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The impact of tax incentives on value-added agricultural exports - empirical evidence from Zimbabwe

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Abstract: *This paper empirically examines the impact of export tax incentives on value-added agricultural export performance in Zimbabwe using historical annual time-series data from 1980-2021. The study uses unit root tests, cointegration analysis, and the Error Correction Model in the analysis. Using an augmented Cobb-Dougllass production function, the study aims at determining whether export tax incentives, real effective exchange rate and value-added agricultural exports are cointegrated. Export tax incentives and real effective exchange rate were found to have a positive and statistically significant effect in the long run on the country's growth of value-added agricultural exports. From the results, policymakers are encouraged to deepen and broaden export tax incentives specifically targeted at value-addition of agricultural products as part of the country's efforts in reforming its trade system to improve the welfare of producers, workers and generate foreign currency for the country.*

Keywords: *value-added agricultural exports; tax incentives; cointegration; unit root tests; Zimbabwe.*

Uticaj poreskih podsticaja na poljoprivredni izvoz sa dodatom vrednošću – empirijski dokazi iz Zimbabvea

Apstrakt: *Ovaj rad empirijski ispituje uticaj poreskih podsticaja na izvoz poljoprivrednih proizvoda u Zimbabveu koristeći istorijske godišnje podatke*

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vremenske serije od 1980-2021. Studija koristi testove jediničnog korena, kointegracionu analizu i model ispravljanja grešaka u analizi. Koristeći proširenu Cobb-Douglass proizvodnu funkciju, studija ima za cilj da utvrdi da li su poreski podsticaji za izvoz, stvarni efektivni kurs i poljoprivredni izvoz sa dodatom vrednošću kointegrirani. Utvrđeno je da poreski podsticaji na izvoz i realni efektivni kurs imaju pozitivan i statistički značajan uticaj na duži rok na rast izvoza poljoprivrednih proizvoda sa dodatom vrednošću. Na osnovu rezultata, kreatori politike se podstiču da prodube i prošire poreske olakšice za izvoz posebno usmerene na dodatnu vrednost poljoprivrednih proizvoda kao deo napora zemlje u reformi svog trgovinskog sistema kako bi se poboljšalo blagostanje proizvođača, radnika i generisala strana valuta za zemlju

Ključne reči: poljoprivredni izvoz sa dodatom vrednošću, poreske olakšice, kointegracija, Unit Root Tests, Zimbabve.

1. Introduction

In Zimbabwe, agriculture is the backbone of economic growth and development. Currently, Zimbabwe's total merchandise exports is over US\$ 6 billion accounting for 0.021 of total world trade with gold, nickel matte, diamond and unprocessed tobacco making more than 80% of total exports (UN Comtrade, 2022). Value-added agricultural exports account for less than 4%. This has not always been the case, as the data from WITS database indicate that value-added agricultural exports contributed about 32% of total exports during the early 1990s (WITS, 2022). And this share has declined over time, highlighting the need for policy interventions to promote value addition and diversification in the export sector.

For centuries, exports have been a crucial driver of economic growth and development for nations worldwide (Bajaj, Datta & Chakraborty, 2022). According to Sheppard (2003), exporting states benefit from the creation of local employment opportunities characterized by higher productivity of the employed labor force and the diversification of the local economy. Newly industrializing countries such as South Korea, Taiwan, Singapore, and Malaysia adopted export-led industrialization strategies during the 1970s and 1980s, which involved some form of tax incentives (Dicle & Dicle, 1992).

Zimbabwe's export policy has evolved over time, with various initiatives aimed at promoting export growth, diversification and competitiveness. For instance, the Export Revolving Fund (ERF) during the early years of independence guaranteed foreign exchange required to purchase inputs for exports, with manufacturers of export of finished goods receiving automatic access to foreign exchange of up to 60% of the value of exports (Riddell, 1990). They also

received a tax-free cash payment equivalent to 9% of the value of these exports, provided that the goods to be exported had a minimum local content equivalent to 25% of the exports value. Additionally, manufacturing exports received a bonus supplementary allocation of foreign currency of up to 25% of their previous years' incremental export performance (Riddell, 1990). And more recently, the Incremental Export Incentive Scheme of 2021 has been introduced to promote export growth and competitiveness in line with VISION 2030 and the National Development Strategy 1 (NDS-1 2021-2025; GoZ, 2021). The scheme includes various incentives such as tax holidays, duty-free importation scheme, inward processing rebate scheme, and export market development expenditure relief fund. These incentives aim to support newly established businesses, promote duty-free importation of raw materials, provide tax relief for manufacturing companies with high export shares, and support export market development expenditure. Value-added exports can play a vital role as a transmission mechanism for economic growth in both developed and developing nations alike (Ledyeva, 2017; Chand, Singh & Lal, 2022). In the case of Zimbabwe, it can be argued that the low contribution of value-added exports to the overall export earnings of the country has indirectly contributed to sluggish economic growth, hence the necessity to find remedies to improve exports of value-added agricultural exports.

Considering the importance of exports in the overall macro-economy of Zimbabwe, the intriguing question is whether the current and past incentives schemes have really helped to improve value-addition of agricultural products in Zimbabwe. This paper, therefore, aims at examining the impact of these tax incentive schemes on the growth of value-added agricultural exports growth from a Zimbabwe perspective. A time-series econometric model based on the Cobb-Douglass production function is used in analyzing the impact of tax incentives on the growth of value-added agricultural exports covering the period from 1980-2021 by regressing value-added agricultural exports against real effective exchange rate; export tax incentives; and the real GDP growth rate. To our understanding, there has not been an empirical study so far that seeks to analyze the impact of various tax incentives on the growth of value-added agricultural exports in Zimbabwe. Hence, this study seeks to fill in this gap in the literature. The findings of the study will provide important policy guidance on the effectiveness of various export tax incentives schemes in meeting national economic aspirations for Zimbabwe.

