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Does importation of Goods and Services affect Gross Domestic Savings in Ghana?

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Abstract: The importation of goods and services is a common phenomenon in Ghana, which has over the years gained a steady significance in international trade. However, the economic implications of the import of goods and services in Ghana have not been exhaustively investigated as most available related studies have concentrated on its impact on Gross Domestic Product (GDP) rather than the Gross Domestic Savings (GDS). The study therefore investigated the interconnection between the Imports of Goods and Services (IGS) and GDS in Ghana based on annual time series data obtained from the World Bank Development Indicators and World Bank Commodity Price Database (2020) from 1970 to 2019. The theoretical framework was based on the life cycle, relative income, and permanent income hypotheses. A confirmation of a long-run association among the variables was indicated by the error correction term, which was both negative and significant. The ARDL bounds test for cointegration was used to examine both the long-run and short-run linkages between the independent variables and the GDS. The study's observational findings showed that, over the long term, the importation of Goods and Services (IGS) was negatively associated with GDS. Industry Value Added (IVA) recorded a statistically positive relationship with GDS, whereas Crude Oil Price (COP), and Manufacturing Value Added (MVA) recorded statistically negative relationship with GDS. MVA had a statistically significant short-term impact on GDS, but IVA had a substantially negative short-term impact on GDS. A unidirectional causality was discovered from IGS to GDS.

Keywords : Importation of Goods and Services, Gross Domestic Savings, Autoregressive Distributed Lag, Unidirectional Causality.

1. Introduction

Gross Domestic Saving (GDS) plays a quintessential role in the growth of a country's economy. Saving is a critical factor required to finance investment, create job opportunities and improve levels of productivity in a country (Khan *et al*., 2017). GDS provides an essential link with respect to the past, present, and future economic growth (Kazmi, 1993). GDS supports high economic growth rates through its influence on gross fixed capital formation and investment. It also functions as a medium that attracts Foreign Direct Investment. According to (Nga, 2007), GDS plays a critical and augmenting role for the sustainability and growth of an economy because it encourages investment and minimises poverty and unemployment rates to the benefit of the citizens of a country. Domestic savings have historically been seen by a variety of economists as one of the most important factors in determining economic growth (Ndirangu & Muturi, 2015).

In Economics, human beings have unlimited wants such as food, clothing, shelter, education, entertainment, leisure, and many others. The fulfilment of one want sets the tone for the emergence of another want. It is believed that the limited supply of goods and services in a particular country hugely accounts for the need for importation of goods and services to augment domestic volumes of production to meet growing needs and wants. According to TrendEconomy, 2019, Ghana spent about $10.4 billion imported items such as vehicles (passenger, private and goods transportation) and their accessories,

plastic products, cereals, pharmaceutical products, refined petroleum products, machinery, and many others. These items were imported from China, USA, UK, India, Belgium, Turkey, South Africa, Vietnam, UAE and Canada in the order of their respective share in trade. Fig.1 provides details of annual percentage imports trends from 2008 to 2019. The highest percentage of import was 69.1% and was recorded in 2008, whiles the lowest was 51.6% recorded for both 2015 and 2016. The trends further revealed an increasing pattern in imports from 2017 to 2019, i.e., from 53% to 61.6%.

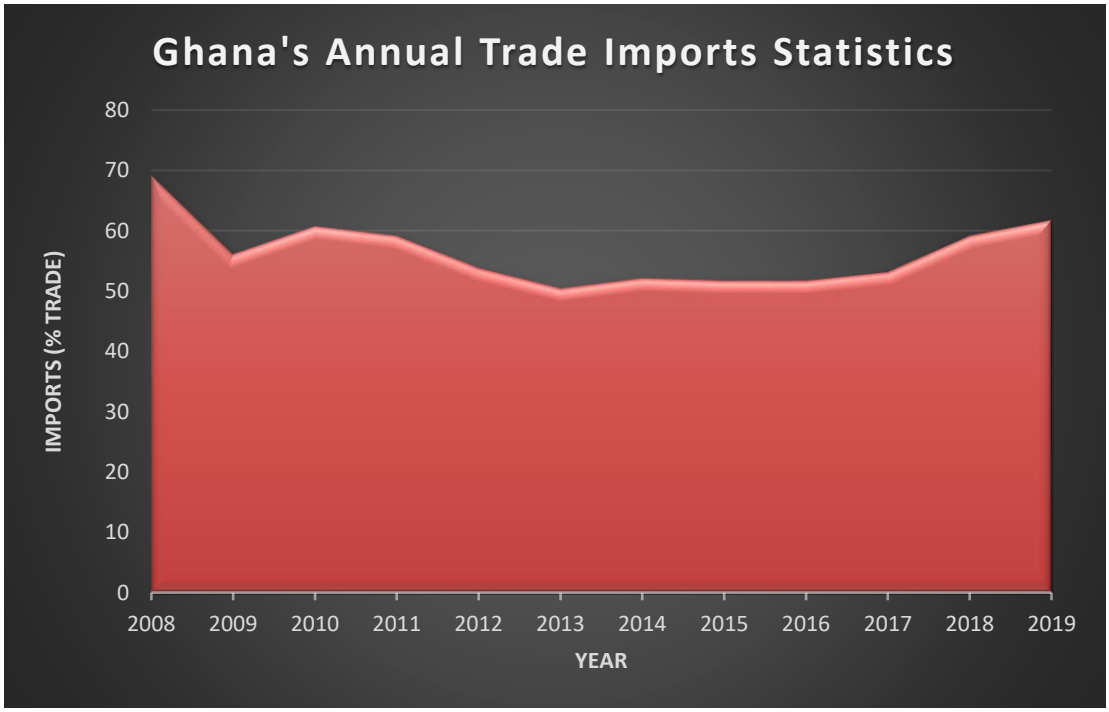

Figure 1: Annual % import trends for Ghana

Source: Author's construct extracted from: https://trendeconomy.com/data/h2/Ghana/TOTAL

Variations in the perceived quality of domestic and foreign goods and services are also determinants of importation of goods and services in Ghana. Services imported include but not limited to general and specific technical expertise, hospitality, medical health care, auditing, consultancy etc.

