosts economic growth through significant contributions from human capital, well-developed financial markets, and free trade regimes. Cambazoglu and Karaalp (2014) used a Vector Error Correction Model to study the effects of inward foreign direct investment on economic growth in Turkey from 1980 to 2010. Following the discovery of a positive relationship using an Autoregressive Distributed Lag model for the period 1971 to 2013, Malaysia should focus on promoting exports and foreign direct investment (Haseeb, Hartani et al. 2014).

Omri and Kahouli (2014) highlights that government of the selected 65 countries to encourage inflow of foreign direct investment as it boost economic growth. Iamsiraroj and Ulubaşoğlu (2015) and Seyoum, Wu et al. (2015) encourages policy makers to focus on policies that attract foreign direct investment after a positive relationship was found between foreign direct investment and economic growth in 140 developed and emerging countries. Iamsiraroj (2016) advocates for government to generate and maintain the availability of labour force, diminish trade barriers and creation of good macroeconomic environment after he discovered a positive relationship between foreign direct investment and economic growth in 124 countries.

According to Omri and Kahouli (2014), the governments of the selected 65 countries should encourage foreign direct investment in order to boost economic growth. After finding a positive relationship between foreign direct investment and economic growth in 140 developed and emerging countries, Iamsiraroj and Ulubaşoğlu (2015) and Seyoum, Wu et al. (2015) encourages policymakers to focus on policies that attract foreign direct investment. After discovering a positive relationship between foreign direct investment and economic growth in

124 countries, Iamsiraroj (2016) advocates for the government to generate and maintain labour force availability, reduce trade barriers, and create a good macroeconomic environment.

By employing an Autoregressive Distributed Lag model for the period 1990 to 2014 and Error Correction model for the period 1975 to 2017, Sunde (2017) and Awunyo-Vitor and Sackey (2018) recommend that government to formulate policies that attract foreign direct investment as it stimulates economic growth in South Africa and Ghana respectively. Owusu-Nantwi and Erickson (2019), Osei and Kim (2020), Sohail and Mirza (2020) and Rautenbach (2021) highlight the need to focus on policies that attract foreign direct investment in South America, 62 middle and high-income countries, Pakistan and East African countries.

Studies that found an inverse relationship: For the period 1980 to 2010, Mazenda (2014) used a Vector Error Correction model to find that foreign direct investment is negatively related to economic growth in South Africa in the long run. The researcher also suggests that, based on empirical evidence, foreign direct investment be encouraged to significantly boost long-term economic growth. For the period 1999 to 2013, Rahman (2015) discovered a negative impact of foreign direct investment on economic growth in Bangladesh and recommended that the government revise its foreign direct investment policies in order to boost economic growth.

Mugowo (2017) looked at the relationship between foreign direct investment and economic growth in the SADC region from 1980 to 2015. Using a fixed effect panel model, the researchers discovered that foreign direct investment has a negative impact on economic growth in the SADC region over the study period. From 1980 to 2012, Mahembe (2014) looked at foreign direct investment and economic growth in 15 SADC countries. To investigate the relationship, the researchers used a vector autoregressive model and an error correction model, which revealed a non-causal relationship between the variables.

For the period 2000 to 2017, Susilo (2018) discovered that foreign direct investment is detrimental to economic growth in the United States of America, and that economic growth in the United States of America is due to personal consumption. Khobai, Hamman et al. (2018) warn against focusing solely on attracting foreign direct investment, instead emphasizing the importance of developing channels and strategies through which foreign direct investment can improve South African welfare.

Studies that found no relation and non-linear: After discovering no link between foreign direct investment and economic growth in 16 Arabian countries, El-Wassal (2012) recommends focusing on the quality of foreign direct investment, reformatting domestic

financial markets, and macroeconomic policies. Financial development is much more important in Sri Lanka than foreign direct investment, according to Jahfer and Inoue (2014), who found no correlation between the variables using a vector error correction model for the period 1996 to 2011. In 27 African countries, Yeboua (2021) discovered a nonlinear relationship between foreign direct investment and economic growth. The author also suggests that policies aimed at attracting foreign direct investment should be coordinated with policies aimed at improving African institutions.

