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Asymmetric Nexus Among Domestic Investment and Economic Growth in Somalia: Evidence from the VEC Model and Granger Causality

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ABSTRACT

This study investigates the relationship between domestic investment and economic growth in Somalia, utilizing time series data from 1992 to 2021. The primary research question centers on understanding the dynamics of this relationship and its implications for Somalia's economic development. Employing rigorous statistical analyses, including long-term cointegration tests, Vector Error Correction Model (VECM), and Granger causality tests, the study reveals insightful findings. The VECM analysis establishes a positive and significant impact of domestic investment on Somalia's economic growth in both the short and long term. Interestingly, foreign direct investment and exports contribute positively to economic growth in the long term. Conversely, exchange rate volatility adversely affects Somalia's economic growth prospects in the long run. The Granger causality test identified a bidirectional causal relationship between domestic investment and economic growth and a unidirectional linkage from exports and exchange rates to Somalia's Gross Domestic Product (GDP). Notably, a confirmed unidirectional relationship exists from economic growth to foreign direct investment. This study significantly contributes to the existing literature by providing a nuanced understanding of the interplay between domestic investment, foreign direct investment, exports, exchange rates, and economic growth in Somalia. The findings emphasize the importance of fostering a conducive environment for domestic investments, facilitating credit access for exporters, promoting human capital development, and implementing effective exchange rate management to sustain and enhance economic growth in Somalia.

1. INTRODUCTION

Over the past century, countries have exhibited diverse patterns of economic growth. There is, however, a clear distinction between developed and developing countries, indicating that they have taken two divergent routes. Developed countries have consistently increased their per capita income and achieved transparent and sustainable development by effectively utilising investments. On the other hand, developing countries like Somalia, a country in the Horn of Africa, have faced numerous challenges to economic progress. The country has been unable to benefit from investments due to various factors such as poverty, corruption, and unstable politics. The inability to address these issues has resulted in a backward trajectory for Somalia. Over the years, Somalia has struggled with economic development due to a lack of resources and infrastructure. The country has yet to modernize its traditional rural pastoralism to adapt to urban trade and service-based industries. This has resulted in minimal progress in Somalia's economy in the last decade. Additionally, corruption has been a significant impediment to Somalia's development. Corruption has allowed the few who are in power to benefit from the country's resources while the majority of the population continues to live in poverty. This has limited the country's ability to invest in social services, education, and infrastructure, vital to economic growth. The political instability in Somalia has also been a significant challenge to the country's economic progress. The country has been in a state of civil war for over two decades, resulting in a lack of security, displacement of people, and loss of lives. The unstable political environment has made it difficult for investment and economic growth. Over the years, Somalia's inability to address poverty, corruption, and unstable politics has limited its economic development. The country needs significant infrastructure, social services, and education investments to support its transition from traditional rural pastoralism to urban trade and service-based industries. According to Somali National Bureau of Statistics (SNBS) [1], the GDP of Somalia increased by 2.9% in 2021, compared with a decrease of -0.3% in 2020. That decline comes from the COVID-19 pandemic shock in 2020.

The graph in Figure 1 illustrates the trends of domestic investment in Somalia. As indicated, the highest level of domestic investment occurred in 2008 at a value of $522 million. Subsequently, there was a decline in investment in Somalia due to factors like insecurity, political instability, and droughts. However, since 2012, domestic investment has been steadily increasing. Figure 2 displays Somalia's annual Gross

Domestic Product (GDP) figures from 1992 to 2021. In general, Somalia's GDP has exhibited a gradual increase since 1996. However, the International Monetary Fund [2] states that the trade imbalance decreased GDP in 2013. Nevertheless, starting in 2014, the GDP resumed its regular growth pattern.

