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ECONOMICS

Evaluating the Nexus Between Exports, Imports, GDP, and Gross Capital Formation in South Africa

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ABSTRACT

Purpose: This study evaluates the connection between exports, imports, GDP, and gross capital formation in South Africa.

Method: The study employed the AutoRegressive Distributed Lag (ARDL) method, along with unit root tests to validate data stationarity, and bounds testing to confirm long-run cointegration among the variables. EViews 12 software was used to analyze the data spanning from 1986 to 2022.

Results: The findings indicate a statistically significant positive relationship between imports and gross capital formation at the 1% level, suggesting that imports stimulate gross capital formation in South Africa. Exports also demonstrate a direct connection with gross capital formation. Empirically, both exports and imports are significant factors in enhancing the level of gross capital formation in the country. This indicates that increasing the gross domestic product (GDP) is crucial for diversifying exports, with economic policy being a major determinant that can promote investment in gross capital formation to boost both exports and imports. This sets the foundation for ensuring that exports and imports have a long-term impact on gross capital formation (GrCaF).

Practical Implications for Economic Growth and Development: This study contributes to economic growth and development by highlighting the critical role of imports and exports in enhancing gross capital formation, which in turn improves the South African economy. The findings suggest that robust policies should be implemented, including tax cuts, increased infrastructure development, the promotion of manufactured goods, and advancements in domestic technologies. The government must provide stronger support for domestic industries to translate these efforts into economic growth and development.

Keywords: *export, import, gross capital formation, GDP, ARDL*

INTRODUCTION

The country's imports, exports, and gross capital formation are among the elements that affect economic growth (Claessens et al., 2010; Hina Najam, 2022). In underdeveloped nations, exports and imports can help reduce poverty and promote economic progress, thereby stimulating gross capital formation. Consequently, given the economic stability that comes from well-structured trade openness encompassing both imports and exports, it is essential to promote gross capital formation (GrCaF) to achieve economic growth and development (Kandil, 2015; Naqvi et al., 2023). A favorable environment for international commerce encourages capital flows, trade earnings, investment, and job creation, all of which support economic growth (Ferrat et al., 2022; Gao et al., 2021; Haseeb et al., 2019; Li et al., 2022). These economic sectors play a crucial role in driving innovations that make traditionally difficult-to-access resources more accessible, accelerating GrCaF. One cannot overstate how imports and exports shape a country's GrCaF. The current literature is controversial, claiming that trade openness can either be a nation's asset or its liability (Hadj & Ghodbane, 2021; Yang et al., 2021). According to Haseeb et al. (2021), a nation's ability to compete on the

international stage can be greatly impacted by its import and export policies, which are influenced by its natural resources.

This opinion is echoed by Chen (2021), who claimed that GrCaF is essential for promoting economic growth. Abdelwahed (2020) noted that GrCaF might offer several advantages, such as higher exports, increased output, and foreign capital inflows that could enhance foreign revenue. The availability of natural international trade can help reduce trade imbalances in emerging economies (Abdulsahib, 2024). Furthermore, trade openness and a well-developed infrastructure can stabilize the economy in various ways, including raising commercial assets and interest margins while decreasing credit circulation (Tang, 2022; Umar, 2020). It is surprising that resource-poor countries often exhibit more sound GrCaF than resource-rich countries, despite the previously described benefits (Dogan et al., 2020; Mlachila & Ouedraogo, 2020). Contractual agreements that govern trade between importers and exporters are essential for the stability of GrCaF. Even with ample liquidity, importers may be reluctant to borrow due to inefficient contracting institutions, which can hinder exporters' ability to enforce contracts and provide importers with little incentive to repay debts (Zingales, 2015). Furthermore, a country's trade sector, typically supported by external financial resources, may suffer from disruptions in GrCaF (Zaman et al., 2021). Retrenchments in the traded sector can thus obstruct a country's economic development.