A general trend of the relationship between GDS and IGS shows that the percentage of GDP corresponding to the expenditure on importation of goods and services is consistently higher than the percentage of GDP corresponding to savings as shown in fig. 2 below.

This portends that Ghana within 1970 and 2019 spent more on the importation of goods and services compared to how much she was able to save except in the year 1982 when GDS was 3.73% of GDP and IGS was 2.98% of GDP. On the 31st of December 1981, Ghana had experienced a coup that led to the termination of her third republic. There was also an attempted coup within 1982 indicating the intensity of the political tension prevalent in the country. Instability bedevilled Ghana's economic growth during this period. However, amid these challenges, Ghana was able to record higher savings than the expenditure on goods and services for that year.

The lowest percentages of GDP for GDS were recorded in 2001, 2008 and 2010; -0.92%, 2.96% and -0.68% respectively. The highest percentage of GDP for GDS was 22.09% and was recorded in 2019, whereas the highest percentage of GDP for IGS was 67.25% in the year 2000.

The trends in GDS and IGS follow an unpredictable pattern in Ghana, thus revealing the need to answer the following research questions: Is Gross Domestic Savings controlled by Imports of Goods and Services? What is the magnitude of impact of IGS on GDS? Is there any causality between GDS and IGS and what is the direction of causality (if causality exists)? Additionally, the study determined to investigate the impact of predictor variables such as Crude Oil Price, Manufacturing Value Added,

Agriculture, Forestry and Fishing, Industry Value Added, Foreign Direct Investment and Broad Money on GDS.

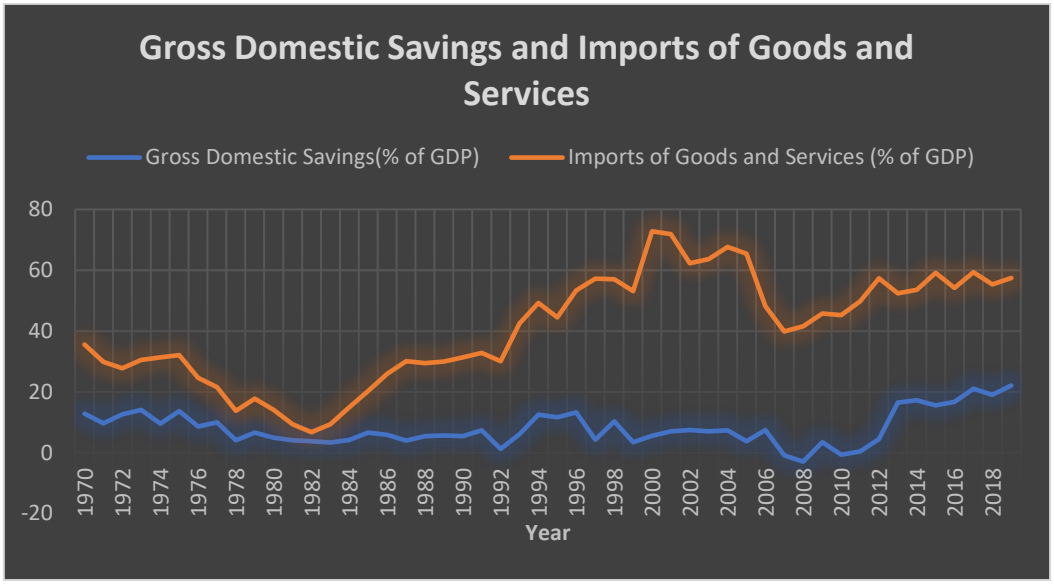

Figure 2 : Ghana's GDS versus IGS from 1970 to 2019

Source: Author's construct based on the data for the study

The rest of this study is planned as follows: The second section examines the theories buttressing the study followed by empirical literature review; the third section indicates the materials and methods used for the study as well as data analysis; section four elucidates on the presentation and discussion of the outcome of the study; sections five and six present the conclusion of the study.

2. Literature Review

2.1 Theoretical Review

2.1.1 The Life-Cycle Hypothesis

According to the Life Cycle Hypothesis (LCH) by Ando and Modigliani (1963), people plan their saving and spending habits throughout the course of their lives. At the commencement of their life-cycle, individuals have a relatively low-income stream due to their low level of productivity. At this stage, they are mostly described as net borrowers. However, after a certain period in their life-cycle, individuals begin to experience high productivity which generates corresponding high streams of income. They are therefore able to use their earned income to partly pay off accumulated debts and partly make savings towards retirement. In the later years of old age within retirement, the income gradually declines until it is exhausted. Expenses are then made from the erstwhile accumulated savings (Ando & Modigliani, 1963). According to the Life Cycle Hypothesis' conclusion, savings and income growth are positively correlated. This provides the grounds that as income growth increases, there is a corresponding accumulation of the income of active employees that leads to an expansion of their permanent incomes, supporting both consumption and saving.

2.1.2. Relative Income Hypothesis

The theory of relative income hypothesis was originated by James Duesenberry. The theory affirms that the behavioural disposition of people regarding saving and consumption is to a large extent dependent on their level of income when compared to the level of income of other people rather than by a hypothetical standard of living. The proportion of resources consumed by an individual is largely

contingent on his percentile position within the income or resources distribution. In other words, households having lower income levels in the reference groups spend more on consumption while households having higher income levels save more of their incomes (Duesenberry, 1949).

2.1.3. The Permanent Income Hypothesis

The theory of permanent income hypothesis in economics, explains the mechanism by which an agent extends utilisation of resources over his lifetime. Developed by Milton Friedman, the theory presumes that an individual's consumption at a point in time is determined not just by their current resources, but also depends on their anticipated future permanent income. In other words, the theory concludes that alterations in permanent income, rather than alterations in temporary income, are responsible for driving the changes in a consumer's consumption patterns. Permanent income is the mean income determined by the expected income to be earned by an individual over an extensive period while transitory or temporary income refers to the unexpected appreciation or depreciation in income (Friedman, 1957). Its prognostication of consumption smoothing, where people spread out transitory alterations in income over time is a departure from the traditional Keynesian emphasis on the marginal propensity to consume.