The rest of the paper is structured as follows: section two (2) reviews the theory literature upon which the study is based on as well as the empirical literature. Section three (3) the data, methodology as well as a brief definition and discussion of the variables used in the study. Section four (4) presents the

empirical analyses of the study and discussion of results. And finally, section five (5) presents the conclusion and policy recommendations.

2. Literature review

2.1. Theoretical framework

The theoretical background of this study is built from the Traditional Neo-Classical Growth theory; the theory of comparative advantage; the Heckscher-Ohlin theory; and the Cobb-Dougllass production function. These theories have been chosen as they are the ones which fully support the case for the provision of export tax incentives to producers of agricultural products who are involved in value-addition for exporting value-added agricultural products. On the other hand, the augmented Cobb-Dougllass production function is the one which best econometrically presents research findings of the study and has been extensively used in the literature (Fanta & Teshale, 2014; Khobai et al, 2023).

2.1.2 The Traditional Neo-Classical Growth Theory

The seminal work of Adam Smith, "The Wealth of Nations", provided three major sources of economic growth for a country in a dynamic economic model composed of growth in labor force and capital, improvements in productive efficiency, and promotion of foreign trade (Harris, 1978). Later, David Ricardo added on Adam Smith's production function, which initially contained factors such as land, capital and labor force by adding technology as the critical factors of productivity growth in the economy. It can be noted that, Smith, Ricardo and Thomas Malthus (1798) are considered as the pioneers of the classical economic growth theory.

These works gave birth to the neoclassical growth theory in economics and is primarily attributed to the works of Robert Solow, Trevor Swan and Roy Harrod. The theory argues that economic growth is chiefly caused by two factors, these being capital accumulation and technological progress. Capital being the accumulation of items such as machinery, and equipment and technological progress is based in the improvements and efficiencies of the production processes using capital goods. Hence, the quality of and quantity of the country's labor force, technological progress and the growth of the total capital stock drive economic growth according to the traditional neoclassical growth theory. The theory also asserts that foreign trade represented by exports and imports also contribute to economic growth in an economy. Hence, according

to the traditional neoclassical growth theory, those countries which are involved in international trade are more likely to experience increased economic growth in comparison with those that do not (Ghattack, 1978). The work of Mankiw et al (1992), support the neoclassical growth theory.

2.1.3 Theory of Comparative Advantage

David Ricardo developed the first comprehensive theory of comparative advantage in his classical book entitled, "On the Principles of Political Economy, and Taxation" (1817). According to Shahriar et al. (2019), comparative advantage is the main motivator leading countries to engage in international trade based on Ricardo's theory of comparative advantage. Countries benefit greatly if they concentrate on producing goods and services in which they have a comparative advantage relative to their trading partners. Zimbabwe has a comparative advantage in the production of agricultural products relative to its trading partners, hence giving tax incentives for value-addition to agricultural products can go a long way in improving Zimbabwe's competitiveness in foreign markets and indirectly contributes to economic growth.

2.1.4 The Hecksher-Ohlin Theory

The Hecksher-Ohlin theory was developed by Eli Hecksher (1919) and Bertil Ohlin (1935). The Hecksher-Ohlin theory, posits that countries export goods that use their abundant factor more intensively. The Hecksher-Ohlin Theorem links relative factor endowments to patterns of international trade. We should be able to observe that countries with an abundance in labor export using labor more intensively, that is, they are using their abundant resource more intensively (Shahriar et al., 2019). However, empirical evidence on the predictions of the Hecksher-Ohlin theory is mixed and leads to some cases taking on the Leontief Paradox (1953). One possible reason for this mixed evidence is that there are some strong assumptions that are necessary for the model that may not hold in reality (Koch & Fessler, 2020). In support of the Hecksher-Ohlin model Wood and Mayer (2010), argues that China's opening to trade effectively lowered the world average land/labour ratio and increased the share of workers with a basic education in the labour force. The relative endowments of other countries were thus shifted in the opposite directions, which pushed their comparative advantage away from labour-intensive manufacturing. Zimbabwe is abundantly resourced in terms of productive arable land in support of the Hecksher-Ohlin theory and can better positioned

in international export markets if it abundantly uses this factor endowment more extensively.

2.1.5 The Cobb-Douglass Production Function

In addition to the above theories, this study's other theoretical background is built from the Cobb-Douglass production function in carrying out the econometric empirical analysis of the variables under study. The Cobb-Douglass production function which was developed and tested empirically by Charles Cobb and Paul Douglass between 1927 and 1947 is a particular form of the production function. In its simplest form the function is given by:

$$Y(L, K) = AL^\beta K^\alpha$$

Where:

Y = total production of all goods produced in a year

L = labour input in terms of person-hours worked in a year

K = capital input as a measure of the machinery, equipment, and buildings that is the value of capital

A = total factor productivity

$0 < \alpha < 1$ and $0 < \beta < 1$ are the output elasticities of capital and labour respectively. Capital and labour being the two factors of production in the original Cobb-Douglass production function.

2.2 Empirical literature review

Given that the relationship between export incentives, export performance, and economic growth has been studied extensively in the literature, it is important to review the empirical literature. Empirical studies have been conducted in various countries to investigate the role of export incentives on export growth and economic growth. However, these studies did not focus on export tax incentives and their impact on value-added agricultural exports but offer a broad view of incentives for the export sector. This proposed study seeks to cover the gaps in literature identified in the following literature review identified below. And make original contribution by focusing on the value-added agricultural export sector which has not been studied with respect to the Zimbabwe export tax incentives.

A study by Mugumisi (2014) attempted to examine the impact of Chinese imports on the deindustrialization of Zimbabwe's textiles and clothing sectors.

