-RESEARCH ARTICLE-

MACROECONOMIC POLICY DIRECTIONS IN THE SOUTHERN AFRICAN CUSTOMS UNION

Opeyemi Aromolaran

Department of Economic Sciences,
North-West University, South Africa
Email: aromolaranopeyemi123@gmail.com
https://orcid.org/0000-0002-9734-0559

David Daw Olebogeng

Department of Economic Sciences,
North-West University, South Africa
Email: David.Daw@nwu.ac.za

─**Abstract**─

This study examines the causal relationship that characterizes some major macroeconomic variables in the Southern African Customs Union (SACU) over the period 1990 to 2019. The technique of the Dumitrescu and Hurlin (2012) Granger non-causality established the direction of causality. The empirical findings among others show that the major capital flow components of foreign portfolio investment and foreign direct investment respectively generate a unidirectional causality in respect of GDP per capita with causation running from the respective capital flow components. Moreover, the globalization index has been established to granger cause foreign direct investment while one-way causation runs from money supply to inflation rate. Additional evidence proves that GDP per capita causes monetary policy rate differential and not otherwise. The respective governments in the Southern African Customs Union need to provide a sound macroeconomic environment that will enable more capital flows for the regional economy to thrive. Moreover, the effective management of the monetary system and the state of the real sector is sine qua non for the soundness of the macroeconomy.

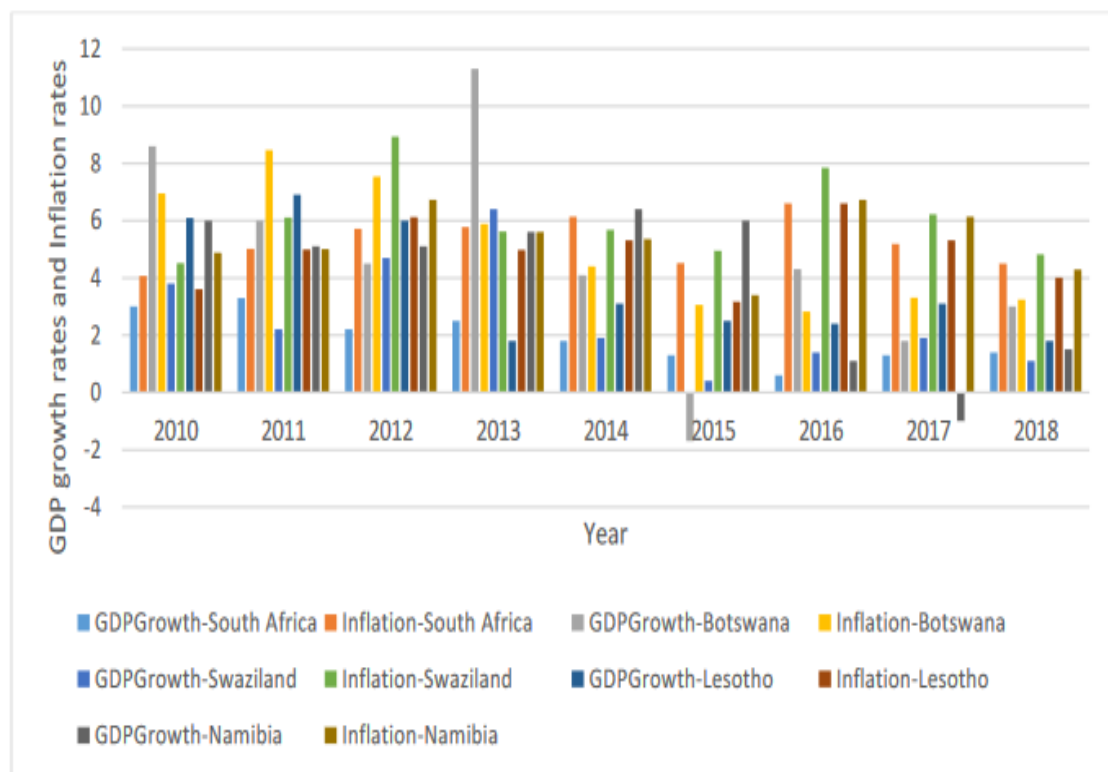**Keywords**: Capital flows, causality, monetary policy, GDP per capita

1. INTRODUCTION

Developing economies need appropriate direction of policies to spur growth and promote the living standards of their citizens. Undoubtedly, this will require an effective policy direction and responsive policy measures by the government. The policy direction of the monetary authority has key implications for the influx of capital flows. It was observed that monetary policy has more impact on the economy via inflation expectations as well as exchange rates (Bean, 2006), Woodford (2005). The attainment of identified objectives through the use of monetary and fiscal policies is the focus of theory and policy (Nayyar, 2011).

According to Kevin Hoover on *Causality in Macroeconomics*, the major basis for studying macroeconomics is to generate the avenue for a secure knowledge on which policies are based; the essence of the policy is to affect certain outcomes, control or effort geared to control; as well as the investigation of the specific connections that allow the control of one item to affect the other signals the study of causality (Hoover, 2001). Macroeconomic policies have intertwined affinity with respect to structural reforms as well as financial market policies (Hodson, 2015) .

Economies around the world have a wide array of variables to harmonize with a view to promoting desirable impacts on their citizens as well as improving global status. Such a complex array of macroeconomic variables generates the need to concentrate on macroeconomic variables which, to a large extent, define the living standards of the citizens.

It was observed that the aim of macroeconomic policy is to ensure a stable economic environment that provides the avenue for the stimulation of strong and sustainable economic growth, which further generate the platforms that provide impetus for the creation of jobs, wealth, as well as, enhanced living standards (Dolamore, 2014). Also, there is the possibility of central banks to realize their dual mandate for the attainment of price stability as well as achieve a target level of economic growth or employment, among other objectives (Bhattacharyya, 2012). Within the context of SACU, there was a record of average growth of 1.3% in 2017 which in comparison with that of 2016 and 2019, when it stood at 0.8%. Botswana had the highest forecasted growth rate of 3.8%, while South Africa and Swaziland had the lowest economic growth rate of 1.7% (Malefane, 2021; Murshed & Rashid, 2020). The stability and depth of economic growth are connected to other macroeconomic policy directions. For instance, the following figure shows the fluctuations in the growth rates of GDP and inflation rates in respect of the countries that constitute the Southern African Customs Union (SACU).

Source: (Taderera et al., 2021)

The foregoing graph describes the unstable structure between economic growth rate and inflation rates. Moreover, David et al. (2010) is of the view that exchange rate policy within the sphere of macroeconomic management in terms of changes in the rate of exchange have pronounced implications for the position of an economy's balance of payment as well as its income distribution and economic growth. Aside from the foregoing figure of Taderera et al. (2021), that compared economic growth rate and inflation rates, other macroeconomic variables can also be compared. It, therefore, becomes a key consideration when examining the direction of macroeconomic variable causality in SACU.

The current study takes inventory of a number of relevant macroeconomic variables that are very crucial for the performance of the Southern African Customs Union. The major consideration in this study is to ascertain the direction of causality of key macroeconomic variables ranging from monetary policy variables, capital flows variables and a number of others, comprising of economic growth, globalization index and real exchange rate with a view to providing guidance for policy formulation in respect of the Southern African Customs Union. The effectiveness of similar macroeconomic policy directions by the respective countries in the region will tend to

promote collective macroeconomic stability which invariably will influence the overall depth of economic activities streaming from the domestic economy to the foreign sector.

2. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Monetary Analysis Theory

This theoretical view posits that monetary policy influences the international mobility of capital, which is in the purview of a monetary phenomenon. International capital flows are expected to be a determinant of domestic monetary policies as well as the rate of change in the reserves. The balance of payments position is determined by the net flows of capital.

According to Harry (1972) as cited in Li (2018) , the following monetary analysis model was given for the analysis of international capital flows.

Money demand function: $H_d = H\left(P^+, Y^+, i^-\right)$

Money supply function: $H_s = H\left(\dfrac{1}{\varphi}\right)(R + D)$

The measure of the price level is P , gross level of output is Y , i is the interest rate, D represents the domestic credit, the international reserves is R while the statutory reserve ratio is φ .

Balance of supply and demand of money: $R + D = \varphi H\left(P, Y, i\right)$

Balance of income and expenditure: $dR = Hd\varphi + \varphi H_1 dp + \varphi H_2 dY + \varphi H_3 di - dD$

The balance of payments will experience improvements according to the monetary theory which states that when an economy is experiencing a rise of gross output or increase in the price level, it will stimulate the demand for money. The reverse will occur if there is a reduction in monetary demand due to higher interest rates. This claim is at variance with the flow model. However, the variance is analyzed in the general equilibrium model of Frankel and Honeywell (1980) as cited in Li (2018), which asserts that the short-term flows of international capital, are functionally dependent on the prevailing level of interest rate while money stock adjustment and domestic credit policy determine the long-term international capital flows (Li, 2018).

2.1.2 Probabilistic Approach to Causality

The probabilistic approach understands causality on the basis of probability raising which implies that item B causes item C provided the occurrence of B enhances the probability that C occurs: P(C\B) > P(C) (Reichenbach, 2018). Causality on the basis of

probabilistic theories can exhibit either the case of ontological reductiveness or concentrate on epistemology (Hodson, 2015; Williamson, 2009). The latter consideration considers the definition of noticeable effects generated by causal relations. Among studies in the context of causality is that of Granger. Its causality is influenced by Stahlman (1948) and Wiener (1956) analytical view of the probabilistic causality on the basis of discrete and continuous time series. The general description of the Granger idea of causality provides that a time series G causes that of H provided:

$P(H_{t+1} \epsilon A/\grave{\Omega}_t) \neq P(H_{t+1} \epsilon A/\grave{\Omega}_t - G_t$ in respect of certain A.