2.2 Empirical Review

Using the ARDL Approach, Nagawa *et al*., (2020) looked at the most influential agents of impacts on Gross Domestic Savings (GDS) in Uganda during the years 1998 to 2017. According to the study's observational findings, while current account balance and gross national expenditure had negative effects on savings over the long term, the GDP growth rate, broad money (M2O) and FDI had an affirmative and notably consequential effect on gross domestic product (GDS). In Uganda, it was discovered that Deposit Interest Rate (DIR) was an insignificant factor influencing GDS. In the short-term, CAB had a statistically significant affirmative impact on GDS, but GDP and DIR had a statistically significant negative impact.

Duran *et al*., (2017) used Deng's Grey Incidence Analysis Model with data from 1990 to 2014 to study the interaction between domestic savings and macroeconomic indicators in Turkey. Prior to 2001, the study hypothesised that unemployment rate and increase in gross domestic product per capita were closely associated. However, current balance ratio and GDP ratio also showed more significant association with domestic savings than the other variables.

In a related development, Uddin *et al*., (2016) investigated the effects of population, age structure and savings rate on the growth of Australia's economy from 1971 to 2014 using the dynamic ordinary least square, fully modified ordinary least squares, and vector error correction model. The dependency ratio, savings rate, and real GDP all showed a long-term linkage in all three models that were used.

Jouini (2016) investigated the relationship between savings and the growth of Saudi Arabia's economy from 1980 to 2012 using the ARDL bounds test approach. Based on the study's findings, economic growth and savings were cointegrated with a positively reciprocated granger causality present in both the short-run and the long-run.

In another study, the Granger causality, Toda-Yamamoto technique, and instantaneous causality test were utilised by Adam *et al*., (2017) to analyse the causative relationship between domestic savings and economic growth in several specific Sub-Saharan African nations using time series data with a shifting data period. The results of the studies showed that domestic savings and economic growth in the three countries were totally independent from one another. Moreover, a unidirectional causality running from savings to economic growth was discovered. The evidence from the other five countries yielded mixed results which were found to be different from the other methods, rendering its outcome inconclusive.

In a related study, Narayan (2005) looked at how investments and savings interacted in China from 1952 to 1998. The study utilised the approach of testing for cointegration and discovered the existence of a significant level of correlation between saving and investment throughout the period under review.

Larbi (2013) also used cointegration analysis to identify the long-term drivers of domestic savings in Ghana using data collected between 1970 and 2010. The studies demonstrated that financial liberalisation, per capita income and inflation had a positive and significant relationship with private savings.

Ayalew (2013) investigated the factors influencing Ethiopia's domestic savings using the ARDL bounds testing method and the error correction model. The analysis's findings indicated that the budget deficit ratio, income growth rate, and inflation rate were the statistically significant factors that affected domestic savings in Ethiopia. It was discovered that the current account deficit, depositing interest rate, and financial depth were irrelevant in explaining the variations in Ethiopia's domestic savings.

Li *et al*., (2003) applied a dynamic panel approach to navigate the impact of imports of services on economic growth with a panel data of 82 countries. The findings suggest that imports of services had both a major positive and negative impact on the rate of growth of developing economies. The results also imply that imports of other services had significant positive effect in developed countries while imports of transportation and travel had no significant effect at all.

Okyere, (2020) conducted a study aimed at identifying and quantifying the impacts of exports and imports on Ghana's economic growth for the period, 1998- 2018. By applying the unit root and first-order difference cointegration tests, it was discovered that there is an insignificant causal relationship between imports in international trade and Ghana's GDP growth. Exports, mainly cocoa, were found to have a significant causal relationship with Ghana's GDP growth. GDP was found to have a unidirectional causality from GDP to exchange rate and inflation rate.

3. Materials and Methods

3.1 Variable Definition, Data Description and Empirical Model

The following definitions apply to the variables used in this study:

- Gross Domestic Savings (GDS)

GDS is defined as the Gross Domestic Product (GDP) less final consumption expenditure. It comprises savings of household, private, corporate and public sectors. It is expressed as a percentage of the GDP for this study. Data was obtained from World Bank Development Indicators (2020)

- Imports of Goods and Services (IGS)

Imports are the commodities and services that citizens of a nation purchase from other nations instead of domestically produced goods. Since import transactions entail payments to sellers who are located abroad, they cause a financial outflow from the nation. It is expressed as a percentage of the GDP. Data was obtained from World Bank Development Indicators (2020).

- Crude Oil Price (COP)

Crude oil, average spot price of Brent, Dubai and West Texas Intermediate, equally weighed and adjusted for inflation. It is measured in $ per barrel of oil ($bbl). Data was obtained from World Bank Commodity Price Data Pink Sheet (2020).

- Agriculture, Forestry, and Fishing, value added (AFF)

AFF includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is estimated without considering the deterioration and depletion of natural resources or the wear and tear on manufactured assets. AFF data is presented in the study as a percentage of GDP and obtained from the World Bank Development Indicators (2020).

- Manufacturing Value Added (MVA)

Manufacturing value added (MVA) of an economy is the total estimate of net-output of all resident manufacturing activity units obtained by adding up outputs and subtracting intermediate consumption. The data for MVA is given as a percentage of GDP and obtained from the World Bank Development Indicators (2020).

- Broad Money (BMO)

Broad money is a measure of the amount of money, or money supply, in a national economy including both highly liquid "narrow money" and less liquid forms. The data for BMO is expressed as a percentage of GDP and obtained from the World Bank Development Indicators (2020).

- Industry Value Added (IVA)

IVA is the contribution of a private industry or government sector to overall GDP . The components of value added consist of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus . Value added equals the difference between an industry's gross output (consisting of sales or receipts and other operating income, commodity taxes, and inventory change) and the cost of its intermediate inputs (including energy, raw materials, semi-finished goods, and services that are purchased from all sources). The data for IVA was expressed as a percentage of GDP and obtained from the World Bank Development Indicators (2020).