Their findings indicate that capacity utilization and the numbers of companies has gone down from a high of 600 firms with a capacity utilization of around 85% in 1989 to a low of less than 150 firms and capacity utilization of below 30% in 2007. Thus, the share of textiles subsectors in manufacturing output declines from 11.3% in 1990 to 5% by 2000 for example. By the end of 1999 a total of over 100 clothing firms and 6 textile firms had permanently shut down with Cone Textiles retrenching over 5000 employees and Fashion Enterprises over 1000 employees. These findings indicate that the collapse of local textile manufacturing firms can be strongly attributed to the collapse of local industry from the 1990s due to adoption of the Economic Structural Adjustment Programme (ESAP) which reversed import substitution industrialization strategy of the earlier years. Export tax incentives in the form of tax holidays and other incentives can go a long way to help revive this historically important sector and contribute to employment generation and foreign currency earnings.

In analyzing the effect of export trade incentives on export growth of Ethiopia, Fanta and Teshale, (2014) used an Export-Led Growth theory and quarterly time series data from the Ethiopian Revenue and Customs Authority (ERCA), National Bank of Ethiopia (NBE), and the Development Bank of Ethiopia (DBE). Using a combination of methods including trend analysis, correlation and time series econometric analysis, the authors used an econometric model with export growth as the dependent variable and fiscal incentives, real GDP growth, and real effective exchange rate as the independent variables. To test the estimated model, the authors used various tests which included correlational tests of the variables. Diagnostic tests results were also carried out to test for stationarity of the variables using the Augmented Dickey-Fuller (ADF) test and the Johansen System Cointegration tests of the variables. The results showed that both financial and fiscal incentives have a statistically significant long-run impact on the growth of exports. The study supported the Export-Led Growth (ELG) theory and supported the introduction of the export incentive scheme in Ethiopia. This study is noteworthy in explaining the effects of export incentive schemes on export growth and hence economic growth within the African context.

Similarly, Mutuku, Sirengo and Omar (2021) investigated the effects of tax incentives and firm traits on Kenyan exports using a two-stage approach to modeling. In the first stage, the firm's decision to export was done in a panel logistic model. In the second stage, the drivers of export volumes at the macro-level were estimated using Vector Autoregressive (VAR) model. The researchers used both Philips Perron and Augmented Dickey Fuller (ADF) tests for stationarity of the variables. And for cointegration tests they used a VAR-based Johansen test to establish the cointegrating vectors. They found that

both the Eigen and Trace statistic rejects the none co-integrating hypotheses at a 5 percent significant level for 1 co-integrating relationship. This revealed that there was enough statistical evidence for the existence of a unique co-integrating vector for the set of variables in the VAR model. The authors concluded as per the findings of the research that firm-specific characteristics (age, size, access to credit, labor intensity, and labor quality) affect exports, government policy in the form of tax incentives may not create a substantial difference in the decision and volume of exports at the firm level. The results of a VAR model using time-series data from 1960 to 2020 confirm the firm-level analysis as well. However, the study offered broader insights, and therefore offer specific analysis of the role of incentives in improving the competitiveness of Kenyan exports in global markets.

Hazvina (2021), analysed the impact of Chinese competition on Zimbabwe's manufacturing exports in third markets. Using the Index of Competitive Threats (ITC) and the Constant Market Share (CMS) analysis, the study's findings reveal that Zimbabwe lost market share to China in export markets that includes South Africa, the UAE, Zambia and Mozambique since 2001. The exports were mainly from sectors such as mining. The study covered a time period of between 2001 and 2016. The results indicate that competitive threats from China in most of Zimbabwe's exports market, especially in the Southern Africa region may also have implications on the region's integration efforts within the SADC, and COMESA region. Whilst the study goes a long way in examining the reasons behind the decline of Zimbabwe's overall export performances, it falls short of interogetting the value-added agricultural export sector.

Beno-Sani and Salihu (2020), analyzed the relationship between exports incentive schemes and manufactured exports in Nigeria using quarterly time series data from 1990 to 2014. They analyzed the data using an Augmented Dickey Fuller (ADF) test for stationarity to test for unit roots in order to avoid spurious results. The authors found the absence of long-run equilibrium relationship between export incentives schemes and manufactured exports in Nigeria. Therefore, export incentives cannot be considered as a policy instrument to increase the value and volume of manufactured exports in Nigeria.

Arslan and van Winjbergen (1993) examined the role of export incentives, exchange rate policy and export growth in Turkey using data covering time period, 1969 to 1987. Using an export supply function model, the authors estimated the model using an Ordinary Least Squares (OLS) regression. The authors found that export incentives and the set of policies allowing real depreciation of exchange rate contributed to a sustained real export growth rate of 20 percent over the 1980 to 1987 period.

Taking the example of India, Shekhar (2018) studied the impact of financial export incentives and their materiality to India's export promotion. His study covered data from 1997 to 2012. The study concluded that incentive schemes have been found to play a very significant role in export promotion in India, leading a significant positive increase export growth.

Sentshol (2002) tested the causal relationship between exports and economic growth in the mining sector in Botswana for the period 1976 to 1997. The objective of the study was to see whether revenues derived from the primary exports sector could lead to positive and significant economic growth in Botswana. The author based the study on evidence from statistical data and an econometric analysis of Botswana's economic growth. To investigate the contribution of exports to Botswana's economic growth, the authors used two aggregate production function models (APFM). The author estimated the APFMs through OLS procedures. In the APFM, the author found evidence supporting the statistical analysis.

Finally, using a Neo-Classical Cobb-Douglass growth model Medina-Smith (2001) attempted to find the export-growth nexus for Costa Rica for the period 1950 to 1997. The Neo-Classical growth model had real GDP, gross capital formation, real exports, real domestic income and labor force as some of its variables. After running an OLS regression, he found strong support for the Export Led Growth (ELG) hypothesis during the short and long run periods.

As reviewed by the empirical literature above, these studies provide insights into the complex relationship between export incentives, export performance, and economic growth with the likes of Fanta and Teshale (2014), Medina-Smith (2001) indicating the positive impact of incentives on manufactured exports. Nonetheless, studies done by Mutuku, Sirengo and Salihu (2020), Beno-Sani & Salihu (2020), Hazvina (2021) offer different results. This shows that the impact of tax incentives on manufactured exports differ from region to region, country to country and also context to context. However, it is important to consider the limitations of these studies and the need for further research to fully understand the impact of export incentives on economic growth.

