www.jard.edu.pl http://dx.doi.org/10.17306/J.JARD.2023.01699

Journal of Agribusiness and Rural Development

pISSN 1899-5241
eISSN 1899-5772

2(68) 2023, 205–215
Accepted for print: 16.06.2023

EFFECT OF REAL EXCHANGE RATES ON FRUIT EXPORTS IN SOUTH AFRICA: A VECTOR ERROR CORRECTION MODEL (VECM) APPROACH

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Abstract. The magnitude of a country's exports positions it for international competitiveness. This study examined the effect of real exchange rates (RER) on fruit exports in South Africa and determined the direction of causality between fruit exports and exchange rate changes. The dataset covered for the period 1971–2019. The variables were tested for stationarity and the Vector Error Correction Model (VECM) was used for data analysis. The results showed that the unit root and cointegration tests indicated that the data were integrated of order one [I(1)]. The long-run OLS regression revealed that a weakening exchange rate has a positive effect on both export values and quantities. The study discovered that government spending in the form of Gross Fixed Capital Formation (GFCF) has a small but positive effect on fruit exports, thereby boosting exports by allowing the fruits to be sold at affordable prices in foreign markets. Also, government spending in the form of GFCF had a small but positive effect on fruit exports. It was concluded that the real exchange rate influences fruit exports in South Africa, and that the government and other stakeholders should work to enhance transportation and related infrastructure through increased public investment for streamlining requisite logistics for boosting agricultural export performance.

Keywords: real exchange rate, fruit exports performance, vector error correction, South Africa

INTRODUCTION

Trade analysis is founded on the theoretical propositions developed by certain classical and neo-classical economists (Viner, 2016), in particular, Adam Smith and David Ricardo, who are widely regarded as the forefathers of classical economics and leading advocates of international trade (Hollander, 1982; Moss, 1984). Therefore, the hallmark of trade is competitiveness (Garcia Pires, 2012), which is mainly driven by some comparative advantages that position some countries at the forefront of trade negotiations and international market control (Coldwell, 2000). It should be emphasized that trade theories are broadly classified as traditional theory and new trade theories (Bernard et al., 2007). The former emphasizes the existence of a perfectly competitive market, product homogeneity and constant returns to scale and comprise of the theories that were proposed by Adam Smith and David Ricardo (Kurz and Salvadori, 2003). The new theories grew out of the limitations of the traditional theories with the emphasis on product differentiation, market imperfection and increasing returns to scale (Brülhart, 1995).

Therefore, within the framework of development and welfare economics, exports play a significant role in determining the state of a country's national accounts. Thus, the export sector's stability is critical for Gross

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Domestic Product (GDP) growth. Export development is a critical path to economic growth. This necessitates an understanding of the factors affecting export performance, the most critical of which is real exchange rate fluctuations. South Africa's economy is one of the strongest in Africa, owing to its impressive manufacturing, agriculture, mining, and services sectors. Although the agricultural sector has been in steady decline over the past few decades, it continues to be the country's largest employer and accounts for a sizable proportion of exports. According to the 2011 National Development Plan, increased exports tend to boost domestic economic growth and job creation in South Africa. South Africa's export performance has deteriorated over the last three decades, and its share of global trade has decreased (Flowkes et al., 2016). According to 2015 fruit industry statistics, agriculture contributes approximately 2.5% of the country's GDP and generates R98 billion in revenue.

GDP growth in real terms slowed to 2.2 % in the first quarter of 2018, following a 3.1 % increase in the fourth quarter of 2017 (StatsSA, 2018). The largest negative contributors to the growth of GDP were agriculture, mining, and manufacturing sectors. Agriculture outputs decreased by 24.2% and contributed –0.7 percentage points to GDP growth (StatsSA, 2018). South Africa exports to high-income European countries and low-income African countries (Peter, 2017). America, Germany, Japan, the Netherlands, the United Kingdom, Saudi Arabia, and India are among South Africa's foremost trading partners. Annually, South Africa produces approximately 4.7 million tons of fruits, with citrus accounting for 55%, pome and stone fruits accounting for 34%, table grapes accounting for 6%, and subtropical nuts accounting for 4% (South African Fruit Industry Statistic, 2015).