- Foreign Direct Investment (FDI)

FDI net inflows are the value of inward direct investment made by non-resident investors in the reporting economy. FDI net outflows are the value of outward direct investment made by the residents of the reporting economy to external economies. Outward direct investment, also called direct investment abroad, includes assets and liabilities transferred between resident direct investors and their direct investment enterprises. It also covers transfers of assets and liabilities between resident and non-resident fellow enterprises if the ultimate controlling parent is resident. Outward direct investment is also called direct investment abroad. The data for FDI (net inflows) was expressed as a percentage of GDP and obtained from the World Bank Development Indicators (2020).

Annual times series data spanning from 1970 to 2019 were employed for this study. The choice for this period was limited by the availability of data for the selected variables.

Equation (1) serves as the research's empirical model, which is consistent with studies on gross domestic savings conducted by Khan *et al.,* (2017):

$$GDS_t = \sigma_0 + \beta_1 IGS_t + \beta_2 COP_t + \beta_3 AFF_t + \beta_3 MVA_t + \beta_3 BMO_t + \beta_3 IVA_t + \beta_3 FDI_t + \varepsilon_t \quad \ldots\ldots (1)$$

where is GDS is Gross Domestic Savings (Dependent variable) and σ_0 is an intercept. The independent variables are presented as follows: IGS refers to Imports of Goods and Services, COP refers to Crude Oil Price, AFF refers to Agriculture, Forestry and Fishing Value Added, MVA refers to Manufacturing Value Added, BMO refers to Broad Money (Money Supply), IVA refers to Industry Value Added and FDI refers to Foreign Direct Investment. Finally, ε_t denotes the error term.

3.1.1 ARDL Bounds Test and Cointegration Analysis

The study adopted the Autoregressive Distributed Lag (ARDL) bounds testing cointegration technique to investigate the presence or otherwise of long-run and short-run relationships as well as the dynamic interrelation among the variables of interest. Pesaran *et al*. (2001) propounded an ARDL Bounds Testing approach to examine the existence of cointegration relationship among variables. The ARDL Bounds Test for cointegration is advantageous in the following ways:

- It overcomes the challenge of the presence of the order of integration related to the Johansen likelihood technique (Johansen and Juselius,1990);

- Contrary to most of the traditional multivariate cointegration techniques cogent for large sample size, the bounds test approach is appropriate for studies associated with small sample size (Pesaran *et al.*,2001); and
- It provides objective estimates of the long-run model and valid t-statistics even when some of the explanatory variables are endogenous (Harris and Sollis, 2003).

The ARDL model is then evaluated, aimed at testing the cointegration relationship between the GDS (predicted variable) and the regressors (IGS, COP, AFF, BMO, MVA, IVA and FDI).

$$\Delta GDS_t = \sigma_0 + \beta_1 GDS_{t-1} + \beta_2 IGS_{t-1} + \beta_3 COP_{t-1} + \beta_4 AFF_{t-1} + \beta_5 BMO_{t-1} + \beta_6 MVA_{t-1} + \beta_7 IVA_{t-1} + \beta_8 FDI_{t-1} + \sum_{i=1}^{a} \delta_i \Delta GDS_{t-i} + \sum_{j=1}^{b} \lambda_j \Delta IGS_{t-j} + \sum_{k=1}^{c} \gamma_k \Delta COP_{t-k} + \sum_{l=1}^{d} \varphi_l \Delta AFF_{t-l} + \sum_{m=1}^{e} \theta_m \Delta BMO_{t-m} + \sum_{m=1}^{f} \emptyset_m \Delta MVA_{t-m} + \sum_{n=1}^{g} \alpha_n \Delta IVA_{t-n} + \sum_{o=1}^{h} \rho_o \Delta FDI_{t-o} + \varepsilon_t \quad \ldots\ldots (2)$$

Where β_i are the long-run multipliers, σ_0 is the intercept and ε_t are white noise errors. The introductory step in the ARDL bounds test technique is the estimation of equation (2) by making use of the Ordinary Least Squares (OLS) to check for the occurrence of a long-run relationship among the variables by executing an F-test for the mutual significance of the coefficients of the lagged versions of the variables. The null hypothesis is juxtaposed with the alternative hypothesis as shown below:

$$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$$
$$H_1 : \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq \beta_8 \neq 0$$

The test designated for the normalisation of GDS is indicated by FGDS (GDS|IGS, COP, AFF, BMO, MVA, IVA, FDI). Two asymptotical, critical value bounds lay out a test for cointegration when3the regressors I(x) [where $0 \leq x \leq 1$]; a lower value on the premise that the regressors are I(0) and an upper value on recognition as purely I(1) regressors. If the F-statistic is higher than the upper critical value, the null hypothesis of no long-run relationship is rejected notwithstanding the orders of integration for the time series. Conversely, if the F-statistic is below the lower critical value, the null hypothesis cannot be rejected. Consequently, if the F-statistic lies between the lower and upper critical values, the result is indeterminate. Upon the conclusion of the existence of cointegration, the conditional ARDL (*a, b, c, d, e, f, g, h*) long-run model for GDS_t is estimated as:

$$GDS_t = \sigma_0 + \sum_{i=1}^{a} \delta_i \Delta GDS_{t-i} + \sum_{j=0}^{b} \lambda_j \Delta IGS_{t-j} + \sum_{k=0}^{c} \gamma_k \Delta COP_{t-k} + \sum_{l=0}^{d} \varphi_l \Delta AFF_{t-l} + \sum_{m=0}^{e} \theta_m \Delta BMO_{t-m} + \sum_{n=0}^{f} \emptyset_n \Delta MVA_{t-n} + \sum_{o=0}^{g} \alpha_o \Delta IVA_{t-o} + \sum_{p=0}^{h} \rho_p \Delta FDI_{t-p} + \varepsilon_t \ldots.(3)$$

