

-RESEARCH ARTICLE-

## CENTRAL BANK POLICY RATE DIFFERENTIAL: THE IMPACT ON FOREIGN PORTFOLIO INVESTMENT AND FOREIGN DIRECT INVESTMENT

**Opeyemi Aromolaran**

Department of Economic Sciences,  
North-West University, South Africa

Email: [aromolaranopeyemi123@gmail.com](mailto:aromolaranopeyemi123@gmail.com)  
<https://orcid.org/0000-0002-9734-0559>

**Olebogeng David Daw**

Department of Economic Sciences,  
North-West University, South Africa

Email: [David.Daw@nwu.ac.za](mailto:David.Daw@nwu.ac.za)

### —Abstract—

This study empirically analyses the threshold levels of central bank policy rate differential concerning foreign portfolio investment and foreign direct investment for the Southern African Customs Union over the period 1990 to 2019. The fixed effect panel threshold described the threshold levels. The findings from the study show that the central bank policy rate differential has a linear relationship with either foreign portfolio investment or foreign direct investment. It is characterized by a threshold of 2.5000 concerning foreign portfolio investment while it stood at 10.1600 in terms of foreign direct investment. Central bank policy rate differential below the threshold of 2.5000 is found to be statistically significant but it decreases foreign portfolio investment while below the threshold of 10.1600, it increases foreign direct investment. However, in either case of foreign portfolio investment and foreign direct investment, broad money growth rate and inflation rate were found to be statistically insignificant in influencing both components of capital flows. The study concludes that the differentials in the policy rates promote foreign direct investment but decrease foreign portfolio investment.

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**Keywords:** Thresholds, foreign portfolio investment, foreign direct investment, Central Bank Policy rate differential

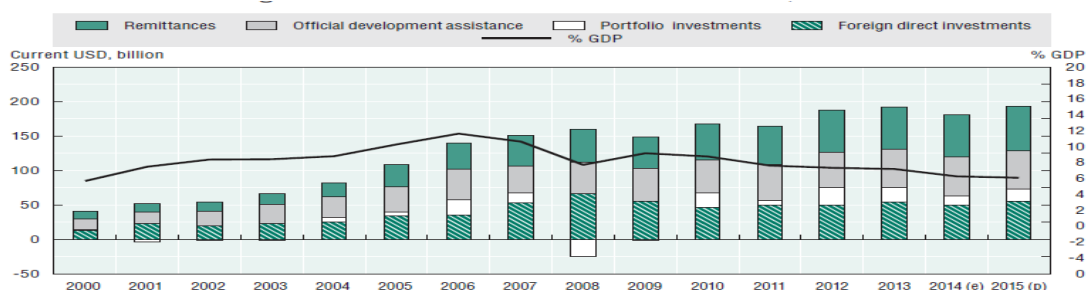
## 1. INTRODUCTION

Threshold analysis is crucial in macroeconomics as it enhances the appropriateness of the magnitude of policy measures necessary to drive desirable impacts of economic variables, thus strengthening policy targets. Capital flows to the developing economies can be examined in four key perspectives which could be foreign portfolio investment, foreign direct investment, official aid and development assistance as well as remittances. However, foreign direct investment and foreign portfolio investment are the major ones that could be sensitive to interest rates.

The contraction in the flows of FDI to the continent of Africa has been forecasted to lie between 25% and 40% on the basis of gross domestic product growth projections and an array of investment-specific factors (UNCTAD, 2020). It was also reported that in general, the first quarter of 2020 was characterized by a downward trend in respect of announced greenfield investment projects, noting that the value of projects (-58%) declined more acutely compared to their number (-23%) (UNCTAD, 2020)

A documentary by African Economic Outlook 2015 provides information on capital flows to Africa. It was reported that external flows to Africa had an estimate of USD 181 billion in 2014 which account for a decrease of 6% when compared to 2013 – a fact attributable to a swift decline in portfolio flows as well as a moderate fall in FDI flows. The foregoing situation is unconnected to the gloomy global demand alongside weak commodity prices, mostly in respect of metals. Generally, foreign flows accounted, on average, for an estimated 7.3% of GDP in 2014 in contrast to 8.2% in 2013. The following graph summarizes the external financial flows to Africa over the period 2000 to 2015 (Africa Development Banks , Development, & Programme, 2015)

### External financial flows to Africa, 2000-15



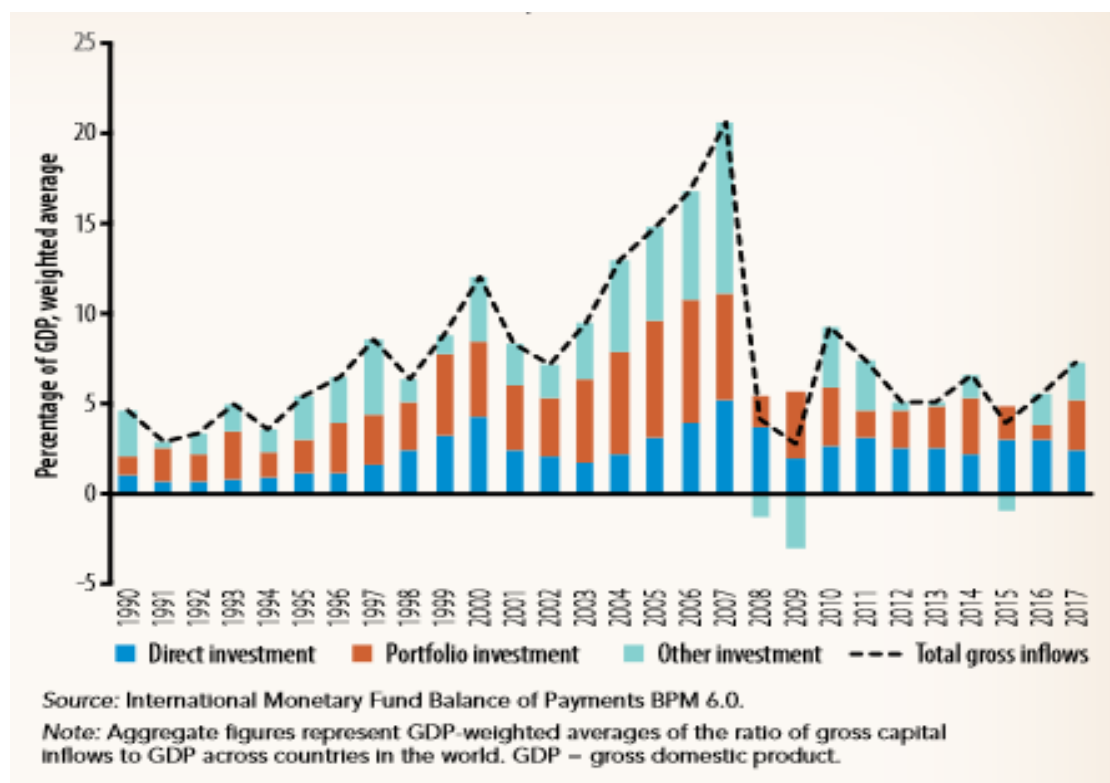
Source: (Africa Development Banks et al., 2015)

As reported by African Economic Outlook, 2015, there has been a rise in portfolio flows. For instance, right from 2011, some countries including Kenya, Nigeria and Uganda

issued international sovereign bonds for the first time to finance large infrastructural projects. However, the proportion of ODA in total external flows reduced from 37% in 2002-06 to 30% in 2010-14 showing a deviation in respect of regional aid allocation characterized by a decline in grants to low-income countries in Africa and a rise in soft loans to middle-income Asian economies (UN, 2014) as cited in (Africa Development Banks et al., 2015).

