“Economic growth and its relationship with the macroeconomic factors: An analysis of Oman”

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ARTICLE INFO	Uzma Khan, Aarif Mohammad Khan and Nahid A. Siddiqi (2022). Economic growth and its relationship with the macroeconomic factors: An analysis of Oman. *Problems and Perspectives in Management*, *20*(4), 356-364. doi:10.21511/ppm.20(4).2022.27
DOI	http://dx.doi.org/10.21511/ppm.20(4).2022.27
RELEASED ON	Thursday, 08 December 2022
RECEIVED ON	Wednesday, 20 April 2022
ACCEPTED ON	Thursday, 01 December 2022

JOURNAL	"Problems and Perspectives in Management"
ISSN PRINT	1727-7051
ISSN ONLINE	1810-5467
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
26	1	6

BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

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ECONOMIC GROWTH AND ITS RELATIONSHIP WITH THE MACROECONOMIC FACTORS: AN ANALYSIS OF OMAN

Abstract

This study determines Oman's most important macroeconomic factors between 1990 and 2019. The ARDL bound test findings for co-integration show that both long and short runs exist. The error-correcting mechanism further states that when the divergence from long-run equilibrium is rectified at an adaptation speed of 78.9%, it signals an inversion to a long-run stable state. In response to a change in the previous year's economic growth, the final consumption expenditure indicates a rise of 0.472; the gross fixed capital formation and export indicate hikes of 0.149 and 0.358 at a 1% significance level. Additionally, the findings of co-integration regression using fully modified ordinary least square (FMOLS), dynamic ordinary least square (DOLS), and canonical co-integration regression (CCR) were used to strengthen and validate the results that export ranks first in Oman, followed by final consumption spending. Therefore, export, gross fixed capital formation, and final consumption expenditure are vital macroeconomic elements supporting Oman's economic development.

Keywords macroeconomics, growth, gross fixed capital formation, gross domestic product

JEL Classification C51, O11, O53

Received on: 20th of April, 2022
Accepted on: 1st of December, 2022
Published on: 8th of December, 2022

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Conflict of interest statement:
Author(s) reported no conflict of interest

INTRODUCTION

Economic growth is not simple; it is a multifaceted macroeconomic phenomenon. It is difficult to fully explain which determinants are the most important that influence economic growth. These macroeconomic variables play an active and dynamic role in accelerating any nation's economic well-being. Although it is evident that each variable has a deep-felt influence on economic growth, it is challenging to distinguish which indicators have greater weight in economic relations. In this regard, immense research is clearheaded and thoughtful and acts as a turning point in promoting economic development. Over the past several decades, rigorous observational analysis has been expected to provide a detailed view of the connection linking export, import, and economic growth – these studies were based on cross-sectional or time-series data with conflicting decisions.

As such, Oman has few studies that can identify which macroeconomic variable is dynamic for the economic prosperity of Oman. The Sultanate of Oman and its administrators typically use professional reports and data from authentic international organizations such as the International Monetary Fund (IMF) and the World Bank to scrutinize their economies (Al-Mawali et al., 2016). Nevertheless, these models are suitable for determining predictors at an aggregate level of macroeconomic variables rather than for complex variables. Consequently, developing a comprehensive model will help Oman's policymakers

http://dx.doi.org/10.21511/ppm.20(4).2022.27

better understand Oman's economy and give more prediction efficiency than the aggregated models. For this reason, and within the context of Oman, it also reinterprets the relationship between export, import, and economic growth, including consumption and investment.

1. LITERATURE REVIEW

The economy and GDP of a nation are typically evaluated based on how wealthy and abundant the government is with resources. Numerous experts have studied and offered explanations for economic growth (Nkalu & Edeme, 2019). The majority of scholars have been drawn to this subject, yet no single definition can encompass all factors contributing to economic growth. Therefore, when researchers talk about a given country's economic development, their descriptions are more detailed and mainly focus on its characteristics. In this connection, Rafindadi (2014) offered the concept of economic growth as an expansion in the output of goods and services in a state over a predetermined period and assessed it without considering inflation.

Most academicians have used a country's gross domestic output, export, and import to calculate the economic growth factor. However, prior research has struggled to adequately explain how a country's various sectors relate to economic growth (Li et al., 2018).