This incorporates the selection of the orders of the ARDL (*a, b, c, d, e, f, g, h*) model in the eight variables based on the Schwarz Bayesian Information Criteria (SBIC). The second step is the acquisition of the short-run dynamic parameters through the estimation of an error correction model associated with the long-run estimates. This is described as:

$$\Delta GDS_t = \sigma_0 + \sum_{i=1}^{a} \Psi_i \Delta GDS_{t-i} + \sum_{j=1}^{b} \omega_j \Delta IGS_{t-j} + \sum_{k=1}^{c} \partial_k \Delta COP_{t-k} + \sum_{l=1}^{d} \pi_l \Delta AFF_{t-l} + \sum_{m=1}^{e} \eta_m \Delta MVA_{t-m} + \sum_{n=1}^{f} \upsilon_n \Delta BMO_{t-n} + \sum_{o=1}^{g} \delta_o \Delta IVA_{t-o} + \sum_{p=1}^{h} \phi_p \Delta FDI_{t-p} + \tau ECT_{t-1} + \varepsilon_t \quad \ldots\ldots (4)$$

Here Δ, Ψ, ω, ∂, π, η, υ, δ and $\boldsymbol{\phi}$ are the first difference operator and the short-run dynamic coefficients of the model's convergence to equilibrium respectively. *a, b, c, d, e, f, g* and *h* are the different variables' optimal lags obtained using the Schwarz Bayesian Information Criterion (SBIC) and τ is the speed of adjustment coefficient which shows the speed at which equilibrium is restored when disequilibrium occurs (NB: τ is expected to have a negative sign).

3.2 Granger Causality

Granger causality determines whether one variable in a linear relationship can be properly defined as the dependent variable and the other variable as the independent variable, if the relationship is

unidirectional, bidirectional, or whether there is no functional relationship at all. The major focus of the analysis is pairwise Granger causality between IGS and GDS.

4 Results and Discussion

4.1 Descriptive Statistics and Unit Root Tests

Table 1 displays the summary statistics for the variables in their untransformed form.

Table 1: Descriptive Statistics

	GDS	IGS	AFF	BMO	COP	FDI	IVA	MVA
Mean	8.0309	32.5402	39.4387	23.0165	41.9183	2.55537	20.8953	9.28143
Median	6.82140	35.6296	38.3655	23.4911	34.2098	1.60771	19.4462	9.29944
Maximum	22.0866	67.2462	60.7119	34.1082	95.3115	9.51704	34.8600	13.9504
Minimum	-2.96337	2.98204	17.3064	11.3050	5.21224	-0.6604	6.24747	3.60551
Std. Dev.	5.68305	17.1334	12.4269	5.92089	25.4330	2.79040	6.79657	2.09020
Skewness	0.58601	0.14173	-0.15507	-0.18598	0.66720	1.03894	-0.00590	-0.59154
Kurtosis	2.86081	2.07360	2.03157	2.17639	2.46388	2.91247	2.64218	3.66754
Jarque-Bera	2.90208	1.95536	2.15423	1.70143	4.30846	9.01085	0.26704	3.84437
Probability	0.23433	0.37618	0.34058	0.42711	0.11599	0.01105	0.87501	0.14629

Source: Author's construct based on the data for the study

In terms of descriptive statistics, the data for GDS are characterised by mean of 8.0309, median of 6.821 (mean nearly equal to median signifies that the distribution is close to being symmetrical), standard deviationof 5.683 and is normally distributed with Jarque-Bera statistic of 2.902 (p -value of 0.234). The data for IGS are characterised by a mean of 32.540, median of 35.629 (mean nearly equal to median signifies that the distribution is close to being symmetrical), standard deviation of 17.133 and show a normal distribution according to the Jarque-Bera statistic of 1 .955 (p-value of 0.376). The data for AFF is characterised by a mean of 39.438, median of 38.366(mean nearly equal to median signifies that the distribution is close to being symmetrical), standard deviation of 12.426 and is normally distributed with Jarque-Bera statistic of 2.154 (p-value of 0.341). The data for BMO are described by a mean of 23.017 and a median of 23.491, suggesting that the data is almost symmetrical. The standard deviation is 5.921 and shows a normal distribution based on the Jarque-Bera statistic of 1.7014 (p -value of 0.427). the data for COP follows a similar pattern; the mean (41.918) does not deviate so much from the median (34.210), indicating that the data approaches symmetry. Furthermore, the data reveals a normal distribution evidenced by a Jarque-Bera statistic at a p -value of 0.116. The data for IVA and MVA also approach symmetrical distributions with means and medians of 20.895 and 19.446; 9.281 and 9.299 respectively. At Jarque-Bera statistic of values of 0.267 (p -value of 0.875) and 3.844 (p -value of 0.416), IVA and MVA respectively show normal distribution patterns. Finally, there is no significant variation between the mean (2.555) and the median (1.608), suggesting the existence of a symmetrical outlook of the dataset for FDI. However, FDI does not show a normal distribution as indicated by its p-value of 0.011 (Jarque-Bera of 9.011).

- **Augmented Dickey Fuller Unit Root Test**

The incorporation of lags is a requirement for the conversion of Dickey Fuller Unit Root Test to Augmented Dickey Fuller Unit Root. The number of lagged difference terms suitable is mostly acquired empirically with the help of the Vector Autoregression Order Selection Criterion purposefully aimed at including sufficient terms that lead to the error term becoming serially uncorrelated. If the absolute value of the ADF test statistic is greater than the absolute value of critical value at 5% significance level, the null hypothesis of non-stationarity (presence of unit root) is abandoned and the alternative hypothesis that stationarity exists is acknowledged. On the other hand, if the absolute value of the ADF test is lower than the absolute value of the test statistic at 5% significance level, the alternative hypothesis is rejected and the null is accepted.