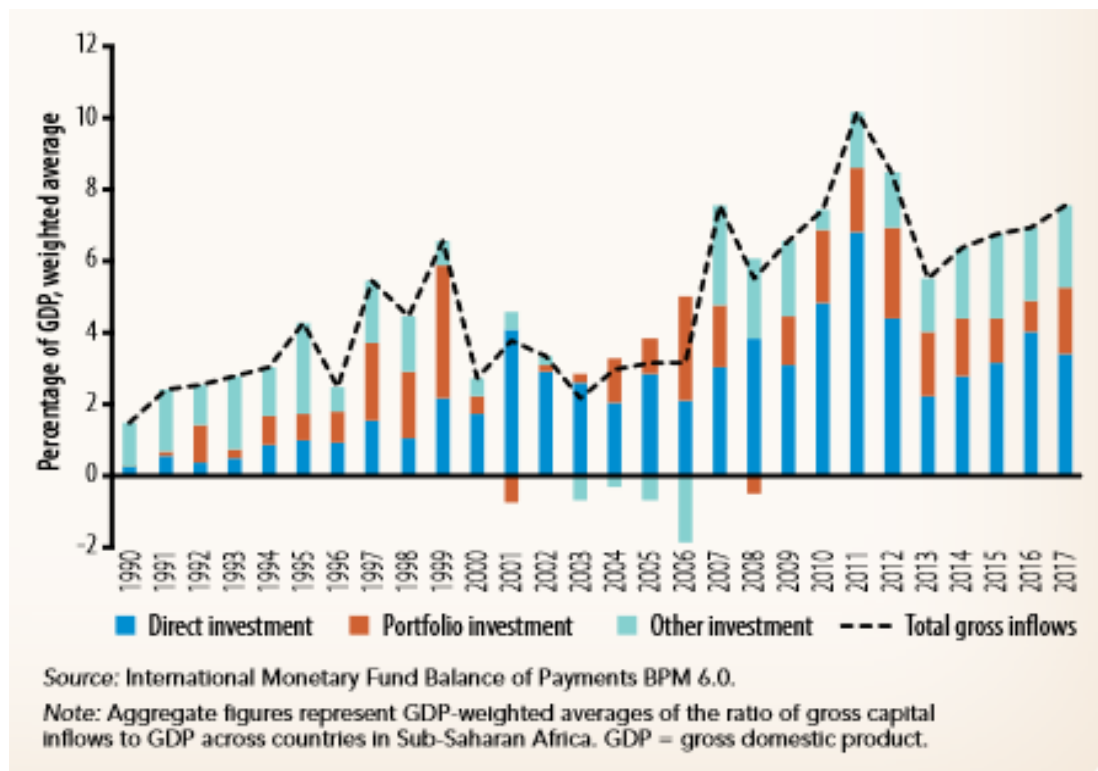
It is noteworthy that the global financial crisis and the European sovereign debt crisis had an impact on Sub-Saharan Africa with the latter exerting more influence on the volume of external finance in Sub-Saharan Africa. There was a divergence in the development of gross capital inflows to Sub-Saharan Africa when compared with global capital flows in the first half of the 2000s. While world capital inflows had a steady growth in the early 2000s till the global financial crisis in 2007, foreign capital inflows to Sub-Saharan Africa improved after 2006 with oil price around US\$65 per barrel (World Bank Group, 2018).

### Evolution of Global Capital Inflows



Source : (World Bank Group, 2018)

## Evolution of Gross Capital Inflows to Sub-Saharan Africa



Source: (World Bank Group, 2018).

It was noted that FDI characterized majorly by crude oil projects was adjured as the key source of the influx of capital to Sub-Sahara as opposed to other investment and portfolio investment of the 2000s. In respect of stocks, South Africa and Nigeria command half of the inward FDI stock in the region with almost 80 per cent of the total stock. Improvement in world gross capital inflows occurred between 2002 and 2003 while that of Sub-Saharan Africa was enhanced in 2006 because of improvement in oil prices (World Bank Group, 2018).

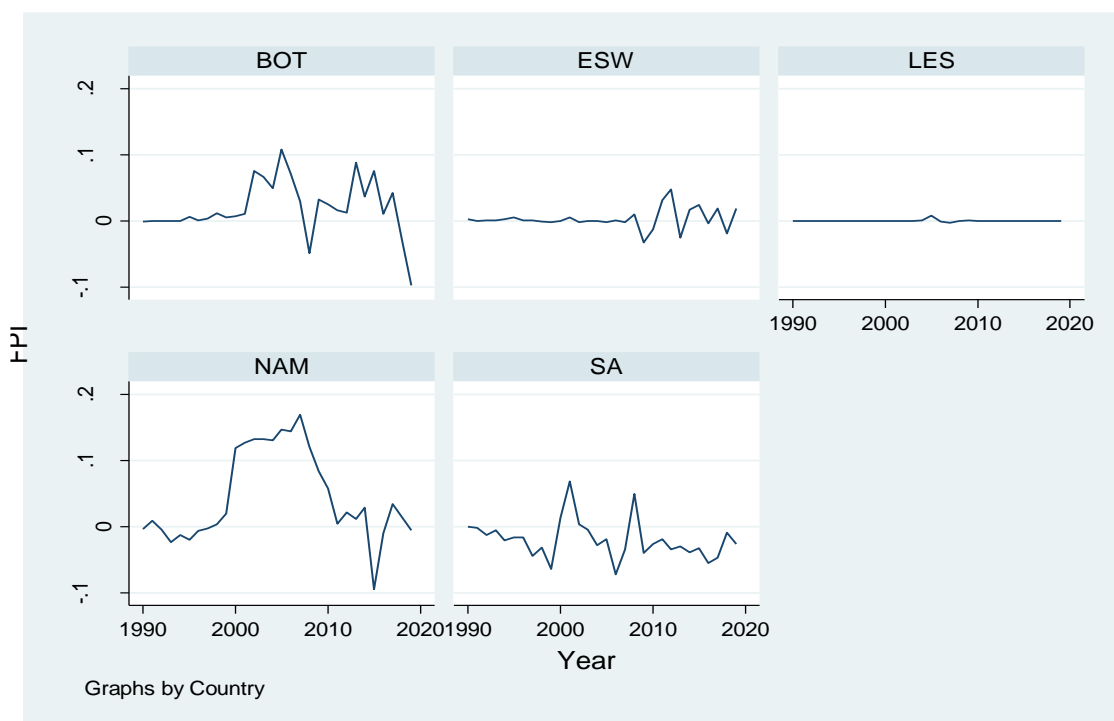
At this point, it becomes crucial to admit that the policy direction of the monetary authorities has a pronounced impact on the cross-border flows of foreign portfolio investment and foreign direct investment. Of note is the differential in interest rate which to a large extent influences the direction of capital flows. This study, therefore, calculated the differential in interest rate between countries that constitute SACU to the rate prevailing in the United State of America (USA) considering the United State of America as one of the key trading partners of the Southern African Customs Union (SACU). Specifically, the threshold of policy rate differential that optimizes foreign

portfolio investment and foreign direct investment for the union is crucial for growth and development. This study admits the fact that despite the major trading partners of the Union, there has not been sustainable growth and development. The study also proves necessary given the dearth of studies specifically within the context of ascertaining the threshold level of policy rate differential as it relates to the major components of capital flows in terms of foreign direct investment and foreign portfolio investment. The empirical relationship will exert some influences on the economies of the Southern African Customs Union and consequently on the living standards of the citizens. The current study, therefore, provides policy insights based on empirical outcomes.

This study, therefore, provides a guide for the region in respect of policy rate differential as it relates to foreign portfolio and foreign direct investment.

## 2. TRENDS AND PATTERNS OF THE MACROECONOMIC VARIABLES

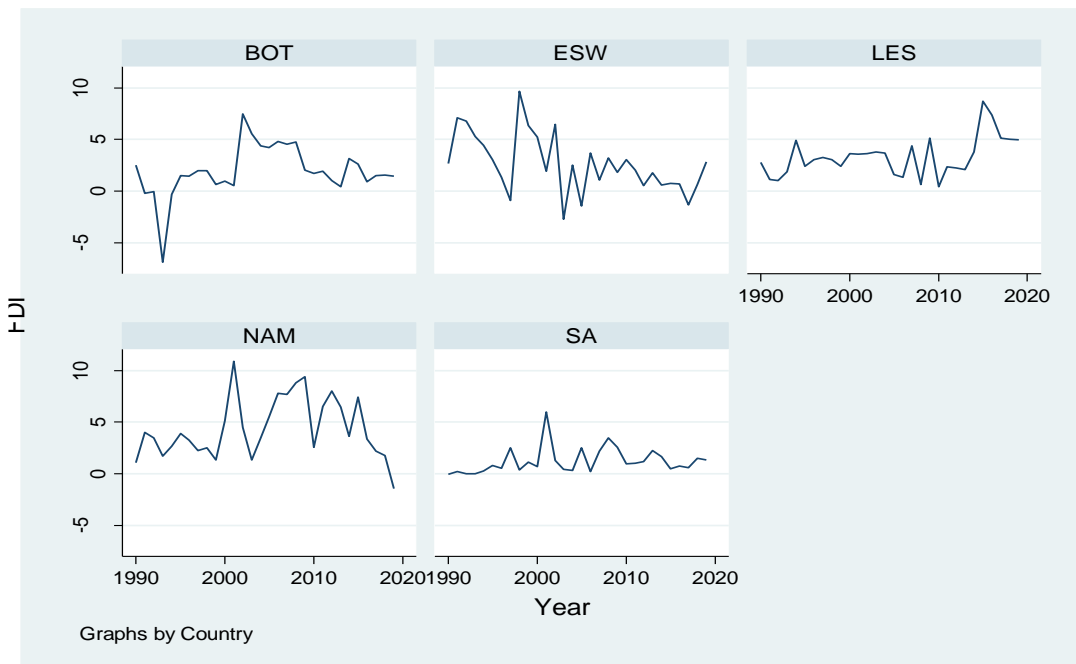
The behavioural pattern of the capital flows components used for the study as well as central bank policy rate differential, broad money growth, and inflation rate are described below:



