IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

IMPACT OF AGRICULTURAL EXPORTS ON THE ECONOMIC GROWTH OF MALAWI: AN ECONOMETRIC ANALYSIS OF TOBACCO, TEA, AND SUGAR.

[1]William H Harawa, [2] Dr. Eric Kiprotich Bett, [3]Dr. Lucy Wangare Ngare

[1]Student [2]Lecturer (Dr) [3]Lecturer (Dr)
[1]Department of Agricultural Economics
[1]Kenyatta University, Nairobi, Kenya

ABSTRACT

This article empirically evaluates the dynamic impact of Malawi's disaggregated agricultural exports (Tobacco, Tea, and Sugar) on the country's economic growth (proxied as the Real GDP) from 1968 to 2019. The Autoregressive Distributed Lag (ARDL) and Error Correction Model (ECM) techniques were used to estimate agricultural exports' long and short-run impact on Malawi's real GDP. In contrast, the Toda Yamamoto-Granger non-causality technique was employed to evaluate the causal direction. The findings indicate that Sugar significantly impacts both the short and long-term performance of Malawi's GDP, whereas Tobacco only has a short-term impact. The Granger causality analysis suggested a bidirectional causal association between Sugar exports and GDP, while a unidirectional causal relationship was observed from GDP to Tobacco exports. The bidirectional causality finding suggests a predictive relationship between Sugar and real GDP in both directions. Likewise, reverse unidirectional causality could suggest ineffective management of export earnings, resulting in suboptimal reinvestment in the tobacco production sector. This study suggests that the Malawi Government should vigorously pursue an export diversification strategy and focus on the premiumization of Tea products to increase export earnings. Additionally, it is recommended that the government reduce its reliance on the Tobacco industry and instead invest in other high-value cash crops. It is crucial to thoroughly assess the potential impacts of divestment by conducting ex-ante simulations to comprehend the welfare implications of this policy recommendation. Given the Tobacco industry's bleak outlook and consistent underperformance, the Malawian government has a valid justification for prioritizing the enhancement of Sugar cane production.

Keywords: External trade; Export-led-growth; ARDL; Granger causality.

1.0 INTRODUCTION

The rationale for open trade and its investment opportunities are crucial to developing countries' (DCs) economic growth (Chaudhary *et al.*, 2007). During the last half-century, we have witnessed an extensive dialogue over the appropriateness of external trade policy regimes that would spur nations' economic development (Todaro & Smith, 2003). The consensus found in the literature shows that most nations favour export promotion (EP) policy over import substitution (IS). The EP, an outward-looking strategy, encouraged the integration of economies into the global economy as a viable means of promoting economic growth. In an open economy, promoting external trade stimulates economic Growth (Keho, 2017; Grossman & Helpman, 1991). The export and economic growth nexus, dubbed "The Export-led-Growth" (ELG), considers exports as the primary driver of economic growth (Medina-Smith, 2001). The theoretical justification for the ELG emerges from several opinions; first, the export sector can engender positive externalities to the wider economy (Feder, 1982): second, export rise enhances productivity; ultimately facilitates economies of scale (Helpman & Krugman. 1985); and exports may ease foreign exchange restrictions; resulting in unfettered access to international trade (Esfashani, 1991).

In the mid-1970s, Malawi and other developing nations (DCs) adopted an export-promotion policy. The rationale for the policy shift was motivated by the goal of restructuring the economy's productive capacity to promote long-term economic growth. Despite adopting the EP strategy, DCs have had mixed outcomes over the impact of export trade on economic growth, with some having higher economic growth and others experiencing declining output, as well as diverse outcomes in their poverty alleviation strategies. As a result, there is skepticism regarding the ability of ELG to enhance growth in developing countries (DCs). Moreover, the need for more consensus is amplified by incongruous outcomes for developing and industrialized countries, ascribed to country-specific economic disparities, the

levels of product transformation being exported, and the utilization of diverse econometric methodologies, necessitating more generalizability.

An analysis of economic development literature demonstrates that sustained economic growth is a sine qua non for alleviating poverty (Ramirez et al., 1997; Adams, 2002; Ravallion&Chen, 1997). Similarly, a sustainable GDP growth rate is crucial for developing countries like Malawi to ensure a better standard of living in the face of a rapidly booming population. Expansion of exports is one strategy for achieving such growth, a point of view that trade policy experts are increasingly promoting to enhance economic growth sustainably. Malawi's export sector is predominantly agro-commodity dependent, highly concentrated in Tobacco, Tea, and Sugar. Tobacco accounts for about 50% of Malawi's export earnings and approximately 15% of GDP, while Tea generates approximately 9% of forex earnings (Courbois et al., 2022), and Sugar generates 11%. Resource-constrained smallholder farmers largely occupy the Tea subsector, the majority of whom are women; their earnings from Tea cultivation are significantly less than what they could potentially earn due to the exportation of inferior Tea with minimal or no value-addition. Tobacco and Tea are classified as exports with a low Product Complexity Index (PCI) relative to Sugar. They are exported primarily in unprocessed form, whereas Sugar is exported in its processed form. However, these commodities exhibit fluctuating export earnings due to the market's price volatility. The detrimental impact of commodity dependence is openness to exogenous shocks that run through the economy, exacerbating macroeconomic vulnerability and impairing long-term economic growth (Persaud & Meade, 2009). In contrast to import substitution, Malawi integrated export expansion trade strategy into overall development policy and macroeconomic planning during the past four decades. Despite implementing an export expansion strategy, the country's trade deficit is still widening. It is still being determined if agricultural exports influence economic growth or which disaggregated agricultural export goods account for economic growth.

The literature on export-led growth has largely ignored the role of agricultural exports in the economic growth of developing countries. Additionally, most studies on agriculture-led growth have focused on the aggregate impact of exportable agricultural commodities instead of isolating the impact of specific exportable agricultural commodities on real GDP. Any attempt to estimate aggregated agricultural exports obscures the impact of marginal discrepancies across export commodities, leading to spurious conclusions favouring the Export-Led Growth Model. This study aims to bridge this knowledge gap by disaggregating agricultural export values into (Tobacco, Tea, and Sugar), and then empirically investigating the short and long-run impact of the disaggregated agricultural exports on Malawi's Real GDP. Secondly, the study seeks to determine the direction of causality between exportable crop commodities (Tobacco, Sugar, and Tea) and economic growth in Malawi. Given the limited literature on the impact of disaggregated agricultural exports on economic growth in Malawi and the need for more generalizability of the ELG study findings, it is imperative to conduct a study that will address Malawi's unique situation.