- **Philips Perron (PP) Unit Root Test**

Through the nonparametric transformation of the Dickey-Fuller test statistics, the PP test makes rectifications for serial correlation. The PP test statistics can be expressed as Dickey–Fuller statistics that has undergone rectification for serial correlation using the Newey–West Heteroscedasticity and autocorrelation-consistent covariance matrix estimator. Under the null hypothesis; PP statistics has asymptotical distributions and normalised bias statistics. The PP tests are more robust to general forms of Heteroscedasticity in the error term μ_t. The PP test does not incorporate lag length specification. If the absolute value of the PP test statistic is greater than the absolute value of critical value at 5% significance level, the null hypothesis of non-stationarity (presence of unit root) is rejected and the alternative hypothesis that there is stationarity is accepted. On the other hand, if the absolute value of the PP test is lower than the absolute value of the test statistic at 5% significance level, the alternative hypothesis is rejected, and the null is accepted. As a means of ensuring the absence of $I(2)$ variables or higher orders of integration in the model, unit root or stationarity tests were conducted with the help of the Augmented Dickey-Fuller (ADF) and the Philips Perron (PP) tests with intercepts. It is econometrically wrong to execute the ARDL bounds test for long-run relationship with $I(2)$ variables. The results of the unit root tests are presented in Table 3. The ADF and PP tests both reveal that the variables in the study form a composition of I (0) and I (1). This is one of the strong justifications for the use of the ARDL approach.

4.2 Lag length Selection

Table 2 displays the results of the vector autoregression selection order criterion (VARSOC) for the entire model. The individual variable lag lengths were also computed and indicated as an essential input in the Augmented Dickey Fuller Unit Root Test. In accordance with the rule of thumb for selection of the suitable lag length, the lag with the smallest Akaike Information Criterion (AIC) and Schwarz Bayesian Information Criterion (SBIC) value is to be chosen. The AIC gives the least value of 38.7569 corresponding to a lag of 4. However, many lags such as 4 have the tendency to inflate standard errors of estimates of the coefficients leading to forecast errors. A cursory look at the least value for SBIC (41.9373) indicates a corresponding value of 1. Furthermore, the SBIC is more suitable for models with multiple predictor variables such as the model of the study. Thus, SBIC was preferentially selected for the model of the study.

Table 2: Model Lag Length Selection Critera

Lag	LL	LR	FPE	AIC	HQIC	SBIC
0	-1070		3.10E+10	46.8675	46.9866	47.1855
1	-826.73	486.45	1.30E+07	39.0751	40.1473	**41.9373***
2	-764.86	123.74	1.90E+07	39.1676	41.1929	44.574
3	-657.45	214.8	6.10E+06	37.2806	40.2589	45.2312
4	-536.99	240.94	3.5E+06*	34.8255*	38.7569*	45.3203

Source: Author's construct based on the data for the study

Table 3: Results of Unit Root Tests

		LEVEL		FIRST DIFFERENCE		Order of Integration
Variable	**LAG**	**ADF**	**PP**	**ADF**	**PP**	
	LENGTH	Constant	Constant	Constant	Constant	
GDS	**1**	-1.111	-10.019	-5.354***	-63.727***	I(1)
IGS	**1**	-1.357	-2.799	-7.187***	-41.698***	I(1)
COP	**1**	-1.833	-5.693	-4.965***	-46.973***	I(1)
AFF	**3**	0.453	0.328	-3.481***	-33.079***	I(1)
MVA	**2**	-3.222***	-15.229**	N/A	N/A	I(0)
BMO	**1**	-1.747	-6.335	-5.512***	-46.835***	I(1)
IVA	**2**	-1.288	-3.617	-4.634***	-31.793***	I(1)
FDI	**1**	-1.628	-5.515	-5.004***	-44.893***	I(1)

The null hypothesis is the presence of unit root in the series .
**** and ** indicate the rejection of the null hypothesis of the existence of unit root at 1% and 5% level of significance respectively*

Source: Author's construct based on the data for the study

4.3 Cointegration Results

Using SIBC as a guide, a maximum lag order of 1 was chosen for the conditional ARDL VECM in equation (2). Table 4 revealed the existence of cointegration among the variables because, the computed F-Statistic of 8.402 was higher than the upper bound at 10% (3.13), 5% (3.50) and 1 % (4.26). This foretells that the variables are cointegrated and that there exists a long-run relationship among GDS and the independent variables.

Table 4: ARDL Bounds Test for Cointegration

Test Statistic	Value	Significance level	I(0)	I(1)
F-statistic	8.402	10%	2.03	3.13
k	7	5%	2.32	3.5
		2.5%	2.6	3.84
		1%	2.96	4.26

Source: Author's construct based on the data for the study

4.4 Long-run Estimates

Table 5: Estimated Long-run Coefficients Results

The Long-run Coefficient ARDL (1,0,0,0,1,0,1,0) based on SIC

Response variable: GDS

Regressor	**Coefficient**	**Standard Error**	**T -statistic**	**P -Values**
IGS	-0.3727	0.0493	-7.5600	0.0000
COP	-0.0662	0.0275	-2.4100	0.0210
AFF	-0.1032	0.1148	-0.9000	0.3740
MVA	-0.7822	0.3555	-2.2000	0.0340
BMO	0.1790	0.1110	1.6100	0.1150
IVA	1.1741	0.1984	5.9200	0.0000
FDI	-0.3685	0.3149	-1.1700	0.2490

Source: Author's construct based on the data for the study

Table 5 shows that IGS had a statistically negative effect on GDS in the long-run at 1% significance level. This means that a 1% appreciation in IGS was affiliated to a 0.3727% decline in GDS ceteris

paribus. This outcome is aligned with existing literature. Whenever there is an appreciation of imports of goods and services at the expense of a country's exports, the country is burdened with a trade deficit. As trade deficit increases, capital inflows in the form of debt from a foreign country are required to meet the investments needs due to a decline in domestic (private and government) savings. In order words, increasing Gross Domestic Savings through the realisation of less imports of goods and services with respect to exports (trade surplus) means that there will be little or no need for financial capital from abroad to meet investment needs. An increase in investment leads to an increase in economic growth as presented in available literature and supported by the studies of Chidoko & Sachirarwe, (2015) and Anwer & Sampath, (1999).