3. Data and methodology

3.1. The data

Data collection and management are also crucial aspects of any research project. In this study, the data was collected in Microsoft Excel format before being imported into Stata Software Version 17.0 for analysis and interpretation. This study used secondary annual time series data collected for the period 1980 to 2021. The secondary annual time series data was collected on Real Effective Exchange Rates (REER); Value-Added Agricultural Exports (VAEX); Real GDP growth rate (RGDP); Export Tax Incentives (EXTI) from the RBZ, ZIMSTA, ZIMRA, UN Comtrade, IMF and World Bank databases and records.

3.2. Definition and discussion of the variables

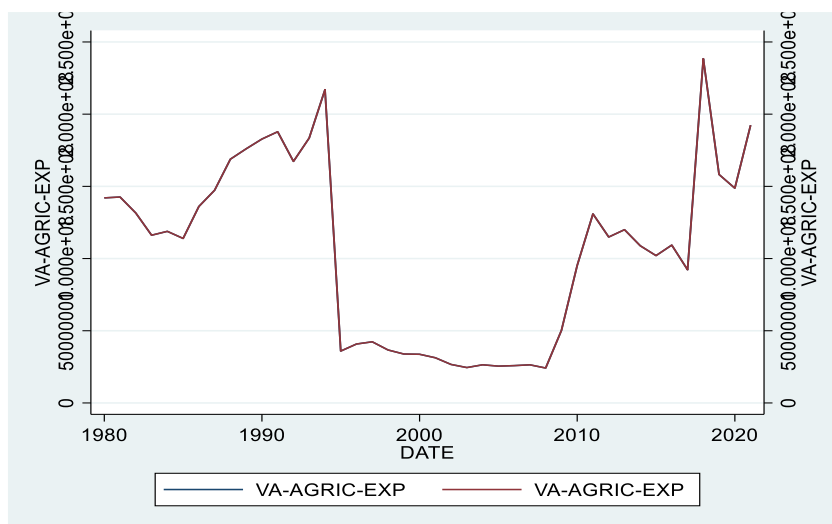
The dependent variable of the study is Value-Added Agricultural Exports (VAEX) and the independent variables being Real Effective Exchange Rate (REER); Export Tax Incentive (EXTI); Real GDP Growth Rate (RGDP).

3.2.1 Value-Added Agricultural Exports (VAEX)

Value-Added Agricultural exports in this study are agricultural products that have undergone additional processing or transformation, increasing their value before being exported. The global items in terms of this variable are Cigarettes from tobacco; fabrics and garments from cotton; fruit juices, wines and beverages as processed from vegetables and fruits; leather products such as shoes, handbags and garments from animal leather. They were measured in gross US dollar values in computed annual values from UN Comtrade databases and RBZ figures. The summary findings and trend analysis are as shown in figure below.

From figure 1, value-added agricultural exports performed well during the first decade of independence as a result of export tax incentives such as The Export Revolving Fund which gave export incentives through a duty drawback scheme facility to exporters of Zimbabwe manufactured goods destined for the export sector (Riddell, 1990). After the introduction of the economic reform programs of the mid 1990s called Economic Structural Adjustment Programme (ESAP) which sought to liberalize the Zimbabwe's economy by removing most of export support systems, the value of value-added exports in general fell sharply (Saungweme, 2013). However, after the reintroduction of export tax incentive, value-added agricultural exports improved, though at a lower relative value in comparison with the early years of independence (NDS 1, 2021).

Figure 1. Trend of value-added agricultural exports in Zimbabwe from 1980-2021

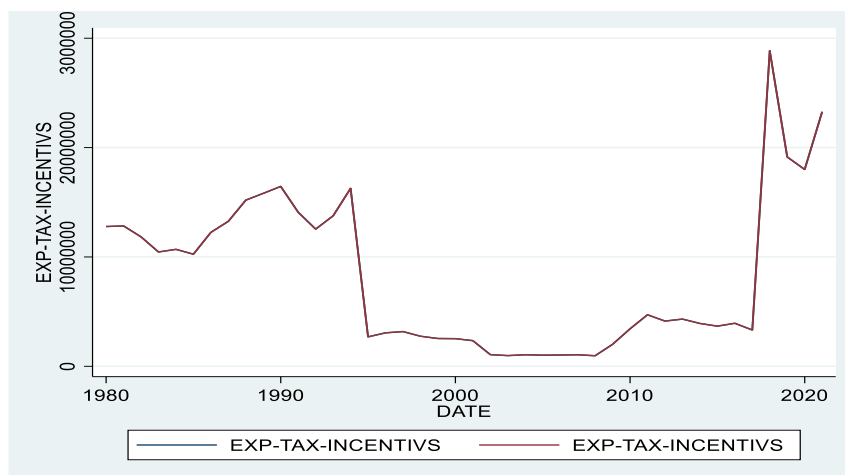


Source: Author's secondary data using STATA Statistical Software 17.0

3.2.2. Export tax incentives (EXTI)

Export Tax Incentives are financial benefits or tax breaks offered by a government to local businesses encouraging them to export to foreign markets. And these are in the form of tax exemptions, tax credits, duty drawback schemes and or market development assistance. These export tax incentives make exporting an attractive proposition to domestic businesses and contribute to the economic growth for a country. In this study, the export tax incentives were estimated using the data generated from the Reserve Bank of Zimbabwe (RBZ) and The Zimbabwe Statistical Authority (ZimStat) in terms of the duty draw back schemes, the Inward Processing Rebate Schemes and the Duty-Free Importation Schemes over the years. The amounts are in gross US dollars annualized for that particular year. Below is a summary of those figures in terms of their trends in Figure 2.