2.0 NEED OF THE STUDY

Moreover, knowledge of the impact of disaggregated agricultural crop exports on Malawi's economic growth is crucial in developing trade policies and strategies to improve the trade balance, which has been structurally in deficit since independence. The study's outcomes, in particular, highlight the distinctive impacts of each major crop on Malawi's real GDP, which may aid in the recalibration of customized export strategies geared at enhancing each crop's export performance rather than a one-size-fits-all strategy. Given that Malawi's economic growth is persistently volatile and efforts to reduce poverty are illusive as poverty is intricately linked to low agriculture productivity, it is both timely and imperative to evaluate trade strategies streamlining the agricultural sector and foreign sector in light of the apparent failure of agriculture export-led growth. In essence, the results of this analysis are relevant to Malawian policymakers, economists, and interest groups because promoting growth through export expansion can contribute to poverty reduction and job creation. The empirics generated from the study will provide insights into identifying the exportable crop commodities that positively impact the Real GDP.

2.1 Literature Review

Using time series from 1980 to 2002, TSinoha-Lopete (2006) investigated nine Southern African countries to confirm ELGH. The empirical study sequentially applied time series techniques such as Stationary/Non-stationary Tests and Cointegration tests, including Granger-Causality. The results demonstrated more significant support for the ELG-Hypothesis study for the Southern Africa Countries. Moreover, leaving out exogenous regressors, the Export-Growth causality hypothesis was validated in Lesotho and Swaziland and was further validated in Botswana, Lesotho, and Swaziland, though without exogenous regressors. This confirmed that sustained export expansion could lead to economic growth and multipronged effects on job creation, income levels, and poverty reduction. On the contrary, while most LDCs implement export-oriented strategies, the long-term outcomes remain theoretical. Sanjuán-López & Dawson (2010) estimated a panel cointegration approach to investigate the causal link involving exports (agriculture and non-agriculture) and Real GDP amongst forty-two DCs. Research results confirmed long-run impact—the aggregate exports predicted Real GDP, and these findings supported ELGH. Moreover, it was observed that significant growth was attained from non-agricultural exports. To investigate the causal link between agricultural exports and Cameroun's economic growth, Noula et al. (2013) used Vector Correction Model (VECM) and Granger causality procedure to estimate an extended generalized Cobb-Douglas production function. The study results generated varied outcomes concerning causality: while Coffee and banana exports granger-caused economic growth, cocoa exports did not granger-cause economic growth.

Rahman & Hossain (2014) employed the Vector Autoregression (VAR) modeling to assess the influence of agricultural exports on GDP in Bangladesh. The study operationalized the Granger causality procedure to evaluate causation among agricultural exports and GDP. Study outcomes revealed a long-run relationship between Agro-exports and Real GDP, and unidirectionally, agricultural exports granger-caused Real GDP. The VAR results affirmed that any variations in agricultural GDP affect economic growth proportionally, which indicates that improving the agricultural sector could effectively stimulate economic growth in Bangladesh. Ijirshar (2015) investigated the effect of agricultural exports on Nigeria's GDP. The author applied the cointegration test and Error Correction Method

(ECM) to evaluate the impact. GDP, a proxy of economic growth, was regressed against Agro-exports, Trade Openness, exchange, and Inflation rate. The research findings exhibited a long-run relationship amidst the series. Overall, Agro- exports had a significant influence on the Nigerian economy. Bokosi (2015) applied (VAR) approach to validate Export-led-growth hypothesis (ELGH) in Malawi, applying 1980-2013 time series data. The export sector was subdivided into services and goods exports, of which the good exports were predominantly agricultural. The study assessed the association between exports and Real GDP in a dual equation system. The study findings demonstrated a lack of long-term interactions between aggregate exports and Real GDP; instead, a short-run association between goods exports and Real GDP was observed—unidirectionally goods export granger-caused Real GDP and goods granger-caused service exports.

3.0 RESEARCH METHODOLOGY

To assess the dynamic causal link between the series, the study utilized historical time series data spanning from 1968 to 2019. The World Bank's publication, World Development Indicators, was mined for its statistics on real GDP, total labor force, gross fixed capital formation, and exchange rates. The data on the export values of the key crops (Tobacco, Tea, and Sugar) were obtained from both the Malawi National Statistical Office (NSO) and FAOSTAT. The current study considers real GDP the dependent variable, whereas the explanatory factors under investigation include Tobacco, Tea, and Sugar exports. The estimation incorporated labour, capital, and exchange rate as control variables that might exert additional influence on the real GDP. All variables are denominated in millions of US dollars, except for the exchange rate, which is given in units of domestic currency per US dollar. To provide reliable and valid empirical results, all the variables, except the exchange rate, were adapted into natural logarithms (Shahbaz et al., 2016). The analysis of time series data in empirical models necessitated a thorough investigation into the characteristics of the data (Ewing et al., 2007). In the initial phase, the stationarity of all the series was assessed, or the integration order of the series was examined using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Integration order pertains to the number of differentiations a series undergoes until it reaches a state of stationarity (Wickremasinghe, 2005). The second step in this study entailed performing a cointegration analysis to ascertain the existence of a long-term link between the series. The ARDL bound test, as put forth by Pesaran et al. (2001), served as the basis for this analysis. The decision is made based on the results of the unit root test, which indicate whether the series is stationary, either at order I(0) or I(1), or a combination thereof. The ARDL bound testing approach was utilized to assess the concurrent impacts of crop exports on Malawi's real GDP in both the short and long run. Following the autoregressive distributed lag (ARDL) model estimation, we conducted a causality test to ascertain the direction of causality using the Toda Yamamoto Granger causality test.