In terms of the other covariates of the study, COP also had a negative statistical relationship with GDS at 5% significance level. This means that 1% crude oil price incremental change, was associated with a decline of 0.0662% in Gross Domestic Savings ceteris paribus. Ghana commenced the commercialisation of oil and gas in 2010 after the discovery of crude oil in 2007. However, Ghana still imports petroleum products to augment her increasing oil and gas consumption demand. The negative association between COP and GDS is a probable indication that, within the period of the study, Ghana spent more of her savings on the importation of large quantities of finished petroleum products that are more expensive than the crude oil she exports after oil production. The ubiquitously uncertain price fluctuations of crude oil prices on the international front obviously have a great impact on the portion of Ghana's GDP that corresponds to her gross domestic savings. This outcome is supported by Kamasa *et al*., (2020).

In the long-run, MVA also had a negative relationship with GDS at 5% level of significance. 1% appreciation in manufacturing value added contributed to 0.7822% decline in Gross Domestic Savings ceteris paribus. This is not surprising as Ghana as a country exports products that have virtually little or no value added. Most of Ghana's exports such as crude oil, cocoa, coffee, cashew nut, gold, bauxite, manganese, etc. are in their raw form. This explains why most of Ghana's imports are within the finished goods category, which are more expensive to buy compared to the revenue derived from the raw material exports, mostly leading to huge trade deficits. These trade deficits in turn have a negative impact on gross savings.

Industry value added in the long-run had a positive relationship with GDS at 1% significance level. This means that 1% increase in Industry value added led to 1.1741% increase in GDS ceteris paribus. Growth in industry relates to production of goods and services as well as the generation of significant wages. This leads to higher income per capita. Savings are eventually enhanced. Saving is positively correlated with income growth, according to the Life Cycle Hypothesis. This shows that a quicker rate of income growth increases the income of active workers, which in turn increases their permanent incomes—which are necessary for both saving and consuming—and leads to further income growth. According to the Relative Income Hypothesis, households with lower incomes in the reference groups spend more on consumption even though they save a lesser percentage of their income than households with higher incomes.

4.5 Short-run Estimates

Table 6 illustrates the results of the short - run coefficients as well as the coefficient of the ECT, which is found to be negative in value and at 1% significance level. This shows that in the event of a short-run volatility, the system uses a rapid correction speed of 93.36% to restore stability.

Table 6 also reveals a negative and statistically significant relationship between Industry Value Added and Gross Domestic Savings. This is explained by the fact that 1% increase in Industry Value Added led to a decline in Gross Domestic Savings by 0.6079% in the short-run.

In addition, there is a positive and significant relationship between Manufacturing Value Added and Gross Domestic Savings. This means that 1% upward adjustment in Manufacturing Value Added led to an increase in Gross Domestic savings by 0.8190% in the short-run.

Table 6: Estimated Short-run Error Correction Model (ECM)

Short-Run Coefficients ARDL (1,0,0,0,1,0,1,0)				
Response Variable : DGDS				
Regressor	**Coefficient**	**Standard Error**	**T-statistic**	**P-Values**
C	6.2206	7.4403	0.8400	0.4080
D(MVA)	0.8190	0.3790	2.1600	0.0370
D(IVA)	-0.6079	0.2113	-2.8800	0.0070
CointEq (-1) *	-0.9336	0.1326	-7.0400	0.0000
R-Squared: 0.8533	*F-Statistics, F (10, 38) =22.11;*		*Prob>F:0.0000*	
Adjusted R-Squared: 0.8147	*Durbin-Watson D-Statistic: 2.27*			

Source: Author's construct based on the data for the study

4.6 Goodness of Fit (R^2)

The data and the model were found to be well matched. The realisation of a high R-squared of 0.8533 served as the basis on which this conclusion was reached. This suggests that the predictor variables in the model account for 85.33% of the variance in the predicted variable (GDS).

4.7 Diagnostics and Post-Estimation Tests of Model

The absence of autocorrelation in the model was demonstrated by the Durbin Watson statistic of 2.27. The Breusch Godfrey test was used to further confirm the absence of serial correlation. Following the realisation of a p-value of 0.1645 (> 5%), there was no autocorrelation in the model. Similarly, there was no misspecification of variables based on a p-value of 0.5436 (>5%). Following the realization of 0.4328 (>5%) from the White's test for unconstrained heteroscedasticity, heteroscedasticity was not found in model. The Jacque Bera test statistic also demonstrated the normal distribution of the residuals.

An additional test for multicollinearity (Table 8) was incorporated into the study through the estimation of the mean variance inflation factor (VIF), which was 7.84, thus indicating a tolerably low presence of multicollinearity. Following the nature of the graphs obtained in Figures 3 and 4, it was confirmed that the model was stable.

Table 7: Post estimation Model Diagnostics

Diagnostics	Chi^2/F-Statistic	$Prob > Chi^2$
Breusch-Godfrey LM test for autocorrelation	1.9320	0.1645
White's test for unrestricted heteroskedasticity	49.00	0.4328
Jarque-Bera normality test	1.349	0.5094
Ramsey RESET test	0.73	0.5436

Source: Author's construct based on the data for the study

Table 8: Multicollinearity Test

Variable	VIF	1/VIF
IVA	17.37	0.05757
AFF	15.41	0.06489
IGS	7.51	0.13316
FDI	6.21	0.16103
MVA	5.09	0.19646
GDS	4.56	0.2193