3 Methodology

Data sources and description: The study utilises annual data collected from the World Bank spanning from 2000 to 2019 for 8 SADC countries namely: Angola, South Africa, Tanzania, Mozambique, Eswatini, Namibia, Mauritius, and Madagascar. The variables are gross domestic product per capita (GDP per capita) annual percentage growth rate, foreign direct investment inflows (FDI) as a percentage of GDP, gross capital formation (GCF) as a percentage of GDP, labour force participation rate (LAB) as a percentage of total population ages 15+ ILO estimates, and official exchange rate (EXC) LCU per US\$ average period.

Empirical model

The main objective of the study is to analyse the relationship between foreign direct investment and economic growth in 8 SADC countries due to the limitation in unavailability of data for other 8 SADC countries through employing gross capital formation, labour force participation rate and official exchange rate as intermittent variables. The empirical model for the study is therefore specified as follow:

$$GDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 GCF_t + \beta_3 LAB_t + \beta_4 EXC_t + \varepsilon_t \dots\dots\dots (1)$$

Whereby β_0 is the slope coefficient, $\beta_{1...4}$ is the slope coefficients of regressors, t is the period and ε_t is the error term.

Model specification

The study analysed the literature review of the studies from developed and developing countries on the relationship between foreign direct investment and economic growth, and concluded employing the Panel Autoregressive Distributed Lag model developed by Pesaran and Smith (1995) and later modified by Pesaran, Shin et al. (1999). This model is called an mediator model since it involves both pooling and averaging (Pesaran, Shin et al. 1999).

Unlike traditional panel ordinary least squares models, PARDL allows intercepts, short-run coefficients, and error variances to differ freely across groups, but constraining long-run coefficients to be the same. The PARDL (p, q,q,...q) model can therefore be specified as:

$$y_{it} = \sum_{j=1}^p \delta_i y_{i,t-j} + \sum_{j=0}^q \beta'_{ij} x_{i,t-j} + \varphi_i + \varepsilon_{it} \dots\dots\dots (2)$$

Where, $x_{it}(k*1)$ is a vector of independent variables, φ_i are unit specific fixed effects, δ_i represent coefficient of the logged dependent variable, ε_{it} is the error term and β'_{ij} coefficient vectors.

The re-parameterised ARDL (p, q,q,..q) error correction model is specified as:

$$\Delta y_{it} = \phi_i y_{i,t-1} - \lambda'_i X_{it} + \sum_{j=1}^{p-1} \xi'_{ij} \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \beta'_{ij} \Delta X_{i,t-j} \delta'_{ij} + \varphi_{it} + \varepsilon_{it} \dots\dots\dots (3)$$

Where, ϕ_i is a group specific speed of adjustment, λ'_i is a vector of long-run relationships, ECT is given by $y_{i,t-1} + \lambda'_{ij} X_{i,t-j}$ and ξ'_{ij}, β'_{ij} are short-run dynamic coefficient.

4 Results

3.1 Descriptive statistics

Table 1: Results of descriptive statistics

	LGDP	LFDI	LGCF	LLAB	LEXC
Mean	2.259437	4.507526	24.21378	69.04200	4.103355
Median	2.721001	2.879569	22.03104	69.15500	3.378003
Maximum	11.03078	39.45620	53.98797	89.05000	8.193766
Minimum	-15.04219	-6.369877	10.97024	46.98000	1.849923
Std. Dev.	3.181247	6.658811	8.648314	14.79140	2.111637
Skewness	-0.963192	2.569630	1.136897	0.022815	0.739970
Kurtosis	8.337730	11.40774	4.274145	1.260880	2.005565
Jarque-Bera	214.6821	647.3476	45.29059	20.17746	21.19414
Probability	0.000000	0.000000	0.000000	0.000042	0.000025
Sum	361.5098	721.2042	3874.206	11046.72	656.5368
Sum Sq. Dev	1609.132	7050.022	11892.14	34786.88	708.9827
Observations	160	160	160	160	160

Source: Author's computation

The study conducted a descriptive statistic as given in table 1 above. The results show that the average gross domestic product per capita is 2.26% representing an average economic growth of 2.26 from the year 2000 to 2019. Furthermore, there is an average foreign direct investment of 4.51%, gross capital formation with 24.21%, labour force participation rate of 60.04% and 4.10% official exchange rate. The results further reveal e negative skewness of gross domestic product per capita with a coefficient of -0.96 while foreign direct investment, gross capital formation, labour force participation rate and official exchange rate to the dollar are positively skewed with coefficients of 2.57, 1.14, 0.02 and 0.74 respectively.