Numerous studies have examined the relationship between imports and exports by analyzing their effects on gross capital formation (GCF) across a wide range of nations and scenarios. These studies, which focused on this field, typically found a substantial correlation between exports and the growth of domestic product as a result of GCF. According to Voivodas (1973), the capital link serves as a mediator between exports and domestic growth. This leads to the conclusion that a nation's exports should prioritize capital, which cannot be achieved without using the proceeds from exports to fund the purchase of capital goods that spur economic expansion. On the other hand, Sun (1998) suggested that increasing domestic production and attracting foreign capital for non-oil industries could be the best ways to boost capital formation and reduce the level of imported goods. Additionally, an economy's capital formation, where labor and physical capital are available, is a major driver of growth (Bruton, 1998). According to Adhikary (2010), foreign direct investment (FDI) and capital formation have a favorable relationship. FDI also influences policy and ensures higher rates of economic growth. In other words, trade plays a major role in boosting investment, especially foreign investment, which increases capital formation and stimulates other economic sectors. Awokuse (2007), in a re-examination of the relationship between trade and economic growth, found that imports drive growth and that there is an inverse causal relationship between GDP and both exports and imports. This implies that a diversified economy can reduce its level of imports, which are essentially the result of existing capital that affects local economic activity as a catalyst, subsequently increasing production and growth.

Additionally, Rajni (2013) investigated the existence of a two-way causal relationship between imports and exports and gross capital formation. Thurayia (2004) found that the growth rate of total exports had a noticeable effect on economic expansion in Saudi Arabia but only a slight effect in Sudan. Furthermore, trade openness and economic growth were shown to be uncorrelated in Brazil and India, but correlated in China. An empirical study by Meyer and Sanusi (2019) discovered a long-term correlation between employment, local investment, and economic growth. Additionally, Fatima et al. (2020) found a significant indirect relationship between trade openness and GDP growth while examining the effect of foreign trade on economic growth. Fatima (2020) claimed that the economic development of belt and road countries improves when gross fixed capital formation increases. Furthermore, Topcu (2020) indicated that the relationship between GDP and gross capital formation depends on national income and its influence on policy decisions. The goal of this study is to demonstrate how effective income utilization and economic policies can drive economic growth. Nonetheless, other research, such as that conducted by Zaman et al. (2021), showed that FDI and gross capital formation have a positive impact on economic growth and no relationship with trade openness or IT exports.

A country's financial development trajectory may also be hindered by decreasing financial demand, which could be related to a decline in the traded sector (Abdelwahed, 2020). Furthermore, the rent-seeking tendencies of resource-rich nations can be attributed to the negative impact of trade openness on GCF. This behavior may obstruct vital economic endeavors such as human capital development, private investment, entrepreneurship, and civil rights, which are critical for the stability of economic development (Casagrande et al., 2024; Gani, 2021).

Basically, depending on the state of the economy, a number of studies have looked into the relationship between trade openness (TO) and gross capital formation (GrCaF). The results have been inconsistent. Yıldırım et al. (2020), Zaidi et al. (2019), and Li et al. (2022) have all discovered a positive correlation between GrCaF and TO. Additionally, Dwumfour and Ntow-Gyamfi (2018) introduced natural resources (NR) as an additional determinant of GrCaF and found a positive correlation between the variables, supporting the arguments made by Atil et al. (2020) for a favorable influence of TO on GrCaF. However, other research has discovered a negative correlation between GrCaF and TO. Similarly, Asif et al. (2020) proposed that, in some circumstances, the abundance of NR could result in adverse conditions for GrCaF. Higher investments, improvements in financial activities, and less volatility in the financial market are thought to be favorably correlated with a nation's sustainable development (Bhutta et al., 2022). It is believed that economies become more competitive and outperform industrialized economies when GrCaF improves (Wang et al., 2023). As a result, it is crucial to ascertain the precise correlation between imports, exports, and GrCaF, as well as their true impact on sustainable growth. Therefore, the main goal of this study is to investigate how imports and exports relate to South Africa's gross capital formation. However, concerns about potential economic, social, and environmental imbalances have been raised by South Africa's reliance on resource-intensive manufacturing and export-oriented trade.