Provided:

H_t; G_t exhibit stationarity;

$\grave{\Omega}_t$ represent the entire pertinent knowledge obtainable in the Universe in t.

However, Granger (1980) remodel Suppes' view of prima-facie causality between events and thus arrived at the following: A variable G prima-facie causes H provided the addition of previous values of G to a model comprising of the entire previous values of H improves the standard of predictions (Granger, 1980) :

$P(H_{t+1} \epsilon A/H, G) \neq P(H_{t+1} \epsilon A/H)$. (Maziarz & Mróz, 2020)

It was observed that the majority of probabilistic theories of causality are inspired by the central intuitions comprising of (i) varying a cause result in a difference to its effects, as well as (ii) the fact that the difference-making manifests in probabilistic dependencies in respect of cause and effect. Several proponents of this theory are of the view that probabilistic dependencies manifest in the causal relation such that it makes available the necessary and sufficient conditions in respect of causal linkage, in the likes of: C causes E provided relevant probabilistic dependencies obtain. Moreover, they further hold the view that probabilistic dependencies examine the causal relation: 'C causes E' simply implies that the corresponding probabilistic dependencies occur. Williamson (2009).

2.1.3 Empirical Review

The subject of capital flows in relation to economic growth and other macroeconomic variables has been examined in past literature. Such studies include Abbes et al. (2015), utilizing cointegration and panel Granger causality tests, arrived at the conclusion that economic growth and FDI are cointegrated in the long-run, using data of 65 countries from 1980-2010. Nevertheless, a unidirectional causality from FDI to GDP was established.

De Vita and Kyaw (2008) conducted a panel study comprising of thirty-two developing economies spanning 1990-2004. The relative significance of crucial economic determinants of foreign direct investment and portfolio flows were analyzed. The

authors estimated a model on the basis of a variety of developed panel data approaches which put into cognizance individual and time effects, and potential heterogeneity over the respective members of the panel. Other considerations include; integration and cointegration properties as well as endogeneity and serial correlation. The authors found that domestic productivity growth is the key determining factor of FDI flows to developing countries. However, domestic money growth is the dominant 'pull factor' in respect of portfolio flows.

(Murshed & Rashid, 2020) worked on the effect that foreign capital inflows have on domestic price levels, volatility of exchange rate and monetary expansion in the case of Pakistan. Linear and nonlinear causality tests were used for the study and the authors found a significant inflationary outcome of inflows of capital, particularly during surges in the flow. They found a significant unidirectional nonlinear Granger causality of capital inflows to the variation in domestic prices while domestic prices have no linear causation in terms of domestic debt growth and the ratio of money supply to GDP. There was no significant relationships of market interest rate and the nominal exchange rate vis-à-vis domestic prices.

Olayungbo and Quadri (2019) examined the nexus among remittances, financial development and economic growth in the context of 20 Sub-Saharan African Countries for the period spanning 2000-2015. They utilized Pooled Mean Group and Mean Group/ARDL as well as panel unit root and cointegration tests. The authors found that in the short and long run, remittances and financial development exert positive effects on economic growth. The interactive term provided the evidence of financial development being substitutionary in the remittances-growth relationship. They found that causality runs from GDP to remittances as well as from financial development to GDP but no evidence of causality in respect of remittances and financial development.

Another study by Cavoli and Rajan (2005) analyzed the problem of capital inflows in some identified Asian economies in the 1990s: Data on variables such as net foreign assets, interest rates, prices, exchange rate, output and money supply were analyzed by adopting ordinary least squares and granger causality tests, establishing a simple model for the examination of why the issue of capital inflow surges in selected Asian economies before the financial crisis of 1997-98. It was revealed that, consistent uncovered interest differentials and the resultant capital inflows may be likely due to complete monetary sterilization, weak reaction of interest rates to domestic monetary equilibrium, perfect capital mobility, or a combination of the three. Capitalizing on the model, the paper performed a series of related empirical tests to examine the dynamic links among international capital flows, their depth of sterilization as well as uncovered differentials in interest rate with respect to Thailand, the Philippines, Malaysia, Korea and Indonesia during the era 1990:1-1997:5. The impact of monetary policy direction is unconnected with the magnitude of capital flows.

Capital inflows has also been found to have an impact on domestic credit expansion. For instance, there are empirical works that confirmed a direct relationship between capital inflows and expansions in credit (Bakker & Gulde, 2010; Gourinchas et al., 2001). This calls for the indispensability of the monetary authority to ensure appropriate management of liquidity in the system. For instance, Bakker and Gulde (2010) asserts that "given the high cost of credit boom-bust cycles, policymakers should closely monitor the joint behavior of capital inflows and domestic lending" utilizing "a combination of macroeconomic, exchange rate, prudential policy, and capital control measures to mitigate the adverse effects of large capital inflows"

Yildirim and Tastan (2012) examined "Capital flows and Economic Growth across Spectral Frequencies: Evidence from Turkey". Interactions and feedbacks with respect to capital flow components and economic growth over the period 1992:01-2009:08 were analyzed. They adopted a new version of the causality test of Geweke (1982) and (Hosoya, 1991).The authors, through standard methods in spectral analysis, disintegrated the total covariance of capital flows and growth over key frequency bands, taking note of lead/lag interactivity. The outcomes of their study show that variations in the respective capital flow components are mostly centered across high frequencies. The feedback in terms of economic growth and capital flows significantly changes in the stretch of the frequency and the capital flows components. Short-term borrowing from abroad as well as portfolio investments on government bonds in the context of business cycle frequencies stimulate economic growth while growth is the motivating factor for long-term borrowing as well as investment in share portfolio. However, bi-directional causality between long-term borrowings from abroad and economic growth was observed to be significant in the aftermath of the post-2001 financial crisis. Short-term borrowings from abroad, portfolio investments and bond flows exhibit no long-run effect on economic growth.

A study was conducted by Mkhonta (2017) to examine "The Impact of Discount Rate Differential with South Africa on Capital Flight in Namibia and Swaziland". Findings from the study reveal that higher interest rates in Swaziland and Namibia compared to South Africa result in capital flight to South Africa in the long run period due to the influence of South Africa in the monetary area. The Johansen, Juselius cointegration technique and the Vector Error Correction Model were used to examine the behavioural pattern above. It was revealed from the estimated model that Swaziland and Namibia differential in interest rates with respect to South Africa exhibits a significant inverse effect on net portfolio investment. The author established on the basis of the impulse response function that capital flight undermines economic growth in Namibia and Swaziland. The causality tests reveal that the budget deficit, differential in the interest rate, and growth all granger cause capital flight. Moreover, the study demonstrates that budget deficit and economic growth in respect of Namibia and Swaziland do not significantly affect capital flight in the long run. It was concluded from the study that in the short run, monetary policy appears more sensitive to financial sector developments

in the case of Namibia compared to Swaziland owing to the divergence in financial markets developments.

A study by (Akinbobola et al., 2017) utilized the technique of Wald causality to determine the direction of causality between foreign portfolio investment and economic growth in Nigeria over the period 1986 to 2013. The authors established the evidence of a direct positive cointegration between foreign portfolio investment and economic growth which signals stability in the long-run equilibrium relationship. Moreover, a bidirectional causal relationship was found between foreign portfolio investment and economic growth. The study also observed the complementary role in respect of domestic savings and interest rate in economic growth. Another study by Munir et al. (2016) analyzed the nexus in terms of personal remittances and economic growth in Pakistan spanning 1980 – 2014 by utilizing time-series data. The authors found, on the basis of the Granger-causality test, evidence showing that personal remittance flow is the variable that causes economic growth.

Mirza and Rashidi (2018) examined the causality between interest rate and inflation rate in respect of SAARC economies by utilizing panel data over the period 2006 – 2013. They considered two instances such that in the first category, they examined the causality between lending interest rate and changes in inflation rate while the second concentrated on the causality between real interest rate and inflation rate. The authors found in the first instance that there is no relational evidence from changes in inflation rate with respect to changes in the lending rate. However, the second category yields result that are dual in nature, establishing the cause-and-effect nexus in terms of real interest rate and inflation rate.

Karahan and Yilgör (2017) investigated the nexus between interest rate and inflation in respect of Turkey for the period 2002-2016. The authors used the techniques of cointegration and causality tests and established the evidence of unidirectional causality running from inflation to interest rate. They concluded that for the economy under consideration, the provision of price stability is necessary for the effective management of interest rate.

Makoni and Marozva (2018), examined the directional relationship for the economy of Mauritius with respect to foreign portfolio investment and financial market development by utilizing secondary data that spanned from 1989 – 2016. The authors found evidence of a long run positive relationship between foreign portfolio investment and real growth.

Ezeanyeji and Maureen (2019) analyzed over the period 1986 to 2017, the effect foreign portfolio investment exerts on economic growth in Nigeria. The authors utilized Augmented Dickey-Fuller test, the technique of Johansen co-integration and the Error Correction Model for the analysis. Net foreign portfolio investment, real Gross Domestic Product, trade openness, inflation rate and market capitalization constitute the variables that were empirically examined. The authors established that foreign portfolio

investments exert a significant positive effect on economic growth in the country. They therefore stated that the government should formulate policies that will stimulate capital market growth in the long-run and the macroeconomy. The provision of a conducive business environment through regular power supply, good roads, safety of life and property as well as the maintenance of policy consistency are all necessary to stimulate domestic investment. It was also advised that the capital market should further be deepened via introduction derivatives.