**Figure 1.** The Trend and Pattern of Foreign Portfolio Investment

Source: Authors computation from Stata 14, 2021

Foreign portfolio investment in South Africa, Namibia, Botswana, and Eswatini appeared to be more volatile. However, it is linearly stable in most parts of the study period for Lesotho, with a little parabolic shape somewhere around 2005. The country had a fpi of 0.008% in 2005, while it was 0 in 2010, but later became negative in 2015 with a per centage of 0.0001%. Portfolio movement was very erratic for South Africa. It can be observed from the graph that it maintained a downward movement to the neighbourhood of 2000, which thereafter followed an upward trend and got to the pick some few years after 2000. It later fell from this peak and later still fluctuated similarly. The value of fpi was -0.01% in 2005, which later decreased to -0.02% and -0.03% in 2010 and 2015, respectively. Botswana initially had stability in fpi over the period 1990 to around 2000 but later turned volatile. Fpi in 2005 was 10%, and it decreased to 2% in 2010 but later rose to 7%. Eswatini's fpi was relatively stable up to a few years before 2010, but later turned erratic. The country had a value of -0.00141 of fpi in 2005, which later decreased to -0.01225 in 2010 and had a value of 0.024151 in 2015.



**Figure 2:** The Trend and Pattern of Foreign Direct Investment  
 Source: Authors computation from Stata 14, 2021

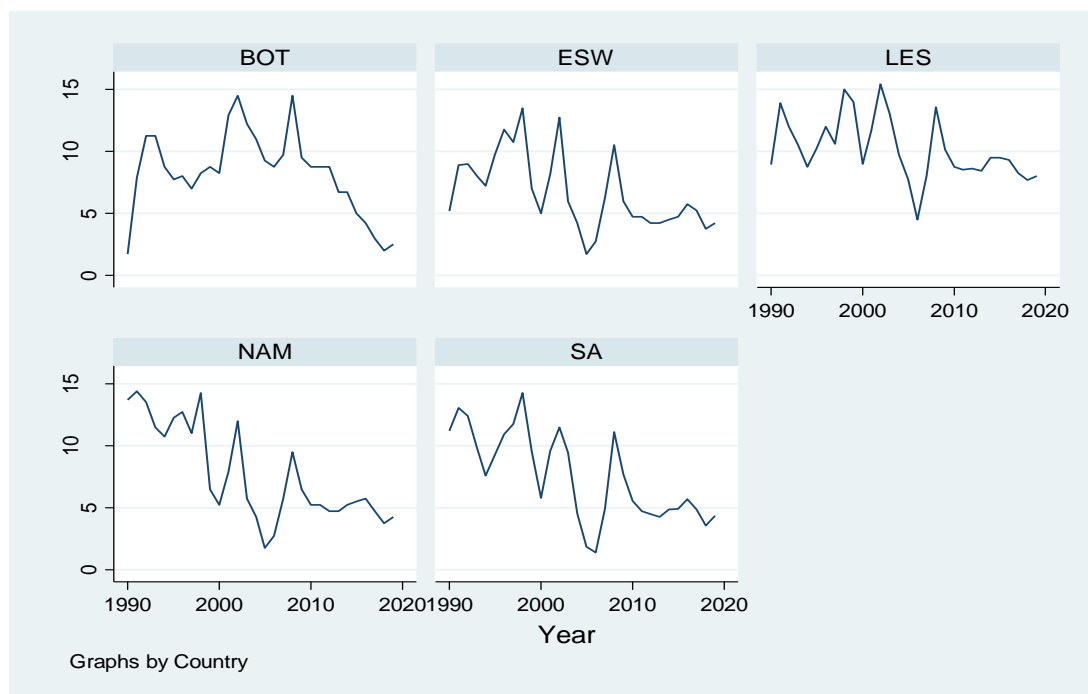
Namibia had the highest values of *fpi* as observed from the graph. Starting from around zero value, it steadily declined, but subsequently became an upward trend, which later declined sharply. It maintained some downward trend for a few years after 2010, with a later smooth upward trend followed by another decline towards the end of the study period. In 2005, *FPI* had a value of 14%, which later declined to 5% in 2010, but became worse in 2015 with a value of -9%.

The fluctuations in foreign portfolio and foreign direct investment above among the countries in the region could be partly due to changes in economic situations. For instance, according to [World Bank \(2011\)](#), net inflows of portfolio equity has been on the rise over time from around 0.303% of GDP in 1993 to around 2.766% of GDP in 1999 which signals the culmination of portfolio equity flow thus far in sub-Saharan Africa, having South Africa as the far-reaching recipient in the region.

Sub-Sahara Africa experienced a swift reversal of portfolio equity inflows in the aftermath of the USA, 2007 financial crisis, resulting in a loss of around US\$5.69 billion in 2008. There was a remarkable recovery of portfolio equity in the SSA in the concluding part of 2008 reaching to the middle of 2010, such that there was a rebound of portfolio equity from a minus of US\$4.706 billion in 2008 to a negative of US\$0.679 billion in 2012. Africa was described to be experiencing a descending trend as a result of the impact of the sovereign debt crises in the Eurozone ([IMF, 2012](#)). South Africa received the largest portfolio equity in SSA and was generally influenced in the region by the variation in the level of portfolio equity ([Adeola, 2017](#))

In another development, the flows of FDI to South Africa in 2012 rose to an estimated US\$4.643 billion in the aftermath of falling swiftly in 2010 from an estimated US\$9.885 billion in 2009 to US\$3.693 billion in the post global financial crisis. The 2008 decline in portfolio equity occurred during the global financial crisis. It thus, spotlights the volatility related to the flows of equity in the era of economic shock ([World Bank, 2014](#)).

The erratic movements in foreign portfolio investment (net) as a percentage of GDP and foreign direct investment net inflows as a percentage of GDP in the respective countries that constitute SACU above in figure two and three is thus connected to the transmission effect of economic shocks that affected the entire Sub-Saharan Africa.