The following is the study's contribution: First and foremost, it is crucial to link imports, exports, and GrCaF in South Africa to evaluate the gross capital formation hypothesis. Given the importance of the findings for legislation, it is imperative to investigate both short- and long-term relationships, as this has not been well addressed in prior research. Therefore, the primary goal of this study is to close this research gap by evaluating the validity of GrCaF throughout the short and long terms for the South African context. For this reason, it has been determined that the VAR methodology is the best econometric testing process to achieve this goal. Secondly, this work is innovative since it examines the dynamic causation between GrCaF and its regressors using an exogeneity causality test.

Furthermore, this work is innovative because it takes a different approach from earlier research that only used a full-sample causality test and assumed continuous causality over time. This method ensures reliability and reduces biases in the results, supporting the contribution of the current research and aligning with recommendations from contemporary literature. Finally, this research offers a unique perspective compared to the existing literature because it focuses specifically on South Africa. Its main goal is to evaluate South Africa's gross capital formation to determine how vulnerable the country is to the GrCaF hypothesis given its current state of economic stability. The study emphasizes the critical need to implement policies that effectively convert trade openness into economic gains for South Africa and other developing countries in comparable circumstances. It urges decision-makers to manage this potential effectively so that more impactful policies may be put into place.

METHOD

The study employs an ARDL approach, using the variables of export, import, and gross capital formation (GrCaF). The primary aim of this model is to empirically analyze the causality between exports and imports, as well as GrCaF in South Africa (SA), to determine the significance of the most importantvariable that can enhance efficiency during the study period. Furthermore, testing the relationships among these variables serves as an assessment of the fiscal policy in SA, where all economic plans aim to diversify the economy and gradually

reduce the level of imports. Consequently, a positive relationship between imports and exports would indicate that the economic plans for diversification have not been effectively implemented.

After confirming the order of integration, the study utilized Pesaran et al. (2001)'s Autoregressive Distributed Lag (ARDL) bounds testing approach to establish the long-term relationship between the variables in question. Compared to other cointegration techniques, this approach offers several advantages. For instance, it can be applied to small sample sizes and accommodates mixed orders of integration. Additionally, by employing an optimal lag in the model design, it addresses endogeneity issues. To estimate the ARDL bounds testing approach, an unrestricted error correction model was utilized.

$$GrCaF = f(Imp, Exp, Gdp) \quad \text{.....1}$$

$$GrCaF = \emptyset_1 + \emptyset_2 Imp_t + \emptyset_3 Exp_t + \emptyset_4 Gdp_t + \mu \quad \text{.....2}$$

$$\Delta GrCaF = \emptyset_0 + \sum_{m=1}^{J} . \emptyset_{1m} \Delta GrCaF_{.t-n} + \sum_{m=1}^{J} \quad \emptyset_{1m} \Delta Imp_{.t-n} + \sum_{m=0}^{J} . \emptyset_{2m} \Delta Exp_{.t-n} + \sum_{m=0}^{J} . \emptyset_{4m} \Delta Gdp_{.t-n} +$$
$$\partial_1 GrCaF_{t-1} + \partial_2 Imp_{t-1} + \partial_3 Exp_{t-1} + \partial_4 Gdp_{t-1} + \mu \quad \text{.....3}$$

Equation (4) utilizes the first difference operator, denoted by Δ, where the error term is μ, the constant term is ∅_1, and the short- and long-term coefficients are represented by θ and ∂, respectively. The ARDL bounds testing approach employs the Wald test (or F test) to assess the long-run relationship. By comparing the F-statistics to the critical value, one can determine whether a long-term relationship exists. If the estimated F-statistic exceeds the critical value, a long-term relationship is confirmed; if it falls below, it is not. If the estimated value lies within the critical value range, no conclusions regarding cointegration can be made. Equation (3) provides a framework for estimating long-term elasticities, while the following equation represents the error correction model.