Batarseh (2021) examined the nexus between M1- money supply and inflation in respect of the economy of Jordan spanning 1980-2019. The author employed econometric analysis of time series encompassing the Augmented Dickey-Fuller (ADF) test, Johansen's Cointegration-in order to ascertain the long-term equilibrium nexus between the variables as well as the use of the Granger Causality Test to establish the direction of causality, if it operates in the short term. It was observed from the study that inflation produced I(0) while the M1-money supply was I(1). The evidence of a causal relationship between the M1-money supply and inflation was non-existing in the long run as established from the Cointegration test. Moreover, a unidirectional causal relationship that runs from the M1-money supply to inflation in the short term was found through the Granger Causality test. The author concludes for the Jordanian economy, that the M1-money supply can provide information on the changes that characterize the consumer price index (CPI). It was prescribed from the study that the Jordanian monetary authority exhibits greater control of the money supply because of its effect on the stability of inflation with a view to avoiding the repetition of the 1989 crisis represented by the swift fall of the dinar exchange rate in relation to other currencies and a rise in the general price level to 25.6% that year.

The study conducted by Bednarik (2010) found a strong and mutual relationship existing in respect of money supply and real GDP and whether the quantity theory of money operates. The techniques of vector Autoregressive, Johansen Cointegration as well as the granger causality test were utilized. The data were quarterly spanning 2002-2009 with respect to Czech Republic money supply (M3) and real GDP.

Duasa and Kassim (2009) examined "Foreign Portfolio Investment and Economic Growth in Malaysia". The authors utilized granger causality test as well as Toda and Yamamoto's (1995) non-causality techniques with a view to ascertaining the direction of causality as regard FPI and real gross domestic product. Volatility of FPI and real GDP were also examined in this regard. Other consideration includes innovation accounting via the simulation of variance decompositions and impulse response functions. The data used for the study is quarterly, spanning from 1991 to 2006. The authors established that changes in FPI are caused by economic growth as well as its volatility but not otherwise. They conclude that the key pull factor that drives in FPI into the economy is economic performance.

Indalmanie (2011) examined for Jamaica, the causal link with respect to inflation rate and money growth rate. He employed quarterly data that spanned 1961 – 2006. Evidence of a feedback effect between inflation and narrow money was ascertained by the author and a unidirectional causality was established from inflation to quasi and broad money.

Singh and Singh (2015) examined the relationship in respect of economic growth and consumer price index for Japan covering 1980 – 2014. The Augmented Dickey – Fuller and the Johansen Co-integration Test were utilized. They also analyzed for causality by the use of Granger Causality model. The authors established a cointegrated relationship between economic growth and CPI as well as a bi-directional causality between economic growth and CPI. The dynamic relationship in respect of economic growth and consumer price index was examined by a time series structure of the Vector Error Correction Models.

Pradhan and Arvin (2015) employed the technique of a panel VECM to examine the causality existing in respect of foreign and economic growth as well as two other variables covering the period 1961-2012. The four variables exhibit a long run equilibrium relationship from the panel cointegration tests. The authors established that a unidirectional causality running from foreign aid to economic growth operates in the short-run. However, the long-run causality between foreign aid and economic growth is bidirectional.

Ali (2018) studied the top ten highest remittance recipient economies in the world by the analysis of causality in respect of remittances and economic growth. The span of the study was 1998 – 2014 and the ratio of remittances to GDP was utilized. Adopting Bootstrap panel Granger-causality, it was found that the situation of a bidirectional causality operates for Haiti.

Ahmed and Hakim (2017) utilized a time series data set which spanned 1974 – 2015 in respect of Togo, analyzed the nexus between remittances and economic growth. The techniques used for the study include the Johansen cointegration test, a three-step vector equilibrium correction mechanism to ascertain long-run causality, Wald test to estimate short-run causality and pairwise-Granger causality. The authors consequently established the case of a long-run bidirectional granger-causality between remittances and economic growth.

A study by Ray (2012) employed the Granger causality test to ascertain the causal relationship between globalization and economic growth with respect to India. The evidence of a mutual causality was established in respect of globalization and economic growth.

Luintel and Khan (1999) established bidirectional causality between financial development and economic growth while covering a sample of ten economies. Another study by Wolde-Rufael (2009) also offers evidence of a bidirectional causality with

respect to economic growth and the respective individual financial development variables.

Uneze (2013) via panel cointegration and causality analyzed in the context of Sub-Saharan African countries the causality as regard capital formation and economic growth over the period 1985–2007. The author found evidence of bidirectional causality between capital formation and economic growth and the outcome remains the same, be it private fixed capital formation or gross capital formation.

3. METHODOLOGY

3.1 Panel Granger Causality test

The panel causality test was used to examine the direction of causality of the macroeconomic variables used for the study. The present research work concentrates on five countries that belong to the same union comprising of Lesotho, Namibia, Eswatini, South Africa and Botswana. The study uses the panel causality in line with Dumitrescu-Hurlin test as expressed in the work of Lopez and Weber (2017) who examined the topic "Testing for Granger causality in panel data".

Referring to the work of Granger 1969 in which a methodology showing the causal relationships between stationary time series was developed; consequently, the equation below that examines the causality of x to y is expressed:

$$y_t = \alpha + \sum_{m=1}^{M} \varphi_k y_{t-m} + \sum_{m=1}^{M} \gamma_m x_{t-m} + \epsilon_t \qquad \text{such that t} = 1, \ldots, T$$

The central focus here is that x causes y provided the previous values of x significantly predict y despite the inclusion of the past values of y. The testing of the null hypothesis below on the basis of F-test therefore holds.

$$H0 : \gamma 1 = \ldots = \gamma m = 0$$

The implication of the foregoing equation is that the rejection of H0 provides that x causes y. Also, the possibility of a bidirectional relationship can also be ascertained from the model.

However, Dumitrescu and Hurlin expanded the causal relationship between y and x for the case of panel data results in the following expression:

$$y_{1,t} = \alpha_i + \sum_{m=1}^{M} \varphi_{im} y_{i,t-m} + \sum_{m=1}^{M} \gamma_{im} x_{i,t-m} + \epsilon_{i,t} \qquad \text{such that I} = 1,\ldots,N \text{ while t} = 1,\ldots,T$$

The variables $x_{i,t}$ and $y_{i,t}$ are expected to be stationary for the respective unit at time t. The DH model permits the coefficients to vary among the units though on the ground of being time invariant. The model requires a panel balanced data set while the lag order "M" is on the basis that it is similar in respects of the units that constitute the panel data.

The null hypothesis to test the causality of the previous values of x on y is therefore expressed below based on the Idea of Granger.

$$H0: \gamma_{i1} = \ldots = \gamma_{im} = 0 \qquad\qquad \forall_i = 1, \ldots, N$$

The equation above implies the absence of causality among the constituent units. The alternative hypothesis is contained below on the basis that some of the units may be characterized by causality.

$$H0 : \gamma_{i1} = \ldots = \gamma_{im} = 0 \qquad\qquad \forall_i = 1, \ldots, N_1$$

$$\gamma_{i1} \neq 0 \text{ or} \ldots \gamma_{im} \neq 0 \qquad\qquad \forall_i = N_1 + 1, \ldots, N$$

Equating $N_1 = 0$ provides the Presence of causality in respect of all the units that constitute the panel and N_1 must be of a lower size compared to N without which causality will be nil for all the units. Thus, H_1 falls to H0

While $N_1 \in [0, N - 1]$ is not known.

Given the following, Dumitrescu-Hurlin provides that "N" individual regressions be implicitly analyzed after which the F-tests of the "M" linear hypothesis $\gamma_{i1} = \ldots = \gamma_{im} = 0$ to obtain Wi. Haven't done the foregoing, the mean ($\bar{w}$) of the N individual Wald statistics is expressed below:

$$\bar{w} = \frac{1}{N} \sum_{i=1}^{N} w_i$$

The foregoing test provides information as regard the causality in the panel while the rejection of H0 has no negating effect of the presence of causality among some units.

Dumitrescu-Hurlin on the basis of the Monte Carlo simulations provides that $\bar{w}$ is asymptotic, therefore, it can effectively examine causality in a panel data set.

Given that w_i is characterized by independent and identical distribution among the units in the panel, it follows that $\bar{Z}$ which is standardized provided T → ∞ and N → ∞, then the standard normal equation below holds:

$$\bar{Z} = \sqrt{\frac{N}{2M}} \cdot (\bar{w} - M) \xrightarrow{d} , N(0, 1) \text{ as } T, N \to \infty$$

However, if T is fixed, having T > 5 + 3M, the following standard normal distribution in respect of $\tilde{Z}$ is obtained:$\tilde{Z} = \sqrt{\frac{N}{2M} \cdot \frac{T-3M-5}{T-2M-3} \cdot \left[\frac{T-3M-3}{T-3M-1} \cdot \bar{w} - M\right]} \xrightarrow{d} N(0, 1), \text{ as } N \to \infty$

In conclusion, the null hypothesis is examined based on $\bar{Z}$ and $\tilde{Z}$. H0 is rejected provided the two statistics exceed the normal critical values which implies the presence of granger causality. Given a panel data set with large N and T, $\bar{Z}$ is appropriate while if N is large

alongside a small T, then $\tilde{Z}$ is more appropriate. However, Dumitrescu-Hurlin, by utilizing Monte Carlo simulations, shows that though T and N may be small, it conveys very good finite sample properties.   (Lopez & Weber, 2017)

The Murshed and Rashid (2020) is of relevance in a situation when N is increasing while T is constant. Also, the test is appropriate when T >N and if N >T. The test is premised on VAR and is based on the idea that cross-sectional dependency is non-existent. However, the Monte Carlo simulations show that the test can generate strong results in the context of cross-sectional dependency (Akbas et al., 2013). The current study comprising of 5 countries (N) having T as 30, with total observations NT of 150 per variable, therefore, finds appropriateness within the context of the Dumitrescu-Hurlin Panel Granger Causality test.