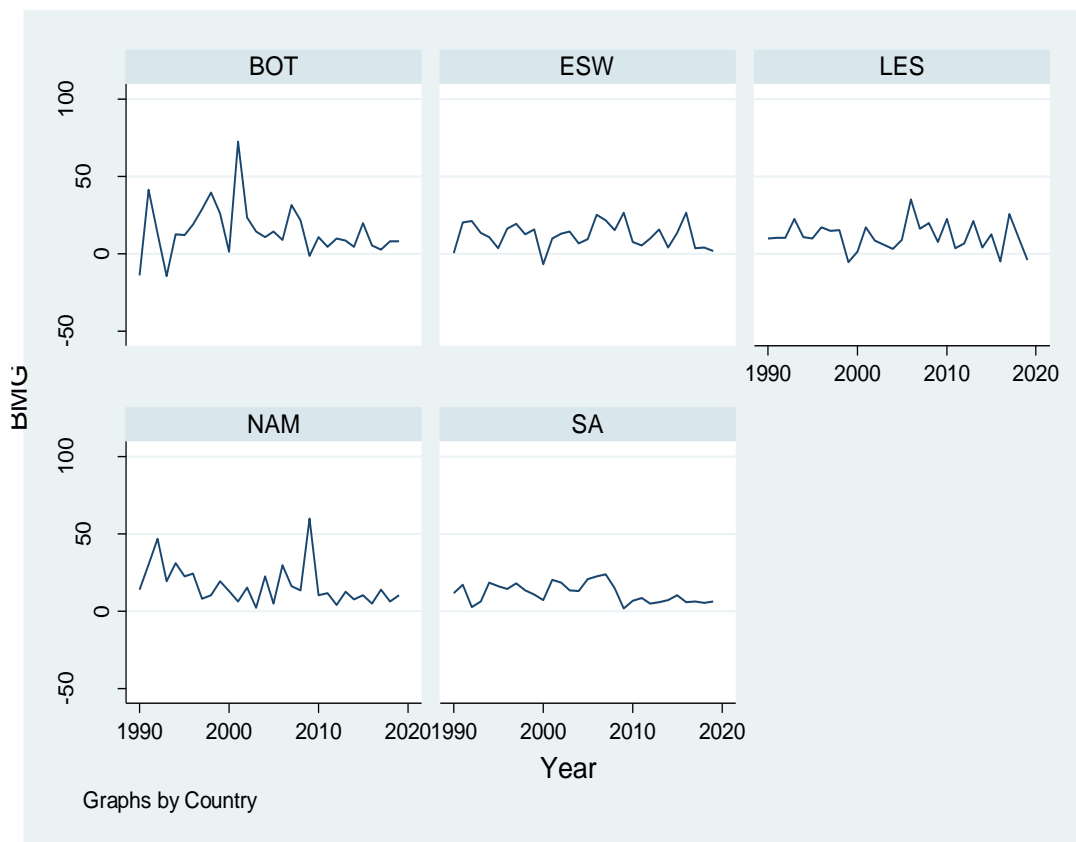


**Figure 3:** The Trend and Pattern of Central Bank Policy Rate Differential

Source: Authors computation from Stata 14, 2021

Figure 3 captures the central bank monetary policy rate differential. Considering the United State as one of the key trading partners of SACU as well as a dominant world economy, a differential was found between the rate that prevailed in the USA and the respective countries in SACU. This will, on average, influence investors' decision of the viability of prospective investments. A positive difference will tend to drive capital flows to the region while a negative difference will dampen investment and will tend to promote capital outflows. The policy rate differentials across the countries fluctuated widely. It was 9.25% in 2005 in Botswana but later declined to 8.75% and 5.0% in 2010 and 2015 respectively. The value in 2005 stood at 1.75% in Eswatini which later had a constancy of 4.75 % in both 2010 and 2015. Lesotho, on the other hand, in 2005 had a policy rate differential of 7.75% which later increased to 8.77% and 9.49% in 2010 and 2015 respectively. Namibia had the same value as Eswatini in 2005. It later increased to 5.25% and 5.50% in 2010 and 2015 respectively. South Africa had a low policy rate differential of 1.88% in 2005 which later rose to 5.58% in 2010 followed by a decline to 4.92% in 2015.





**Figure 4:** The Trend and Pattern of Broad Money Growth

Source: Authors computation from Stata 14, 2021

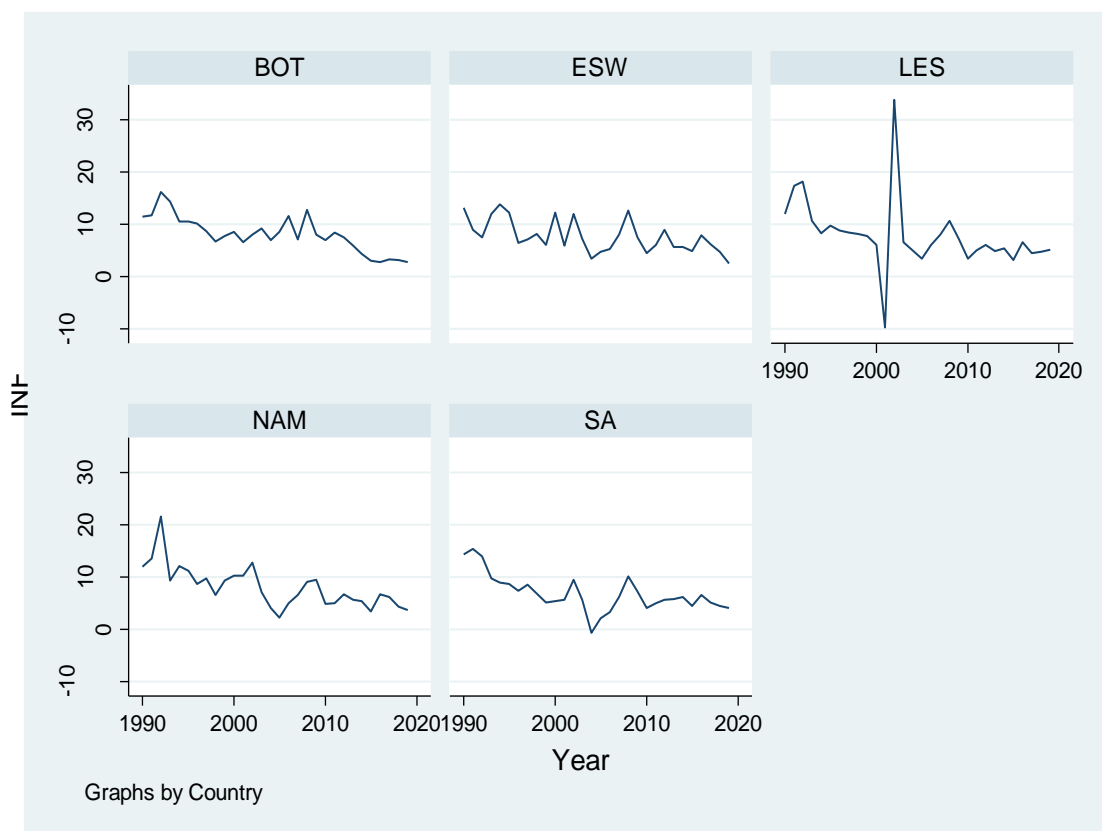
Broad money growth is a core monetary policy variable that affects the level of liquidity in an economy. All the countries are characterized by erratic fluctuations in broad money growth over the study period. The fluctuations seem to follow a similar trend across the economies. The BMG for Eswatini, Lesotho, and South Africa is roughly approximate, while Botswana and Namibia had episodes of sharp upward and downward growth in broad money growth.

The value of BMG stood at 14.40% in 2005 in Botswana, but later fell to 10.7% in 2010, accompanied by an increase to 19.87% in 2015. Within this time band, it was observed by Southern African Customs Union (2013) that broad money supply (M2) in Botswana increased by 9.0% in December 2012 compared to 4.4% growth in December 2011, majorly influenced by falling government deposits alongside the expansion in credit growth. The rate in 2005 with respect to Eswatini was 9.71%. It later declined to 7.9% in 2010, followed by a rise to 13.57% in 2015. Lesotho, on the other hand, had a bmg of 9.13% in 2005, which drastically increased to 22.36% in 2010, but stood at 12.55% in

2015. Considering the information from the [Southern African Customs Union \(2013\)](#), which also falls within the time period covered in this study, real growth in money supply was reported to have rapidly increased by 16.1% in December 2013 relative to the 2.8% growth documented in December 2012. It was observed that the rapid rise in money supply outpaced the inflation rate and was influenced by a fall in local credit, inclusive of claims on the government, while there was a rise in credit to the private sector.

It was 5.11% in 2005 with respect to Namibia, which increased to 10.52% in 2010, but declined to 10.17% in 2015. The bmg growth in 2005 was 20.69% for South Africa. It later declined to 6.93% in 2010 and stood at 10.32% in 2015.

A publication by the [Central Bank of Lesotho \(2015\)](#), stated that in 2014, given the 2013 strong growth, money supply rose slightly by 4.0 per cent. The downshift in the growth of money supply was majorly attributed to the deceleration in net foreign assets as well as private sector credit. The rise in net foreign assets declined in 2013 from 25.7% to an estimated 8.8% in 2014, majorly as a result of a decline in commercial banks' net foreign assets. Moreover, based on the outlook, the supply of money was forecasted to increase in the medium term by 6.9% on average, while rising by 9.2% in 2015 but declining to 8.3% in 2017. It was also observed that the rise in money supply was predominantly influenced by private sector credit ([Central Bank of Lesotho, 2015](#)).



**Figure 5:** The Trend and Pattern of inflation Rate

Source: Authors computation from Stata 14, 2021

Figure 5 displays the inflation rate across the respective countries in the Southern African Customs Union. Obviously, they are all characterized by instability in inflation rates. The instability in the inflation rate appears to have negatively trended in SACU over the study period. Botswana, Lesotho, Namibia, and South Africa initially had a rise in inflation rate from the reference period of 1990. It thereafter fluctuated downward, while Eswatini declined initially and later followed a fluctuating pattern. Bank of Namibia (1999), reported that the consumer inflation rate in 1999 for Namibia was 8.7% though at a variance with the consumer price index figure of 9.380156% obtained from UNCTADSTAT, used for this study. Nevertheless, the situational description of the economy as reported by the Bank for the period explained inflation rate in Namibia. The Bank of Namibia, stressed that the 1999 inflation rate occurred as a result of favourable economy-wide conditions, stability of the local currency and declining interest rates. The inflation rates in Namibia within the study period stood at 6.147401% in 2017 but declined to 4.29361% in 2018. The lower inflation rate in 2018 is substantiated by the

Bank of Namibia (2018) report. According to the report, the Bank of Namibia's Monetary Policy Committee persistently sustained a stance of accommodative monetary policy in 2018 with the aim of bolstering the local economy alongside keeping up the one-to-one link to the rand. The monetary policy stance was triggered due to the weak domestic economy in 2018 which majorly characterized wholesale and retail trade, hotels and restaurants, real estate and business services, taxes on products and Government services. The yearly inflation levels reduced and remained contained, recording 4.3% on the average relative to 6.2% registered in 2017.