3.2 Correlation analysis

Table 2

Correlation	DLGDP	DLFDI	DLGCF	DLLAB	DLEXC
DLGDP	1.000000				
DLFDI	-0.180819	1.000000			
DLGCF	-0.061022	0.423195	1.000000		
DLLAB	-0.048224	0.036150	0.065555	1.000000	
DLEXC	-0.099900	0.078745	-0.086670	0.113311	1.000000

Source: Author's compilation

The study conducted a correlation analysis to check the nature of correlation that exists between the variables. There is a negative correlation between foreign direct investment, gross capital formation, labour force participation rate and official exchange rate. The coefficient of correlation is -0.19 between DLFDI and DLGDP, -0.06 between DLGCF and DLGDP, -0.05 between DLLAB and DLGDP, and -0.10 between DLEXC and DLGDP. The highest positive correlation is between DLGCF and DLFDI with a coefficient of 0.42. These results confirms that the variables are a good for conducting the study as their correlation coefficients are very low.

3.3 Perform unit root test

The study employs the cross sectionally independent group and individual unit root test to reveal the order of integration of the variables. The results Levin, Lin and Chu group unit root test reveals that LGDP, LGFDI and LGCF are stationary at 5% and 1% significantly at the level form, except for LLAB and LEXC that are not stationary. The study individual unit root test of Im, Pesaran and Shin, ADF-Fisher Chi-square, and PP-Fisher individual unit root test

LGDP, LFDI and LGCF are stationary at level form except for PP-Fisher unit root test that reveal that LGCF is not stationary at level form.

The study therefore continues with Levin, Lin and Chu group unit root test and found that all the variables are stationary at first difference at 1% level of significance except for LLAB that is stationary at 10%. This implies that the variables are integrated of I(1). The results of Pesaran and Shin, ADF-Fisher and PP-Fisher individual unit root test reveals that the variables are stationary at first difference implying that they are integrated of I(1). This makes it suitable for employing the panel ARDL model since it requires the variables to be stationary at I(0) or I(1) or a mixture of I(0) and I(1) but no variable should be stationary at I(2).

Table 3: Unit root test

Panel unit root test					
Null Hypothesis: Unit root					
At level	LGDP	LFDI	LGCF	LLAB	LEXC
Levin, Lin & Chu t*	-2.1287 **	-1.9139 **	-3.7749 ***	-1.0529	0.7431
Im, Pesaran & Shin W-stat	-3.1587 ***	-2.1903 **	-1.7122 **	0.5338	2.4508
ADF-Fisher Chi-square	42.2242 ***	29.6421 **	26.0154 *	13.4005	3.3027
PP-Fisher	74.6496 ***	52.5564 ***	21.2989	7.0880	9.2147
At first difference	DLGDP	DLFDI	DLGCF	DLLAB	DLEXC
Levin, Lin & Chu t*	-11.298 ***	-2.6219 ***	-3.3231 ***	-1.5659 *	-7.4228 ***
Im, Pesaran & Shin W-stat	-11.819 ***	-5.8613 ***	-3.6582 ***	-1.5664 *	-6.8819 ***
ADF-Fisher Chi-square	142.377 ***	64.5335 ***	41.3467 ***	24.7944 *	74.4692 ***
PP-Fisher	518.795 ***	279.485 ***	81.9608 ***	39.3131 ***	90.3260 ***

Source: Author's own computation (*) 10%, (**) 5% and (***) 1% significant respectively

3.4 Optimal leg selection

The study conducted the cross-section independent group and individual unit root test and revealed that the variables are integrated of I(0) and I(1). The study further followed the VAR optimal lag selection criterion and revealed that the maximum number of lags that can be utilized in the study is 1 lag as given in table above selected by the FPE, AIC, SC, and HQ criterion while the LR criterion selected 4 lags as shown in table 4 below.