3.1 Econometric methodology

Solow's (1956) augmented neoclassical production function provides the theoretical underpinning for conducting empirical research into the causal relationship between agricultural exports and economic development. The Augmented production function proposes that in addition to traditional inputs such as capital and labor, non-traditional inputs such as exports and other factors may be incorporated into the model to account for their impact on economic growth. Nevertheless, it is worth noting that the present investigation has implemented an augmented production function to account for the causal-dynamic association pertaining to exportable agricultural commodities, namely Tobacco, Tea, and Sugar, and the overall economic output of Malawi, as measured by the real (GDP). This is achieved by utilizing the renowned Cobb-Douglas (C-D) neo-classical production function, which conventionally incorporates the factors of capital and labor as autonomous stocks of economic growth.

$$Y_t = A_t\, K_t^{\alpha} L_t^{\beta} \tag{1}$$

Whereas Y_t represents the aggregate economy output or real GDP in a specified time t, A_t factor productivity, K_t a capital proxy for domestic investment, and L_t labor stock. Still, due to its inherent mathematical flexibility, the augmented neo-classical production function is subsequently modified to accommodate the disaggregated exportable agricultural commodities of Tobacco, Tea, and Sugar. The generalized neo-classical production function that follows is expressed as:

$$Y_t = f\left(L_t^{\alpha},\ K_t^{\beta}, TOB_t^{\gamma}, TEA_t^{\varphi}, SUG_t^{\psi}, \varepsilon_t\right) \tag{2}$$

And ($\alpha, \beta, \gamma, \varphi, \psi$) denote elasticities of production relating to ($K_t, L_t, TOB_t, TEA_t, SUG_t$) respectively. TOB_t denotes Tobacco exports at time t; TEA_t, denotes value of Tea exports at time t; SUG_t, is value of Sugar exports at time. Further, the variable exchange rate was incorporated into the model to account for any negative impact on economic growth (Bermudez & Dabus, 2015). The functional form between real GDP and the explanatory variables is expressed as:

$$RGDP_t = f\left(TLF_t^{\alpha}, GFCF_t^{\beta}, TOB_t^{\gamma}, TEA_t^{\varphi}, SUG_t^{\psi}, EXR_t^{\tau},, \varepsilon_t\right) \tag{3}$$

Where $RGDP_t$ a proxy for annual aggregate output for the economy, TLF_t denotes total labor stock, $GFCF_t$ represents Gross Domestic Fixed Capital Formation, TOB_t is Tobacco export value in dollars, TEA_t is Tea export value in dollars, SUG_t is Sugar export in Dollars, EXR_t denotes exchange rate, and ε_t is error term. The augmented neoclassical production model is derived and empirically estimated to examine the causal effect of exportable crop commodities on Malawi's economic growth utilizing Equation (3). Any variations in the unit of measurement across the variables are removed by transforming equation (3) through the application of natural logs on both sides though except on exchange rates, which results in the subsequent estimated model:

$$LRGDP_t = \alpha + \beta LTLF_t + \vartheta LGFCF_t + \gamma LTOB_t + \delta LTEA_t + \rho LSUG_t + +\tau EXR_t + \varepsilon_t \tag{4}$$

Where L introduced in front of each variable denotes natural log for the variable in the model, and ε_t stochastic disturbance term (error term), α is the constant, and β, ϑ, δ, ρ, and τ are the parameters.

3.2 Empirical model estimations

3.2.1 ARDL Cointegration Test

To estimate both short and long-run causal dynamics among exportable crop commodities (Tabacco, Tea, Sugar) and real GDP, this study adopted the ARDL-Bounds cointegration approach as a fundamental vector autoregressive (VAR) procedure established by Pesaran et al. (2001). Engle and Granger (1987) conceptualized Cointegration as an econometrical technique to assess long-run relationships in series. According to Gujarat (2004), Cointegration represents an econometric outcome that establishes a long-run relationship among series that are independently nonstationary at the level form and stationary after initial differencing. The ARDL model has a certain number of advantages over the traditional methods of testing cointegration. Firstly, the ARDL Bounds Test technique is more efficient as it circumvents the order of integration challenges associated with Cointegration. Second, the ARDL model allows for estimation in cases where the sample size is parsimoniously limited, and it accommodates the challenge of endogeneity by including lagged values of both the regressand and the regressors in the model. In addition, the ARDL procedure permits the evaluation of the short-run and long-run dynamic effects of one series over another by reparametrizing ARDL into ECM (Bentzen & Engslted, 2001). Empirically, the parameters of the ARDL model are used to determine the long-run impact on the dependent variable; and the model is presented as:

$$LRGDP_t = \alpha + \sum_{i=1}^{p} \gamma LRGDP_{t-1} + \sum_{i=0}^{q_1} \beta_{2i} LGFCF_{t-i} + \sum_{i=0}^{q_2} \beta_{3i}\, LTLF_{t-1} + \sum_{i=0}^{q_3} \beta_{4i} LnTOB_{t-i} + \sum_{i=0}^{q_4} \beta_{4i} LnTEA_{t-i} + \sum_{i=0}^{q_5} \beta_{5i} \Delta LnSUG_{t-i} + \sum_{i=0}^{q_6} \beta_{6i} EXR_{t-i} + \varepsilon_{ti} \quad (4)$$

Where as (LRGDP, LGFCF, LTLF, LTOB, LTEA, LSUG, and EXR) are macro series under study and ε_t is white noise. The ARDL Cointegration Bound Test was conducted by converting Equation (4) into a Bound Testing model by incorporating both short- and long-run dynamism. The ARDL Bound Test procedure to Cointegration provides an opportunity to conduct an F-test on the selected ARDL model equation with an appropriate lag length. Overall, the approach is estimated to investigate the short and long-run interactions among series; and the selected values $(p, q_i, \dots, q_6)$ represent the optimal lag length of the Cointegration model based on Akaike Information Criteria (AIC). The vector Cointegration equation under study is expressed as:

$$\Delta LRGDP_t = \alpha_0 + \sum_{i=1}^{p} \beta_{1i}\, \Delta LRGDP_{t-i} + \sum_{i=0}^{q_1} \beta_{2i} \Delta LGFCF_{t-i} + \sum_{i=0}^{q_2} \beta_{31}\, \Delta LTLF_{t-1} + \sum_{i=0}^{q_3} \beta_{4i} \Delta LnTOB_{t-i} + \sum_{i=0}^{q_4} \beta_{5i} \Delta LnTEA_{t-i} + \sum_{i=0}^{q_5} \beta_{6i} \Delta LnSUG_{t-i} + \sum_{i=0}^{q_6} \beta_{7i} \Delta EXR_{t-i} + \beta_7 LnRGDP_{t-i} + \beta_8 LnGFCF_{t-i} + \beta_9 LnTLF_{t-i} + \beta_{10} LnTOB_{t-i} + \beta_{11} LnTEA_{t-i} + \beta_{12} LnSUG_{t-i} + \beta_{13} EXR_{t-i} + \varepsilon_t \quad (5)$$

Where Δ denotes difference operator; and $p \geq 1, q \geq 0$ are selected lag operators for differenced dependent variable and for all series identified as independent variables respectively. Under the null hypothesis of no cointegration, the ARDL Bounds Test is procedurally conducted to estimate equation (5) using (OLS) to examine the presence of long-run interactions. The presence of co-integration is validated by the standard F-test (Pesaran et al., 2001), which has established two distinct sets of critical values (lower and upper) for the ARDL bound testing. The critical values globalizes the hypotheses that the series of (I(0)) and (I(1)) accordingly. This establishes a comprehensive constraint that includes any feasible distinctions of the variables. If the F-statistics derived from the ARDL Bound Test model exceeds the upper bound, the null hypothesis of no co-integration is rejected. Conversely, in case the F-statistics falls beneath the lower limit, the null cannot be rejected. After establishing the existence of Cointegration between variables, we proceeded to analyse the short-run dynamics by appropriate reparameterization of (ARDL) model into an Error Correction Model (ECM). The ECM is the expressed as follows.