Figure 2. Trend of export tax incentives from 1980-2021

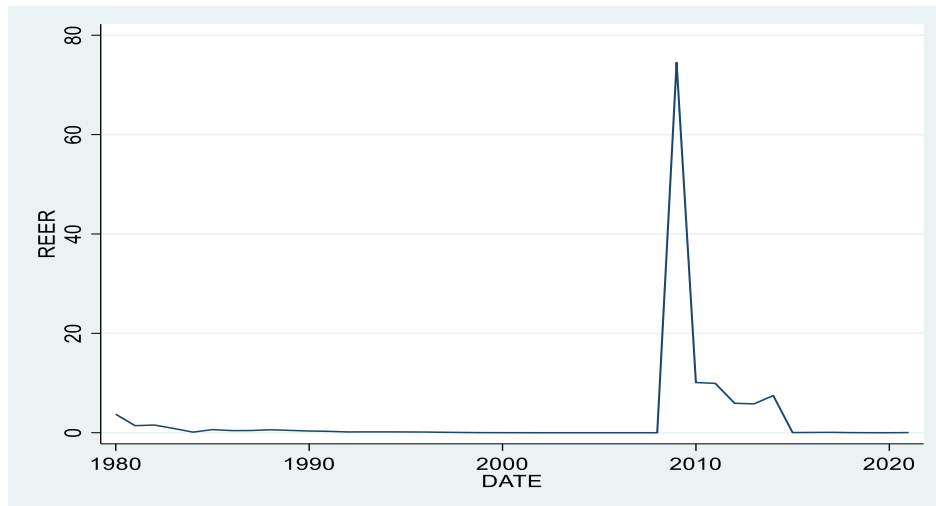


Source: Author's secondary data analysis using STATA 17.0 Statistical Software

3.2.3. Real effective exchange rate (REER)

Real Effective Exchange Rate (REER) is a measure of the value of a country's currency relative to a weighted average of its major trading partners and is calculated by taking the nominal effective exchange rate and adjusting it for inflation. It can be used to assess a country's competitiveness in international trade (IMF, 2024). An increase in the REER implies a loss in the trade competitiveness. The real effective exchange rate (REER) used in the study is based on the South African/Zimbabwean Real Exchange Rate, the justification being that South African has been our most important trading partner for a period in excess of 65 years (Brixiova & Ncube, 2014; Saungweme, 2013; UN Comtrade, 1994). Figure 3 below is summary trend analysis of the Real Effective Exchange Rate of the Zimbabwean dollar based on the South African Rand to the Zimbabwean dollar.

Figure 3. Zimbabwe's real effective exchange rate

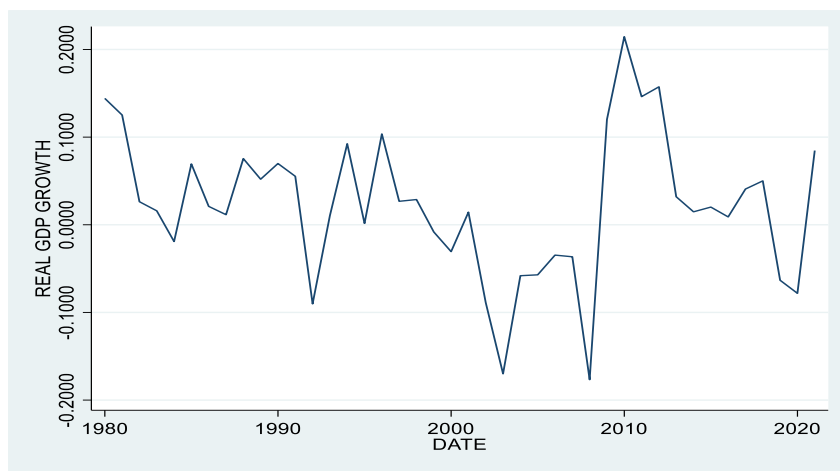


Source: Author's secondary data analysis using STATA 17.0 Statistical Software

3.2.4. The real GDP growth rate (RGDP)

The real GDP growth rate is a measure of the change in the inflation-adjusted value of all goods and services produced in an economy over a specific time period, usually a year. It is calculated by the nominal GDP growth rate adjusted for inflation. In this study the real GDP growth rate which is measured as a percentile is taken directly from IMF databases. Figure 4 below is a trend analysis of the real GDP growth rate from 1980 to 2021.

Figure 4. Trend of Real GDP growth rate in Zimbabwe from 1980-2021



Source: Author's secondary data analysis using STATA 17.0 Statistical Software

3.2.5 Methodology

The study employed a combination of trend analysis and time-series econometric analysis. Philosophically, a positivist philosophical worldview guided this study which assumes that there is an objective reality that can be studied through empirical observation and measurement (Slevitch, 2011). We were guided by the causal-comparative approach as we sought to establish a cause-effect relationship between variables using quantitative secondary data from published sources (Creswell, 2013). The study employed quota sampling as these were most suitable in meeting our research objectives.

3.2.6. The Model

Following Fanta and Teshale (2014) who examined the contribution of manufacturing export incentives on Ethiopian manufacturing export performance, we formulated a model of the effect of tax incentives on value-

added agricultural exports with other endogenous variables (Fanta & Teshale, 2014) in an augmented Cobb-Douglass production function. The paper employs secondary data covering the period from 1980 to 2021.

The variables used in this study were then transformed into natural logarithms in order to rule out the differences in the units of measurements of the study variables. The final regression will take the form:

$$\text{LOG}(\text{VAEX}) = \beta_0 + \beta_1 \text{Log}(\text{REER}) + \beta_2 \text{Log}(\text{RGDP}) + \beta_3 \text{Log}(\text{EXTI}) + \mu$$

Where:

VAEX = Value-added agricultural exports

REER = Real effective exchange rate

RGDP = Real GDP growth rate

EXTI = Export tax incentive

β = Regression coefficient

μ = The error term

We now use this OLS regression to estimate the contribution of export tax incentives to value-added agricultural export growth in Zimbabwe from 1980 to 2021.