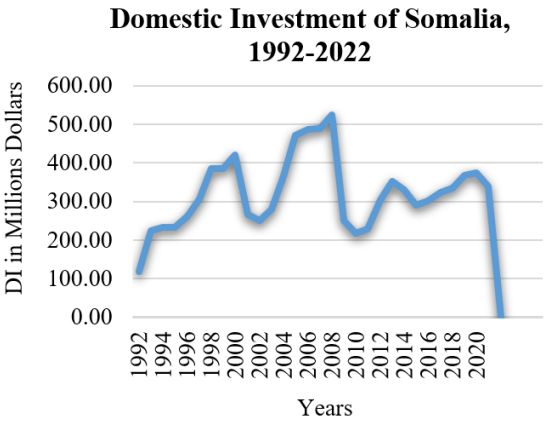

Figure 1. Domestic investment in Somalia
Data Source: OICStat

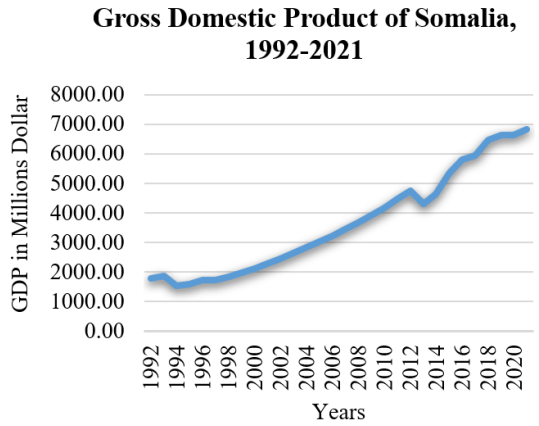

Figure 2. Gross Domestic Product of Somalia
Data Source: OICStat

According to the findings of Barro and Sala-i-Martin [3], economic growth can be enhanced by allocating significant resources to investment, as it has demonstrated a positive correlation with economic growth. The investment is a crucial instrument for attaining a higher standard of living and overall development. Although there are two types of investment—domestic and foreign—this study primarily focuses on domestic investment (DI) as an instrument variable to promote economic growth in low-income countries like Somalia. The fact that motivates this choice is that domestic investment facilitates the creation of job opportunities and promotes technological advancements, both of which are fundamental driving forces for economic development. It should be noted that much research has focused on the impact of Foreign Direct Investment on GDP, overshadowing the importance of domestic investment in driving economic growth. This is evidenced by abundant literature on the former topic [4-8].

The importance of domestic investment (DI) in driving economic growth has been debated among researchers for some time. Scholars such as Adams [9], Ali and Mna [10], and Keshava [11] have argued that DI impacts economic growth more than foreign direct investment (FDI). This argument is based on neo-classical and endogenous growth theories, suggesting DI is critical to promoting economic development. In light of these theories, this article aims to explore the correlation between domestic investment and economic growth in the context of Somalia.

2. LITERATURE REVIEW

Over the past decade, there has been extensive discussion about the nexus among domestic investment and economic growth. Numerous empirical studies have examined the relations between fixed capital formation and economic expansion. For example, Bal et al. [12] determined that investment from citizens played a vital part in driving economic sustainability growth by studying India's economic growth. Similarly, Bakari [13] emphasises that a country's economic performance relies heavily on its dynamic capacities, such as domestic investment, which is vital for fostering economic growth. According to Güngör and Ringim [14], investment is critical for economic development, especially in developing nations. However, determining the prioritised investment type is essential because it significantly impacts a country's economic performance.

In Asia, Asnawi et al. [15] revealed that domestic investment played a significant and positive role in fostering economic growth across most provinces in Indonesia by Analysing how fixed capital formation and foreign direct investment (FDI) affect the growth of economics in different Indonesian provinces. Researchers fixed the effects of OLS and pooled models since they used panel data from 2014 to 2018. Their research findings imply that increased domestic investment has boosted economic expansion in Indonesia. Raza et al. [16] researched how domestic investments related to Thailand's economic expansion from 1975 to 2018**.** They used Johansen Cointegration, Granger Causality, and VECM models and found a long-term connection among domestic investment and economic growth. Eshpulotovich and Abdusattarovich [17] thoroughly researched the nexus among foreign direct investment (FDI), domestic investment, and economic growth in Uzbekistan, analysing a VEC model and quarterly data from 2010 to 2019, and they found long-run cointegration among DI, FDI, and economic development and bidirectional causality among domestic investment and GDP in Uzbekistan. In his research, Bakari [13] found that domestic investment plays a significant and positive role in driving the long-term economics of Malaysia by analysing the economic growth effects of domestic investment in Malaysia from 1960 to 2015. He employed statistical techniques such as Johansen's cointegration, correlation analysis, Granger causality test, and VEC Model to gain deeper insights. Bakari suggested that increasing domestic investment can contribute to overall advancement.

In Africa, Ijirshar and Andohol [18] studied the correlation between domestic investment and GDP in West Africa. They utilised panel data from 1986 to 2018 and conducted an analysis using the Granger causality test. Their research findings highlighted the significance of fixed capital formation for the economies of West African countries. As their study emphasises, it is more important to establish a cause-and-effect relationship between domestic investment and GDP. According to a research paper conducted by Metu et al. [19], an examination of the relationship between the ageing population, domestic investment (DI), and Gross Domestic Product (GDP) in Africa was undertaken. The research utilised panel data from 28 countries from 1975 to 2018 and employed generalised method of moments (GMM) models for analysis.

The study's findings revealed that domestic investment was crucial in promoting economic growth by mitigating the negative impact.

On the other hand, Lerato and Lorainne [20] used the Vector Error Correction Model (VECM) with annual data from 1977 to 2014 in Cameroon to explore the relationship between domestic investment, economic development, and instability. According to the study, a bidirectional connection between economic instability and private fixed capital formation exists. In simpler terms, changes in domestic private investment can affect economic instability, while economic instability can also influence domestic private investment. This bidirectional association sheds light. Their study analyzed how Foreign and Domestic investments affect South African economic prosperity. They found a positive cointegration between domestic investment and economic growth and a negative correlation between foreign investment and economic prosperity in South Africa by analyzing the Autoregressive Distributed Lag Model and data period from 1994 to 2018. From 1975 to 2014, Feddersen et al. [21] used the Vector Error Correction Model, Granger causality, and Johansen cointegration analysis methods to analyse the role of exports, fixed capital formation and GDP using quarterly data in South Africa. Results show a significant and long-term impact of domestic investment on economic growth, while exports positively affect economic growth in the short run. This study highlights how domestic investment and exports played a vital role in driving economic growth in South Africa.