3.2   Sources of Data

The foundational root of SACU can be traced to the late nineteenth century. South Africa alongside Bechuanaland (Bank of Botswana), Basotholand (Central Bank of Lesotho) and Swaziland (Eswatini) signed a treaty in 1969. However, Namibia formally connected to SACU in 1990 after which it attained independence in 1990, though, previously indirectly part of SACU when it was within the administrative jurisdiction of South Africa (McCarthy, 2003). It, therefore, becomes more appropriate to employ annual secondary data that spanned 1990 to 2019 for the empirical analysis which produced enough observations.

The data on GDP per capita, FPI, FDI, Inward Remittances, Official Aid and Development Assistance, monetary credit to the private sector, broad money growth and gross capital formation growth rate were sourced from the World Development Indicators (WDI). FPI is foreign portfolio investment (net) as a percentage of GDP, FDI is foreign direct investment (net inflow) as a percentage of GDP. Moreover, the data sets on globalization index were obtained from the KOF Globalization Index, real exchange rate from Bruegel data, and inflation rate (proxied by consumer price index) from UNCTADSTAT. The central bank policy rates of South Africa (proxied by repo rate) were obtained from the SARB, while that of Lesotho, Namibia Eswatini and Botswana as well as the United States of America (World Interest Rates) were sourced from the IMF.

3.3   Panel Unit Root Test

Prior to empirical analysis in economics, it becomes crucial to ascertain the stationarity of the variables in order to avoid spurious results. Consequently, the following table describes the unit root as obtained through the Levine Lin and Chu as well as Im Pesaran and Shin tests.

As can be observed from Table 1 below, the variables exhibit a combination of I (1) and I (0) series and are thus appropriate for the study. The description of the variables takes the following:

Lgdpc: Log of Gross Domestic Product per Capita; FPI: Foreign Portfolio Investment;

FDI: Foreign Direct Investment; Lgin: log of globalization index; Lreer: log of real exchange rate; Linr: log of inward remittances; Lfda: log of Official Aid and Development Assistance; Lmscp: log of monetary sector credit to the private sector; Inf: Inflation rate; Gcfg: Gross capital formation growth rate; Cbpd: Central bank policy rate differential; Bmg: Broad money growth rate.

3.4   Panel Causality Test

The respective descriptions of the causality across the variables are expressed in Table 2 below.

3.5   Interpretation of Results

The causality test was examined using the Murshed and Rashid (2020) Granger non-causality test. The results are expressed in Table 2 by utilizing the bootsrap approach. In all cases, the null hypothesis is rejected provided the bootsrap p-value is statistically significant. Observing "lgdpc fdi", evidence from the p-values at the one per cent level of significance implies that FDI granger cause lgdpc while "fdi lgdpc" at non-statistically significant p-values provides that the null hypothesis that lgdpc does not granger cause FDI cannot be rejected.

A uni-directional causality from FDI to lgdpc characterizes the two variables. Similarly, the null hypothesis that "FPI" does not granger cause lgdpc is rejected at the 5% level of significance while the outcome that lgdpc does not cause FPI cannot be rejected. A one-way causality does hold from FPI to lgdpc. The results also provide that cbpd does not cause lgdpc while based on the statistical significance of the p-value, the null hypothesis that lgdpc does not cause cbpd is rejected. A uni-directional causation is also the field day from lreer to lgdpc while lgdpc proves that it does not cause lreer in the Southern African Customs Union over the study period. Moreover, examining the causality between "inf" and "bmg" shows causation from bmg to inflation but inflation does not cause bmg. It was also observed from the study that while the null hypothesis that lreer does not cause FDI cannot be rejected, however, FDI is found to granger cause lreer given the statistical significance of the bootsrap p-value.

Table 1: Panel Unit Root Test Results

Series	Levin, Lin and Chu Test [A]				Im, Pesaran and Shim Test [B]				Result [A]	Result [B]
	Level		First Difference		Level		First Difference			
	T –Test	Prob. Value	T -Test	Prob. Value	T -Test	Prob. Value	T -Test	Prob. Value		
Lgdpc Constant Constantandtrend			-5.6887 -4.3541	0.0000 0.0000			-6.0409 -4.5224	0.0000 0.0000	I(1) I(1)	I(1) I(1)
Fpi Constant Constant and trend	-2.4608 -1.7804	0.0069 0.0375			-4.4382 -2.9271	0.0000 0.0017			I(0) I (0)	I(0) I(0)
Fdi Constant Constant and trend	-5.6356 -5.5841	0.0000 0.0000			-5.4644 -5.2235	0.0000 0.0000			I(0) I(0)	I(0) I(0)
Lgin Constant Constant and trend	-3.4713	0.0003	-8.7246	0.0000			-9.1321 -9.3085	0.0000 0.0000	I(0) I(1)	I(1) I(1)
Lreer Constant Constant and trend	-2.9755 -3.3190	0.0015 0.0005			-2.2629 -2.7015	0.0118 0.0035			I(0) I(0)	I(0) I(0)
Linr Constant Constant and trend			-4.5164 -3.5288	0.0000 0.0002			-4.7706 -3.6353	0.0000 0.0001	I(1) I(1)	I(1) I(1)
Lfda Constant Constant and trend	-1.8611	0.0314	-11.7148	0.0000			-12.0095 -11.5580	0.0000 0.0000	I(0) I(1)	I(1) I(1)

Table 1. Continued

Lmscp											
Constant	-3.5404	0.0002			-2.5243	0.0058			I(0)		I(0)
Constant and trend					-4.9128	0.0000					I(0)
	-7.2046	0.0000							I(0)		
Inf											
Constant	-4.8681	0.0000			-4.5556	0.0000			I(0)		I(0)
Constant and trend					-6.1786	0.0000					I(0)
	-6.4043	0.0000							I(0)		
Gcfg											
Constant	-10.2337	0.0000			-10.1431	0.0000			I(0)		I(0)
Constant and trend	-9.4138	0.0000			-9.4527	0.0000			I(0)		I(0)
Cbpd											
Constant	-3.0212	0.0013			-2.3393	0.0097			I(0)		I(0)
Constant and trend	-4.6686	0.0000			-3.5086	0.0002			I(0)		I(0)
Bmg											
Constant	-3.8048	0.0001			-4.6199	0.0000			I(0)		I(0)
Constant and trend	-3.3056	0.0005			-3.6962	0.0001			I(0)		I(0)

Source: Author's Computation from stata 14

Table 2: Dumitrescu and Hurlin (2012) Granger Non-Causality Test Results

Direction of causality	W-bar	Z-bar	Z-bar tilde
A. lgdpc fdi	7.2863	5.9103 (0.0000) (2.4144)	4.7280 (0.0000) (1.8269)
Fdi lgdpc	1.8508	1.3452 (0.1800) (2.8851)	1.0507 (0.2100) (2.3842)
B. lgdpc fpi	2.7800	2.8144 (0.0300) (2.6325)	2.3230 (0.0300) (2.1655)
Fpi lgdpc	1.2720	0.4300 (0.6200) (3.6610)	0.2582 (0.7400) (3.0560)
C. lgdpc cbpd	0.6263	-0.5909 (0.6200) (5.7488)	-0.6258 (0.5700) (4.8639)
Cbpd lgdpc	4.7549	5.9371 (0.0200) (4.7417)	5.0270 (0.0200) (3.9919)
D. Lgdpc lreer	5.8453	4.2991 (0.0400) (3.8266)	3.3910 (0.0400) (2.9988)
Lreer lgdpc	3.3510	1.5105 (0.3500) 5.8022	1.0767 0.4100 4.6383
E. Lgdpc inf	2.0864	1.7177 (0.2200) (5.3261)	1.3733 (0.2200) (4.4979)
Inf lgdpc	5.5134	3.9281 (0.0700) (4.5208)	3.0831 (0.0700) (3.5749)
F. Lgdpc lfda	0.6475	-0.5573 (0.6700) (4.6060)	-0.5967 (0.6300) (3.8744)