Altaee et al. (2016) analyzed Saudi Arabian economic growth between 1980–2014 by applying ARDL and ECM for co-integration analysis. They found a positive short- and long-run affiliation among the dependent variable GDP and independent variables of fixed capital formation and export. However, import was negatively related to economic growth. Masoud and Suleiman (2016) applied a co-integration test and VAR analysis on time series data of the Malaysian economy's GDP, export, and import and found no long-run relationship. However, they showed a causality from export and GDP to domestic investment. Finally, Bakari and Mohamed (2017) used the co-integration analysis given by Johansen to evaluate the Vector Auto Regression Model and the Granger-Causality tests to examine Panama's economic growth by export and import. They fetched dual causality from both export and import to economic growth.

Using the dynamic OLS model, Siddiqui and Abhishek (2020) scrutinized the bond amid Oman's export and economic progression. They concluded that export plays a vital role in promoting the economic advancement of Oman. Kalaitzi and Chamberlain (2020) probed the hypothesis of the ELG (export-led growth) for GCC countries banning Qatar only by using the Johansen co-integration and the multivariate Granger causality test, with an enhanced version of the Wald test in an augmented vector autoregressive model framework. They found a co-integration among all GCC countries except Oman and no causality from export to economic growth in Oman's short and long run. Finally, Khan and Khan (2021) piloted a study to measure the role of export and import in the economic development of Oman. Their finding revealed a short-run association where export had a negative effect.

In contrast, imports positively affected economic growth and showed one-way causation between export and import and economic growth. They emphasized policymakers' reformist role in stimulating import and export, influencing the Sultanate of Oman's economic progress. Using the ARDL Bound and Granger-causality tests, Khan et al. (2022) investigated the relationship between the three macroeconomic variables (consumption, export, and import) to determine how they affected the economy of Oman. They discovered connections between the test variables throughout the long and short term. The Granger Causality tests show that there is one-way causality running from import to economic growth and import to consumption, demonstrating that import had both short- and long-term consequences. However, the study's findings showed that import is crucial for economic growth because it can incorporate foreign technology into the home economy, increasing export and serving as another growth-promoting force.

Bakare (2011) demarcated the affinity between capital formation and economic growth using the Harrod-Domar model to test its current appli-

cation to the economic growth of Nigeria by using the OLS estimate model. He discovered that the Harrod-Domar model had been successful in Nigeria, where it had been shown that savings and capital formation are positively correlated with GDP. Finally, Ugochukwu and Chinyere (2013) came up with the most important conclusion that Nigeria's accumulation of capital formation would boost the economy and develop its state in the long run.

Kanu (2014) examined the effects of capital creation on Nigeria's economic growth using a variety of variables, including GDP growth, gross fixed capital formation, total exports, total imports, total savings, and inflation. The results confirmed that gross fixed capital formation did not have a substantial short-term impact on economic growth. However, over time, the VAR model revealed a positive long-run association between economic growth in Nigeria and gross fixed capital creation, total exports, and lag GDP values. Adegboyega and Odusanya (2014) predicted that capital formation might boost Nigeria's economic growth by improving the effectiveness of its fiscal and monetary policies to boost export. According to Shuaib and Dania (2015), gross domestic capital formation and growth are significantly correlated.

Ali (2017) utilized the Augmented Dicky-Fuller (ADF) test, the Johansen Co-integration, and ultimately the Vector Error Correction Model to investigate the effects of gross fixed capital formation (GFCF) on the economic growth of Pakistan from 1981 to 2014. Their findings demonstrated that GFCF has a favorable long-term impact on economic growth, as an increase of 1% in GFCF will increase 60% in Pakistan's economic development. Similar findings were made by Boamah et al. (2018), who examined panel data for 18 Asian countries from 1990 to 2017 and found bidirectional causality between gross capital production and GDP. Based on income levels from 1980 to 2018, Topcu et al. (2020) used panel vector autoregressive to assess 124 economies. According to the findings, gross capital formation significantly affects economic growth in high- and middle-income nations. Nevertheless, it has harmed low-income nations. Additionally, one-way causation between gross capital creation and GDP was discovered for all panels.