Table 4: Results of the optimal leg selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-815.4618	N/A	86.26976	18.64686	18.78762	18.70357
1	-645.5331	316.6853	3.204959*	15.35302*	16.19757*	15.69327*
2	-627.0073	32.42012	3.733526	15.50017	17.04850	16.12395
3	-607.4009	32.08327	4.279362	15.62275	17.87487	16.53007
4	-578.2207	44.43344*	3.995908	15.52774	18.48366	16.71861

Source: Author's compilation

3.5 Cointegration test

Table 5: Results of the cointegration test

Null hypothesis: No cointegration			
		t-Statistic	Prob
Kao Residual Cointegration Test	ADF	-3.654131	0.0001
		Statistic	Prob
Pedroni Residual Cointegration	Panel v-Statistic	-1.479954	0.9306
	Panel rho-Statistic	-1.368308	0.0856
	Panel PP-Statistic	-16.17306	0.0000
	Panel ADF-Statistic	-8.196337	0.0000

Source: Author's compilation

The study conducted a cointegration test to determine if there is a long-run relationship between the variable. The results of Kao and Pedroni residual cointegration are given in table 5 above and their probabilities confirms the rejection of null hypothesis (Ho) of no cointegration, and we can therefore conclude that there exists long-run relationship among the variable in the model. This validates the results of long-run regression that will be given by the panel ARDL model in table 6 below.

3.6 Pooled Mean Group (PMG) Estimator/ ARDL models

There results of the panel ARDL short run regression are given in table 6 below. There is a positive statistically significant short run relationship between foreign direct investment and economic growth in SADC region. A 1% increase in foreign direct investment in the short run will significantly results in economic growth increasing by 0.22%, ceteris paribus. This means that foreign direct investment is very important for economic growth in the short run in SADC region and calls for these countries to focus on policies that increase foreign direct investment as it boosts economic growth. These results are consistent with the study conducted by Ndambendia and Njoupouognigni (2010) that utilised panel estimation data and found that there is a positive relationship between foreign direct investment and economic growth, though the study focused on Sub-Saharan Africa.

Table 6: Panel ARDL short run regression

Panel ARDL model short run equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob
CointEq(-1)	-1.492756	0.170452	-8.757632	0.0000
D(DLGDP(-1))	0.202301	0.089220	2.267448	0.0270
D(DLFDI)	0.209386	0.095548	2.191427	0.0323
D(DLFDI(-1))	0.220047	0.093737	2.347499	0.0222
D(DLGCF)	-0.032814	0.170191	-0.192808	0.8478
D(DLGCF(-1))	-0.216023	0.192765	-1.120653	0.2669
D(DLLAB)	-10.58293	7.955752	-1.330224	0.1885
D(DLLAB(-1))	4.347651	2.703120	1.608382	0.1130
D(DLEXC)	2.073781	4.116005	0.503833	0.6162
D(DLEXC(-1))	1.459143	3.012886	0.484301	0.6299
C	-0.066125	0.157018	-0.421131	0.6752

Source: Author's own computation (*) 10%, (**) 5% and (***) 1% significant respectively

Furthermore, there is a negative statistically significant short run relationship between gross capital formation and economic growth in SADC region. A 1% increase in gross capital formation in the short run, will insignificantly results in economic growth declining by 0.22%, ceteris paribus. Though the results are negative in the short run, these countries must focus on ways that increase in gross capital formation as it boosts economic growth in the long run.

There is a positive statistically insignificant short run relationship between labour force participation rate and economic growth in SADC region. A 1% increase in labour force participation rate in the short run, will insignificantly result in economic growth increasing by 4.35%, *ceteris paribus*. Though the relationship is insignificant, the contribution is positive, and this calls for these countries to promote increase labour force participation as it boosts economic growth in their economies.

There is a positive statistically insignificant short run relationship between official exchange rate and economic growth in SADC region. A 1% increase in official exchange rate in the short run, will insignificantly result in economic growth increasing by 1.46%, *ceteris paribus*. Though the results are insignificant, the positive contribution it has on economic growth is important for the growth of these countries. This calls for these countries to keep track on factors that increase the official exchange rate as this has a final chain reaction of an increase in economic growth of these SADC countries.

The results in table 6 above shows an error correction term (CointEq(-1)) that is negative and statistically significant. The coefficient of the error correction term (ECT) is 1.49 meaning that 149% of the error in economic growth are corrected annually. These results are consistent with the prior expectation of an error correction term that it should be negative and statistically significant for it to correct error that might happen in the model.