Table 2: Continued

Lfda lgdpc	1.8262	1.3063 (0.4800) (5.8577)	1.0170 (0.5100) (4.9582)
G. Lgdpc linr	1.2903	0.4590 (0.7000) (4.5487)	0.2834 (0.7400) (3.8248)
Linr lgdpc	17.8257	5.4927 (0.4100) (14.9264)	0.4543 (0.5000) (2.1609)
H. Fpi cbpd	2.3816	2.1845 (0.1100) (3.4305)	1.7775 (0.1100) (2.8564)
Cbpd fpi	1.8991	1.4217 (0.2300) (3.0476)	1.1170 (0.2600) (2.5249)
I. fdi cbpd	1.4935	0.7803 (0.4900) (2.3587)	0.5616 (0.6000) (1.9283)
Cbpd fdi	0.4543	-0.8628 (0.4400) (3.3525)	-0.8612 (0.3700) (2.7889)
Lgdpc lgin	35.7193	15.4956 (0.0700) (19.2123)	2.2639 (0.0700) (2.9363)
Lgin lgdpc	19.0912	6.2002 (0.2400) (14.5198)	0.5823 (0.3400) (2.0874)
CBPD INF	24.1704	9.0395 (0.1300) (12.4105)	1.0960 (0.1300) (1.7058)
INF CBPD	2.4344	2.2679 (0.1400) (3.5605)	1.8498 (0.1400) (2.9690)

Table 2: Continued

INF BMG	2.8753	2.9652 (0.0400) (2.4811)	2.4535 (0.0400) (2.0343)
BMG INF	1.2189	0.3461 (0.6600) (2.2017)	0.1856 (0.8400) (1.7924)
FPI BMG	0.8784	-0.1923 (0.8300) (2.3800)	-0.2806 (0.7300) (1.9468)
Bmg fpi	2.0637	1.6818 (0.0900) (2.5361)	1.3422 (0.1100) (2.0820)
FDI BMG	1.2283	0.3610 (0.7500) (2.4847)	0.1985 (0.8500) (2.0375)
Bmg fdi	0.3700	-0.9961 (0.3500) (2.8663)	-0.9767 (0.2900) (2.3679)
LGDPC LMSCP	34.0476	14.5611 (0.1400) (23.1948)	2.0948 (0.1400) (3.6567)
Lmscp lgdpc	2.7176	2.7158 (0.3400) (5.8759)	2.2375 (0.3400) (4.9740)
Lgdpc gcfg	0.9582	-0.0661 (0.9400) (1.9811)	-0.1713 (0.8300) (1.6014)
Gcfg lgdpc	0.8527	-0.2329 (0.9000) (1.9730)	-0.3158 (0.7800) (1.5944)
Lgdpc bmg	0.8982	-0.1610 (0.9100) (2.8674)	-0.2535 (0.8400) (2.3689)

Table 2: Continued

Bmg lgdpc	28.8510	11.6561 (0.0500) (13.7848)	1.5693 (0.0500) (1.9544)
fpi lreer	0.6626	-0.5335 (0.5700) (3.4283)	-0.5761 (0.4800) (2.8545)
lreer fpi	4.3608	2.6394 (0.0600) (2.7861)	2.0136 (0.0600) (2.1353)
fdi lreer	2.1878	1.8781 (0.1000) (3.1164)	1.5122 (0.1000) (2.5844)
lreer fdi	4.0342	2.2743 (0.0200) (1.9783)	1.7106 (0.0200) (1.5530)
inf fpi	0.2869	-1.1275 (0.2700) (2.7787)	-1.0904 (0.2600) (2.2921)
fpi inf	60.6383	29.4257 (0.0100) (20.4230)	4.7840 (0.0100) (3.1553)
inf fdi	0.9556	-0.0702 (0.9500) (3.2957)	-0.1749 (0.8700) (2.7397)
fdi inf	1.7129	1.1272 (0.2500) (2.4586)	0.8619 (0.3300) (2.0149)
lgin fpi	25.1456	9.5847 (0.1100) (13.0733)	1.1946 (0.1100) (1.8257)
fpi lgin	0.1646	-1.3210 (0.1800) (3.0894)	-1.2579 (0.1600) (2.5610)

Table 2: Continued

Lgin fdi	15.2653	4.0614 (0.2500) (12.1390)	0.1954 (0.7200) (1.6567)
fdi lgin	4.6780	5.8154 (0.0000) (2.7545)	4.9216 (0.0000) (2.2711)
linr lreer,	2.0603	1.6764 (0.2400) (3.5031)	1.3375 (0.2600) (2.9193)
lreer linr	2.8248	2.8853 (0.1200) (3.7096)	2.3843 (0.1200) (3.0981)
lreer lfda	8.4083	4.9371 (0.0000) (3.5560)	3.6394 (0.0000) (2.5545)
lfda lreer	0.8391	-0.2544 (0.7700) (3.6190)	-0.3344 (0.7400) (3.0197)
lreer cbpd	18.3009	11.3059 (0.0000) (4.7427)	7.9439 (0.0000) (3.1537)
cbpd lreer	2.3587	2.1483 (0.1400) (4.0111)	1.7462 (0.1400) (3.3592)
gcfg fpi	1.1919	0.3035 (0.8200) (2.8566)	0.1487 (0.9200) (2.3595)
fpi gcfg	0.4499	-0.8698 (0.4300) (2.2671)	-0.8672 (0.3600) (1.8490)
fdi gcfg	0.6512	-0.5515 (0.5300) (3.1820)	-0.5917 (0.4600) (2.6413)

Table 2: Continued

gcfg fdi,	2.9847	3.1381 (0.0200) (2.2508)	2.6032 (0.0200) (1.8350)
inf lreer,	3.2867	3.6156 (0.0500) (3.4771)	3.0167 (0.0500) (2.8968)
lreer inf,	53.0930	25.2077 (0.0100) (11.7295)	4.0209 (0.0100) (1.5826)
lreer lmscp,	8.3315	7.0788 (0.0000) (3.4441)	5.6977 (0.0000) (2.6814)
lmscp lreer	2.6419	2.5961 (0.1100) (3.7700)	2.1340 (0.1100) (3.1504)
gcfg linr,	2.4399	2.2766 0.0500) 2.3308)	1.8573 0.0500, 1.9042)
linr gcfg,	21.6587	8.7603 0.0100, 5.3734)	3.0644 0.0100, 1.7287)
bmg lreer,	1.7044	1.1138 0.3300, 3.7828)	0.8504 0.4000, 3.1615)
lreer bmg,	4.5645	2.8672 0.0400, 2.5956)	2.2026 0.0400, 1.9773)
inf lmscp,	6.1576	8.1548 0.0100, 4.7358)	6.9473 0.0100, 3.9867)
lmscp inf	3.0519	3.2443 0.0200, 2.4308)	2.6952 0.0200, 1.9908)

Source: Author's Computation from stata 14

Another one-way causation is between inflation rate and foreign portfolio investment. Evidence shows that while no causality runs between foreign direct investment and inflation, that of foreign portfolio investment and inflation is different. Inflation rate only causes foreign portfolio investment. Of crucial outcome is the relationship between globalization index (lgin) and foreign direct investment (FDI). While FDI does not granger cause globalization index, globalization index was found to granger cause foreign direct investment at the one per cent level of significance. The nexus between official Aid and Development Assistance (lfda) and the real exchange rate (lreer) provides information that lreer does not cause lfda in the Southern African Customs Union but lfda causes lreer at the one per cent level of significance. Moreover, Monetary policy rate differential (cbpd) causes lreer at the one per cent level while lreer does not cause monetary policy rate differential. One-way causation is also the characteristic between FDI and gcfg such that while gcfg does not cause FDI, FDI on the other hand granger causes gcfg. Similar trend of one-way causality also characterized inflation rate and the real exchange rate in the region with inflation rate granger cause lreer. "lmscp" which is monetary sector credit to the private sector is a measure of financial sector development producing a causal impact on the real exchange rate(lreer) but lreer does not cause "lmscp". At the five per cent level of significance, gross capital formation (gcfg) was found to granger cause inward remittance (linr) but the null hypothesis that linr does not cause gcfg cannot be rejected. Furthermore, within the context of one-way causation is the relationship between broad money growth (bmg) and the real exchange rate. The region is characterized by lreer not exerting a causal impact on bmg while bmg granger cause lreer at the five per cent level. While most of the outcomes exhibit one-way causation, the relationship between inflation rate (inf) and the monetary sector credit to the private sector is bidirectional at the five per cent level of significance in either direction.

Moreover, the bootstrap p-value is found to be statistically insignificant in either direction for "lgdpc inf" which implies no evidence of causality. The same conclusion characterizes "lgdpc lfda" "lgdpc linr", "fpi cbpd", "fdi cbpd", "lgdpc lgin" "cbpd inf" "fpi Bmg" "fdi bmg" ,"lgdpc lmscp", lgdpc gcfg, and "lgdpc bmg", "fpi lreer", "fpi lgin" "linr lreer" "gcfg fpi"

The foregoing causality test results among the macroeconomic variables provide information on the nature of directional influence that characterize the Southern African Customs Union and thus provide insights for policy makers.

4. DISCUSSION OF THE EMPIRICAL RESULTS

The results of the panel causality test offer insight as regards to the directional influence of the variables which invariably guides the process of policy formulation. Using the Dumitrescu and Hurlin (2012) Granger non-causality test for all the variables, it was found that the direction of causation between FDI and lgdpc is unidirectional with FDI

causing lgdpc. Foreign direct investment in either green field of brownfield alongside its accompanied technical capacity that expands the productive capacity in SACU, will promote employment and stimulate the living standards of the citizens. A similar outcome was found by Feridun and Sissoko (2011) that analyzed findings in case of Singaporean economy, related to the nexus between FDI and gross domestic product per capita. The authors established unidirectional causality from FDI to GDP.

Theoretically, the causality between FDI and GDP growth can occur in either direction. Based on the "FDI-led growth hypothesis", the inflows of FDI can promote growth for the recipient economies through an increase in capital stock, generation of new job prospects and paving the way for technology transfer (Borensztein et al., 1998; De Gregorio, 2005; de Mello, 1997).