$$\Delta LRGDP_t = \alpha + \sum_{i=1}^{p} \beta_{1i} \Delta LRGDP_{t-1} + \sum_{i=0}^{q_1} \beta_{2i} \Delta LGFCF_{t-i} + \sum_{i=0}^{q_2} \beta_{3i}\, \Delta LTLF_{t-1} + \sum_{i=0}^{q_3} \beta_{4i} \Delta LTOB_{t-i} + \sum_{i=0}^{q_4} \beta_{4i} \Delta LTEA_{t-i} + \sum_{i=0}^{q_5} \beta_{5i} \Delta LSUG_{t-i} + \sum_{i=0}^{q_6} \beta_{6i} \Delta EXR_{t-i} + \pi ECM_{t-1} + \mu_t \quad (6)$$

Whereas Δ is the first difference estimator; π represents error correction coefficient or feedback effect; and μ_t is white noise, $\beta_0 to\, \beta_6$ represents the short-run impact on $RGDP_t$. ECM_{t-1} (Error Correction Term) is estimated out of residuals mined from the long-run equilibrium estimates (Gujarati, 2004). The error correction coefficients measures the rate at which the Cointegration equation adjusts to

its steady state following short-run shocks that result in disequilibrium. In this process, the relationship is represented by a negative and statistically significant value of the error correction term coefficient (π) (Shahbaz et al., 2013). Furthermore, the ARDL model underwent diagnostic testing in order to verify the consistency and reliability of its parameters. The Breush-Godfrey serial correlation LM and Bresuch-Pagan tests were employed to examine the presence of serial correlation and heteroscedasticity, respectively. The Ramsey Reset test is employed for investigating potential model misspecification. The Recursive CUSUM and CUSUM of squares approaches, which were initially introduced by Brown et al. (1975) and Pesaran (1997) respectively, are utilized for evaluating the stability of the parameters in the model.

3.2.2 Causality Test

The Granger-Causality test, originally developed by Granger in 1969, is a widely utilized technique for assessing whether two variables are causally related. This study aimed to ascertain whether the values of exportable commodities, specifically (Sugar, Tea, and Tobacco) granger cause Real GDP or vice versa. The conventional Granger Causality test is often conducted using basic vector autoregressions (VAR), despite the presence of several limitations in the test. This study employed the Granger causality procedure developed by Toda and Yamamoto (1995). This procedure utilizes an augmented VAR estimation technique and proposes a modified Wald test to address issues related to specification bias and spurious output commonly observed in traditional Granger causality analysis. Toda & Yamamoto (1995) based granger causality technique applies an augmented structured VAR of k (lag-length) with d_{max} (maximum order of integration) that forms asymptotic VAR statistic by means of χ^2 distribution. When the VAR of $[p + d_{max}]^{th}$ order is operationalized, the parameters of the lagged $[d_{max}]$ vectors are disregarded. The original granger causality assumed two series (Y & X) to be cointegrated if their linear grouping is stationary, though this not always the case in most circumstances. Moreover, it is important to note that the conventional method of inferring causality may prove inadequate in cases where the time series under consideration are not stationary but rather co-integrated, as highlighted by Engel and Granger in their seminal work in 1987. In order to confront this particular challenge, Toda & Yamamoto (1995) conducted a study wherein they showcased that despite the presence of varying orders of integration within a set of series, the conventional asymptotic theory would remain applicable, provided that the integration order does not exceed the lag-length of the VAR (k) equation. The operationalization of Toda-Yamamoto Granger Causality entails the implementation of various stages in a schematic manner. Primarily, each series underwent ADF and PP tests in order to determine the maximum order of integration. Secondly, the process involves determination of optimal lag-length by estimating the VAR in levels by means of the Akaike Information Criteria (AIC). The modified Wald technique is used to analyse the VAR (k) model for causality and its likely direction in the final step. The optimal lag length is equivalent to $k = (p + d_{max})$. Accordingly, a multivariate VAR model could be estimated regardless of either the series levels or the outcome of cointegration, and Granger non-causality tests could be experimented. The subsequent equations presents the Toda-Yamamoto method for Granger causality analysis, which utilizes a bivariate vector autoregressive (VAR) model to examine the causal link between real gross domestic product (RGDP) and exportable crop commodities.

$$Y_t = \alpha_1 + \sum_{i=1}^{k+d} \beta_{1i} Y_{t-i} + \sum_{j=1}^{k+d} \gamma_{1j} X_{t-j} + \xi_{1t} \qquad (10)$$

$$X_t = \alpha_2 + \sum_{i=1}^{k+d} \beta_{2i} X_{t-i} + \sum_{j=1}^{k+d} \gamma_{2j} Y_{t-j} + \xi_{1t} \qquad (11)$$

Where d denotes maximum order of integration of the series (Y and X) in the VAR model, (k) represents lag length, ξ_{1t} *and* ξ_{2t}, are white noise with zero mean, homoscedastic and are not serially correlated. From the equation 10, the null hypothesis of 'no Granger causality' is conducted with F-test, and is presented as follows: H_0: 'X_t does not Granger cause Y_t' if $\gamma_{1j} = 0$, in contrast to the H_A: 'X_t does Granger causes Y_t if $\gamma_{1j} \neq 0$ for each j. Likewise, in equation 11, H_0 'Y_t does not Granger cause X_t' if $\gamma_{2i} = 0$ against the H_A: 'Y_t does Granger causes X_t' if $\gamma_{2i} \neq 0$ for each j.