Theoretically the regression coefficient for Export Tax Incentives, Real GDP growth rate, and Real Effective Exchange Rate are expected to have positive signs, that is, $(\beta_1, \beta_2, \beta_3 > 0)$. In practice, however, the above variables may have a positive or negative, or even zero effect on Value-Added Agricultural Exports. But in this research, the emphasis is mainly on the Export Tax incentive coefficient (β_3) which is expected to exhibit either of the above signs as follows:

$\beta_3 > 0$ implying that export tax incentives increase value-added agricultural exports

$\beta_3 < 0$ implying that export tax incentives decrease value-added agricultural exports

$\beta_3 = 0$ implying that export tax incentives have no effect on value-added agricultural exports

Therefore, considering the above model estimate, the long-run causality among the study variables is examined empirically in order to meet the research objective.

4. Empirical analysis and discussion of results

4.1. Descriptive statistics of the sample

Table 1 provides an overview of the descriptive statistics of the key variables used in the study. This gives a better understanding of the data used in the study.

Table 1. Summary of descriptive statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Value-Added Agricultural Exports (VAEX)	38	7.971	0.304	7.389	8.377
Real-Effective Exchange Rate (REER)	38	-0.89	1.509	-4.699	1.872
Real GDP Growth Rate (RGDP)	38	0.33	0.707	-1.230	1.331
Export Tax Incentives (EXTI)	38	6.794	0.410	5.991	7.460

Source: Authors' secondary data analysis using STATA Statistical Software 17.0

The present study employed descriptive analysis to summarize the data, which included mean, standard deviation, minimum and maximum values. However, it is important to note that the number of observations was 38, not 42, as data for the years 2004, 2006, 2007 and 2008 were excluded due to their outlier status (Cowell & Victoria-Feser, 1996; Barnett Lewis, 1994). These years were characterized by hyper-inflation in Zimbabwe, which had a detrimental effect on the calculation of the real effective exchange rate (REER), (Hanke & Kras, 2012; Brixiova & Ncube, 2014; RBZ, 2015).

4.2. Empirical results

To ensure the reliability of the results a series of tests were carried out. Test for unit roots in the series (stationary or non-stationary series) and test for cointegration. These tests are essential to ensure that the data meets the assumptions of the OLS regression model and the results obtained from the model are valid (Wooldridge, 2010; Greene, 2011).

Many methods can be used to test for stationarity in the time-series data, for example, the Augmented Dickey-Fuller (ADF) test, Im, Pesaran and Shin (2003), Levin, Lin and Chu (2002). The ADF test is appropriate for those series which are cross-sectionally dependent. In this study, the ADF test was used to

perform unit root tests on the variables (Said & Dickey, 1984; Dickey & Fuller, 1979). Pretesting for unit roots is often a first step in cointegration modelling (Maddala & Kim, 1998). Table 2 below gives the results of the unit root tests using the Augmented Dickey-Fuller test. Value-Added Agricultural Exports and Export Tax Incentives were found to be non-stationary, whilst the real effective exchange rate and real GDP growth rate were stationary of order one.

Table 2. ADF Unit Root Test results in levels

Variables	Probability value	Order of integration
VAEX (value-added agricultural exports)	0.4697	Non-Stationary
REER (real effective exchange rate)	0.0438	1(0)
RGDP (Real GDP growth rate)	0.0001	1(0)
EXTI (export tax incentives)	0.5329	Non-Stationary

Source: Authors' own calculations using STATA 17.0 Statistical Software

After performing the ADF unit root test for stationarity, value-added agricultural exports and export tax incentives were found to be non-stationary and differenced in Table 3 (Levin et al, 2002; Im et al, 2003).

Table 3. ADF Unit Root Tests results at first difference

Variables	Probability value	Order of integration
VAEX (value-added agricultural exports)	0.0000	1(1)
EXTI (export tax incentives)	0.0000	1(1)

Source: Authors' own calculations using STATA 17.0 Statistical Software

The study also used the Johansen Test for cointegration to determine whether there is a long-run linear relationship among the variables. The Johansen Test estimates the number of cointegrating vectors that exist among the variables and provides a statistical test for the null hypothesis of no cointegration (Johansen, 1988).

This is necessary in order to avoid the risk of running spurious regression, which can occur when two or more variables are not truly related, but their relationship appears significant due to chance or other factors (Gujarati & Porter, 2010; Salvatore, 2013). This is important for ensuring the validity and reliability of the results obtained from the regression analysis (Enders, 2014).

Table 4. Cointegration test results

Rank	Eigen Value	Trace Statistic	Critical Value
0		64.4827	68.52
1	0.59509	32.8399*	47.21
2	0.44400	12.2951*	29.68
3	0.266078	1.7195* ³	15.41
4	0.04794	-0.0000	3.76
5	-0.0000		

Source: Authors' own calculations using STATA 17.0 Statistical Software

From the Johansen Cointegration Test results in Table 4 above, the study concluded that there are cointegrating equations between the variables and indicates that the variables have a long run relationship. The existence of cointegration among the variables in the long-run recommends the use of an Error Correction Model (ECM) as shown in Table 5 below to estimate short run relations (Salvatore, 2013; Gujarati & Porter, 2010).