The results above, like FDI growth nexus, a uni-directional causality was observed running from FPI to GDP per capita. Foreign portfolio investment belongs to the category of inter-countries flow of financial resources and can be necessary to trigger the liquidity needs of productive activities in an economy and by implication for the Southern African Customs Union. The effective and appropriate sector channeling of foreign portfolio investment will contribute to growth and raise living standards for the region. It was also observed from the empirical results that a uni-directional causality runs from broad money growth (BMG) to inflation. Expansionary monetary policy without a concomitant rise in the economy-wide output will lead to rising price levels in the economy. This can be observed within the quantity theory of money of $MV = PQ$ where "M" is the money supply, "V" is the velocity of money, "P" is the price level and "Q" is output. According to the theory, expanding the money supply (M) while velocity (V) and output (Q) are held constant will invariably generate a higher price level in the economy.

The causation of inflation in the Southern African Customs Union by the money supply has implications on the real income and consequently, on the living standards of the citizens. It, therefore, becomes necessary for the monetary authorities to ensure effective monetary stability in the region. A study by Sasongko and Huruta (2018) employed a Granger Causality model covering monthly data that spanned January 2007 to July 2017. The authors established for Indonesia, a unidirectional causation of money supply to the price level.

The study also found one-way causation running from GDP per capita to monetary policy rate differential. The explanation for such an outcome can be situated within the IS /LM framework. An outward shift of the IS curve (while the LM curve maintains its position) which signals increased productivity in the goods market brought about by favourable government fiscal policy will result in higher output accompanied by a rise in the interest rate. The domestic interest rate relative to the world interest rate thus generates a differential, which according to the neoclassical theory has implications for

the amount of inflow of resources from the foreign economies. The inflows of resources that consequently stimulate the real sector will promote the welfare of the citizens.

Other macroeconomic variables from the empirical study show that a number of them exhibit no causality. For instance, there was no evidence of causality between foreign portfolio investment and central bank policy rate differential. The implication of the forgoing is that the differential in the monetary policy rate has not been motivating enough to drive net portfolio investments as a proportion of GDP per capita, which is a sign that the SACU region may have the inability to attract sufficient portfolio assets, while the domestic investors may channel their resources to other economies which may adversely affect output and living standards in the region. A similar result was also found between central bank policy rate differential and foreign direct investment.

The globalization index and GDP per capita do not exhibit causality. The inability of globalization index to cause GDP per capita necessitates the need to examine the performance of the factors that constitute the index. For instance, according to the KOF globalization index of Dreher (2006) which was updated in Dreher (2006), globalization can be measured in terms of economic, social as well as political consideration in respect of the majority of countries in the world since 1970. It therefore implies that the effectiveness of the respective components of the index needs to be adequately managed in order to improve the living standards for the region. On the other hand, GDP per capita does not cause globalization. A diversified productive base of the economy of SACU that effectively connects with the respective key institutions will be indispensable to the process of benefiting from globalization.

The differential in the monetary policy rate and inflation rate exhibits no causality. This is in consonance with the previous non-causality of monetary policy rate differential and the capital flows components of foreign portfolio and direct investment. The monetary policy rate differential that is not capital flows attracting may likely not cause inflation for the region. However, if it were to attract sufficient capital flows, the prevailing level of economic activities will be enhanced which invariably may cause inflation. On the other hand, inflation over the study period has not been causing the differential in the monetary policy rate which is an indication that interest rate differential is caused by non-inflation factors.

The study also provides evidence of no causality between the capital flows components of foreign portfolio and direct investment in relation to the broad money growth (Money supply). Expansion in the money supply that is biased against foreign investors may discourage foreign investment from flowing into the Southern African Customs Union and has the tendency to adversely affect employment and living standards. The non-causation of the money supply by the two major capital flow elements in the region can be foundational for the repatriation of surplus to foreign banks which reduces the prevailing amount of liquidity in the host economy.

The monetary sector credit, a financial development variable - does not cause GDP per capita for the region. Credit extended to the private sector but characterized with moral hazards by the supposed investors will result in poor utilization of funds and invariably may not substantially cause output and living standards. Also, the domestic output does not cause monetary sector credit. This is an indication that monetary sector credit can be caused by other factors in SACU. This could be the soundness and the development of the financial sector, ease of alternative sources of funds apart from the domestic financial system. For instance, domestic investors may source funds from the eurocurrency market which are not influenced by domestic monetary regulation. A study by Aliero et al. (2013) utilized the technique of the autoregressive distributed lag (ARDL) model on a study in respect of Nigeria. They also used the technique of causality between private sector credit and economic growth covering a data set that spanned 1974-2010. The authors established a long-run relationship among the variables while the causality test showed the absence of causality.

Evidence from the results shows that no causation runs in either direction between GDP per capita (lgdpc) and gross capital formation (gcfg). Gross capital formation is expected to cause growth. However, the formation of capital that does not contribute to the real sector may not cause output and living standards. Conversely, GDP per capita that is not characterized by savings towards the capital formation, may not cause gross capital formation for the Southern African Customs Union. The non-causation between the two variables calls for the need to examine the process of capital formation in the Southern African Customs Union, as this has implications for future productivity and the standard of living of the citizens. Akindele, (2010) in his publication provided that, within the context of the classical theories, accumulation of capital is claimed as "the key to progress". The classicists thus are of the view that the accumulation of capital is the driver of economic progress through growth.

Broad money growth (Money Supply) and GDP per capita exhibit no causality for SACU in either direction. This is an indication that monetary expansion is not sufficient for stimulating output and raising the living standard of the citizens. The direction of use of the money supply will, to a large extent determine its directional impact on GDP per capita. Also, other non-monetary factors such as the political system, rent-seeking activities among others can undermine the capacity of the money supply to cause GDP per capita. The non-causality of the money supply by GDP per capita is an indication that money supply is influenced by monetary variables which could be interest rate, cash ratio, bank rate, among others. A corroborating study in this regard, though with difference in variable measurements is that of Obaid (2007). The author used the technique of Granger causality to examine over the period 1970-2006, the causal nexus between money supply (M3) and real GDP in Egypt. The author concluded that there is an absence of causality in respect of nominal money supply and nominal GDP. However, he established a bidirectional causality by using the real money supply alongside with real GDP in the country.

The study provides the evidence of a unidirectional causation from FDI to lreer. Foreign direct investment involves inter-boundaries movement of resources which invariably influences the rate of exchange and the value of the domestic currency relative to the foreign currencies. The prevailing exchange rate thus affects cost of production and living standards. Connecting this with the literature of Morandé (1988), who provided that capital inflows exert a causal relationship in relation to the real exchange rate, and most especially that inflows of capital have the tendency to appreciate the domestic country's currency. It was established from the study that the unanticipated disruption of capital flows in late 1981 caused the peso to experience a real depreciation from June to August 1982. Moreover ,Tsaurai (2015) established that the inflows of FDI exert an effect on real exchange rates. Furthermore, while no causation exists between foreign direct investment and inflation, the inflation rate was found to cause foreign portfolio investment. Portfolio investment falls in the category of more volatile investment and has the tendency to respond swiftly to variations in variables that contribute to the macroeconomic stability of the host economy. Therefore, inflation is one of the key determinants of investment climate and invariably influences the extent of foreign portfolio investment into the Southern African Customs Union. The finding corroborates the study of Kumar et al. (2019) who analyzed in respect of Pakistan, the causality comprising of certain selected macroeconomic indicators and foreign portfolio investment by utilizing monthly time-series data that spanned 2006-2017. The explanatory variables constitute an external debt, inflation rate, gross domestic product, KSE-100 return, interest rate, and foreign direct investment while the explained variable is foreign portfolio investment. The authors observed that the overall model exhibits significance characterized by an adjusted r-square of 78.4877%. On the basis of the autoregressive distributed lag (ARDL) model, interest rate and the external debt exert significant effects on foreign portfolio investment while in the context of granger causality; KSE-100 return and inflation rate produced significant effects on foreign portfolio investment.

The globalization index exerts a causal impact on foreign direct investment while FDI does not. As noted earlier, the globalization index describes an economy across three major factors comprising of economic, social, and political environment. These three factors to a large extent determine the quality of the macroeconomic environment for foreign direct investment. A sound macroeconomic environment, stimulating FDI and economy-wide output will contribute to improved living standards for the citizens in the region. The finding is in line with the study of Aluko et al. (2021) that examined the causal relationship comprising of foreign direct investment (FDI) and globalization in Africa. The authors used a panel data set comprising of 50 economies spanning 1996-2016 as well as the technique of the Dumitresu-Hurlin panel Granger causality test. It was found from the study that a unidirectional causality runs from globalization to FDI. Given the dimensions of globalization, they also established one-way causation running from political and social globalization to FDI but in respect of economic globalization,

the causal direction emanates from FDI. It was also observed by the authors on the basis of country level, that there are considerable variations with respect to the causalities. They concluded that policies of FDI-globalization should be handled with caution because one-size cannot fit all given within Africa, the differential causal relations.