4.0 RESULTS AND DISCUSSION

4.1 Stationarity test

The results of the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are presented in Table 1.0. It has been noted that the variables under examination did not demonstrate stationarity at their respective levels, with the exception of the logarithm of the Sugar export series. This particular series displayed significant stationary characteristics at a 5% level of significance, as determined by the PP test. All the series, nonetheless, achieved stationarity at the 1% significance level subsequent to the first differentiation, thereby suggesting that they possess an integration order of one. The fact that the ADF and PP report inconsistent results for the same series may indicate that the series does not satisfy the assumptions underlying both tests, indicating that there is no structural break. In the event that a series exhibits a structural break, it has been observed that the Augmented Dickey-Fuller (ADF) test may yield an erroneous outcome by indicating non-stationarity. Further investigation was conducted on the output of the inconsistent unit root tests in the series by subjecting the regression equation to the Quandt-Andrews unknown breakpoints test. According to Table 1.1, it is evident that a significant turning point in the economic structure, known as the Structural Break Point (SBP), transpired in the year 2002. This pivotal event coincided with a notable downturn in the Gross Domestic Product (GDP). The decline was attributed to the withholding of aid by donors in response to

Table 1.0 Stationary test results

	Level		First Difference	
Variables	**ADF**	**PP**	**ADF**	**PP**
LnRGDP	-3.290	-3.296	-5.719***	-7.915***
LnGFCF	-2.631	-2.675	-4.779***	-7.199***
LnTLF	-2.045	-1.596	-4.702***	-4.863***
LnTOB	-2.730	-2.599	-6.782***	-7.584***
LnTea	-3.359	-3.223	-7.796***	-9.433***
LnSUG	-3.342	-3.656**	-7.824***	-7.824***
EXR	0.071	0.723	-4.985***	-4.943***

The H_0: non-stationarity is rejected at ***, **, significant at 1% and 5% respectively
(MacKinnon) p-values corresponding to (ADF) and (PP): 1%= -4.152, 5%=-3.502, and 10%-3.181

Table 1.1 Result of Quandt–Andrews unknown breakpoint test.

Statistic	**Value**	**Prob**
Maximum LR F-statistic (2002)	6.253184	0.0000
Maximum Wald F-statsic (2002)	37.51910	0.0000

Null Hypothes: No Breakpoints within 15% Trimmed Data
Note: probabilities are calculated using Hansen's (1997) method

the Malawi government's attempt to bypass presidential term limits. After the timing of the structural break has been determined endogenously, the structural break is incorporated as a structural dummy variable in the ARDL model. The ARDL model included a dummy variable (DY2002) with designated 'zero values' for years prior to 2001 and 'one values' for years afterward.

4.2 The ARDL cointegration test results

Table 2.0 displays the outcomes of the cointegration analysis, specifically focusing on the potential cointegrating vectors derived from the ARDL Bounds testing model. The findings presented in Table 2.0 indicate that the estimated F-statistics for the dependent variables RGDP, Tobacco, and Sugar (7.29, 3.99, and 7.21, respectively) exceed upper

Table 2.0 ARDL bounds test for the vector ARDL equations for LRGDP, LTob, LTea, and Lsug

ARDL Model	**Ardl specification**	**F-statistic**	**Upper bound I(1)**	**Outcome**
LRGDP	ARDL(1,2,0,3,0,2,1,3)	7.2853***	4.26	Cointegration
LTob	ARDL(1,0,0,0,1,0,0,0)	3.9941**	3.21	Cointegration
LTea	ARDL(1,1,0,1,0,0,0,0)	3.1587	3.21	No Cointegration
LSug	ARDL(1,0,0,0,2,3,2,0)	7.2066***	3.9	Cointegration

Note: Note: For the ARDL bounds testing, the asymptotic critical value bounds have been with unrestricted constant and no trend; and ** and *** denote 5% and 10% levels of significance respectively.

Table 2.1: ARDL bounds test results of Cointegration for the LRGDP based model

Test Statistic	**Significance level**	**Lower bound I(0)**	**Upper bound I(1)**	**Conclusion**
	10%	2.03	3.13	Evidence of
(F-statistic)	5%	2.32	3.5	cointegration
7.2853	1%	3.498	4.26	

limit of I(1) values at significance levels of 1%, 5%, and 1%, respectively. Subsequently, the study's findings indicate the presence of a cointegration relationship among variables when a structural break is taken into consideration. Table 2.1 validates the long-term relationship between LRGDP and agricultural commodity exports, which is our primary ARDL model of interest. In the ARDL Bounds Cointegration equation of RGDP with predetermined regressors, the null hypothesis that there is no cointegration is rejected because the F-statistic of 7.285 is significantly higher than the upper bound values of 4.26 at the 1% significance level. Therefore, it can be demonstrated that real GDP and the other regressors exhibit cointegration in the presence of a structural break, implying a long-term cointegration relationship between the variables.

4.3 Estimated ARDL long-run results

Given the evidence of cointegration, we proceeded to estimate the long-run parameters, and the results of these estimations are presented in Table 3.0. Based on the findings, it can be shown that the control variables, namely Total labour force, Capital (LGFCF), and Exchange rate (EXR), had a positive and statistically significant influence on the economic growth of Malawi. Consistent with theory, an increase of 1% in either capital or labour can result in a long-run growth of 0.25% and 0.93% in the (GDP), respectively, ceteris paribus. Likewise, the exchange rate coefficient was positively significant at 1% alpha in predicting long-run growth. Since GDP and the exchange rate have a log-linear connection in the model, GDP grows by 0.07 for every unit increase in the (US Dollar against the Malawi kwacha) exchange rate, 'typically nominal currency adjusts triggering devaluations' over time. This empirical result is consistent with the findings of Fentahun (2011), Uremadu and Onyele (2012), and Yifru (2015). The parameters of Tobacco and Tea, save Sugar, were

statistically insignificant. However, the Sugar exports (LSug) parameter is positive and statistically significant (alpha = 0.01). This implies that in the long run, a marginal increase of 1% in Sugar exports would result in an average long-run rise of 0.19% in Malawi's Gross Domestic Product (GDP), ceteris paribus. The failure of Tobacco exports to positively impact GDP could be attributable to a global decline in Tobacco demand, which has led to a decline in Tobacco export prices, thereby impairing the economy as a whole and export earnings in particular. As a result, the proportion of crop producers who cultivate Tobacco has plummeted from 16% to 5%, as has Tobacco's contribution to the total value of commodities produced (Appau et al., 2020). The price decline is exacerbated by global anti-smoking efforts to reduce demand for Tobacco products and address supply issues (Lencucha et al., 2017) and the actions of business cartels that collude to maintain low auction prices. Given the economy's long history of trade deficits coupled with persistent spending procyclicality, which forces the government into debt crises, the sector's contribution to economic growth is likely overstated.