Consequently, the literature review showed that these factors are macroeconomic. As a result, they are fundamental to the nation's economic progress and cannot be thoroughly evaluated outside of a macroeconomic context. While many studies examine these factors' effects on economic growth independently, this study has focused on four crucial factors: final consumption, gross fixed capital creation, export, and import. Additionally, despite the substantial volume of literature, there are only a few studies on Oman's economy, which adds to the body of knowledge. Therefore, this paper represents a small start toward investigating macroeconomic variables viewing Oman as an example.

2. DATA AND METHODOLOGY

Due to the lack of data for all the variables in the World Bank archives, this study examines the relationships between final consumer expenditure, gross fixed capital formation, export, and import on the economic growth of the Sultanate of Oman from 1990 to 2019. Based on a method established by Pesaran and Shin (1999) known as autoregressive distributed lag (ARDL), the current study evaluates the reciprocities within GDP growth, final consumption expenditure, gross fixed capital formation, export, and import:

$$\begin{aligned} &Economic\ growth = f\left(consumption,\right. \\ &Gross\ fixed\ capital\ formation, \\ &\left.Export, Import\right). \end{aligned} \tag{1}$$

All the parameters are used in an actual term and converted into a logarithmic function,

$$LYt = \log\left(Yt\right). \tag{2}$$

The model constituted a log-linear econometric structure

$$\begin{aligned} &\log\left(GDP\right)t = \beta_0 + \beta_1 \log\left(cons\right)t + \\ &+\beta_2 \log\left(gcf\right)t + \beta_3 \log\left(ex\right)t + \\ &+\beta_4 \log\left(im\right)t + \varepsilon_t, \end{aligned} \tag{3}$$

where β_0 is constant term, β_1 is coefficient of final consumption expenditure, β_2 is coefficient of gross fixed capital formation, β_3 is coefficient of export, β_4 is coefficient of import, t is time and ε_t is random error.

http://dx.doi.org/10.21511/ppm.20(4).2022.27

The relationship between the variables in the time-series data model and the descriptive statistics was confirmed using correlation analysis. The Augmented Dicky Fuller (ADF) unit root test (Dickey & Fuller, 1979, 1981), the Phillips-Perron (P.P.) unit root test (Phillips & Perron, 1988), and the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) unit root tests were all used in this study to analyze unit root tests (Kwiatkowski et al., 1992). The auto regressive distributed lag (ARDL) bound test approach was employed to support a few data and produce a reliable estimation. Given that not all of the delays in the model must be the same integration, i.e., integration of order one, order zero, or both, this model can be used with different and mixed orderings of variables. It concurrently resolves autocorrelation and offers characteristics of disclosing coefficients in the short and long runs. In light of this, the generalized ADRL (p, q1, q2, q3, q4) model is described as:

$$\begin{aligned} GDP_t &= \phi_{0i} + \sum_{i=1}^{p} \alpha_i GDP_{t-i} + \\ &+ \sum_{i=0}^{q_1} \beta_i Cons_{t-i} + \sum_{i=0}^{q_2} \gamma_i Gcf_{t-i} + \\ &+ \sum_{i=0}^{q_3} \delta_i Ex_{t-i} + \sum_{i=0}^{q_4} \sigma_i \,\mathrm{Im}_{t-i} + \varepsilon_t , \end{aligned} \tag{4}$$

where *GDP* represents the natural logarithm of economic growth; $Cons_t$, Gcf_t, Ex_t, and Im_t represent baseline regressors of the model, α, β, γ, δ, and σ are the respective coefficients; ϕ is the constant; p and q's are the optimal lag orders; ε_t vector error terms (serially uncorrelated).