The research indicated how exchange rates, foreign direct investments, and exports are viral variables for economic growth, especially in developing countries. Studies by scholars [8, 22, 23] have confirmed the positive impact of FDI on economic growth, while other scholars [21, 24-27] have shown that exports are the most influential variable for promoting economic growth. However, after analysing export expansion, fixed capital formation, and economic growth, Omidiji and Aras [28] determined that exports adversely influence economic development in Nigeria.

In contrast, numerous studies [25-27, 29-32] have consistently shown that the exchange rate hurts economic growth. Moreover, a study by Yusuf et al. [33] found that Nigeria's exchange rate significantly impacts its GDP. Additionally, the literature recognizes the significance of fixed capital formation in driving economic growth. It is widely acknowledged in the literature that the careful selection of appropriate investments is one of the key factors in promoting economic growth. This understanding highlights the crucial link between domestic investments and overall economic performance.

3. METHODOLOGY AND DATA SOURCE

3.1 Data

This study uses quantitative analysis of secondary data from 1992 to 2021 to determine how domestic investment affects the economic prosperity in Somalia; the data was collected from the specified period 1992 to 2021 to ensure data availability and to understand the economic impact after the military regime government collapsed. The dependent variable of this study is the Gross Domestic Product, with domestic investment, foreign direct investment, exchange rate, and exports as explanatory factors. This study utilises data from the Food and Agriculture Organization (FAO), the International Monetary Fund (IMF), and the Statistical, Economic and Social Research and Training Center for Islamic Countries (SESRIC). See Table 1 for details.

Table 1. Data description

Variables	Category	Measurement	Source
GDP	DV	GDP, Constant 2015 Prices	SESRIC
DI	IV	Gross Capital Formation, Constant 2015 Prices	SESRIC
FDI	IV	Foreign direct investment, net inflows (BoP, current US$)	IMF
EXP	IV	Exports of Goods and Services, Constant 2015 Prices	SESRIC
EXCH	IV	Official exchange rate (LCU per US$, period average)	FAO

3.2 Methodology

The Augmented Dickey-Fuller (ADF) unit root test and Johansen cointegration test are used in this study to determine the long-run association between domestic investment and economic growth. This study also analyses the Toda-Yamamoto (T-Y) approach of the Granger causality test to determine causality among the study's variables and the Vector Error Correction (VEC) model. Toda-Yamamoto is deemed superior to the traditional Granger causality test due to its capacity to work with any level of integration for the used series, whether it is I (0), I (1), or I (2) [34]. Granger Causality also helps this study identify the direction of causality between variables, which is essential for understanding whether domestic investment drives economic growth or vice versa [35-37]. On the other hand, The VEC model can handle data with different levels of stability, which is essential since economic data is often not perfectly stationary. It also provides insights into short-term and long-term relationships between variables [38, 39]. It's like an expert detective who examines the data and reconstructs the timeline of events (the relationships between variables). Together, these tools help to determine whether domestic investment drives economic growth in Somalia.

3.3 Unit root test

Assessing the stationarity of time series data is essential. Various unit root tests are documented in the literature, including the NG-perron, ADF, and Phillips and Perron tests. However, this study uses the ADF unit root test because it includes extra lags for the dependent variable to eliminate autocorrelation. It can assume three possible questions.

$$\begin{aligned} &\text{No Constant, No Trend} \\ &\Delta y_{t-1} = \gamma y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta y_{t-1} + \varepsilon_t \\ &\text{Constant, No Trend} \\ &\Delta y_{t-1} = \alpha_0 + \gamma y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta y_{t-1} + \varepsilon_t \\ &\text{Constant, Trend} \\ &\Delta y_{t-1} = \alpha_0 + \alpha_0 T + \gamma y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta y_{t-1} + \varepsilon_t \end{aligned} \quad (1)$$

The τ test value is computed as:

$$\tau = \frac{\hat{\gamma}}{\sigma_{\hat{\gamma}}} \quad (2)$$

where, $\hat{\gamma}$ is the estimation coefficient, and $\sigma_{\hat{\gamma}}$ is the standard error of the estimation coefficient.

The ADF's Null hypothesis (H_0): data series is nonstationary or unit root.