However, Lesotho experienced a sharp upward trend in the neighbourhood of 2000, followed by a sharp downward trend after which it maintained some steady fluctuations. Based on the [SACU \(2016\)](#), Lesotho's consumer prices rose by 3.2% in 2015 compared to 5.4% in 2014. The decline in the inflation rate was majorly attributed to the fall in housing and utility prices, which fell by 6.8% from 7.7% in 2014. The decline was subsequently observed in transport, which increased by 0.3% in 2015 compared to 10.5% in 2014. The inflation rate was 8.6% for Botswana in 2005 and has consecutively declined to 6.9 and 3.06 in 2010 and 2015, respectively. The inflation rate in Botswana, which followed a downward trend over time, similarly relates to the observation in the [Southern African Customs Union \(2013\)](#) report. Based on the reports, inflation in Botswana moved in a descending trajectory from the yearly mean of 8.5 percent that characterized 2011 to 5.9 percent in 2013 and declined over the objective span. The declining trend was attributed to the depression in local demand and the adjustment in regulated prices, inclusive of the government levies, which were characterized by mutation, resulting in less pressure. That of Eswatini was 4.7% in 2005, which later declined to 4.5% in 2010, and thereafter increased to 4.9% in 2015. Furthermore, the relatively downward trend of inflation rate, albeit with some fluctuations, can be implied by the documentary of the [Southern African Customs Union \(2013\)](#), which is of the observation that inflation in Eswatini trended in the downward direction from a peak of 9% in 2012 to 5.6 % in 2013, which was attributed primarily to a decline in food inflation. Following a similar vein, in 2005, the inflation rate was 3.43% in Lesotho and later increased to 3.46%, after which it fell to 3.21% in 2015. Namibia had it at 2.28% in 2005. It increased to 4.87% in 2010 and later declined to 3.39% in 2015. South Africa's inflation rate has also not been stable, despite being a key player in the region and operating discretionary monetary policy within the CMA. It had a rate of 2.06% in 2005, which rose to 4.06% in 2010, but then fell to 4.5% in 2015. A comparable description of the inflation rate is that provided by the SACU (2016). According to the report, the inflation rate improved to 4.6% in 2015 in South Africa from its 6.1% rate in 2014, falling within the target bound of 3–6% set by the Reserve Bank (SARB). The fall in inflation rate based on the SACU report was majorly observed in transport inflation, which declined by 1.2% relative to a rise of 6.2% in 2014. Moreover, the decline was

subsequently observed in food prices, which only rose by 5.1% in comparison to 7.6% in 2014.

Also, the [World Bank \(2018\)](#), observed in respect of South Africa that there was a decline in consumer price inflation from 6.6% in January 2017 to a rate of 4.4 in January 2018, which subsequently declined in February to 4%. A number of factors were accounted for the fall, such as minimal food and fuel price inflation, which constituted the main factors, mostly as the economy began to revamp from the drought in 2015, whose effects were continuously felt in 2016. Moreover, based on the report, it was observed that the improvement in inflation rate was because the rand experienced appreciation due to the impressive commodity prices as well as the improvement in investor confidence alongside the inflows of capital since the elective conference of the ANC in December 2017.

## 2. LITERATURE REVIEW

This section encompasses a brief review of empirical works. For instance, [Mughogho and Alagidede \(2019\)](#) analysed the impact capital account liberalization has on the inflows of capital to Sub-Saharan Africa. A panel analysis comprising of 13 SSA economies spanning 1996-2013 was used for the study. The authors utilized Fixed Effects and System-GMM estimators. Other techniques include sample splitting and threshold effects to check the possibility of asymmetries as regards the flows of capital to SSA. They established that the liberalization of capital account enhances the flow of capital to SSA. Another characteristic of their study involves threshold effects in terms of financial sector development and institutional quality. They concluded that greater magnitude of institutional quality and financial sector development have the propensity to maximize advantages from capital account liberalization.

[Choong, Baharumshah, Yusop, and Habibullah \(2010\)](#) analysed, within the context of developed and developing economies, the economic growth-stimulating effect of the receipt of foreign direct investment, portfolio investment, and foreign debt. They focused on stock markets as a medium in translating foreign capital flows for the enhancement of economic growth. The authors found that FDI exerts a positive impact on economic growth but across all the countries used for the study, foreign debt and portfolio investment impact economic growth negatively. They were able to establish from their results the relevance of stock markets as a medium that transfers the effect of capital flows on economic growth. They concluded that the stock market development needs a certain degree of a threshold for it to convert the negative impact of private capital flows to positive outcomes irrespective of being domiciled in developed or developing economies.

[Slesman, Baharumshah, and Wohar \(2015\)](#) employed threshold regression and established that FDI, as well as other categories of capital flows, promotes economic

growth provided countries are characterized by high-quality institutions. FDI is not significant or negative for countries that operate below the threshold level of institutional development.

A study by [Enisan \(2017\)](#) employed the Markov-regime switching model (MSMs) spanning 1970-2012 and provides that inflation, exchange rate as well as discount rate are the crucial variables influencing FDI flows.

[McCloud and Delgado \(2018\)](#) examined the topic "Domestic Interest Rate and Foreign Direct Investment under Institutional Uncertainty". The authors used corruption as a measure of institutional uncertainty resulting in the outcome that across countries, the domestic interest rates decline to the tune of 0.7 (1) per cent arising from a one per cent rise in the inflows (outflows) of FDI. They concluded that the empirical relationship between domestic interest rates and the flows of FDI is non-monotonically uncertainty-contingent.

[Hermes and Lensink \(2003\)](#) formulated a model predicting that the effect of FDI on economic growth is dependent on the development of host economy's financial markets. They used cross-section and panel data covering 67 developing economies and found that FDI has a positive growth impact provided the financial system is adequately developed.

[Tu and Tan \(2012\)](#) employed time-series data in respect of 10 ASEAN countries spanning 1990-2008 and established that there exists a positive impact of FDI on economic growth provided human capital is above a threshold level. However, if it is contrary, FDI is more likely to erode economic growth based on the possibility to use local cheap labour and crowd out investment in the domestic economy. [Azman-Saini, Baharumshah, and Law \(2010\)](#) utilized Hansen's approach by considering cross-country data from 91 countries covering the period 1975-2005 to ascertain that the direct impact of FDI on economic growth occurs provided financial development is above a particular threshold. [Agbloyor, Abor, Adjasi, and Yawson \(2014\)](#) employed the generalized method of moments (GMM) for the analysis of the economic growth effect of private capital inflows in respect of 14 African countries over the period 1990-2007. The authors found that all the components of private capital inflows generate a negative impact on economic growth. It was also established that economies characterized by a strong financial market have the capacity to transform the negative effect of private capital inflows into a positive one.

Another study by [Kalai \(2021\)](#), analysed the non-linear effect of foreign direct investment concerning the development of the Arab Maghreb Union (AMU) countries spanning 1980-2019. The author employed Panel Smooth Transition Regression Model (PSTR) as well as Panel Smooth Transition Autoregressive Model (PSTAR). It was

established from the study that there was an opposite impact of FDI below and above the estimated threshold. It was therefore concluded that this is due to the asymmetrical effect of unforeseen shocks in respect of its volatility.

Razin (2002) provides that the contribution of FDI to domestic investment and output growth is more pronounced compared to the contributions running from portfolio equity flows as well as international loans. Moreover, the net private capital inflows in respect of emerging markets were analysed by Ahmed and Zlate (2014). It was provided that push factors like foreign economic growth, global risk appetite, and interest rate differentials are the factors that explained the private investment inflow of emerging markets in their study. An effort was geared at ascertaining the drivers of portfolio inflows before and in the aftermath of the 2008 global financial crisis. Capital flight back to the source country in the aftermath of the global financial crisis is explained by the significant impact of interest rate differential.

Beckmann and Czudaj (2017) established that both gross and net capital flows exert a direct impact on economic growth except South Korea. Furthermore, Igan and Tan (2017), in a sample of 33 economies, found that capital inflows stimulate credit growth as well as raise the likelihood of credit booms in both household and corporate sectors.