Further results also show that while lreer does not cause lfda; lfda causes lreer. lfda captures Official Aid and Development Assistance. The causality of lreer by lfda may arise from the effect of the inter-country movement of resources by the influence that international economic institutions such as International Bank for Reconstruction and Development have on the exchange rate. The foregoing results are related to previous empirical literature by Murshed and Rashid (2020) which analyzed the dynamics in terms of the responses of the real exchange rate to international remittances, foreign direct investments, and official development assistance entering the four emerging South Asian economies of Pakistan, Sri Lanka, Bangladesh, and India. Using an econometric approach, the authors found that the real exchange rate respectively appreciates by 0.18% and 0.23% provided there is a 1% increase in the aggregate volume of official development assistance and remittances obtained. Moreover, the real exchange rate is characterized by a depreciation of 0.19% arising from a 1% increase in the inflows of FDI. They also established the evidence on the basis of the Murshed and Rashid (2020) that one-way long-run causations stemming from official development assistance and the inflow of FDI to real exchange rate characterized the South Asian economies. It was also found that inward international remittances and the real exchange rate exhibit a relationship that is bidirectional.

The study also establishes the evidence that for the region understudy, the differential in the monetary policy rate has a causal impact on the exchange rate but not otherwise. The differential in the policy rate that is the difference between the prevailing policy rate in the Southern African Customs Union and the world interest rate (The united State of America) determines the attractiveness of interest-sensitive investment such as financial investment which invariably, as a result of inter-country exchanges, affects the exchange rate and by implication, the real exchange rate. FDI from the empirical results show that while gcfg does not cause FDI, the reverse holds as FDI was found to granger cause gcfg. Obviously, the influx of foreign direct investment which could be green field or brownfield, contributes to the capital stock of the respective economies in SACU, thus, contributing to employment generation, skill acquisition, enhanced GDP and improved living standards. In another scenario, the inflation rate was found to granger cause lreer. The stability of the inflation rate is one of the central goals of monetary authorities in the SACU. A moderate and stable inflation rate that drives investment activities in the economy is one of the signals to existing and prospective foreign investors which, due to inter-country movement of resources, influences the rate of exchange and by implication, the real exchange rate. Another consideration is on the ground that, the real exchange rate is a nominal exchange rate less the rate of inflation. The extent of price level variation is therefore expected to have a pronounced impact on the real exchange

rate. Relating this outcome to previous studies is the work of Achsani et al. (2010) that compared the reaction of inflation to the variation in real exchange rates in Asia (ASEAN +3) with effort to comparing it with what was obtained in the EU and North America. They employed an explorative statistical approach as well as the Granger-causality technique to establish the case of a strong correlation in respect of inflation rate movements with real exchange rate in the majority of the countries. Asia is characterized by a significant unidirectional relationship, such that the nominal and real exchange rates generate a significant effect on the inflation rate. However, in the context of the non-Asian economies, the causality operates in the opposite direction. Also, the authors established on the basis of utilizing panel data model with fixed effects, that the reaction of inflation to the variation in exchange rates in Asia is more, relative to that of EU and North America.

Furthermore, within the context of the real exchange rate, it bears to note that one-way causality runs from lmscp to lreer. Effective advancement of funds to the private sector for entrepreneurial activities can filter on the exchange rate due to the procurement of certain raw materials and other categories of inputs that cannot be easily obtained in the domestic economy. Gross capital formation which is an indication of the rate of growth of the capital stock granger cause inward remittances. The need for increased capital formation in the domestic economy can result in the diversion of remittances to achieve the goal which results in its productive use and consequently promotes quality of living standards. Moreover, broad money growth granger cause the real exchange rate. The prevailing amount of liquidity in the system is a function of the rate of money supply which influences the volume of economic activities and can also filter on the exchange rate arising from the purchase of goods and other business resources from abroad. Finally, a bidirectional relationship characterizes inf and lmscp. Extension of credit facilities to the private sector will stimulate business activities and, in some measure, influences the inflation rate arising from increased liquidity in the system. However, the state of the general price level at any given period of time can determine the volume of monetary sector credit to the private sector. More advances of fund can be issued in most cases when the economy is operating below full employment level of output.

5. CONCLUSION AND POLICY RECOMMENDATIONS

This study empirically examined the nature of causality that characterizes some major macroeconomic variables in the Southern African Customs Union. Of key note are the two major components of capital flow comprising of foreign portfolio and direct investment which influence living standards in the Southern African Customs Union. A key finding of the study is that the globalization index influences foreign direct investment in the region. The study concludes that pragmatic policy measures that will result in the attraction of these two components of capital flows should be designed. Policy measures must include factors that will enhance the macroeconomic stability of the region in order to boost foreign investors' confidence. Moreover, the growth rate of

the money supply needs to be adequately controlled to ensure price stability as this will significantly influence investment and the living standards of citizens. The one-way causality running from GDP per capita to monetary policy rate differential is an indication that the real sector activities indirectly influence interest rate and by implication the differential.

Finally, it can be inferred from the study that the interplay between the real and monetary sectors is crucial for the sound functioning of the macroeconomy. The effective management of the monetary system is still an indispensable tool in the Southern African Customs Union and inevitably influences the living standards of the citizens.

REFERENCES

Abbes, S. M., Mostéfa, B., Seghir, G., & Zakarya, G. Y. (2015). Causal interactions between FDI, and economic growth: evidence from dynamic panel co-integration. *Procedia Economics and Finance*, *23*, 276-290.

Achsani, N. A., Fauzi, A., & Abdullah, P. (2010). The relationship between inflation and real exchange rate: comparative study between Asean+ 3, the EU and North America. *European Journal of Economics, Finance and Administrative Sciences*, *18*(18), 69-76. http://achsani.blog.mb.ipb.ac.id/files/2010/11/ejefas_18_06.pdf

Ahmed, F., & Hakim, M. (2017). The relationship between remittances and economic growth in Togo: A vector equilibrium correction mechanism. *Global Economy and Finance Journal*, *10*(1), 1-11. https://www.researchgate.net/profile/Farhana-Ahmed-8/publication/316452959

Akbas, Y. E., Senturk, M., & Sancar, C. (2013). Testing for causality between the foreign direct investment, current account deficit, GDP and total credit: Evidence from G7. *Panoeconomicus*, *60*(6), 791-812. http://www.doiserbia.nb.rs/Article.aspx?id=1452-595X1306791A#.YgOx-ZbhVPY

Akinbobola, T., Ibrahim, T., & Ibrahim, O. (2017). Foreign portfolio investment-economic growth nexus in Nigeria: Co integration and granger causality analyses. *Research Journal of Finance and Accounting*, *8*(5), 11-17.

Ali, H. S., Law, S.H., Yusop, Z., Zeqiraj, V., Kofarmata, Y.I. and Abdulkarim, F.M. (2018). Remittance and growth nexus: bootstrap panel granger-causality evidence from high remittance receiving countries. *International Journal of Economics and Business Research*, *15*(3), 312-324. https://doi.org/10.1504/ijebr.2018.091046

Aliero, H. M., Abdullahi, Y. Z., & Adamu, N. (2013). Private Sector Creditand Economic Growth Nexus in Nigeria: An Autoregressive Distributed Lag Bound Approach. *Mediterranean Journal of Social Sciences*, *4*(1), 83-83. https://www.richtmann.org/journal/index.php/mjss/article/view/11561/11170

Aluko, O. A., Ibrahim, M., & Atagbuzia, M. O. (2021). On the causal nexus between FDI and globalization: Evidence from Africa. *The Journal of International Trade & Economic Development*, *30*(2), 203-223. https://doi.org/https://doi.org/10.1080/09638199.2020.1823460

Bakker, B. B., & Gulde, A.-M. (2010). The credit boom in the EU new member states: Bad luck or bad policies? *IMF Working Papers*, 1-46 https://doi.org/https://dx.doi.org/10.2139/ssrn.1620249

[Record #472 is using a reference type undefined in this output style.]

Batarseh, A. (2021). The nature of the relationship between the money supply and inflation in the Jordanian economy (1980–2019). *Banks and Bank Systems*, *16*(2), 38. https://doi.org/https://doi.org/10.21511/bbs.16(2).2021.04

Bean, C. (2006). Globalisation and inflation." speech to the lse Economics Society. *London School of Economics, London, UK*.

Bednarik, R. (2010). Money Supply and real GDP: The case of the Czech Republic. *Available at SSRN 1539390*, 1-7. https://doi.org/https://dx.doi.org/10.2139/ssrn.1539390

Bhattacharyya, N. (2012). *Monetary policy and employment in developing Asia*. ILO Geneva.

Borensztein, E., De Gregorio, J., & Lee, J. W. (1998). How does foreign direct investment affect economic growth? *Journal of International Economics*, *45*(1), 115-135. https://doi.org/https://doi.org/10.1016/S0022-1996(97)00033-0

Cavoli, T., & Rajan, R. S. (2005). The Capital Inflows Problem in Selected Asian Economies in the 1990s Revisited. *The World Economy, August*, 1-26.

[Record #473 is using a reference type undefined in this output style.]

David, O., Umeh, J., & Ameh, A. A. (2010). The effect of exchange rate fluctuations on the Nigerian manufacturing sector. *African Journal of Business Management*, *4*(14), 2994-2998. https://doi.org/https://doi.org/10.5897/AJBM.9000567

De Gregorio, J. (2005). The Role of Foreign Direct Investment and Natural Resources in Economic Development. In E. M. Graham (Ed.), *Multinationals and Foreign Investment in Economic Development* (pp. 179-197). Palgrave Macmillan UK. https://doi.org/https://dx.doi.org/10.1057/9780230522954_9

de Mello, L. R. (1997). Foreign direct investment in developing countries and growth: A selective survey. *The Journal of Development Studies*, *34*(1), 1-34. https://doi.org/https://doi.org/10.1080/00220389708422501

De Vita, G., & Kyaw, K. S. (2008). Determinants of FDI and portfolio flows to developing countries: A panel cointegration analysis. *European Journal of Economics, Finance and Administrative Sciences*, *13*(13), 161-168.