3.7 Panel ARDL and long run estimation

Table 7: Panel ARDL long run regression

Panel ARDL model long run equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob
DLEFDI	-0.100884	0.051922	-1.942977	0.0567
DLGCF	0.072879	0.039259	1.856351	0.0683
DLLAB	-0.369081	0.148947	-2.477935	0.0160
DLEXC	-2.591178	1.259113	-2.057940	0.0439

Source: Author's own computation (*) 10%, (**) 5% and (***) 1% significant respectively

The results of the PARDL long run relationships are given in the table 7 above. There is a negative statistically significant long-run relationship between foreign direct investment and economic growth in the selected 8 SADC countries. A 1% increase in foreign direct investment will significantly result in 0.10% decrease in economic growth in the long-run, *ceteris paribus*.

The magnitude of impact is negative and small implying that it is very important to note the negative effect foreign direct investment has on economic growth in the long run in SADC region.

This calls for these countries to reduce reliance on foreign direct investment in the long run as it is detrimental for the growth of their economies. These results are constant with the study conducted by Mugowo (2017) that found a negative relationship between foreign direct investment and economic growth in SADC region. Mahembe (2014) also reveal non-causal relationship between foreign direct investment and economic growth in both the short-run and long-run relationship. Ndambendia and Njoupouognigni (2010) found a positive contribution of foreign direct investment in 36 Sub-Saharan countries which is a region that also covers some of the SADC countries.

The results further reveal a positive statistically significant long-run relationship between gross capital formation and economic growth in SADC region. A 1% increase in gross capital formation in SADC region will significantly increase economic growth by 0.07%. This means gross capital formation is important for economic growth in SADC region in the long-run and this calls for these countries to put more focus gross capital as it boosts economic growth.

Furthermore, the study reveals a negative statistically significant long run relationship between labour force participation rate and economic growth in SADC region. A 1% increase in labour force participation rate will significantly result in economic growth declining by 0.37%, *ceteris paribus*. This implies that for the period understudy, labour force participation rate has not contributed positively to economic growth. This may be due to lack of skills needed in certain sectors to carry on daily tasks.

Finally, there is a negative statistically significant long-run relationship between official exchange rate and economic growth in SADC region for the period understudy. A 1% increase in official exchange rate will significantly result in economic growth declining by 2.59%, *ceteris paribus*. Exchange rate to the dollar has a negative impact on economic growth in SADC region. This may be because the dollar always fluctuates and gains much against the currencies of developing countries such as of the SADC region. This call for these countries to take note of the shocks in the exchange rate of these countries to counter the negative impact on economic growth.

3.8 Cross-Section Short run Coefficients

The study further conducted cross section short-run effect to evaluate the country specific effects in the short-run as shown in table 8 below. South Africa has a small coefficient of short-run adjustment towards long-run equilibrium compared to its SADC counterparts. The coefficient of adjustments towards long-run equilibrium is 0.98 for South Africa, 2.38 for Tanzania, 1.42 for Mozambique, 1.27 for Eswatini, 1.09 for Namibia, 1.16 for Angola, 1.68 for Mauritius and 1.95 for Madagascar. This means that if there are any errors in economic growth, 97%, 115% and 196% is adjusted towards long-run equilibrium for South Africa, Angola, and Madagascar respectively. These results are not much different to the group or panel error correction term of 149% for all the countries given in table 6 above.

Table 8: Country-specific effects

Country	Variables					
	CointEq(-1)	DLFDI	DLGCF	DLLAB	DLEXC	C
South Africa	-0.9790***	0.2572***	-0.1955*	-0.4351***	2.0812	-0.0002
Tanzania	-2.3786***	0.0073	0.0681***	3.2065*	4.5776	-0.1086
Mozambique	-1.4227***	-0.0221***	0.0450***	0.9176	6.7924	-0.5227***
Eswatini	-1.2720***	0.3417***	-1.4423***	14.8985	3.4041	0.0740
Namibia	-1.0934***	-0.1613**	0.4324***	0.2028	-15.096	-0.1722
Angola	-1.1567***	0.3193***	-0.1713***	17.9916	-5.9986	-0.7048
Mauritius	-1.6813***	0.3517***	-0.2814***	-0.1687	2.8634	0.1456***
Madagascar	-1.9583	0.6666**	-0.1833**	-1.8319	13.0489	0.7600

Source: Author's own computation (*) 10%, (**) 5% and (***) 1% significant respectively

There is a significant relationship between foreign direct investment and economic growth in SADC countries except for Tanzania where the relationship is insignificant. A 1% increase in foreign direct investment will significantly result in economic growth increasing by 0.26% in South Africa, 0.34% in Eswatini, 0.32% in Angola, 0.35% in Mauritius and 0.67% in Madagascar respectively, *ceteris paribus*. The relationship between foreign direct investment and economic growth is significantly negative in Namibia and Mozambique. A 1% increase in foreign direct investment will significantly result in economic growth declining by 0.02% and 0.16% in Mozambique and Namibia respectively, *ceteris paribus*. These results mean that foreign direct investment is not good for economic growth in Mozambique and Namibia in the short run.