Baba and Sevil (2020) examined the influence foreign capital shifts exert on economic activities and asset prices in respect of South Korea. They employed the Bayesian threshold vector autoregressive (TVAR) model in the determination of the regimes of large and low inflows of foreign capital. Also, structural impulse response analysis was utilized to ascertain if the response of the variables varies across the estimated regimes. They utilized quarterly data of foreign capital inflows, gross domestic product (GDP), credit to the private non-financial sector, consumer price index, house prices, stock returns as well as real effective exchange rate (REER). The authors established that large inflows of gross foreign capital, foreign direct investments (FDI) as well as foreign portfolio investments (FPI) appeared inefficient in the stimulation of economic growth. However, large inflows of other foreign investments (OFIs) have a significant impact on GDP. It was found that the larger depreciation of REER results in the declines of foreign capital inflows while the large inflows of gross foreign capital, FDI, and OFIs have an affinity with further expansion of credit supply to private non-financial sectors.

The role of the international credit channel in respect of Turkey was analysed by Baskaya, di Giovanni, Kalemli-Özcan, Peydro, and Ulu (2017) in which the authors concluded that higher capital inflows are the determinant of an increase in credit supply by banks.

Fornah and Yuehua (2017) examined the nexus and the effect of interest rates on the inflows of FDI as well as ascertained other factors that significantly influence FDI inflows in Sierra Leone spanning 1990-2016. The authors utilized secondary data obtained from the World Development Indicators as well as used the technique of



Ordinary Least Square. It was found from the study that interest rates exert a significant effect on the inflows of FDI which, according to the authors, can be considered for policy formulation. It was also observed from the study that trade openness and GDP growth constitute the key determinant of FDI in Sierra Leone. The study, therefore, provides that policies that enhance trade as well as facilitate GDP growth should be motivated to achieve long-term FDI inflows.

Das, Chowdhury, and Islam (2021) in a study ascertained the threshold value of institutional quality indicators as well as its effect on Bangladesh's capital flight. They used the ICRG and WGI governance data that spanned 1989-2016 and observed that the nonlinear regression shows that up to a particular threshold state of institutional quality, interest rate differential declines while economic growth enhances net capital flight of Bangladesh. Moreover, up to a particular threshold, the level of corruption, as well as interest rate differential, reduce net capital flight but above that level, there was no effect. It was also observed that none of the explanatory variables affects Net capital Flight provided the role of government stability threshold is put into consideration.

Asiamah, Ofori, and Afful (2019) analyzed the determinants of FDI in Ghana spanning 1990-2015 by utilizing the technique of a causal research design. Also, the Johansen's approach for ascertaining cointegration in the context of vector autoregressive was utilized. The authors established a cointegrating relationship in respect of FDI and its determinants. It was ascertained that in both the long run or short run, there were statistically significant negative impacts of interest rate, exchange rate, and inflation rate on FDI in the economy. However, telephone usage, gross domestic product, and electricity production exhibit a direct impact on FDI.

Hlophe and Emenike (2020) examined the nexus between financial indicators and foreign direct investment in respect of Eswatini. The essence of the study was to determine if there occurs significant relationship and causality as regard FDI and inflation rate, interest rate and exchange rate by utilizing yearly data covering the period 1980 to 2019. It was observed that all the data were stationary at first difference through the Augmented Dickey Fuller test. Furthermore, the outcome of the correlation provides that there exists a directly significant relationship in respect of FDI and the exchange rate. However, a direct but weak correlation exists for the interest rate while there is a negatively weak correlation in respect of the inflation rate. Their results also show based on the Granger causality test that a unidirectional causality occurs from exchange rate to FDI as well as inflation rate to FDI. The authors, therefore, prescribed that the monetary authorities in Eswatini should consistently employ fiscal and monetary policies towards containing inflation in the country.

Another study by Benson, Eya, and Yunusa (2019) analyzed the impact of inflation, exchange rate as well as interest rates in respect of FDI in Nigeria spanning 2006 to 2018. The authors found evidence of a direct and significant relationship between FDI



and exchange rate. Moreover, the results also show that a negative and non-significant relationship occurs between interest rate and FDI based on the long-run co-integrating equation. However, there exists a negative relationship between inflation and FDI in the long run.

### 3. METHODOLOGY

The two variables of foreign portfolio investment and foreign direct investment are key components of capital flows. Therefore, the functional relationship of capital flows (*Cap*) to central bank policy rate differential (*cbpd*) is expressed below:

$$Cap = f(cbpd)$$

However, the study included other relevant monetary variables comprising of broad money growth rate and inflation rate (INF)

Therefore,

$$Cap = f(cbpd, bmg, inf)$$

Where "*bmg*", is the broad money growth rate while "*inf*" is the inflation rate.

### 4. FIXED-EFFECT PANEL THRESHOLD MODELS

The Fixed-effect Panel threshold is used for the determination of the optimal level of foreign direct investment (FDI) and that of foreign portfolio investment (FPI) for the Southern African Customs Union. This study followed the work of Wang, 2015 in expressing the following fixed-effect panel threshold model as well as used the developed Stata command for the estimation of the threshold level of central bank policy rate differential concerning FDI and FPI.

#### 4.1 Single-Threshold Model

The single threshold model is expressed as below:

$$y_{it} = \alpha + X_{it}(q_{it} < \gamma)\beta_1 + X_{it}(q_{it} > \gamma)\beta_2 + u_i + \varepsilon_{it}$$

Where the threshold variable is *qit* while the threshold parameter ( $\gamma$ ) splits the equation into two regimes characterized by the coefficients of  $\beta_1$  and  $\beta_2$ . The respective effect is captured by *ui* while the stochastic is measured by  $\varepsilon_{it}$ . Adapting the model to the current study follows that *y<sub>it</sub>* represents either foreign portfolio investment (FPI) or foreign direct investment (FDI) while *q<sub>it</sub>* represents central bank policy rate differential (*cbpd*)

Alternatively; the equation can be expressed as:

$$y_{it} = \alpha + X_{it}(q_{it}, \gamma)\beta + u_i + \varepsilon_{it}$$

Having

$$X_{it}(q_{it}, \gamma) = X_{it}I(q_{it} < \gamma) \\ X_{it}I(q_{it} \geq \gamma)$$

With the value of  $\gamma$ ,  $\beta$  can be estimated as

$$\hat{\beta} = \{\mathbf{X}^*(\gamma)' \mathbf{X}^*(\gamma)\}^{-1} \{\mathbf{X}^*(\gamma)' \mathbf{y}^*\}$$

The  $\widehat{\epsilon}^* ' \widehat{\epsilon}^*$  measures the residual sum of squares while the value of  $\gamma$  can be searched through the subset of  $q_{it}$  while  $\mathbf{y}^*$  and  $\mathbf{x}^*$  are amidst group deviations. The author restricted the range within the interval of  $(\gamma, \bar{\gamma})$ , quantiles of  $q_{it}$ . The estimate of  $\gamma$ s minimizes the RSS, consequently, the following expression holds:

$$\hat{\gamma} = \arg \min S1(\gamma)$$

$\gamma$

Hansen (1999) claimed that testing  $\gamma = \gamma_0$  requires the formulation of a confidence interval through the “no-rejection region” approach with a likelihood-ratio (LR) statistic by the following:

$$LR1(\gamma) = \frac{LR1(\gamma) - LR1(\gamma_0)}{\sigma^2} PR \omega$$

$\rightarrow$

$$\Pr(x < \omega) = (1 - e^{\frac{-x}{2}})^2 \dots \dots \dots 2$$

If  $\alpha$  is the level of significance, the maximum value in the LR series, therefore, correlates with the smaller limit while the higher limit correlates with the minimum LR series. The  $\alpha$  quantile based on the inverse function of equation 2 is expressed below:

$$c(\alpha) = -2\log(1 - \sqrt{1 - \alpha})$$

$H_0$  is rejected provided  $LR_1(\gamma_0)$  is greater than  $c(\alpha)$ . The following equation computes the F statistic:

$$F_1 = \frac{S_0 - S_1}{\hat{\sigma}^2}$$

Given the null hypothesis ( $H_0$ ),  $\gamma$  is not ascertained alongside that  $F_1$  is not characterized by standard asymptotic distribution.

The bootstrap concept is employed on the critical values of the F statistic to examine the significance of the impact of the threshold.