$$\Delta GrCaF = \emptyset_0 + \sum_{m=1}^{J} . \emptyset_{1m} \Delta GrCaF_{.t-n} + \sum_{m=1}^{J} . \emptyset_{1m} \Delta Imp_{.t-n} + \sum_{m=0}^{J} . \emptyset_{2m} \Delta Exp_{.t-n} + \sum_{m=0}^{J} . \emptyset_{4m} \Delta Gdp_{.t-n} +$$
$$\partial_1 GrCaF_{t-1} + \partial_2 Imp_{t-1} + \partial_3 Exp_{t-1} + \partial_4 Gdp_{t-1} + \in ECT_{t-1} + \in_t \quad \text{.....4}$$

According to the ECM, the error correction term accurately represents the dynamics of the process of adjustment leading to long-term equilibrium in the short term. The ECM coefficient, represented by ξ, quantifies the rate of adaptation towards long-term equilibrium. It is anticipated to be negative and less than one, with a bigger magnitude indicating a quicker process of adjustment. In addition, we employed the time-varying exogeneity causality test, which enables us to track alterations in causal linkages over time. There are two reasons why this strategy is better than other approaches. First, it removes the requirement to run a unit root test to verify variable stationarity. Secondly, there is no need to conduct cointegration tests between the variables.

Data Source and Description

Data were collected annually from the World Development Indicator (WDI, World Bank). The number of samples and the variables used were determined based on data availability. Table 1 provides a summary of the dataset.

Table 1. Measurement of Variables and Data Sources

Variables	Measurements	Data Sources
Gross Capital Formation	Net inflow of FDI (% of GDP)	WDI
Exports	Export of goods and services (% of GDP)	WDI
Imports	Import of goods and services (% of GDP)	WDI
GDP	Gross domestic products (annual change)	WDI

Source: Author's compilation (2024)

Hypotheses Development

Exports and Gross Capital Formation

The relationship between gross capital formation and its economic variables is explained by endogenous growth theory. This theory posits that exports are expected to stimulate gross capital formation in an open economy. A significant amount of research has been conducted on the link between gross capital formation and its associated factors using the endogenous growth theory. However, the results have been mixed. For instance, Wani (2022) argues that imports and exports have a detrimental effect on gross capital formation. Similarly, Islam et al. (2023) contend that foreign grants alone do not have a favorable impact on gross capital formation. On the other hand, other scholars have developed models and analyzed data to show that imports and exports have a positive impact on gross capital formation (Aslan, 2020; Fatima, 2020). In light of these differing views, the author proposes the following hypothesis:

H1: Exports significantly influence gross capital formation

Imports and Gross Capital Formation

On the one hand, endogenous growth theory emphasizes the contribution of imports to gross capital formation. According to this theory, imports can enhance the supply of intermediate goods and inputs by incorporating foreign technology into the domestic economy. These imports may include equipment, skilled labor, human capital, and machinery, all of which can generally boost economic production. As a result, imports have garnered significant attention in discussions of long-term capital formation, especially in emerging economies (Adekunle et al., 2023; Adekunle, 2024; Bekun et al., 2023).