4.4 Results of short run estimates

Table 3.1 presents the estimated short-run impacts of Tobacco, Tea, and Sugar exports on Malawi's real GDP using the error-correction model (ECM). The parameter for the error-correction term is negative (-0.878208) and highly significant at the 1% level. This suggests that 88% of the disequilibria caused by preceding shocks will converge to a steady state in the next period. At levels, the domestic investment (LGFCF) showed no short-run impact on economic growth; however, the lagged values of LGFCF indicated an inversely significant impact on growth at the 1% significance level. This meant that a 1% rise in the lagged LGFCF value led to a subsequent decline of 0.22% in real GDP the following year, assuming else equal. Labour was not statistically significant and could not impact real GDP in the short run. Parameters of Tobacco exports and their lagged values were positively significant at 5%, 1%, and 1% levels, respectively, in the short run. This suggests that every 1% increase in Tobacco exports at levels and its lagged values improve real GDP by nearly 0.25 %, 0.22%, and 0.32%, respectively, assuming other factors remain unchanged. Tobacco is the primary source of foreign exchange for Malawi: and the short-run noticeable benefits of tobacco exports are particularly noted by a brief surge in foreign exchange when farmers sell tobacco from April to June. The subsequent period is punctuated by extended forex shortages, leading the government to resort to foreign debts to shore up its foreign exchange reserves to meet the country's import bills. The coefficient for Tea is found to be statistically insignificant in both short-run and long-run estimations. This suggests that Tea has no significant impact on Malawi's economic growth. This can be attributed to the fact that Tea is exported as an inferior product, leading to lower pricing in the international market. In contrast to the long-term results, the short-term analysis reveals a statistically significant negative relationship between the exchange rate parameter (EXC) and economic growth. Specifically, a 1% increase in the exchange rate is associated with a 0.2% decrease in Malawi's economic growth. This suggests an increase in the Kwacha currency's value leads to a short-run economic contraction. The consistent short- and long-run findings suggest that the exchange rate could be a growth catalyst. Both at levels and the lagged value of Sugar coefficients were significant at 5% and 1% significant levels, respectively. Though the study's findings suggested that the causal impact involving Sugar exports and economic growth was positive at certain levels, it was proven inverse at the first lag. All else being equal, the positive link meant that a 1% rise in Sugar exports might translate into a 0.07 percent gain in Malawi's real GDP. This implies that expanding Sugar exports can stimulate short-term economic growth in Malawi.

Table 3.0 : Estimated ARDL long run coefficients.

Dependent Variable: LRGDP				
Variables	**Coefficient**	**Standard Error**	**T-Statistic**	**Probability**
LGFCF	0.250863	0.088537	2.833437	0.0084***
LTLF	0.934555	0.364042	2.567163	0.0159***
LTob	0.043085	0.182735	0.235779	0.8251
LTea	-0.008362	0.084014	-0.099535	0.8930
LSug	0.193320	0.050133	3.856141	0.0006***
EXR	0.000663	0.000232	2.851762	0.0081***
DY2002	0.257529	0.119949	2.147000	0.0406**
Const.	-1.584345	0.189379	-8.36596	0.0000***

***significant at 1%, **significant at 5%; Adj. R squared=0.77 DW statistics =2.3578:

Table 3.1: ECM-Short-run results

Dependent Variable LRDP				
Variables	**Coefficient**	**Standard Error**	**T-Statistic**	**Probability**
D(LGFCF)	0.074113	0.059561	1.638087	0.1126
D(LGFCF(-1))	-0.215915	0.065205	-3.311316	0.006***
D(LTLF)	0.820734	0.334458	1.244321	0.2237
D(LTob)	0.190544	0.081980	2.324274	0.0276**
D(LTob(-1))	0.221616	0.088113	2.506202	0.0186***
D(LTob(-2))	0.318471	0.033701	3.614359	0.0012***
D(LTea)	0.007344	0.073532	-0.099874	0.9212
D(LSug)	0.067978	0.033701	2.017113	0.0534**
D(LSug(-1))	-0.100342	0.034647	-2.896145	0.0073***
D(EXC)	-0.002078	0.000546	-3.803181	0.0007***

D(DY2002)	-0.0061897	0.111055	-0.557354	0.5817
D(DY2002(-1))	0.483021	0.126179	3.828057	0.0007***
$ECM_{(t-1)}$	-0.878208	0.102890	-8.535412	0.0000***

***significant at 1%, **significant at 5%,

R^2=0.835274, $\bar{R}^2$=0.778797; F-statistic =14.78953 (0.0000), DW = 2.400218

4.5 Postestimation diagnostic test

Based on the results from Table 4.0, there is no evidence to reject the presence of homoscedasticity. This is supported by the Breusch-Pagan-Godfrey F-statistics (1.4624) and the probability value (0.2072>5%). The Breusch-Godfrey test's probability value was (0.11632>5%), which validates that the null hypothesis of no serial correlation could not be rejected. The model is correctly specified based on the Ramsey Test; thus, the observed causal link between the real GDP and agricultural exports does not seem arbitrary. Figures 1A and 1B depict CUSUM and CUSUMSQ schematic representations, respectively. The plots clearly demonstrate that the values consistently fall within the 5% critical bounds, suggesting that the model coefficients remained robustly stable.

Table 4.0: Diagnostic Test Results

Statistical-Test	F	Probability
Breusch-Godfrey for autocorrelation LM test	1.280256	0.1163
Heteroskedasticity Test: Breusch-Pagan-Godfrey	1.439487	0.2072
Jarque-Bera (Histogram Normality Test)	7.245089	0.026715

Source: data source (2022)