## 4.2 Multiple-Thresholds Model

The case of multiple thresholds requires fixing the model sequentially. Given the expression below:

$$y_{it} = \alpha + X_{it}(q_{it} < \gamma_1)\beta_1 + X_{it}(\gamma_1 \leq q_{it} < \gamma_2)\beta_2 + X_{it}(q_{it} \geq \gamma_2)\beta_3 + u_i + \varepsilon_{it}$$

The double-threshold model splits the equation into three regimes having the coefficients  $\beta_1, \beta_2, \beta_3$ .  $(N \times T)^2$  times, and is obtained by the use of the grid search approach.

Estimating the threshold sequentially, the author proceeded as follows:

Step 1: The single threshold is first ascertained to determine the estimator  $\hat{\gamma}_1$  as well as the RSS  $S_1(\hat{\gamma}_1)$

Step2: Given the ascertainment of  $\hat{\gamma}_1$ , the next threshold alongside its confidence interval is expressed below:

$$\begin{aligned}\hat{\gamma}_2^\tau &= \arg \min \{S_2^\tau(\gamma_2)\} \\ S_2^\tau &= S \{ \min((\hat{\gamma}_1, \gamma_2) \max(\hat{\gamma}_1, \gamma_2)) \} \\ LR_2^\tau(\gamma_2) &= \frac{S_2^\tau(\gamma_2) - S_2^\tau(\hat{\gamma}_2^\tau)}{\hat{\sigma}_{22}^2}\end{aligned}$$

Step 3: Considering that  $\hat{\gamma}_2^\tau$  exhibits efficiency while  $\hat{\gamma}_1^\tau$  does not, it follows that the first threshold is re-estimated as expressed below:

$$\begin{aligned}\hat{\gamma}_1^\tau &= \arg \min \{S_1^\tau(\gamma_1)\} \\ S_1^\tau &= S \{ \min(\gamma_1, \hat{\gamma}_2) \max(\gamma_1, \hat{\gamma}_2) \} \\ LR_1^\tau(\gamma_1) &= \frac{S_1^\tau(\gamma_1) - S_1^\tau(\hat{\gamma}_1^\tau)}{\hat{\sigma}_{21}^2}\end{aligned}$$

The test for double threshold becomes imperative provided the null hypothesis in a single-threshold model is rejected. While the  $H_0$  is a single threshold model, the  $H_1$  is a double threshold. The F statistics is therefore expressed as below:

$$F_2 = \left\{ \frac{S_1((\hat{\gamma}_1) - S_2^\tau(\hat{\gamma}_2^\tau)}{\hat{\sigma}_{22}^2} \right\}$$

It is also to be noted that the bootstrapping method in this instance is identical to the case of a single-threshold model. (Wang, 2015)

The specification of the threshold model above becomes necessary to ascertain the specific level of policy rate differential that will produce an optimal effect on foreign portfolio investment and foreign direct investment. According to Wang (2015), the threshold model shows the structural break in the relationship among variables. Hansen (1999) is of the view that threshold regression models describe those respective observations can be split into categories based on the value of an observed variable. It, therefore, promotes the effectiveness of policy direction by the monetary authorities in the Southern African Customs Union as regards monetary policy rate determination

towards achieving desirable capital flows and by implication, result in the attainment of other macroeconomic objectives.

### **4.3 Sources of Data**

FPI is foreign portfolio investment (net) as a percentage of GDP, FDI is the foreign direct investment (net inflow) as a percentage of GDP. The central bank policy rate differential (cbpd) is obtained by the difference between the world monetary policy rate (the United State of America) and the rate prevailing in the respective countries in the Southern African Customs Union. The inflation rate is measured by the consumer price index (annual average growth rate). The data set on foreign portfolio investment, foreign direct investment, and Broad money growth (BMG) were sourced from the World Development Indicators (WDI). Inflation rate data were obtained from UNCTADSTAT. Policy rates for South Africa (Repo Rate) were obtained from the South Africa Reserve Bank (SARB) while the policy rates for the remaining four countries in the Union as well as for the United States of America (to calculate the central bank policy rate differential) were sourced from the International Monetary Fund (IMF).

## **5. THE EMPIRICAL RESULTS**

### **5.1 Panel Unit Root Test**

Before the empirical analysis of the macroeconomic variables, the panel unit root tests were examined to ensure that no variable is integrated of order greater than “1” as well as in the light of the need to avoid spurious estimations. [Table 1](#) below presents the results of the panel unit root tests. The panel unit root tests were ascertained on the basis of the Levin, Lin and Chu (LLC) and Im, Pesaran and Shin (IPS). All the variables are stationary at level in both tests except that foreign direct investment (FDI) is integrated after the first difference in LLC on the basis of constant and trend. The outcomes of the panel unit root tests thus provide the reliability of the use of the variables for estimations as no variable is integrated of order greater than one

Table 1: Panel Unit Root Test

Series	Levin, Lin and Chu Test [A]				Im, Pesaran and Shim Test [B]				Result [A]	
	Level		First Difference		Level		First Difference			Result [B]
	T-Test	Prob. Value	T-Test	Prob. Value	T-Test	Prob. Value	T-Test	Prob. Value		
FDI Constant Constant and trend	-2.2516	0.0122			-2.7316	0.0032			I(0)	I(0)
			-5.2651	0.0000	-1.6699	0.0475			I(1)	I(0)
FPI Constant Constant and trend	-2.4608	0.0069			-4.4382	0.0000			I(0)	I(0)
	-1.7804	0.0375			-2.9271	0.0017			I(0)	I(0)
BMG Constant Constant and trend	-8.1694	0.0000			-8.0537	0.0000			I(0)	I(0)
	-8.0692	0.0000			-7.6865	0.0000			I(0)	I(0)
INF Constant Constant and trend	-4.8681	0.0000			-4.5556	0.0000			I(0)	I(0)
	-6.4043	0.0000			-6.1786	0.0000			I(0)	I(0)
CBPD Constant Constant and trend	-3.0212	0.0013			-2.3393	0.0097			I(0)	I(0)
	-4.6686	0.0000			-3.5086	0.0002			I(0)	I(0)

## 5.2 The Threshold of Central Bank Policy Rate Differential to Foreign Portfolio Investment

**Table 2a: Threshold Estimator (Level = 95)**

Model	Threshold	Lower	Upper
Th-1	2.5000	2.0000	2.7500

**Table 2b: Threshold Effect Test (Bootstrap = 300)**

Threshold	RSS	MSE	F stat	Prob	Crit10	Crit5	Crit1
Single	0.2062	0.0017	4.07	0.6267	12.4153	14.1432	18.9278

<b>Table 2.c:</b> Fixed-effects (within) regression	Number of obs	=	150
Group variable: country	Number of groups	=	5
R-sq: within = 0.0346	Obs per group: min	=	30
between = 0.0015	avg	=	30.0
overall = 0.0230	max	=	30
F(4,141)	=	1.26	
corr(u_i, Xb)	= -0.0315	Prob > F	= 0.2869

Dependent Variable: FPI

Explanatory Variables	Coefficient	Standard Error	t	P > t	95%Conf. Interval
Bmg	-.000046	.0002903	-0.16	0.874	-.0006198 .0005279
Inf	.0001671	.0008727	0.19	0.848	-.0015581 .0018922
_cat#c.cbpd					
0	-.020598	.0092566	-2.23	0.028	-.0388977 -.0022984
1	-.001511	.0012707	-1.19	0.236	-.0040231 .0010011
_cons.	0.0228355	0.0097961	2.33	0.021	0.0034693 0.0422018
sigma_u	.02413458				
sigma_e	.03823841				
Rho	0.28487858	(fraction of variance due to u_i)			

F test that all u\_i=0: F (4, 141) = 11.45

Prob &gt; F = 0.0000

### 5.3 The Threshold of Central Bank Policy Rate Differential to Foreign Direct Investment

**Table 3a: Threshold Estimator (Level = 95)**

Model	Threshold	Lower	Upper
Th-1	10.1600	9.4150	10.2500

**Table 3b: Threshold Effect Test (Bootstrap = 300)**

Threshold	RSS	MSE	F stat	Prob	Crit10	Crit5	Crit1
Single	743.6067	6.1967	8.32	0.2233	12.3416	15.3750	22.6491

<b>Table 3c: Fixed-effects (within) regression</b>	Number of obs = 150
Group variable: country	Number of groups = 5
R-sq: within = 0.0731	Obs per group: min = 30
between = 0.0112	avg = 30.0
overall = 0.0478	max = 30
F(4,141) = 2.78	
corr(u_i, Xb) = -0.0893	Prob > F = 0.0292

Dependent Variable: FDI

Explanatory Variables	Coefficient	Standard Error	t	P > t	95%Conf. Interval	
bmg	.0139101	.0175092	0.79	0.428	-.0207044	.0485245
inf	-.0533957	.0526595	-1.01	0.312	-.1574998	.0507085
_cat#c.cbpd						
0	.3202283	.1089642	2.94	0.004	.1048135	.5356431
1	.1464941	.0750103	1.95	0.053	-.001796	.2947843
_cons.	.9602062	.7142311	1.34	0.181	-.4517797	2.372192
sigma_u	1.2583039					
sigma_e	2.3068291					
rho	.22930875	(fraction of variance due to u_i)				

F test that all u\_i=0: F(4, 141) = 8.69

Prob > F = 0.0000



Examining the panel threshold of cbpd to fpi, it shows that a linear relationship exists between cbpd and fpi. The single-threshold model's estimator is 2.5000 at 95% confidence interval [2.0000, 2.7500]. The *F* statistic is 4.07 at a p-value of 0.6267 which is not statistically significant. By implication, the null hypothesis of a single threshold model cannot be rejected. At cbpd below the threshold level, a one per cent rise in cbpd reduces fpi by 0.02 and is found to be statistically significant while above the threshold level, a unit increase in cbpd decreases fpi by 0.001 but is not statistically significant. However, broad money growth and inflation rate are not statistically significant in explaining foreign portfolio investment.