Table 5. The Short-Run Relations (Error Correction Model)

Variable	Coefficients	Std. Error	t-Statistic	Probability
REER	-0.0077462	0.00096702	-0.80	0.429
RGDP	0.0386112	0.023891	1.65	0.108
EXTI	0.6347955	0.0605456	10.48	0.000
Constant	-0.0199979	0.01884138	-1.09	0.285

Source: Authors' calculations using STATA Statistical Software 17.0

Using the Ordinary Least Squares (OLS) regression to estimate the model, below are the results of the study. The initial regression of the model is as follows:

$$\text{LOG(VAEX)} = \beta_0 + \beta_1\text{Log(REER)} + \beta_2\text{Log(RGDP)} + \beta_3\text{Log(EXTI)} + \mu$$

Table 6. OLS regression results of the model

Explanatory Variables (regressors)	Variable Coefficient	Standard Error.t	Prob>t	Prob>F	R-Squared	Number of observations
LogREER	-0.0077462	0.0096702	0.429	0.0000	0.8444	37
LogRGDP	0.0386112	0.0233891	0.108			
LogEXTI	0.6347955	0.0605456	0.000			
Constant	-0.019998	0.0184138	0.285			

Source: Authors' secondary data analysis using STATA Software 17.0

The study finally came up with the following OLS regression to estimate the Model,

³ *Indicates the presence of cointegrating equations at 5% level of significance.

$$\text{LogVAEX} = -0.0199979 - 0.0077462\text{LogREER} + 0.0386112\text{LogRGDP} + 0.6347955\text{LogEXTI} + \mu$$

Hence, the study outcome is that a 1% increase in export tax incentives leads to a 0.635% corresponding increase in value-added agricultural exports. Whilst a 1% increase in the Real Effective Exchange Rate (REER) leads to 0.0077462 decrease in Value-Added Agricultural exports (VAEX). This is in line with other studies carried out Brixiova and Ncube (2014), and RBZ (2015). Hence, an increase in REER will have a negative impact on the overall growth of Value-Added Agricultural Exports. This is because real effective exchange rate appreciation normally implies a loss of external competitiveness unless if they are accompanied by improvements in productivity (Rogoff, 1996; Rapetti, Skott & Razmi, 2011).

Thence, the study found that there is a positive long-run relationship between export tax incentives and value-added agricultural exports in Zimbabwe covering the study period of between 1980 and 2021. We can therefore conclude that tax incentives do indeed increase value-added agricultural exports. However, the role of a competitive exchange rate cannot be excluded. A depreciating currency plays another crucial and complimentary role in encouraging overall exports growth. And this is in line with other studies which focused on the role of the exchange rate in boosting exports growth generally such as Brixiova and Ncube (2014), RBZ (2015), and Mzumara (2011).

5. Conclusion and policy implications

The Zimbabwean government has implemented various trade-related policies aimed at promoting economic growth with varying degrees of success (Bonga, Shenje & Sithole, 2015; Ndlela, 2015; Mzumara, 2011; Goz, 1994). Similar policies have been implemented in other developing countries such as Kenya, Nigeria and Ethiopia, with mixed results (Mutuku, Sirengo & Omar, 2021; Beno-Sani & Salihu, 2020; Fanta & Teshale, 2014).

The study employed an augmented Cobb-Douglass production function using the OLS regression method which is based on the work of Feder (1982) and Ram (1985). The study found that tax incentives contributed to the growth of value-added agricultural exports during the period from 1980 to 2021. Specifically, a one percent increase in tax incentives led to an approximately 0.635 percent increase in value-added agricultural exports, which was statistically significant at the 95 percent level of confidence. These findings

suggest that tax incentives can be an effective means of promoting value addition in agricultural primary products and should be tailored to meet the specific needs of the Zimbabwean economy.

Based on the study's findings that there is a long-run cointegration between export tax incentives and value-added agricultural exports performance in Zimbabwe, it is imperative to encourage policies that target value-addition of agricultural primary products. In order to achieve this, exporting firms and individuals must be motivated to pursue value-addition as part of their overall export goals in the long-run. However, to achieve this, incentives should be expanded to include training incentives for exporters in order to capacitate them in skills upgrading through such organisations as ZIMTRADE.

Moreover, it is crucial to consider firm-level determinants of exporting firms that have a significant impact on the export value of value-added agricultural exports, as evidenced by studies conducted by Mutuku et al (2021). It is important to note that tax incentives alone are insufficient to increase the output of value-added agricultural exports. Therefore, bottlenecks in the supply side of the economy, such as the availability of electricity, water, and an efficient transport network, must also be addressed to ensure the success of exporting firms in general.

In conclusion, the country should continue to implement export-led development strategies such as the National Development Strategy 1 (NDS-1) and VISION 2030 economic blueprints, as there is strong empirical evidence in support of these policies. And in addition to that, Zimbabwe needs significant investments in technologies and training that can help in the processing of primary products in order for the country to rapidly industrialise. There is also need for targeted investment in research and development to identify and develop new value-added products, and the need for improvements in infrastructure to support increased production and export of value-added agricultural products.

References

- Bajaj, H, Datta, S., & Chakraborty, K. (2022). Export-led growth hypothesis: A review of the literature. *International Journal of Economics and Business Research*, 23(2), 121-139.
- Barnet L. (1994). *Outliers in statistical data*. John Wiley & Sons.
- Beno-Sani, A., & Salihu, M. (2020). Export incentive schemes and manufactured exports in Nigeria: An empirical analysis. *Journal of Economic and Sustainable Development*, 11(5), 27-39.