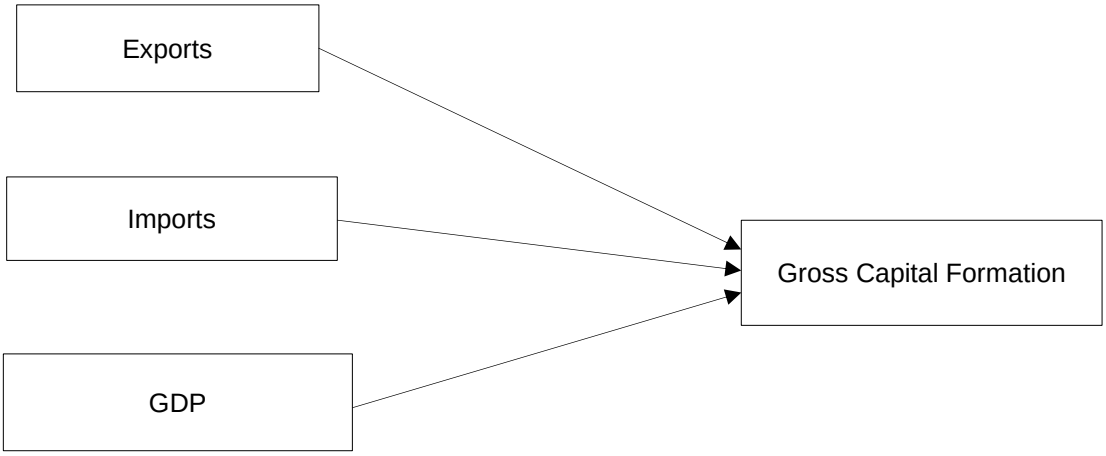
H2: Imports significantly influence gross capital formation

GDP and Gross Capital Formation

Net additions to the economy's physical capital are referred to as capital formation, which reflects the true extent of domestic investment in sectors where goods and services are produced. Capital formation is closely linked to GDP, as higher investment demand increases export demand, which in turn boosts GDP. Theoretically, capital formation can drive economic growth by enhancing local technology and increasing the capital stock. Importantly, increased imports—particularly of capital goods and inputs like foreign technology and intermediate goods—can also raise GDP and accelerate capital formation. Previous studies have shown that GDP and gross capital formation have a positive relationship and tend to influence each other (Istaiteyeh et al., 2023; Abdulsahib, 2024).

H3: GDP significantly influence gross capital formation

Figure 1. Research Framework



Source: Developed by the author (2024)

RESULT AND DISCUSSION

Descriptive Statistics

Table 2 presents the mean, standard deviation, minimum, and maximum values for the variables. The results show that the mean values for GrCF, EXP, IMP, and GDP were 2.51, 2.71, 4.41, and 0.49, respectively. These positive mean values indicate an upward trend in all the variables over the study period. Additionally, the standard deviation values for all variables are positive and greater than one.

Table 2. Descriptive Statistics

Variable	Observation	Mean	Std.Dev	Min	Max
GrCaF	36	2.51	9.41	-24.5	21.4
EXP	36	2.71	5.65	17.0	10.9
IMP	36	4.41	8.61	-17.6	21.9
GDP	36	0.49	2.63	7.10	4.59

Source: Processed data (2024)

ADF and DF Unit Root Testing

The study employed standard unit root and stationarity tests, including the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) tests. These tests were used to assess the unit root and stationarity of the variables. The goal was to accurately predict and forecast the empirical effects of the explanatory variables on the response variables. Table 3 shows that the ADF and DF test statistics are significant at I(0) and I(1), leading to the rejection of the null hypothesis of a unit root at all levels.

Table 3. Unit Root Testing @ I(0) and I(1)

		ADF (H_0)				DF (H_0)			
$z_{.t}$		$\tau_{.\mu}$	1%	5%	Prob.	τ_{τ}	1%	5%	Prob.
Intercept without	GrCaF	1.25	2.92	4.24	0.27	0.64	2.76	3.96	0.84
	Exp	0.58	2.97	2.58	0.85	0.95	2.84	3.64	0.62
	Exr	1.59	3.46	2.92	0.94	1.93	2.96	1.76	0.69