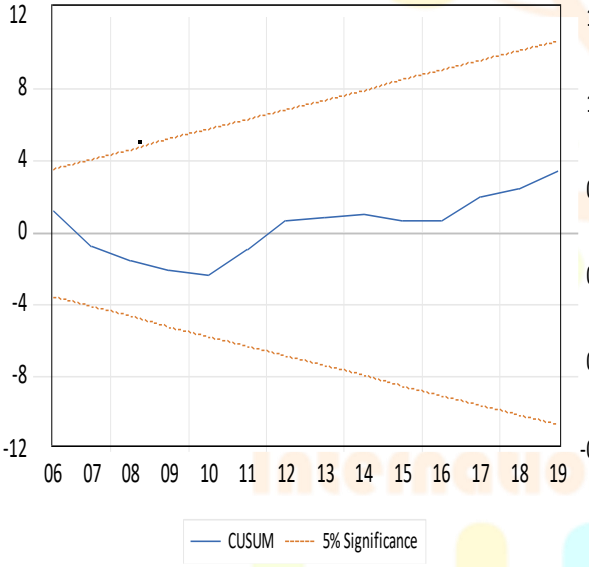

Figure 1A CUSUM Test

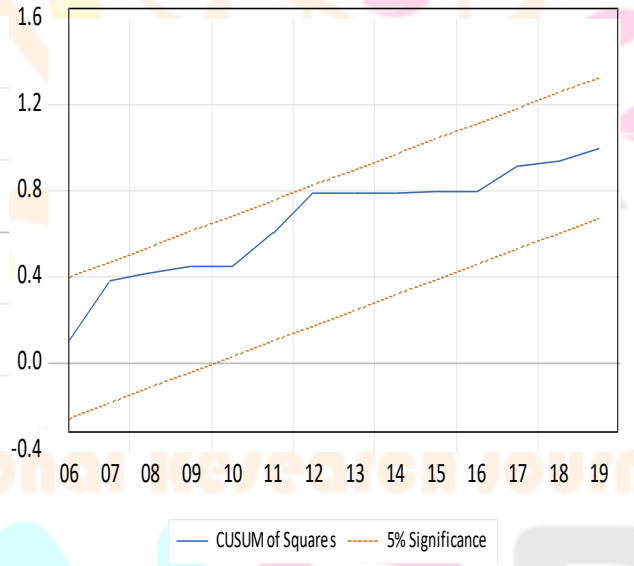

Figure 1B: CUSUMSQ Test

Figure 1.0: CUSUM and CUSUMSQ charts

4.4 Granger causality between economic growth and agricultural exports

The presence of cointegration between Real GDP and agricultural crop exports implies the potential either for bidirectional long-run causality, meaning that agricultural crop exports can granger-cause Real GDP or vice versa. Table 5.0 presents the results of the Granger non-causality test using the Toda and Yamamoto technique. The results align with the long-run impact findings. Given the probability values (0.0000<0.05 and 0.0001<0.05), both hypotheses were rejected, confirming a bidirectional causality between Sugar exports and Real GDP. This finding supports the notion of a feedback mechanism in which Sugar exports and GDP mutually influence or predict each other. Tobacco and Tea exports to the Real GDP offered no evidence of causality. However, given that the Granger non-causality was rejected at (0.0458<0.05), one-way reverse causation from the Real GDP to Tobacco exports was confirmed, implying that the real GDP granger-causes Tobacco exports. This outcome could signal ineffective management of Tobacco revenue, in which earnings are not redirected into Tobacco production and trading processes. As a result, inefficiencies may arise, undermining the positive impact of increasing GDP on exports while failing to mitigate the adverse implications of a decline in export performance.

Table 5.0: Toda Yamamoto Granger Non-Causality Test: 1969 -2019

H_0	F-statistics	P-values	Granger Causality
LTob does not Granger cause LRGDP	3.28	0.5123	No causality
LRGDP does not Granger cause LTob	9.70	0.0458**	Unidirectional
LTea does not Granger cause LRGDP	3.72	0.4451	No causality
LRGDP does not Granger cause LTea	1.96	0.7423	No causality
LSug does not Granger cause LRGDP	24.02	0.0000***	causality
LRGDP does not Granger cause LSug	23.84	0.0001***	causality

Note: Rejection of the H_0 is indicated by ***, **at 1%, and 5% significance level.

CONCLUSION AND POLICY IMPLICATIONS

The study objective was to empirically evaluate the impact of disaggregated agricultural export commodities (specifically Tobacco, Tea, and Sugar) on Malawi's economic growth, as measured by the Real GDP. The analysis was based on annual time series data spanning from 1968 to 2019. The ARDL long-run findings revealed a significant positive relationship between Sugar exports and economic growth. However, the study also found a negligible causal effect between Tobacco and Tea exports and economic growth. Consistent with expectations, control variables such as Gross Fixed Capital Formation (GFCF), Total Labour, and the Exchange Rate significantly impacted economic growth. The Error Correction Mechanism (ECM), feedback effect, returns 88%, indicating the extent to which the disequilibrium is adjusted in the subsequent forecasting period. The ECM analysis demonstrated a statistically significant positive relationship between tobacco and sugar exports and economic growth, as measured by real GDP. The study results indicated a negligible effect of Tea on the real GDP. The Toda-Yamamoto Granger-causality test revealed a bidirectional causal relationship between sugar exports and economic growth. Additionally, it indicated a unidirectional causal relationship from real GDP to tobacco exports, suggesting that changes in real GDP tend to precede changes in tobacco exports. Malawi's trade deficit and limited growth necessitate examining how the level of product transformation affects the impact of disaggregated agricultural exports on economic growth. This study suggests that it is advisable to pursue a strong strategy of diversifying exports and increasing the value of tea products. Additionally, it is recommended to reduce reliance on tobacco and instead focus on cultivating other high-value cash crops and legumes. However, it may be necessary to use ex-ante simulations to guide the policy prescription and analyze the welfare changes that would result from the divestment option. To promote economic growth, the government should prioritize expanding sugar cane production. This is necessary because the long-term sustainability of tobacco, which is Malawi's primary forex earner, is at risk. The decline in demand for tobacco in critical global markets, driven by health concerns and a transition to other commodities, have all contributed to the present situation.

REFERENCES

Adams, R (2002) Economic Growth, Inequality and Poverty: Findings from a New Data Set, Policy Research Working Paper 2972, World Bank, February 2002,

Appau Adriana, PhD and others, Explaining Why Farmers Grow Tobacco: Evidence From Malawi, Kenya, and Zambia, Nicotine & Tobacco Research, Volume 22, Issue 12, December 2020, Pages 2238–2245, https://doi.org/10.1093/ntr/ntz173

Asteriou, D. and Hall, S.G. (2007) Applied Econometrics: A Modern Approach Using Eviews and Microfit, Revised Edition. Palgrave Macmillan.. http://scholarcommons.usf.edu/cgi

Bermudez, C. and Dabus, C. 2015. "Let it float: new empirical evidence on de facto exchange rate regimes and growth in Latin America," Estudios Economicos, Universidad Nacional del Sur, Departamento de Economia, vol. 32(65), pages 3-18. https://ideas.repec.org/a/uns/esteco/v32y2015i65p3-18.html

Bokosi, F.K. (2015) Export Trade and Economic Growth in Malawi: A Disaggregated Approach. International Journal of Economics and Financial Research, 1,97-105. Available at RePEc:arp:ijefrr:2015:p:97-105

Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for Testing the Constancy of Regression Relationships over Time. Journal of the Royal Statistical Society. Series B (Methodological), 37(2), 149–192. http://www.jstor.org/stable/2984889

Chaudhary & Shirazi,, Aslam, Muhammad & Nasim, Nasim & Munir, Shumaila. (2007). Trade Policy and Economic Growth in Bangladesh: A Revisit. Pakistan Economic and Social Review. 45.