There is a significant relationship between gross capital formation and economic growth in all the 8 SADC countries. A 1% increase in gross capital formation will significantly result in economic growth increasing by 0.08% in Tanzania, 0.05% in Mozambique and 0.43% in Namibia, *ceteris paribus*. A 1% increase in gross capital formation will result in economic growth declining by 0.20% in South Africa, 1.43% in Eswatini, 0.17% in Angola, 0.28% in Mauritius and 0.18% in Madagascar in the short run, *ceteris paribus*. These results mean that gross capital formation is good for economic growth in Tanzania, Mozambique, and Namibia in the short run and detrimental for economic growth in South Africa, Eswatini, Angola, Mauritius, and Madagascar. These results are consistent with the results found in table 6 above that show the existence of a negative relationship between gross capital formation and economic growth in the panel except for Tanzania, Mozambique, and Namibia.

There is a negative and positive significant relationship between labour force participation rate and economic growth in South Africa and Tanzania in the short run respectively. A 1% increase in labour force participation rate will result in economic growth significantly declining by 0.44% in South Africa and increasing by 3.21 in Tanzania, *ceteris paribus*. The negative relationship between labour force participation rate and economic growth in South Africa in the short run mean that labour force has not been able to significantly increase economic growth in South Africa calling for policy makers to take note of the policies that can increase labour force quality and skills so it can boost economic growth. The relationship is positive and statistically insignificant in Mozambique, Eswatini, Namibia, Angola and negative statistically insignificant in Mauritius and Madagascar. These results validate the results in table 6 that show the relationship between labour force participation and economic growth is insignificant in the panel in the short run.

There is an insignificant relationship between official exchange rate and economic growth in all the 8 SADC countries in the short run. These results are consistent with the results given in table 6 above that shows a statistically insignificant short run relationship between official exchange rate and economic growth in the panel. Though the relationship is statistically insignificant, it is positive in South Africa, Tanzania, Mozambique, Eswatini, Mauritius and Madagascar and negative in Namibia and Angola. Though they are insignificant, their contribution to growth of these economies is important since it is positive in majority except for a special case of Namibia and Angola where the relationship is negative.

3.9 Causality test

The study further conducted a Granger causality test shown in table 9 below to validate the results of short-run and long-run effects given in tables 6, 7 and 8. The results of Granger causality test indicate that there is bidirectional causality between foreign direct investment and economic growth, gross capital formation and economic growth, official exchange rate and economic growth. Furthermore, the results reveal no causal effect between labour force participation rate and economic growth.

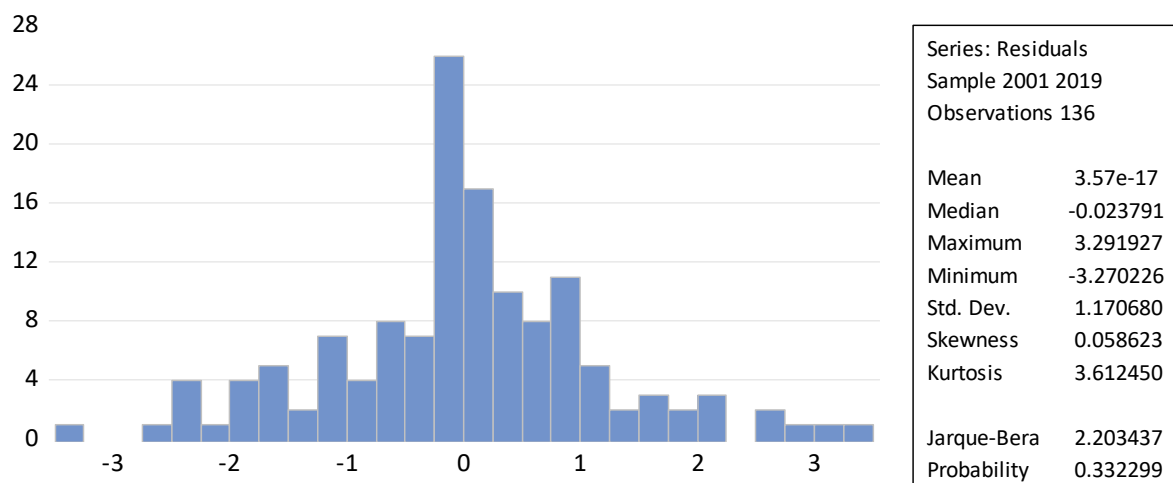
Table 9: Pairwise Granger Causality test