time trend	Gdp	1.64	3.98	2.95	0.78	0.97	2.93	1.85	0.95
	GrCaF	4.72	4.75	3.98	0.00	2.75	3.85	3.58	0.04
	∆Exp	5.68	3.93	2.93	0.00	2.84	3.68	3.56	0.06
	∆Exr	3.64	3.57	2.69	0.00	2.86	3.88	3.64	0.00
	∆Gdp	3.78	4.85	3.46	0.50	3.05	3.65	3.79	0.00
Intercept with time trend	GrCaF	5.78	3.94	2.84	0.00	3.78	2.96	1.84	0.00
	Exp	2.76	4.79	3.96	0.95	4.57	2.68	1.92	0.00
	Exr	3.69	3.58	2.95	0.00	3.68	2.75	1.87	0.00
	Gdp	5.68	3.79	2.75	0.00	3.85	2.78	1.69	0.00
	∆GrCaF	4.95	4.84	3.69	0.00	4.95	3.82	3.64	0.00
	∆Exp	5.74	4.99	3.77	0.00	5.09	3.64	3.68	0.00
	∆Exr	3.92	4.85	3.94	0.00	3.89	3.73	3.69	0.00
	∆Gdp	5.60	4.75	3.87	0.00	7.56	4.60	3.84	0.00

Source: Processed data (2024)

Bound Testing

The study assessed both long-term coefficients and short-term dynamic relationships using the ARDL cointegration framework, after confirming the existence of cointegration in the gross capital formation model. Selecting the appropriate lag length is as crucial as choosing the variables to include in the equation. The ARDL Bounds Test method requires determining the maximum lag period, which is presented in Table 4 below.

Table 4. ARDL Bound Testing

Test Statistic	**Value**	**K**
F-statistic	8.161136	3
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Source: Processed data (2024)

ARDL Long- and Short-run Estimation

This subsection presents the study's empirical findings on the long-term relationship between GDP, exports, imports, and gross capital formation in the South African economy. Table 5 shows the results of the ARDL long-run estimation. The data in Table 5 confirm a long-term relationship between gross capital formation and the other variables. The findings underscore the importance of developing sound economic policies for the economy. These relationships offer insights into how GDP, imports, exports, and gross capital formation interact, highlighting areas where policy changes could have a particularly significant impact. The results from the individual regressions support the endogenous growth theory for South Africa.

Table 5. Long-run Estimation

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
IMP	0.947201	0.093950	10.081931	0.0000
EXP	0.300663	0.111578	2.694652	0.0139
GDP	0.965448	0.148449	6.503554	0.0000
C	-1.192178	0.415140	-2.871749	0.0094

Source: Processed data (2024)

The findings in Table 6 indicate that GDP, exports, imports, and gross capital formation are cointegrated, as the coefficient of the error correction term (CointEq-1) is negative and significant at the 1% level. The absolute value of the error correction term (ECM(-1)) is 1.67, suggesting that approximately 167% of the annual deviation in gross capital formation (GrCaF) from its long-term equilibrium is corrected in the short run. In other words, around 167% of the disequilibrium in GrCaF from the previous year is restored within the current year. The larger the coefficient of the error correction term, the faster the variable adjusts to restore equilibrium after a shock.