The presence of co-integration establishes if the variables under examination are affiliated over the long or short term. The F and t statistical bound test approach recommended by Pesaran et al. (2001) for co-integration was used to determine the presence of co-integration. This paper continues to use the ARDL error correction to investigate the long-run association and short-run dynamic in the presence of co-integration. It is illustrative of

$$\begin{aligned} \Delta \ln gdp_t &= \partial_0 - \rho\left(\ln gdp_{t-1} - \theta \ln cons_t - \right. \\ &\left. - \vartheta \ln gcf_t - \mu \ln ex_t - \pi \ln im_t\right) + \\ &+ \sum_{i=1}^{p-1} \alpha_i \Delta \ln gdp_{t-i} + \sum_{i=0}^{q-1} \beta_i \Delta \ln cons_{t-i} + \\ &+ \sum_{i=0}^{q-1} \gamma_i \Delta \ln gcf_{t-i} + \sum_{i=0}^{q-1} \delta_i \Delta \ln ex_{t-i} + \\ &+ \sum_{i=0}^{q-1} \sigma_i \Delta \ln im_{t-i} + \varepsilon_t, \text{while } \rho = 1 - \sum_{i=1}^{p} \alpha_i , \end{aligned} \tag{5}$$

where, Δ is the sign of difference operator; ρ is the rate of adjustment coefficient of speed; θ, ϑ, μ, π are the coefficient for long-run; α, β, γ, δ, σ are the coefficient of short-run, ε_t is the vector error terms (serially independent). The statement that "lngdp_t" t depends on its lag, the differenced explanatory variables, and the equilibrium error term is accurate even though the other parameters are the same as those in the equations above. The model is out of equilibrium if the latter is nonzero. Since γ is predicted to be negative, its absolute value determines how well equilibrium has been restored.

Following the estimation of the ARDL model, the study must review the best linear unbiased estimate (BLUE) to test the endogenous and exogenous variables for normality, heteroscedasticity, and serial correlation. First, the model's stability was assessed using the cumulative sum of recursive residuals (CUSUM) and the sum of squares of recursive residuals (CUSUM of squares). Additionally, because co-integration was present, co-integration regression was performed using the fully modified ordinary least square (FMOLS), dynamic ordinary least square (DOLS), and canonical co-integration regression (CCR) tests, which were also put to the test using the Hansen instability parameters and the normality test.

3. RESULTS

On each variable's properties, the variables' basic statistical features divulge that the minimum and maximum value of economic growth between 1990 and 2019 are 23.15 and 25.11, respectively, while the consumption expenditure ranged between 22.796 and 24.63 over the same period. In addition, gross fixed capital formation ranged between 20.13 and 22.84, and export between 22.31 and 24.81 during the same period. Import has values of 21.89 and 24.46, ranging from lowest to highest throughout the study. Table 1 delineated the Pearson correlation matrix analysis that indicated a strong identification among the model variables.

Moreover, this study tested the data's stationarity features at intercept. The results show that the parameters are integrated in mixed order, i.e., first-order and zero-order, as delineated in Table 2.

Table 1. Descriptive statistics and Pearson correlation analysis

Source: Authors' computation.

Variable	Mean	S.D	Max	Min	Jarque-Bera	Probability	Observations
LNGDP	24.15	0.74	25.11	23.15	3.45	0.18	30
LNCONS	23.66	0.65	24.63	22.796	3.35	0.19	30
LNGCF	21.65	0.95	22.84	20.13	3.29	0.19	30
LNEX	23.56	0.88	24.81	22.31	3.001	0.22	30
LNIM	23.25	0.86	24.46	21.89	3.13	0.21	30
	LNGDP	**LNCONS**	**LNGCF**	**LNEX**	**LNIM**		
LNGDP	1						
LNCONS	0.98	1					
LNGCF	0.99	0.96	1				
LNEX	0.99	0.85	0.96	1			
LNIM	0.99	0.98	0.99	0.98	1		

Therefore, after the series' stationarity properties are affirmed, the study proceeds toward a co-integration estimate by the ARDL test.

Table 2. Unit root results

Source: Authors' computation.