Null Hypothesis	F-Statistic	Prob
DLFDI does not Granger Cause DLGDP	3.83521	0.0241
DLGDP does not Granger Cause DLFDI	4.35752	0.0147
DLGCF does not Granger Cause DLGDP	4.85103	0.0093
DLGDP does not Granger Cause DLGCF	2.74697	0.0678
DLLAB does not Granger Cause DLGDP	1.75591	0.1768
DLGDP does not Granger Cause DLLAB	0.20187	0.8175
DLEXC does not Granger Cause DLGDP	4.12615	0.0183
DLGDP does not Granger Cause DLEXC	3.19274	0.0443

Source: Author's compilation

3.10 Diagnostic

Figure 1: Histogram normality test



Source: Author's compilation using data from World Bank

The study conducted the Jarque-Bera normality test as given in the figure above. The coefficient of Jarque-Bera is 2.203437 and its probability (0.332299) is greater than 0.05 the

critical value. This implies that we fail to reject the null hypothesis that the residuals are normally distributed in the model. This is consistent with the prior expectation of the assumption of the linear regression models that the residuals must be normally distributed for a model to be considered a good model for policy formulation.

The results found from the study make economic sense as they reveal that the individual effect of foreign direct investment is not the same for countries in the short run. This reveals that these countries have comparative advantage when it comes to the impact foreign direct investment have on a single economy. A comparative advantage of foreign direct investment on the growth of South African economy as opposed to the negative effect of foreign direct investment on the economic growth of Mozambique. This can be the case with a positive contribution of labour participation on economic growth in Tanzania and the detrimental effect of labour force participation rate on economic growth in South Africa. It can therefore be concluded that Tanzania has a comparative advantage in the labour force participation as compared to South Africa.

5 Conclusion and Recommendation

The study conducted unit root test to avoid problem of spurious regression, cointegration test to determine the existence of long run relationship, performed panel ARDL test to show the short run and long run results, performed Granger causality test to see if there is causal effect among the variables and finally performed diagnostic tests to reveal how serious the results can be taken and to avoid biased results. The study went on to reveal cross-section short run coefficients to show country specific short run effects.

Based on statistical results obtained from the study, it can therefore bring to the following policy recommendations: Firstly, the policy makers in these countries must develop and implement policies that encourage foreign direct investment inflows in the short run as it was found to boost economic growth except for Mozambique and Namibia whereby the causal relationship was found to be negative statistically significant.

Secondly, policy makers must revise policies of gross capital formation in the short run as it was found to have a negative causal relationship to economic growth. Policies that reduce gross capital formation in the short run will boost economic growth in these countries except for Mozambique and Tanzania where the relationship was found to be positive and statistically significant in the short run. Therefore, the positive short run statistically significant relationship between gross capital formation and economic growth in Mozambique and Tanzania calls for

the policy makers of these two countries to develop and implement policies that encourage gross capital formation as it boosts growth of their economies.

Thirdly, policy makers should reveal policies on labour markets since the relationship was found to be positive and statistically insignificant in the short run except for Tanzania where it is positive and statistically significant. Labour force participation rate in South Africa was found to be negative and statistically significant which calls for policy makers in South Africa to reveal the quality of labour they have and implement policies that will help labour force to contribute positively to economic growth in the short run.

Fourthly, in the long run, policy makers should revise policies of foreign direct investment, labour force participation rate and exchange rate as they contribute negatively to economic growth in the long run. Gross capital formation should be the focus in the long run as it significantly boosts growth of the panel countries.

The study would have liked to analyse the relationship in the panel until 2020 but there wasn't sufficient data for foreign direct investment in 2020 for all the panel countries. In conclusion, the paper has analysed the relationship between foreign direct investment and economic growth in SADC region and found that foreign direct investment is increasing in Mauritius, Eswatini, Angola, and South Africa while it is decreasing in Tanzania, Namibia, Madagascar, and Mozambique.

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