Table 6. Short-run Estimation

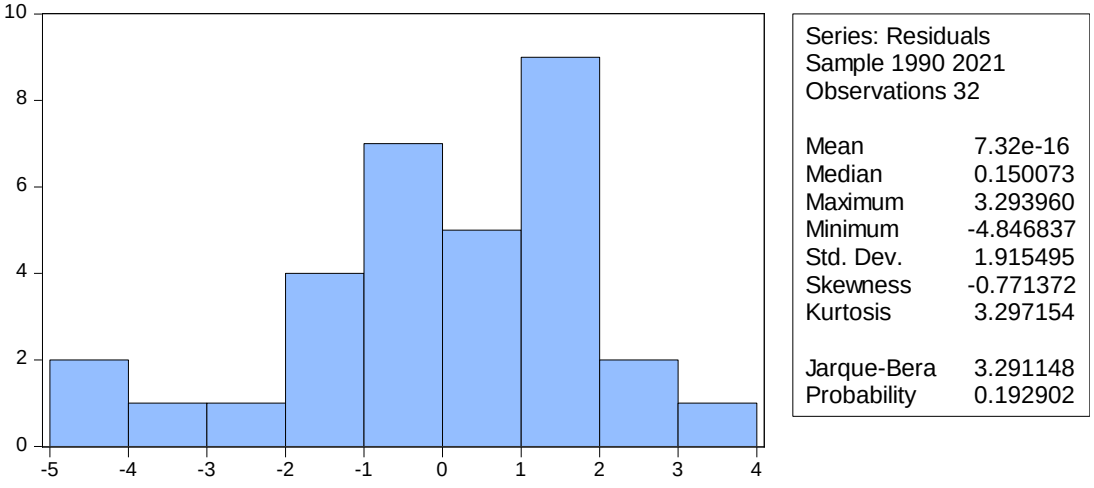
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GRCAF(-1))	0.632400	0.156114	4.050881	0.0006
D(GRCAF(-2))	0.297080	0.105570	2.814042	0.0107
D(GRCAF(-3))	-0.075218	0.054108	-1.390146	0.1798
D(IMP)	1.062553	0.097711	10.874451	0.0000
D(IMP(-1))	-0.207149	0.104403	-1.984139	0.0611
D(IMP(-2))	-0.458200	0.107049	-4.280295	0.0004
D(EXP01)	-0.860143	0.130978	-6.567071	0.0000
D(GRDP)	1.615468	0.261083	6.187563	0.0000
CointEq(-1)	-1.673284	0.201160	-8.318194	0.0000

Source: Processed data (2024)

Stability Test for the Model

To ensure that the regression results are robust and free from serial correlation and heteroscedasticity, the statistical properties of the model were assessed using various tests. The results of the normality test indicate that the model's residuals are normally distributed. The skewness statistic ranges from -0.77 to 0.5, with an average of 0.15. The kurtosis score of 3.29 suggests that the data is slightly leptokurtic, with a positive excess kurtosis of +2. According to the Jarque-Bera test (coefficient = 0.19, p ≈ 0.05), the data is normally distributed. These results are displayed in Figure 2.

Figure 2. Normality Test



Source: Processed data (2024)

Additionally, Table 7 shows that the p-values for serial correlation and heteroscedasticity are 0.80 and 0.88, respectively, indicating no evidence of issues in these areas. Therefore, we fail to reject the null hypothesis, meaning there is no significant serial correlation, the functional form is correct, the residuals are normally distributed, and homoscedasticity holds at the 5% significance level.

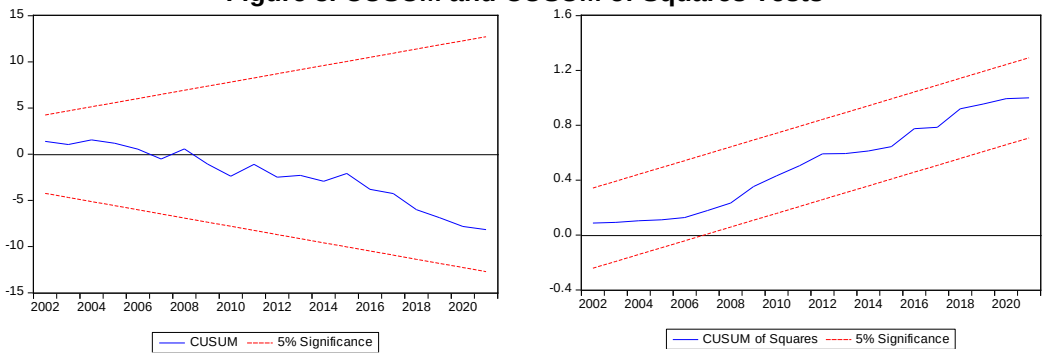
Table 7. Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.121898	**Prob. F(2,18)**	0.8860
Obs*R-squared	0.427624	**Prob. Chi-Square(2)**	0.8075

Source: Processed data (2024)

Finally, the stability of the long-run and short-run coefficients was assessed using the Cumulative Sum of Squares (CUSUM SQ) method, as outlined by Brown et al. (1975). Both the CUSUM and CUSUM SQ tests indicated that the model is stable, showing no structural instability.