Table 3a conveys a single-threshold model's estimator of 10.1600 at 95% confidence interval [9.4150, 10.2500]. The *F*-statistic in this instance is 8.32 at a p-value of 0.2233. The non-statistical significance of the *F*-Statistic established that the null hypothesis of a single threshold cannot be rejected. A linear relationship therefore exists between central bank policy rate differentials and foreign direct investment. The regression estimates reveal that cbpd is only statistically significant below the threshold level but becomes insignificant at cbpd above the threshold.

If cbpd rises by one per cent, it generates an increase in fdi by 0.32 per cent while above the threshold, it insignificantly affects fdi by 0.14 percent. The optimal level of cbpd that promotes foreign direct investment, therefore, occurs below the threshold of 10.1600. Moreover, broad money growth and inflation rate are also found to be statistically insignificant in determining foreign direct investment in the Southern African Customs Union.

## **6. DISCUSSION OF THE EMPIRICAL RESULTS**

The threshold level of cbpd to fdi is 10.1600 and found to have a linear relationship with fdi. The estimates show that while cbpd is not statistically significant above its threshold, it is significant at the one per cent level provided it falls below the threshold and is found to promote fdi by 0.32 arising from a unit rise in it. The result indicates that prospective foreign investors in foreign direct investment take into consideration the differential in the policy rate in their investment decision process. This is unconnected to the fact that the returns on their investment activities and the condition of credit facilities in the domestic economy can be influenced by the monetary policy rate that prevails in the host economy among other factors.

The relationship between cbpd and fpi is also linear having a threshold of cbpd at 2.5000. The relationship is such that cbpd exerts a negative effect on fpi either below or above the threshold level. Nevertheless, it is only statistically significant below the threshold level. This calls for studies on why cbpd promote FDI but decreases FPI.

The negative effect of cbpd on fpi shows that, as interest rate differentials increase, foreign portfolio investment decreases. Foreign portfolio investment is expected to be

more sensitive to policy rate differential compared to foreign direct investment. Existing and prospective portfolio investors, therefore, have a high probability to divert resources to economies characterized by more effective returns on investments and stable monetary policy regimes. Some related findings within the ambit of the literature include the empirical work of [Karimo \(2020\)](#), who analysed the impact of interest rate differential as well as exchange rate movement in respect of the dynamics of Nigeria's foreign private capital flows over the period 2010Q1 to 2019Q4. The author utilized the interest rate parity theory and the Markov Switching Time-Varying Transition Probability Modelling technique. It was established from the study that the dynamics of aggregate capital and foreign direct investment flows are not determined by interest rate differential while it exerts a significant impact on foreign portfolio investment flows. Moreover, the flows of FPI in either direction, as well as inflows in FDI, are significantly determined by the movement in real exchange rate while it is neutral in respect of aggregate capital flows.

The study of [Karimo \(2020\)](#), emphasized the significant impact of interest rate differential on foreign portfolio investment in either direction. This somehow corroborates the current empirical finding that interest rate differentials are crucial in the determination of foreign portfolio investment.

[Makhetha-Kosi, Mishi, and Ngonyama \(2016\)](#) analyzed “*The Response of Capital Flows to Interest Rate Differentials: The Case of South Africa*” spanning 1990-2013 by utilizing the technique of Vector Error Correction Modelling as well as controlling for financial crisis effects. The authors established that, despite the positive interest rate differentials in South Africa, it did not result in a proportionately greater inflow of capital. Such outcome according to the authors can be attributed to externalities in terms of human capital formation as well as a risk premium in favour of advanced economies. Moreover, it was noted that different capital flows do not respond similarly to interest rate differentials. The non-similar response of different capital flows to interest rate differential corroborates the current results which show that while foreign direct investment increases due to a unit increase in policy rate differential below the threshold, it however dampens foreign portfolio investment.

In either context, broad money growth and inflation do not significantly affect foreign portfolio investment and foreign direct investment. The non-significant impact of inflation rate in influencing FDI negates the study of [Onyeiwu and Shrestha \(2004\)](#). The authors examined the topic “Determinants of Foreign Direct Investment in Africa”. They employed the fixed and random effects models to analyse if FDI determinants influence the flows of FDI to Africa in conventional ways. By using a panel dataset comprising of 29 African economies spanning 1975-1999, they observed that, economic growth, openness of the economy, inflation, international reserves, and the availability of natural resources are significant for the flows of FDI to Africa. However, political rights and infrastructures were identified to exert unimportant effect on the flows of FDI to Africa.

The authors concluded that, a variable generates a significant impact on the flows of FDI to Africa based on if country- and time-specific effects are fixed or stochastic.

In another development, the study of [Pondo \(2018\)](#) corroborates the non-significant effect of money supply on foreign direct investment. The author examined, in respect of Mozambique, the empirical impacts of monetary and fiscal policies on foreign direct investment by using quarterly macroeconomic data covering the period 2005–2015. The macroeconomic variables of lending rate, treasury bill rate, money supply, taxes, inflation rate, government expenditure, and foreign direct investment constitute the study. In order to determine the dynamic relationship between the explained and explanatory variables, the author used econometric techniques such as unit roots and the Johansen cointegration test with a vector error correction model. It was found from the study that all the explanatory variables except money supply influence the inflow of foreign direct investment in the country. However, the author established a significant effect of the inflation rate on foreign direct investment, which contradicts the non-significant effect it has in this current study.

Furthermore, the non-statistical significance of money supply and inflation rate in relation to foreign portfolio investment negates the empirical findings of [Akhyuni and Aimon \(2021\)](#). The authors examined, in the context of Upper Middle-Income economies in ASEAN, the effects of money supply, inflation, economic growth, and stock prices on portfolio investment. They also analyzed the impact of portfolio investment, interest rates, inflation, and government expenditure on the money supply of the target economies. Specifically, Indonesia, Malaysia, and Thailand comprised the study. The panel data set used for the study spanned 2005–2019, while the method was the Two Stage Least Square. It was found by the authors that the money supply and portfolio investment produced a significant and negative simultaneous relationship, while stock prices exhibited a significant direct relationship with portfolio investment. In terms of portfolio investment, economic growth generated a negative significant relationship, whereas inflation has a significant direct relationship. Moreover, it was observed that a simultaneous negative and significant relationship characterized portfolio investment and the money supply while inflation exerts a significant and direct relationship with the money supply, but interest rates and government expenditure produced insignificant negative effects on the money supply.

## 7. CONCLUSION AND POLICY RECOMMENDATIONS

This study empirically analysed the appropriate level of threshold of central bank policy rate differential to foreign direct investment and foreign portfolio investment in the Southern African Customs Union. The differential in interest rate becomes crucial considering its role in influencing the direction of resources to economies for efficient returns on investment. This is consistent with the neoclassical theory on the international

flows of capital. This study found that the differential in policy rate decreases foreign portfolio investment but promotes foreign direct investment. The study also established that a linear relationship characterizes monetary policy rate differential and foreign portfolio investment as well as between it and foreign direct investment.

The respective monetary authorities in SACU are therefore expected to influence the policy rate in a way as to significantly promote FDI. The level of domestic interest rate, while taking cognizance of world interest rate, should be compensated by incentives to encourage more foreign direct investment into the countries. This can be achieved through government policies that promote the stability and economic viability of the respective economies that constitute the Southern African Customs Union. The increased flows of FDI most especially to the real sector will tend to expand the level of productivity in the host economies, raise employment opportunities and enhance the living standards of the citizens.

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