Variable	ADF	PP	KPSS (LM–Stat.)
LNGDP	–0.55	–0.54	0.68*
	(0.87)	(0.87)	(0.74)
ΔLNGDP	–5.46*	–5.46*	0.14*
	(0.00)	(0.00)	(0.74)
LNCON	–0.099	0.02	0.68*
	(0.94)	(0.95)	(0.74)
ΔLNCON	–2.97**	–2.91**	0.15*
	(0.05)	(0.05)	(0.74)
LNGCF	–1.287	–1.29	0.676*
	(0.62)	(0.62)	(0.74)
ΔLNGCF	–3.94*	–3.79*	0.203*
	(0.005)	(0.008)	(0.74)
LNEX	–0.76	–0.73	0.66*
	(0.81)	(0.83)	(0.74)
ΔLNEX	–5.024*	–5.07*	0.13*
	(0.00)	(0.00)	(0.74)
LNIM	–1.08	–1.07	0.68*
	(0.71)	(0.71)	(0.74)
ΔLNIM	–4.69*	–4.66*	0.15*
	(0.00)	(0.00)	(0.74)

Note: * and ** are 1% and 5% significance levels, respectively.

The co-integration results, presented in Table 3, provided conclusive proof that the variables do not often drift apart over time. Furthermore, close examination of the model reveals that, at a 1% level of significance, the discovered F-statistic and t-statistic from the ARDL bounds test (8.469 and –5.537) are more significant than the upper bound critical values determined by Pesaran et al. (2001). (5.06 and –4.6). As a result, the co-integration model described above encourages utilizing the ARDL ECM process with an unrestricted constant and no trend to examine long- and short-run analyses.

Table 3. Co-integration test results

Source: Authors' computation.

Co-integration Hypothesis	Model		10%	5%	2.50%	1%
Bound Test (F-Statistics)	8.469*	I(0)	2.45	2.86	3.25	3.74
		I(1)	3.52	4.01	4.49	5.06
Bound Test (t-Statistics)	–5.537*	I(0)	–2.57	–2.86	–3.13	–3.43
		I(1)	–3.66	–3.99	–4.26	–4.6

Note: * 1% significance level; Pesaran et al.'s (2001) upper bound critical value at 1% = 5.06 (F-stats) and –4.6 (t-stats).

Table 4 estimates the relationship between economic growth and its variables throughout the long and short term. When employing the ARDL on economic growth as a dependent variable and the other variables as independent ones with no trend and an unlimited constant, proper lag selection is crucial (1,1,1,1,0). Remember that the import is at 0 lag while all the variables are at one lag. As a result, at lag 1, the study applied the AIC criteria suggested by Akaike (1987).

The model's long-run finding, which contributes 0.68% at a 1% significance, provides strong evidence that final consumption expenditures influence economic growth. Like this, ceteris paribus, gross fixed capital creation positively influence economic growth at the 1% level by an average of 0.233%. Additionally, export has a positive and statistically significant influence at the 1% level. Ceteris paribus raises economic growth by an average of 0.51%. Overall, long-run results showed that the best way to boost Oman's economic growth is through consumption, followed by export.

http://dx.doi.org/10.21511/ppm.20(4).2022.27

Table 4. ARDL ECM results

Source: Authors' computation.

Variable	Coefficient	t-statistic
C	1.065*	7.069
Long-run		
Cons_1, log	0.68*	8.25
Gcf_1, log	0.233*	10.132
Ex_1, log	0.516*	28.15
Adjustment	–0.789*	–7.128
Short-run		
Gdp_1, log	–0.789*	–5.537
Cons_1, log	0.472*	6.075
Gcf_1, log	0.149*	4.832
Ex_1, log	0.358*	5.14
Im, log	–0.163**	–2.298
Observation	29	
R-square	0.985	
F-Statistic	380.91	
Durbin-Watson	2.236	
Selected model	(1,1,1,1,0)	

Note: *, ** represent 1% and 5% significance levels, t-statistics from HAC standard errors and covariance (Pre-whitening with lags = 1, Bartlett kernel, Newey-West fixed bandwidth = 4.0000).

While in the short run, lag 1 of economic growth has an asymmetric impact on economic growth at 1%. The outcomes indicate that economic growth falls by 0.789% in response to a change in the prior year's economic growth. On the other hand, the final consumption expenditure indicates a rise of 0.472; the gross fixed capital formation and export indicate a rise of 0.149 and 0.358 at a 1% significance level in response to a change in the previous year's economic growth.