3.4 Johansen cointegration test

The framework created by Johansen enables the incorporation of five types of trends and constants in both the short-run equations and cointegration relationships, which are restricted trend, unrestricted trend, restricted constant, unrestricted constant, and no trend or constant, the specificities of trends and constants may vary depending on the data. This study adapts unrestricted constant. Therefore, after specifying the cointegration type, the VECM equation looks as follows:

$$\begin{aligned} &\Delta lnGDP_t \\ &= v + \alpha\beta'(GDP_{t-1} + \varepsilon) + \theta_1 GDP_{t-1} \\ &+ \theta_2 GDP_{t-2} \ldots\ldots + \theta_{P-1} GDP_{t-(\rho-1)} + \mu_t \end{aligned} \quad (3)$$

where, $\alpha\beta'$ indicates the rank of Metrix that is explained in Eq. (3). $\alpha\beta' = \begin{bmatrix}\alpha_1 \\ \alpha_2\end{bmatrix}$ are short-run adjustment coefficients, and β_s are cointegrating vectors of long-run relationship. At the same time, ε is constant in the cointegration equation.

3.5 Model specification

This study adopted the following model to determine the nexus between domestic investment and economic growth in Somalia:

$$\boldsymbol{G}DP = (FDI, FDI, ER, EXP,) \quad (4)$$

where, GDP is Gross Domestic Product, which measures the economic growth of Somalia, while DI is Domestic Investment, FDI is Foreign Direct Investment, ER is Exchange Rate, and EX is Exports.

The entire variable converted into natural Logarithmic to avoid heteroscedasticity and expression as an Econometric model:

$$\begin{aligned} lnGDP_t = \beta_0 + \beta_1 lnDI_t + \beta_2 lnFDI_t + \beta_3 lnER_t \\ + \beta_4 lnEX_t + \varepsilon_t \end{aligned} \quad (5)$$

where, β_s are coefficients of the study and expected to be> 0, and ε is the error term, Subscript ***t*** is time, which indicates that this study uses time series data.

3.6 Vector error correction model

This practices the VEC model to estimate both short-run and long-term relationships between the variables. It can also aid in determining how errors in equilibrium are fixed over time. Finally, yet importantly, adjustment coefficients show how well the changes in disequilibrium were made up. The general VECM questions can be written as:

$$\Delta y_t = \alpha + \sum_{i=1,2\ldots}^{\rho-1} \beta_i \Delta y_{t-1} + \lambda ECT_{t-1} + \varepsilon_t \quad (6)$$

where, Δ indicates the first difference is vector coefficient, β_i is short-term dynamic coefficients of the model's long-run adjustment equilibrium, λ is a speed of adjustment parameter, ECT_{t-1} is error correction term legged from cointegrating regression of the dependent variable on regressors, and ε_t is a vector of impulse. The VECM model used in this study constitutes two parts; the first part is the lagged explanatory variables coefficients, which tell the causality of short-term relationships among the variables in the estimated model. The second part is ECT_{t-1}, which describes the long-term causality between the variables of the estimated model. When the VECM model in Eq. (6) applies to our study and expands as matrix form, it looks like the following equation:

$$\begin{aligned} &\begin{bmatrix}\Delta lnGDP_t \\ \Delta lnDI_t \\ \Delta lnFDI_t \\ \Delta lnEX_t \\ \Delta lnER_t\end{bmatrix} = \begin{bmatrix}\alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5\end{bmatrix} + \begin{bmatrix}\lambda_1 \\ \lambda_2 \\ \lambda_3 \\ \lambda_4 \\ \lambda_5\end{bmatrix} ECT_{t-1} \\ &+ \sum_{i=1}^{\rho-1} \begin{bmatrix}\beta_{1i} & \beta_{1i} & \beta_{1i} & \beta_{1i} & \beta_{1i} \\ \beta_{2i} & \beta_{2i} & \beta_{2i} & \beta_{2i} & \beta_{2i} \\ \beta_{3i} & \beta_{3i} & \beta_{3i} & \beta_{3i} & \beta_{3i} \\ \beta_{4i} & \beta_{4i} & \beta_{4i} & \beta_{4i} & \beta_{4i} \\ \beta_{5i} & \beta_{5i} & \beta_{5i} & \beta_{5i} & \beta_{5i}\end{bmatrix} \\ &\times \begin{bmatrix}\Delta lnGDP_{t-1} \\ \Delta lnDI_{t-1} \\ \Delta lnFDI_{t-1} \\ \Delta lbEX_{t-1} \\ \Delta lbER_{t-1}\end{bmatrix} + \begin{bmatrix}\varepsilon_t \\ \varepsilon_t \\ \varepsilon_t \\ \varepsilon_t \\ \varepsilon_t\end{bmatrix} \end{aligned} \quad (7)$$

where, ρ-1 is the optimal lag length, which is reduced by 1. *i* indicates the number of variables used in the article. According to Toda and Yamamoto [34], using the Granger causality test is the main requirement for short-term causality relationships among the endogenous variables in the VECM. Therefore, this study will use a pairwise Granger causality test.