[Record #961 is using a reference type undefined in this output style.]

Dreher, A. (2006). Does globalization affect growth? Evidence from a new index of globalization. *Applied Economics*, *38*(10), 1091-1110. https://doi.org/https://doi.org/10.1080/00036840500392078

Duasa, J., & Kassim, S. H. (2009). Foreign portfolio investment and economic growth in Malaysia. *The Pakistan Development Review*, 109-123.

Dumitrescu, E.-I., & Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels. *Economic Modelling*, *29*(4), 1450-1460.

Ezeanyeji, C., & Maureen, I. (2019). Foreign portfolio investment on economic growth of Nigeria: An impact analysis. *International Journal of Academic Management Science Research*, *3*(3), 24-36. https://www.researchgate.net/profile/Ezeanyeji-Clement/publication/332061303

Feridun, M., & Sissoko, Y. (2011). Impact of FDI on Economic Development: A Causality Analysis for Singapore, 1976-2002. *International Journal of Economic Sciences & Applied Research*, *4*(1), 7-17. https://www.ceeol.com/search/article-detail?id=10845

Geweke, J. (1982). Measurement of linear dependence and feedback between multiple time series. *Journal of the American statistical association*, *77*(378), 304-313.

[Record #966 is using a reference type undefined in this output style.]

Granger, C. W. J. (1980). Testing for causality: A personal viewpoint. *Journal of Economic Dynamics and Control*, *2*, 329-352. https://doi.org/https://doi.org/10.1016/0165-1889(80)90069-X

Hodson, D. (2015). "Policy-making under economic and monetary union: Crisis, change and continuity" in Wallace, H, Pollack, MA, and AR Young (Eds.), Policy-Making in the European Union, Seventh Edition, Oxford. *Policy Making in the European Union (ed. H. Wallace et Al). Oxford University Press*.

Hoover, K. D. (2001). Causality in macroeconomics. Cambridge: CUP.

Hosoya, Y. (1991). The decomposition and measurement of the interdependency between second-order stationary processes. *Probability theory and related fields*, *88*(4), 429-444.

Indalmanie, S. P. (2011). The Relationship between Money Supply and the Rate of Inflation: A Causality Approach to the Study of the Jamaican Economy, 1961-2006. *Available at SSRN 2586254*, 1-20. https://doi.org/https://dx.doi.org/10.2139/ssrn.2586254

Karahan, Ö., & Yilgör, M. (2017). The Casual Relationship Between Inflation and Interest Rate in Turkey. *Journal Asian Development Studies*, *6*(2), 309-316. https://is.muni.cz/do/econ/soubory/sborniky/70896034/EFS2017-Proceedings_1_final.pdf#page=310

Kumar, V., Ahmed, F., Bai, P., & Ramrakhiani, V. (2019). Do Macroeconomic Indicators Granger cause Foreign Portfolio Investment: Evidence from Pakistan. *Sindh Economics & Business Review International*, *1*(1), 1-19. www.fandfonline.com/index.php/sebri/article/download/1/4

Li, D. (2018). An economic analysis of international capital flow. *American Journal of Industrial and Business Management*, *8*(02), 404.

Lopez, L., & Weber, S. (2017). Testing for Granger Causality in Panel Data. *The Stata Journal*, *17*(4), 972-984. https://doi.org/https://doi.org/10.11772F1536867X1801700412

Luintel, K. B., & Khan, M. (1999). A quantitative reassessment of the finance–growth nexus: evidence from a multivariate VAR. *Journal of Development Economics*, *60*(2), 381-405. https://doi.org/https://doi.org/10.1016/S0304-3878(99)00045-0

Makoni, P. L., & Marozva, G. (2018). The nexus between foreign portfolio investment and financial market development: Evidence from Mauritius. *Academy of strategic management journal*, *17*(5), 1-14. https://www.abacademies.org/articles/The-nexus-between-foreign-portfolio-investment-and-financial-market%201939-6104-17-5-263.pdf

Malefane, M. (2021). Export-led growth hypothesis: Empirical evidence from the Southern African Customs Union countries. *Entrepreneurial Business and Economics Review*, *9*(2), 55-69. https://www.ceeol.com/search/article-detail?id=975635

Maziarz, M., & Mróz, R. (2020). Response to Henschen: causal pluralism in macroeconomics. *Journal of Economic Methodology*, *27*(2), 164-178. https://doi.org/https://doi.org/10.1080/1350178X.2019.1675897

McCarthy, C. (2003). The Southern African Customs Union in Transition. *African Affairs*, *102*(409), 605-630. https://doi.org/https://doi.org/10.1093/afraf/adg082

Mirza, A., & Rashidi, M. (2018). Causal Relationship between Interest Rate and Inflation Rate: A study of SAARC Economies. *Kardan Journal of Economics and Management Sciences*, *1*(2), 157-169. https://kardan.edu.af/data/public/files/issue2-aimalmirza-meetrarashidi10082021035555.pdf

Mkhonta, S. F. (2017). The Impact of Discount Rate Differential with South Africa on Capital Flight in Namibia and Swaziland. *RESEARCH BULLETIN VOLUME*, 68.

Morandé, F. G. (1988). Domestic currency appreciation and foreign capital inflows: What comes first? (Chile, 1977–1982). *Journal of International Money and Finance*, *7*(4), 447-466. https://doi.org/https://doi.org/10.1016/0261-5606(88)90027-7

Munir, R., Mureed, S., Dar, A. A., & Gardezi, M. A. (2016). Impact of personal remittances on economic growth of pakistan: A multivariate cointegration analysis. *Developing Country Studies*, *6*, 45-49. https://d1wqtxts1xzle7.cloudfront.net/55751125/6a-with-cover-page-v2.pdf?Expires=1644417113&Signature

Murshed, M., & Rashid, S. (2020). An Empirical Investigation of Real Exchange Rate Responses to Foreign Currency Inflows: Revisiting the Dutch Disease Phenomenon in South Asia. *The Economics and Finance Letters*, *7*(1), 23-46. https://doi.org/https://dx.doi.org/10.18488/journal.29.2020.71.23.46

Nayyar, D. (2011). Rethinking macroeconomic policies for development. *Brazilian Journal of Political Economy*, *31*, 339-351.

Obaid, G. (2007). Money supply-output causality in Egypt. *Faculty of Commercial and Business Administration Magazine, Helwan University*.

Olayungbo, D., & Quadri, A. (2019). Remittances, financial development and economic growth in sub-Saharan African countries: evidence from a PMG-ARDL approach. *Financial Innovation*, *5*(1), 1-25.

Pradhan, R., & Arvin, B. M. (2015). Foreign aid, economic growth, FDI, and trade openness in lower middle-income countries: A dynamic panel data analysis. In *Handbook on the economics of foreign aid* (pp. 232–254). Edward Elgar Publishing. https://doi.org/https://doi.org/10.4337/9781783474592.00024

Ray, S. (2012). Globalization and economic growth in India: A Granger causality approach. *JL Pol'y & Globalization*, *2*, 18. https://heinonline.org/HOL/LandingPage?handle=hein.journals/jawpglob2&div=4&id=&page=

Reichenbach, H. (2018). The philosophy of Space and time. . *North Chelmsford: Courier Corporation*.

[Record #591 is using a reference type undefined in this output style.]

Sasongko, G., & Huruta, A. D. (2018). Monetary policy and the causality between inflation and money supply in Indonesia. *Business: Theory and Practice*, *19*(1), 80-87. https://doi.org/https://doi.org/10.3846/btp.2018.09

Singh, S., & Singh, A. (2015). Causal nexus between inflation and economic growth of Japan. *Iranian Economic Review*, *19*(3), 265-278.

Stahlman, W. D. (1948). *Wiener's theory of prediction for discrete time series* Massachusetts Institute of Technology. Department of Mathematics].

Taderera, C., Runganga, R., Mhaka, S., & Mishi, S. (2021). Inflation, interest rate and economic growth nexuses in SACU countries. 1-21. https://mpra.ub.uni-muenchen.de/105419/

Tsaurai, K. (2015). FDI location and exchange rates, is there really a relationship between the two? , *13*(1), 644-653. http://hdl.handle.net/10500/22978

Uneze, E. (2013). The relation between capital formation and economic growth: evidence from sub-Saharan African countries. *Journal of Economic Policy Reform*, *16*(3), 272-286.

Wiener, N. (1956). The theory of prediction. Modern mathematics for engineers. *New York*, *165*.

Williamson, J. (2009). Probabilistic theories of causality. *The Oxford handbook of causation*, 2-25. https://d1wqtxts1xzle7.cloudfront.net/1781106/8znw1uqblspidyt-with-cover-page-v2.pdf?Expires

Wolde-Rufael, Y. (2009). Re-examining the financial development and economic growth nexus in Kenya. *Economic Modelling*, *26*(6), 1140-1146. https://doi.org/https://doi.org/10.1016/j.econmod.2009.05.002

[Record #1000 is using a reference type undefined in this output style.]

Yildirim, N., & Tastan, H. (2012). Capital flows and economic growth across spectral frequencies: Evidence from turkey. *Panoeconomicus*, *59*(4), 441-462.