Similarly, import exhibits a dip of 0.163 and a negative relationship with economic growth at a 5% level. According to the overall error adjustment mechanism, a return to a long-run stable condition is indicated by a deviation from long-run equilibrium adjusted at an adjustment speed of 78.9%. In summary, consumption and export are the main drivers of Oman's economic growth. The model also demonstrates the model's goodness-of-fit, which is demonstrated by the R-squared F-statistic and Durbin-Watson data.

Table 5 reports co-integration regression analysis results using FMOLS, DOLS, and CCR to test the variables for economic growth. The finding revealed that export has the highest value (0.51), reflecting an increase in export will contribute 0.51% to its economic growth based on FMOLS and CCR. The second rank stands for the final consumption expenditure, which accounted for 0.45, revealing that an increase in consumption will result in 0.45% of economic growth based on FMOLS.

A rise in gross fixed capital formation results in a 0.18% contribution to economic growth, according to the gross fixed capital formation's 0.18 coefficient value at a 1% level. Import also has a negative value at the exact moment. The Hansen instability test shows that the co-integration regression is stable.

Table 6 presents the diagnostics test for the model that revealed no sign of higher-order heteroscedasticity and serial correlation. In addition,

Table 5. Co-integration regression results

Source: Authors' computation.

Variable	FMOLS		DOLS		CCR	
LNCON	0.45	0.00*	0.52	0.00*	0.47	0.00*
LNGCF	0.18	0.00*	0.18	0.009*	0.19	0.00*
LNEX	0.51	0.00*	0.38	0.001*	0.51	0.00*
LNIM	–0.18	0.07	–0.123	0.52	-0.21	0.1
C	1.91	0.00*	1.62	0.02**	1.86	0.00*
Adj R2	0.999		0.999		0.999	
Long-run Variance	0.001		0.0003		0.0008	
Co-integration test (Hansen Instability)	0.44	0.2	0.101	0.2	0.202	0.2
Normality test (Jarque-Bera)	5.95	0.051	0.603	0.74	5.91	0.052

Note: C; Co–integration coefficient deterministic; * represents 1% significance level.

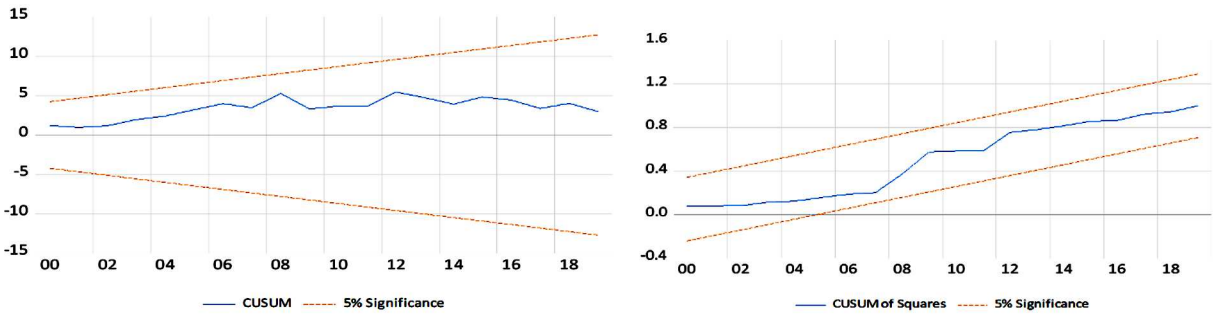

Figure 1. CUSUM stability

Table 6. Diagnostic test

Source: Authors' computation.

Heteroskedasticity Test, Breusch-Pagan-Godfrey				
F-Statistic	0.29	Prob. F (8,20)	0.96	Conclusion
Obs*R-squared	2.97	Prob. Chi-Square(8)	0.94	Homoskedasticity
Scaled explained SS	1.1	Prob. Chi-Square(8)	0.99	
Breusch-Godfrey Serial Correlation L.M. Test				
F-Statistic	0.66	Prob. F(1,12)	0.43	Conclusion
Obs*R-squared	0.97	Prob. Chi-Square (1)	0.33	No Serial Correlation
Normality Test				
Jarque-Bera	0.89	Probability	0.64	Normally distributed
CUSUM test	Stable	Cusum Square	Stable	Evidence of stability

the Jarque-Bera test with p-values above 0.05 shows that the data satisfy normality. In the end, Figure 1 indicates that the model is structurally stable as the cumulative sum of squared residuals (CUSUMQ) is within the significance level.