4. EMPIRICAL ANALYSIS AND DISCUSSIONS

4.1 Descriptive statistics

The descriptive statistics in Table 2 provide an overview of the variables and are crucial in clarifying their properties. The average values for the variables show that Real GDP and domestic investment are the greatest at 21.90 and 19.89, respectively, while the exchange rate is the lowest at 9.58. The most excellent maximum values are for Real GDP and exports, which reach 22.64 and 21.15 respectively. Notably, the standard deviation of foreign direct investment is 3.25 compared to the others, suggesting that it is the variable with the most significant volatility. The Jarque-Bera probability value also indicates that the variables have a regular and identical distribution. In other words, Table 2 also details how the variables have correlated.

4.2 Unit root test

A unit root test was utilised in the study to determine whether the time series variables were stationary. The results presented in Table 3 revealed that all the variables were nonstationary at the level, implying a unit root issue. To address this challenge, a first difference was employed, which led to the creation of stationary variables appropriate for the VECM model for this paper.

Table 2. Descriptive statistics

Variables	LGDP	LDI	LFDI	LEX	LER
Mean	21.903	19.899	16.436	19.122	9.577
Median	21.926	19.757	18.331	19.640	9.756
Maximum	22.642	20.841	20.050	21.150	10.360
Minimum	21.146	19.348	10.597	15.966	8.290
Std. Dev.	0.495	0.457	3.254	1.624	0.623
Skewness	-0.002	0.600	-0.460	-0.466	-0.743
Kurtosis	1.633	2.123	1.709	1.879	2.336
Jarque-Bera	2.336	2.763	3.142	2.657	3.313
Probability	0.311	0.251	0.208	0.265	0.191
Correlations					
LGDP	1.000				
LDI	0.955	1.000			
LFDI	0.889	0.822	1.000		
LEX	0.956	0.847	0.883	1.000	
LER	0.859	0.713	0.698	0.882	1.000

Table 3. Unit root tests

Variables	ADF Level		PP Level	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
LGDP	0.278	-3.578**	0.278	-3.578**
LDI	1.886	-2.843	1.601	-2.843
LFDI	-1.484	-2.279	-1.495	-2.494
LEX	-2.081	-1.466	-3.981***	-1.082
LER	-1.803	-2.416	-2.892*	-1.250
Variables	**First Deference**		**First Deference**	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
d(LGDP)	-6.479***	-5.969***	-4.797***	-4.796***
d(LDI)	-4.466***	-4.137**	-4.466***	-5.793***
d(LFDI)	-6.613***	-6.450***	-6.506***	-6.364***
d(LEX)	-4.196***	-4.320**	-4.085***	-6.291***
d(LER)	-4.463***	-4.522***	-4.441***	-8.506***

Note: ***, **, or * represents the 1%, 5%, or 10% significance level, respectively.

Table 4. Johansen cointegration test

Hypothesised No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.789	43.550	33.877	0.003
At most 1	0.542	21.859	27.584	0.228
At most 2	0.496	19.159	21.132	0.092
At most 3	0.372	13.008	14.265	0.078
At most 4	0.049	1.418	3.841	0.234

Note: Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

4.3 Johansen cointegration test

The Johansen cointegration test determines its use in this study before applying the corrections stemming from long-run deviations using the Vector Error Correction Model (VECM). Table 4 shows that the null hypothesis in the max-eigenvalues test is rejected. There is no cointegration between variables, signifying the presence of a long-run equilibrium relationship between the variables outlined in this paper. Thus, the VECM model can estimate how deviations from the long-run cointegration are corrected in this paper.

4.4 Diagnostic check

To ensure the credibility and coherence of the empirical findings, we conducted various diagnostic examinations, including tests for heteroscedasticity, serial correlation, and normality. The results of these diagnostic assessments, as presented in Table 5, indicate the absence of any issues. The consistency in the error term variances confirms the model's homoscedastic nature. The chosen model for this study exhibits no signs of serial correlation, indicating that the error term variances are not interrelated. Additionally, the data's mean and variance are distributed identically and independently, affirming the assumption of normal distribution.

Table 5. Diagnostic checks

Test Type	Prob.
H_0: No Heteroscedasticity	0.7633
H_0: No serial correlation at lag h	0.3725
H_0: Normality test	0.1163

4.5 VECM results

The results of the VEC model in Table 6 indicated that domestic investment spurs economic growth in the short and long run. Meanwhile, exports, exchange rates, and FDI lead to economic growth only in the long term. Economic growth spurs domestic investment in short and long durations, while Foreign Direct Investment, exports, and exchange rates predominantly affect domestic investment over the long term. Domestic investment and exchange rates influence FDI in the short term, while domestic investment FDI, exchange rate, and economic growth significantly affect long-term exports. Economic growth and FDI are intricately linked to the exchange rate in the short term. Domestic investment stimulates economic growth and generates employment opportunities and income, thus fostering a cycle of robust economic expansion.