- Bonga, W.G., Shenje, T.E, & Sithole, R. (2015). Export sector contribution to economic growth in Zimbabwe: A Causality Analysis. *The International Journal of Business and Management*, 3(10).
- Brixiova, Z., & Ncube, M. (2014). The real exchange rate and growth in Zimbabwe: Does the currency regime matter? *IZA Discussion Paper Series No 8398*.
- Chand., R., Singh, R., Lal., S. (2022). Determinants of exports in a small and vulnerable economy: Fiji Islands. A disaggregated analysis. *The European Journal of development research*, 34, 2948-2969.
- Cobb, C.W. & Douglass, P.H. (1928). "A Theory of Production." *American Economic Review*. 18, 139-165.
- Cowell, R. G., & Victoria-Feser, M. P. (1996). Robustness properties of some poverty indices. *Economica*, 63(250), 543-563.
- Dickey, D.A., & Fuller, W.A. (1979). Distribution of estimators for autoregressive time series with unit root. *Journal of the American Statistical Association*, 74, 427-431.
- Dicle, I.A., & Dicle, U. (1992). Effects of government export policies on Turkish export trading companies. *International Marketing Review*, 9(3).
- Enders, W. (2014). *Applied econometric time series*. John Wiley & Sons.
- Fanta, A. B., & Teshale, B. A. (2014). The effect of export trade incentives on export growth: Evidence from Ethiopia. *Journal of Economics and International Business Research*, 2(1), 1-14.
- Feder, G. (1982). On export and economic growth. *Journal of Development Economics*. 12, 59-72
- GoZ. (1994). *Government of Zimbabwe: Zimbabwe National Export Strategy*. Harare: Government Printers.
- GoZ. (2021). *Government of Zimbabwe: Press statement by the Minister of Finance and Economic Development on the National Budget Strategy Paper for 2022*. Retrieved from <https://www.zimtreasury.gov.zw/>
- Greene, W. H. (2011). *Econometric analysis*. Pearson Education India.
- Gujarati, D. N., & Porter, D. C. (2010). *Basic econometrics*. McGraw-Hill Irwin.
- Hazvina, F. (2021). An Analysis of the Impact of Chinese Competition on Zimbabwe's Manufacturing Exports in Third Markets.
- Im, K.S., Pesaran, H.M., & Shin, Y (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 11, 57-74
- Johansen, S. (1988). "Statistical Analysis of Cointegration Vectors." *Journal of Economics Dynamics and Control*, 12, 231-254.
- Khobai, H., Mbiakop, W.D., & Fani, D.C.R. (2023). Response of Agriculture Production to Change of Foreign Direct Investment and Public Agriculture Expenditure in South Africa: A Monte Carlo Simulation Analysis. *International Journal of Economic and Financial Issues*, 13(6), 1-7.
- Koch, M., & Fessler, P. (2020). The Leontief Paradox: Evidence from a panel VAR. *Empirical Economics*, 58(6), 2695-2723.
- Ledyeva, S. (2017). Export subsidies and export performance: Evidence from firm-level data. *Journal of Comparative Economics*, 45(4), 702-722.
- Levin, A., Lin, C.F., & Chu, C.S. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics*, 108(1), 1-24
- Maddala, G.S., & Kim, I.M. (1998). *Unit roots, cointegration and structural change*. Oxford University Press, Oxford, U.K.

- Mankiw, N.G., Romer, D., & Weil, D.W. (1992). A Contribution to the Empirics of Economic Growth. *The Quarterly Journal of Economics*, 107, 407-437.
- Medina-Smith, E.J. (2001). Export-led growth in Costa Rica: An empirical analysis for 1950-1997. *CEPAL Review*, (74), 115-129.
- Mugumisi, N. (2014). Sectorial Deindustrialisation of Zimbabwe's Textiles and Clothing Sectors: Are Chinese Imports to Blame? *The International Journal 's Research of Commerce and Behavioural Science*, 3(3).
- Mutuku, C., Sirengo, M., & Omar, A. (2021). Effects of tax incentives and firm traits on Kenyan exports: A two-stage modeling approach. *Journal of International Trade Law and Policy*, 20(1), 45-65.
- Mzumara, M. (2011). Was Zimbabwe competitive in international trade 2000-2009? *International Journal of Economic Research*, 2(5), 195-216.
- National Development Strategy 1 (NDS1). (2021). Export Market Development Expenditure. Retrieved April 28, 2023, from <https://www.zimtreasury.gov.zw/national-development-strategy-1-2021-2025/>
- Ndlela, D. (2011). Zimbabwe's Hyperinflation Episode: A Cautionary Tale. *IMF Working Papers*, 11(12), 1-34.
- Ram, R. (1985). "Exports and Economic Growth: Some Additional Evidence." *Economic Development and Cultural Change*, 33(2), 1055-1065
- Rapetti, M., Skott, P., & Razmi, A. (2011). The real exchange rate and economic growth: Are developing countries different? *Economics Department Working Paper Series. 115. Working Paper 2011-07*. University of Massachusetts, Amherst.
- RBZ. (2015). Assessing the impact of the real effective exchange rate on competitiveness in Zimbabwe. Economic Research Department. *RBZ Working Paper Series No1*.
- Riddell, R. (1990). Zimbabwe's Export Revolving Fund, 1983-1989. *The Journal of Modern African Studies*, 28(3), 433-455.
- Rogoff, K. (1996). The purchasing power parity puzzle. *Journal of Economic Literature*, 34(2), 647-668
- Said & Dickey. (1984). Testing unit roots in autoregressive moving average models with unknown order. *Biometrika*, 71, 599-607.
- Salvatore, D. (2013). *Schaum's outline of theory and problems of econometrics*. McGraw-Hill.
- Sani, M.B. & salihu, A. (2020). Analysis of the relationship between exports incentives schemes and manufactured exports in Nigeria. *IJCIRAS*, 3(2).
- Sentsho, T. (2002). Exports and economic growth in the mining sector in Botswana: A cointegration analysis. *Botswana Journal of Economics*, 1(1), 67-78.
- Shahriar, S., Qian, L., & Kea, S. (2019). Determinants of exports in China's meat industry: A Gravity Model Analysis. *Emerging Markets Finance and Trade*, 55(11).
- Shekar, C. (2018). Impact of financial export incentives and their materiality to India's export promotion: A study of selected export incentives schemes. *International Journal of Business Management Research*, 8(2), 1-11.
- Sheppard, H. (2003). Rethinking tax-based incentives: Converting repeated defeats before the WTO into positive tax policy. *Texas International Law Journal*, 39(1).
- Slevitch, L. (2011). Qualitative and Quantitative Methodologies Compared: Ontological and Epistemological Perspectives. *Journal of Quality Assurance in Hospitality and Tourism*.

- United Nations Commodity Trade Statistics Database (UN COMTRADE). (2022). International Trade Statistics. Retrieved April 28, 2023, from <https://comtrade.un.org/data/>
- WITS. (2022). World Integrated Trade Solution. <https://wits.worldbank.org> accessed on 5 April 2023.
- Wood, A., & Mayer, J. (2011). Has China de-industrialized other developing countries? *Review of World Economics*, 147(2), 325-350.
- Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*. MIT press.