4. DISCUSSION

The exogenous and endogenous factors showed a substantial connection in the Pearson correlation matrix analysis. Export, gross capital formation, and import show 99%, while consumption shows 98% toward economic growth. The ARDL model test was made possible since ADF, P.P., and KPSS demonstrated a mixed series order and hypothesized that the series became stationary at first and zero-order. The ARDL bound test identified co-integration as being present. Since the F-statistic and t-statistic from the ARDL bounds test (8.469 and –5.537, respectively) are higher than those from Pesaran et al. (2001), it shows the presence of long-run and short-run analysis at unrestricted constant and no trend with upper bound critical values at a 1% level of significance (5.06 and –4.6).

The long-run ARDL error correction model (ECM) depicted the strongest association by consumption as 0.68%, followed by export at 0.52% and the end at 0.233 by the gross capital formation, while no role of import toward the economic growth in the long run. The findings also show that –0.79 is the repulsion toward the equilibrium in the long run. Likewise, the findings of the short-run indicate the same results except that it assigned a negative role association toward import and economic growth. However, these findings contradict the findings of Khan et al. (2022), as they found that import certainly plays a vital role in developing Oman's economy. However, the span is just 18 years, which is evitable due to its duration.

Additionally, the findings contradict those of Kalaitzi and Chamberlain (2020), who investigated the idea that export has little to no influence on the expansion of Oman's economy. Khan and Khan (2021) showed that import had a favorable impact on Oman's economic growth, while export had a negative impact. Khan et al. (2022) found that import contributed to Oman's economic expansion. Altaee et al. (2016) reached the same conclusions for Saudi Arabia.

http://dx.doi.org/10.21511/ppm.20(4).2022.27

CONCLUSION

By analyzing the relationship between economic growth, final consumption expenditure, gross fixed capital formation, export, and import in the Sultanate of Oman using annual data from 1990 to 2019, the current study contributes to the previously enduring literature. The ARDL bounds test and the co-integration regression were employed to accomplish the specified objectives. Exogenous (GDP) and endogenous (final consumption expenditure, gross fixed capital production, export, and import) factors were related. According to the design of the limitations test, all parameters have a long-run association aside from import. Export and final consumption expenditure support the Sultanate's economic performance and gross fixed capital creation, just as the ARDL and short-run expectations indicate. Import has a negligible effect on the Oman Sultanate's financial performance during the same period.

Although this study concludes that the main drivers of economic growth in the Sultanate of Oman are export, final consumer spending, and gross fixed capital creation, this was not the primary goal. Therefore, this study recommends that the government of Oman implement policies that increase export and consumption expenditure, and despite negative repercussions, import must consider technological innovation. Briefly, this study focuses on policymakers and their reformist role in boosting the export that affects the Sultanate of Oman's level of economic development. The final goal is to assess the controlled macroeconomic variables and how they affect economic growth.

Future research may be required due to some constraints. It may focus on accurate primary and secondary data to examine the impact of macroeconomic variables on economic growth more dynamically. These constraints may call for future investigations. Because the yearly time series data utilized in this study were relatively short (less than 40 years), the long-term trend of the study cannot be fully supported; thus, future research must employ more comprehensive data and more sophisticated techniques and factors.

AUTHOR CONTRIBUTIONS

Conceptualization: Uzma Khan, Nahid A. Siddiqi.
Data curation: Aarif Mohammad Khan.
Formal analysis: Uzma Khan.
Investigation: Aarif Mohammad Khan, Nahid A. Siddiqi.
Methodology: Aarif Mohammad Khan.
Resources: Uzma Khan, Aarif Mohammad Khan, Nahid A. Siddiqi.
Software: Aarif Mohammad Khan.
Supervision: Aarif Mohammad Khan, Nahid A. Siddiqi.
Validation: Nahid A. Siddiqi.
Visualization: Uzma Khan, Aarif Mohammad Khan, Nahid A. Siddiqi.
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Writing – review & editing: Uzma Khan, Nahid A. Siddiqi.

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