Table 6. The outcome of the VECM model

	Short Run					Long Run
Variables	**D(LGDP)**	**D(LDI)**	**D(NFDI)**	**D(LEX)**	**D(LER)**	**ECT_{t-1}**
D(LGDP(-1))		0.97*	12.39	1.27	-0.06	-0.13**
D(LDI(-1))	-0.69*		-6.18	1.19	-0.32	-0.27***
D(LFDI(-1))	-0.01	-0.02**		0.04	-0.05*	0.59
D(LEX(-1))	0.03	0.05	-2.16		0.28	0.50**
D(LER(-1))	0.13*	0.14	-2.89*	-0.35		-0.02

Note: ***, **, or * represents the 1%, 5%, or 10% significance level, respectively.

4.6 Granger causality test

The Summary of the Granger causality test outcomes in Table 7 indicated that Domestic Investment (DI) significantly causes GDP at the 5% level. Similarly, GDP demonstrates Granger causality over DI, with notable probability values of 0.015 and 0.018, respectively, which signifies a bidirectional relationship between DI and GDP. In the case of FDI, economic growth (GDP) Granger Causes Foreign Direct Investment (FDI) at the 5% significance level, with p-values of 0.017. However, the reverse causality is not observed, as the p-value of 0.59 for FDI's Granger causality over GDP exceeds 0.05%. That means there is a unidirectional relationship from GDP to FDI.

Furthermore, the findings indicate that exports Granger Cause economic growth (GDP) with a high significance level

at 1%, as denoted by the p-value of 0.007. However, the reverse causality does not exist, as the p-value of 0.44 for GDP's Granger causality over exports surpasses 0.05, implying a unidirectional relationship from exports to GDP. Similarly, the exchange rate Granger Causes economic growth (GDP) at the 5% level, as indicated by the p-value of 0.018. Conversely, the p-value of 0.64 for GDP's Granger causality over the exchange rate exceeds 0.05, establishing a unidirectional relationship from the exchange rate to GDP.

The collective influence of Domestic Investment, FDI, exports, and exchange rates propels Somalia's economic expansion. However, the results suggest that exports and exchange rates do not have significant Granger causal effects on FDI. Thus, exports and exchange rates are not influential factors in Foreign Direct Investment in Somalia.

Table 7. Pairwise granger causality tests

Null Hypothesis:	Obs	F-Statistic	Prob.
LGDP is not caused by LDI	29	6.85965	0.0145**
LDI is not caused by LGDP		6.40923	0.0177**
LGDP is not Caused by LFDI	29	0.29978	0.5887
LFDI is not Caused by LGDP		6.48964	0.0171**
LGDP is not Caused by LEX	29	8.77304	0.007***
LGDP is not Caused by LGDP		0.62699	0.4356
LGDP is not Caused by LER	29	6.40121	0.0178**
LER is not Caused by LGDP		0.21759	0.6448
LDI is not Caused by LFDI	29	0.91449	0.3477
LFDI is not Caused by LDI		3.14268	0.088*
LDI is not Caused by LEX	29	9.22231	0.005***
LEX is not Caused by LDI		0.00665	0.9356
LDI is not Caused by LER	29	4.91316	0.0356**
LER is not Caused by LDI		8.20E-05	0.9928
LFDI is not Caused by LEX	29	2.35489	0.137
LEX is not Caused by LFDI		0.45788	0.5046
LFDI is not Caused by LER	29	2.19909	0.1501
LER is not Caused by LFDI		0.20621	0.6535
LEX is not Caused by LER	29	4.09706	0.0533
LER is not Caused by LEX		3.58748	0.0694

Note: ***, **, or * represents the 1%, 5%, or 10% significance level, respectively.

5. CONCLUSION AND POLICY IMPLICATIONS

The purpose of this research was to explore the correlation among the level of domestic investment and the economic growth of Somalia over almost three decades, ranging from 1992 up to 2021, by using annual time series data and both the Granger causality test and the Vector Error Correction Model (VECM). The study found that domestic investment, foreign direct investment, and exports positively contributed to economic growth, while the exchange rate hurt economic growth. The results showed bidirectional causal relations among economic growth and domestic investment in Somalia and a unidirectional causality association from exports and exchange rates to GDP in Somalia. The causal analysis also confirmed a unidirectional causal relation from economic growth to FDI in Somalia.

Recommendations from this study suggest that Somali government policymakers should prioritise creating a favorable environment for domestic investments by reducing bureaucratic obstacles, simplifying regulations, and offering incentives to attract local and foreign investors. In order to make the investment process more efficient, policymakers should focus on creating a business environment that is both transparent and effective. Offering tax incentives, such as reductions or breaks, can help ease the financial burden on businesses, making for a more competitive investment landscape. Improving the domestic investment climate can increase capital infusion and drive economic growth. Other suggestion for policymakers is to invest in research and development, enhance infrastructure for production and transportation, and facilitate access to credit for businesses that export goods. Boosting the export sector can make a significant contribution to long-term economic growth. Policymakers must prioritise human capital development to drive economic growth through foreign direct investment. Investing in education and skills training can attract foreign direct investment and establish Somalia as a desirable location for skilled workers. Fluctuations in exchange rates can harm a country's economic growth. Policymakers can manage this by increasing foreign exchange reserves, stabilising exchange rates, and promoting currency stability. A stable exchange rate regime can foster economic growth.