Courbois, L., Blackmore, E., Mtukule, K., Schwartz, B. (2022). Challenges and opportunities for small-scale Tea producers in Malawi.IIED, London

Dawson, P. J. (2005). The export-income relationship: the case of India. Progress in Development Studies, 5(1), 16–29. https://doi.org/10.1191/1464993405ps098oa

Engle, Robert F & Granger, Clive W J, 1987. "Co-integration and Error Correction: Representation, Estimation, and Testing," Econometrica, Econometric Society, vol. 55(2), pages 251-276, March. RePEc: ecm: emetrp: v:55:y:1987:i:2:p:251-76

Esfasani, H. S. (1991), 'Export, Imports and Economic Growth in Semi- industrialized Countries', Journal of Development Economics, 35, pp 93-1 16. Fujita, N. available at http://www.sciencedirect.com/science/article/pii/0304387891900687

Ewing, Bradley T. & Thompson, Mark A., 2007. "Dynamic cyclical comovements of oil prices with industrial production, consumer prices, unemployment, and stock prices," Energy Policy, Elsevier, vol. 35(11), pages 5535-5540, November.

Feder, Gershon. 1985. "On Exports and Economic Growth" Journal of Development Economics, 12 (February) : 59-73.Available at http://www.sciencedirect.com/science/article/pii/0304387883900317

Fentahun, B. (2011) The Impact of Real Effective Exchange Rate on the Economic Growth of Ethiopia. Master's Dissertation, Addisa Ababa University, Addisa Ababa.Gujarati, D. N. (2004), "Basic Econometrics", 4th Edition, The McGraw-Hill Companies.

Helpman, E., and Krugman, P. R., 1985. Market structure and foreign trade: Increasing returns, imperfect competition and the international economy: MIT Press, Cambridge, MA, 1985). Journal of International Economics, Elsevier, vol. 21(1-2), pages 183-187, August. https://ideas.repec.org/a/eee/inecon/v21y1986i1-2p183-187.html
Granger, C.W.J. (1969) Investigating Causal Relationships by Econometric Models and Cross Spectral Methods. Econometrical, 37, 424-438. https://doi.org/10.2307/1912791
Grossman, G. M., Helpman, E. 1991. Trade, knowledge spill overs, and growth European Economic Review. Volume 35, Issues 2–3, April 1991, Pages 517-526. https://doi.org/10.1016/0014-2921(91)90153-A
Keho, Y. (2017). The Impact of Trade Openness on Economic Growth: The Case of Cote d'Ivoire. Cogent Economics & Finance, 5, 1-14.https://doi.org/10.1080/23322039.2017.1332820
Lencucha Raphael and others, Global Tobacco control and economic norms: an analysis of normative commitments in Kenya, Malawi and Zambia, *Health Policy and Planning*, Volume 33, Issue 3, April 2018, Pages 420–428, https://doi.org/10.1093/heapol/czy005
Ijirshar, Victor. (2015). The empirical analysis of agricultural exports and economic growth in Nigeria. Journal of Development and Agricultural Economics. 7. 113-122. 10.5897/JDAE2014.0615.
Medina-Smith, E. J., 2001. Is the Export-Led Growth Hypothesis Valid for Developing Countries? A Case Study of Costa Rica. Policy Issues in International Trade and Commodities Study Series No. 7. University of Sussex, United Kingdom and Universidad de Carabobo, Venezuela. https://unctad.org/en/docs/itcdtab8_en.pdf
Noula, G.A., Gustave, L.S. and Munchunga, D.G. (2013) Impact of Agricultural Export on Economic Growth in Cameroon: Case of Banana, Coffee and Cocoa. International Journal of Business and Management Review, 1, 44-71. Accessible at https://www.eajournals.org/journals/international-journal-of-business-and-management-review-ijbmr/impact-of-agricultural-export-on-economic-growth-in-cameroon-case-of-banana-coffee-and-cocoa/
Persaud Suresh Chand, Meade Birgit Gisela Saager. 2009. Trade and Development When Exports Lack Diversification A Case Study from Malawi. Economic Research Service Number 77. USAID
Pesaran, M.H., Shin, Y., and Smith, R.J. (2001), "Bound Testing Approaches to the Analysis of Level Relationship," Journal of Applied Economics, (16):289-326.
Rahman, Z. and Hossain, M.E. (2014) Role of Agriculture in Economic Growth of Bangladesh:
Ravallion, M and S Chen (1997) 'What Can New Survey Data Tell Us about Recent Changes in Distribution and Poverty?' World Bank Economic Review, 11(2): 357-82Asteriou, D. and Hall, S.G. (2007) Applied Econometrics: A Modern Approach Using Eviews and Microfit, Revised Edition. Palgrave Macmillan. http://scholarcommons.usf.edu/cgi
Sanjuán-López, A.I. and Dawson, P.J. (2010), Agricultural Exports and Economic Growth in Developing Countries: A Panel Cointegration Approach. Journal of Agricultural Economics, 61: 565-583. doi:10.1111/j.1477-9552.2010.00257.x
Shahbaz, M., Loganathan, N., Muzaffar, A.T., Ahmed, K., Jabran, M.A., 2016. How urbanization affects CO2 emissions in Malaysia? The application of STIRPAT model.Renew. Sustain. Energy Rev. 57, 83–93.
Sinoha-Lopete, Ramona, (2006). "Export-led growth in Southern Africa". LSU Master's Theses. 1531.https://digitalcommons.lsu.edu/gradschool_theses/1531
Solow R. M., -(1956). A Contribution to the Theory of Economic Growth. Author(s): Quarterly Journal of Economics, Vol. 70, No. 1 (Feb., 1956), pp. 65-94. Available at https://doi.org/10.2307/1884513
Toda, H.Y. and Yamamoto, T. (1995) Statistical Inference in Vector Autoregressions with Possibly Integrated Processes. Journal of Econometrics, 66, 225-250. http://dx.doi.org/10.1016/0304-4076(94)01616-8
Todaro, M., & Smith, S. (2003). Economic development (8th ed.). Boston: Addison Wesley
Uremadu S.O.& Onyele K.O. 2012. The impact of selected agricultural exports on the growth of the domestic economy. Academia Journal of Agricultural Research 4 (5), 281-291
Yifru, T. (2015) Impact of Agricultural Exports on Economic Growth in Ethiopia: The Case of Coffee, Oilseed and Pulses (No. 243473). Collaborative Master's Program in Agricultural and Applied Economics.
Wickremasinghe, G. B. (2005). Efficiency of foreign exchange markets: A developing country perspective. SSRN Electronic Journal, 10(1), 1–17. https://doi.org/10.2139/ ssrn.609285