COP	3.32	0.3012
BMO	3.21	0.31153
Mean VIF	**7.84**	

Source: Author's construct based on the data for the study

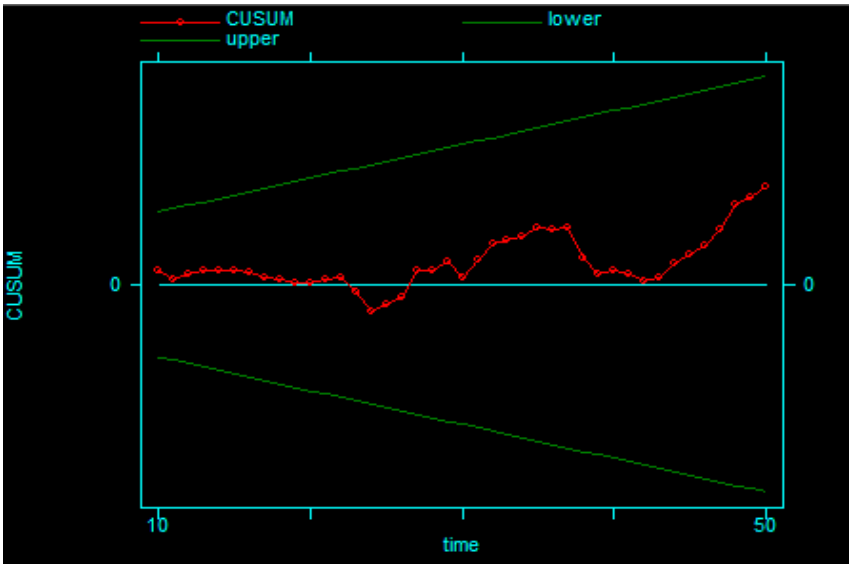

Figure. 3: Cumulative sum of recursive residual

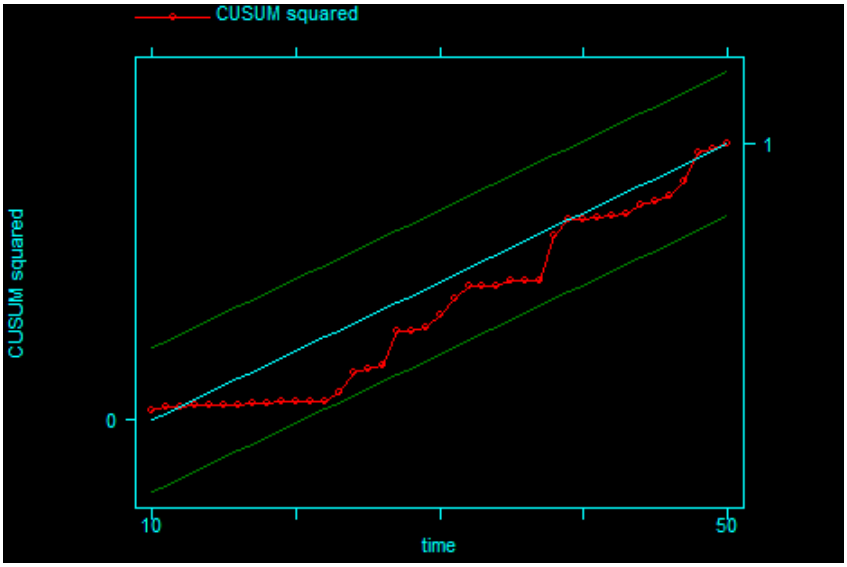

Figure.4: Cumulative sum of squares recursive residual

4.8 Pairwise Granger Causality Test

Table 9: Pairwise Granger Causality Tests

Null Hypothesis	F-Statistic	P - value	Conclusion
IGS does not Granger Cause GDS	13.8320	0.0000	IGS ⟶ GDS
GDS does not Granger Cause IGS	0.12063	0.9739	

Source: Author's construct based on the data for the study

Pairwise Granger causality tests conducted to identify the existence of causality and also determine the direction of the causality. In Table 9, the study showed that the null hypothesis of "IGS does not Granger Cause GDS", is rejected based on a very low probability value (p = 0.0000). Therefore, we accept the alternative hypothesis and conclude that IGS Granger Causes GDS. Consequently, the study reveals the existence of unidirectional causality, which runs from Importation of Goods and Services to Gross Domestic Saving in Ghana.

5. Conclusions

This paper examined the relationship between Imports of Goods and Services and Gross Domestic Savings in Ghana making use of available yearly data from 1970 to 2019. The Autoregressive Distributed Lag (ARDL) estimation technique was used on the variables. Based on the results of the ARDL bounds test, it was established that there was a long-run relationship among the variables. Gross Domestic Savings was found to have a significantly negative association with Imports of Goods and Services in the long-run. In terms of the covariates, Crude Oil Price and Manufacturing Value Added in the long-run were found to be also negatively associated with Gross Domestic Savings. Industry Value Added on the other hand, showed a significantly positive relationship with Gross Domestic Savings. Agriculture, Forestry and Fishing as well as Foreign Direct Investment had negative relationships with Gross Domestic Savings albeit insignificant. Finally, Broad Money had an insignificantly positive relationship with Gross Domestic Savings.

The outcome of the study indicates that Ghana's public and private savings are negatively impacted on by the importation of goods and services. This outcome arises from Ghana's overreliance on imported goods and services due to the lack of adequately resourced manufacturing firms that specialise in the addition of value to most of the things that are manufactured for domestic consumption and export. It is also noteworthy that foreign direct investments do not particularly improve domestic savings within the period of study in Ghana as a greater chunk of the proceeds from FDI's are channeled back to the foreign countries of origin. Conventional Agriculture, Forestry and Fishing have not been transformed into the manufacturing of goods and services due to low levels of industrialisation. Inadequate crude oil refining in Ghana has led to the inadequate volumes of finished petroleum products that are in high demand, leading to its consequent importation at the expense of savings made from crude oil revenues (oil rents).

It is therefore recommended that policy makers must consider a gradual rigorous approach to industrialisation as the key to transforming Ghana's primary abundant raw materials and human capital into value added manufactured goods and services that can be used locally as well as exported. This will ensure a significant reduction of imports of goods and services to the country and improve gross domestic savings in response to the fact that importation of goods and services granger causes gross domestic savings. An extensive industrialisation approach leads to an increase in employment and income growth, which improves savings and investment for advancement in economic growth. It is also important for policy makers to put in measures aimed at reducing the overdependence on imported petroleum products in the energy sector by building more oil refineries to convert locally produced crude oil to value-added petroleum products. Other sources of energy that are both cheaper and renewable must be explored.

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