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REFERENCES

[1] Somali National Bureau of Statistics (SNBS). (2022). Somalia Gross Domestic Product Report. https://www.nbs.gov.so/gdp-graph, accessed on Mar. 10, 2024.

[2] International Monetary Fund. (2017). Six things to know about Somalia's economy. International Monetary Fun. https://www.imf.org/en/News/Articles/2017/04/11/NA041117-Six-Things-to-Know-About-Somalia-Economy, accessed on Jul. 24, 2024.

[3] Barro, R.J., Sala-i-Martin, X. (2004). Economic Growth (2nd ed.). London, England: The MIT Press.

[4] Wang, X., Xu, Z., Qin, Y., Skare, M. (2022). Foreign direct investment and economic growth: a dynamic study of measurement approaches and results. Economic research-Ekonomska Istraživanja, 35(1): 1011-1034. https://doi.org/10.1080/1331677X.2021.1952090

[5] Wei, X., Mohsin, M., Zhang, Q. (2022). Role of foreign direct investment and economic growth in renewable energy development. Renewable Energy, 19: 828-837. https://doi.org/10.1016/j.renene.2022.05.061

[6] Odhiambo, N.M. (2022). Foreign direct investment and economic growth in Kenya: An empirical investigation. International Journal of Public Administration, 45(8): 620-631. https://doi.org/10.1080/01909622.2022.2080849

[7] Asafo-Agyei, G., Kodongo, O. (2022). Foreign direct investment and economic growth in Sub-Saharan Africa: A nonlinear analysis. Economic Systems, 46(4): 101003. https://doi.org/10.1016/j.ecosys.2022.101003

[8] Ciobanu, A.M. (2021). The impact of FDI on economic growth in case of Romania. International Journal of Economics and Finance, 12(12): 1-81. https://doi.org/10.5539/ijef.v12n12p81

[9] Adams, S. (2009). Foreign Direct investment, domestic investment, and economic growth in Sub-Saharan Africa. Journal of Policy Modeling, 31(6): 939-949.