Figure 3. CUSUM and CUSUM of Squares Tests



Source: Processed data (2024)

Discussion

The bound testing results reveal cointegration among the variables studied, covering the period from 1986 to 2021. Specifically, a statistically significant positive relationship is found between imports and gross capital formation (GrCaF) at the 1% significance level. This suggests that imports contribute to stimulating gross capital formation in South Africa. Exports also show a direct relationship with gross capital formation, further emphasizing their role in the economy.

Empirical evidence indicates that both exports and imports are crucial factors in boosting gross capital formation in South Africa. This highlights the importance of GDP growth as a key driver for diversifying exports. The main factor influencing this diversification is economic policy, which should prioritize investment in gross capital formation to boost both exports and imports.

Aslan (2021) found that imports and exports positively influence GrCaF in various countries across Asia, Europe, and America, supporting the findings of this study. Additionally, Nguyen (2021) showed that exports, in combination with other factors, can increase GrCaF, with foreign direct investment (FDI) playing a crucial role in fostering growth and economic activity in Vietnam. Ntamwiza (2022) also observed a positive correlation between capital formation and other variables, which accelerates economic growth in Rwanda and significantly contributes to the country's economy.

However, the empirical results in Table 6 suggest that imports do not positively influence gross capital formation in South Africa. This is due to the dominance of non-capital-intensive goods in South Africa's import composition during the 1986-2021 period. In other words, South African imports are primarily consumable goods, which limits their contribution to capital formation. Wani (2022) argued that trade openness and GrCaF in India are negatively correlated, recommending that human and physical capital formation should be increased to strengthen the economy. Similarly, Islam and Biswas (2023) found a positive correlation between foreign grants and gross fixed capital formation in Bangladesh, while Istaiteyeh (2023) demonstrated a positive short-term correlation between GDP and gross capital formation in Jordan from 1976 to 2021.

In South Africa, GDP is closely linked to gross capital formation, with capital being used primarily to meet the demand for exports of consumable goods. This suggests that while gross capital formation is important, it may not be fully optimized, as unused capital goods hinder the increase in value-added production. Furthermore, the results indicate cointegration between GDP and GrCaF, suggesting that foreign trade positively affects the level of gross capital formation. This relationship, which is statistically significant, implies that imports and exports play a role in stimulating investment and industrial growth in South Africa.

CONCLUSION

This study explores the relationship between imports, exports, GDP, and gross domestic capital formation (GrCaF) in an emerging economy like South Africa, using ARDL methodologies. The properties of the data were assessed for stationarity using the ADF-DF unit root test, which revealed that all variables are stationary at levels I(0) and I(1). The cointegration test results, based on bounds testing, show that exports, imports, GDP, and gross capital formation are cointegrated, indicating a long-term equilibrium relationship among the variables, even though they may be out of equilibrium in the short run. The empirical findings suggest that exports, imports, and gross capital formation significantly influence one another.

The study confirms the existence of a long-term relationship between GDP, imports, exports, and gross capital formation in South Africa. This implies that economic policies aimed at boosting GDP, exports, and imports will likely lead to an increase in gross capital formation over time. In the short run, exports play a key role in facilitating imports, which, in turn, contribute to gross capital formation. The government must ensure that imports, particularly machinery and capital goods, are aligned with economic growth objectives. Additionally, the study found that exports directly influence gross capital formation, reinforcing this connection. To ensure that GDP has a sustained impact on gross capital formation, the government must implement policies that support long-term growth, such as tax reductions, enhanced infrastructure development, and investments in domestic manufacturing and technology.

Future research should focus on examining the role of economic growth, imports, and exports in shaping gross capital formation, particularly in Sub-Saharan Africa. Expanding the scope and data coverage could also help explore the long-term effects of social and environmental factors on gross capital formation.

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