https://doi.org/10.1016/j.jpolmod.2009.03.003
[10] Ali, W., Mna, A. (2019). The effect of FDI on domestic investment and growth case of three Maghreb countries. International Journal of Law and Management, 61(1): 91-105. https://doi.org/10.1108/IJLMA-09-2017-0214
[11] Keshava, D.S. (2008). The effect of FDI on India and Chinese economy: A comparative analysis. In Second Singapore International Conference on Finance, Indian, pp. 1-24. https://doi.org/10.2139/ssrn.1089964
[12] Bal, D.P., Dash, D.P., Subhasish, B. (2016). The effects of capital formation on economic growth in India: Evidence from ARDL-bound testing approach. Global Business Review, 17(6): 1388-1400. https://doi.org/10.1177/0972150916660403
[13] Bakari, S. (2017). The impact of domestic investment on economic growth: New evidence from Malaysia. Journal of Smart Economic Growth, 2: 105-121.
[14] Güngör, H., Ringim, S.H. (2017). Linkage between foreign direct investment, domestic investment and economic growth: Evidence from Nigeria. International Journal of Economics and Financial Issues, 7(3): 97-104.
[15] Asnawi, A., Irfan, I., Ramadhani, M.F.C. (2020). The gap in economic growth from foreign investment and domestic investment across provinces in Indonesia. Electronic Journal of Education, Social Economics and Technology, 1(1): 34-38. https://doi.org/10.33122/ejeset.v1i1.7
[16] Raza, M., Aldeehani, T.M., Alshebami, A.S. (2020). The relationship between domestic investment and quality economic growth in Thailand. International Journal for Quality Research, 14(3): 691-704 https://doi.org/10.24874/IJQR14.03-03
[17] Eshpulotovich, K.A., Abdusattar, K.O. (2020). Foreign direct investment and domestic investment on the economic growth of the Uzbekistan-A VECM analysis. International Journal of Academic Research in Business, Arts & Science, 2(5): 75-86. https://doi.org/10.5281/zenodo.3832977
[18] Ijirshar, V.U., Andohol, J. (2022). Investment-growth nexus in West Africa: An assessment of whether fragility matters. International Review of Economics & Finance, 81: 1-17. https://doi.org/10.1016/j.iref.2022.04.006
[19] Metu, A.G., Kalu, C.U., Igwegbe, N.I., Ajudua, E.I. (2020). Ageing population, domestic investment and economic growth in Africa. A Journal of Research and Development, 7(1): 32-35. https://doi.org/10.1111/1467-8268.12479
[20] Lerato, M., Lorainne, F. (2019). An empirical analysis of foreign direct investment and domestic investment as drivers of economic growth in South Africa. In Proceedings of the 52nd International Academic Conference, Barcelona, Spain, pp. 340-352. https://doi.org/10.20472/IAC.2019.052.047
[21] Feddersen, M., Nel, H., Botha, F. (2017). Exports, capital formation and economic growth in South Africa. African Review of Economics and Finance, 9(1): 213-244.
[22] Magazzino, C., Mele, M. (2022). Can a change in FDI accelerate GDP growth? Time-series and ANNs evidence on Malta. The Journal of Economic Asymmetries, 5: e0023. https://doi.org/10.1016/j.jeca.2022.e00243
[23] Wako, H.A. (2021). Foreign direct investment in sub-Saharan Africa: Beyond its growth effect. Research in Globalization, 3: 100054. https://doi.org/10.1016/j.resglo.2021.100054
[24] Ahmed, A.O., Chuks, E., Kamaldeen, F.S., Bolaji, Y.A. (2018). The relationship between import, export, domestic investment and economic growth in Nigeria. EuroEconomica, 37: 149-156.
[25] Hassan, K.G. (2020). Empirical investigation on the relationship between exports and economic growth in selected LDCs country groups (1988-2018). Economic of Emerging Markets, 12(1): 1-12. https://doi.org/10.20885/ejem.vol12.iss1.art1
[26] Keho, Y. (2019). Revisiting the exports and economic growth nexus: Rolling window cointegration and causality evidence from Cote d'Ivoire, Malaysia, Pakistan and South. Asian Journal of Economics and Empirical Research, 6(1): 27-35. https://doi.org/10.20448/journal.501.2019.61.27.35
[27] Oluwatobi, A.A., Daniel, G.A., Akande, J.O. (2022). On export and economic growth: A comparative analysis of selected West African countries. International Journal of Economics and Financial Issues, 12(4): 106. https://doi.org/10.32479/ijefi.9043
[28] Omidiji, J.O., Aras, O.N. (2022). Export expansion, domestic investment, and economic growth in Nigeria. Journal of Global Economics and Business, 3(9): 15-37. https://doi.org/10.31039/jgeb.v3i9.3
[29] Ameziane, K., Benyacoub, B. (2022). Exchange rate volatility effect on economic growth under different exchange rate regimes: New evidence from emerging countries using panel CS-ARDL model. Journal of Risk and Financial Management, 15(11): 499. https://doi.org/10.3390/jrfm15110499
[30] Ramoni-Perazzi, J., Romero, H. (2022). Exchange rate volatility, corruption, and economic growth. Heliyon, 8(12): 1-11. https://doi.org/10.1016/j.heliyon.2022.e12328
[31] Morina, F., Hysa, E., Ergün, U., Panait, M., Voica, M.C. (2020). The effect of exchange rate volatility on economic growth: Case of the CEE countries. Journal of Risk and Financial Management, 13(8): 177. https://doi.org/10.3390/jrfm13080177
[32] Barguellil, A., Ben-Salha, O., Zmami, M. (2018). Exchange rate volatility and economic growth. Journal of Economic Integration, 33(2): 1302-1336. https://doi.org/10.1111/jei.12522
[33] Yusuf, W.A., Isik, A., Salisu, N.I. (2019). Relative effects of exchange rate and interest rate on Nigeria's economic growth. Journal of Applied Economics and Business, 7(2): 28-37.
[34] Toda, H.Y., Yamamoto, T. (1995). Statistical inference in vector autoregressions with possibly integrated processes. Journal of Econometrics, 66(1-2): 225-250. https://doi.org/10.1016/0304-4076(94)01616-8
[35] Bressler, S.L., Seth, A.K. (2011). Wiener–Granger causality: A well established methodology. NeuroImage, 58(2): 323-329. https://doi.org/10.1016/j.neuroimage.2010.02.059
[36] Ding, M., Chen, Y., Bressler, S.L. (2006). Granger causality: Basic theory and application to neuroscience. In Handbook of Time Series Analysis: Recent Theoretical and Applications, New Jersey, USA, pp. 437-460. https://doi.org/10.1002/9783527609970
[37] Hiemstra, C., Jones, J.D. (1994). Testing for linear and nonlinear Granger causality in the stock price–volume relation. The Journal of Finance, 49(5): 1639-1664.

https://doi.org/10.1111/j.1540-6261.1994.tb04776.x
[38] Pesaran, M.H., Shin, Y., Smith, R.J. (2000). Structural analysis of vector error correction models with exogenous I(1) variables. Journal of Econometrics, 97(2): 293-343. https://doi.org/10.1016/S0304-4076(99)00073-1
[39] Maysami, R.C., Koh, T.S. (2000). A vector error correction model of the Singapore stock market. International Review of Economics & Finance, 9(1): 79-96. https://doi.org/10.1016/S1059-0560(99)00042-8