With 50% of all agricultural exports from South Africa being fresh fruits, the contributions of the fruit subsector cannot be underestimated, and the exchange rate can significantly influence its performance. More importantly, the South African rand has weakened against the US Dollar over the last few years. As De Jager and Kahn (2012) explained, perpetually weak Rand may have a negative effect on some macroeconomic variables. The main objective of real exchange rate policies is to preserve the value of domestic economic growth by reallocating favourable reserves and stabilizing the macroeconomy. Boonzaaier and Van Rooyen (2017) correctly observed that the country has little influence over the exchange rate determination process. However, a better understanding of the magnitude of how that volatility affects specific sectors of the economy enables policy makers to take some informed economic decisions. It raises critical questions about the extent to which the South African Reserve Bank (SARB) should be held accountable for exchange rate shocks, and also provides some critical information for local fruit production. This study is significant because it contributes to the debate on the extent to which currency fluctuations have harmed export performance and the economy as a whole. To accomplish these goals, the study's primary objective was to analyse the effect of exchange rate fluctuations on South Africa's fruit export performance from 1971 to 2019 using a Vector Error Correction Model (VECM) approach.

MATERIALS AND METHODS

Sources of data

Secondary data were gathered from a variety of sources for this study. The South African Reserve Bank (SARB) provided exchange rate data for the study, while the Organization for Economic Cooperation and Development (OECD) provided Terms of Trade (TOT) data. FAOSTAT [The Food and Agriculture Organization's (FAO) data platform] was used to obtain data on fruit export performance, while the World Bank's (WB) World Development Indicators (WDI) was used to obtain some important control variables. The research presented regression analysis results on the correlation between exchange rate fluctuations (and other variables) and fruit exports using these data. According to Hasan et al. (2015), the researcher anticipated that estimates would be more robust if monthly export data were obtained. However, because data on fruit exports are available on a yearly basis, the research was conducted based on yearly recorded figures. The forty-eight-year (48) period from 1971 to 2019 was chosen for econometric analysis because it contained the most complete data when all data sources were combined, and the 48-year period was appropriate for statistical/econometric analysis.

Estimated model

The study estimated a regression model in long-run levels using an Error-Correction Model (ECM) because the data were co-integrated at the first difference (Yoo,

2005; Gokmenoglu Sadeghieh, 2019). The export performance model is specified as:

$$EP_t = \beta_0 + \beta_1 RER_t + \beta_2 TOT_t + \beta_3 INF_t + \beta_4 INT_t + \beta_5 GFCF_t + \beta_6 GDP_t + \beta_{7.8}(D)_{A,W} + \mu \quad (1)$$

where:

EP_t – is the total value of fruit exports,
RER_t – is the real exchange rate,
TOT_t – is the terms of trade, and
INF_t – is inflation rate,
INT_t – is interest rate,
$GFCF_t$ – is Gross Fixed Capital Formation (GFCF),
GDP_t – is GDP growth,
$(D)_{A,W}$ – are the post-apartheid and post-minimum wage dummies,
$\beta_{(0,\ldots,8)}$ – is the set of regression beta coefficients and μ is a stochastic regression error term.

Error correction model (ECM)

Unit root tests can be used to determine whether or not variables in a model specification are stationary at the same level. If the Johansen co-integration test confirms this long-run relationship, it implies the existence of an underlying error correction model (ECM) that should account for both the short- and long-run confounding dynamics of the model (Dhungel, 2014). ECM is advantageous in that it is based on a less restrictive lag structure that does not preclude partial or complete rebalancing of the model following shocks. The ECM is a two-pronged approach that takes both short- and long-term effects into account. The ECM approach works by first estimating the model at a level and then iterating the process using the generated residual series. A critical condition is that the residual series be of lower order integrated; otherwise, the ECM will be difficult to specify correctly (Yoo and Jung, 2005). The final step is to estimate the equation at the first difference, taking into account the residual errors. The ECM was specified as follows by Francke et al. (2009):

Long Run:

$$EP_t^* = \beta_1 X_{1t} + \ldots + \beta_K X_{Kt} \quad (2)$$

Short Run:

$$\Delta EP_t = \alpha \Delta EP_{t-1} + \delta(EP_{t-1} - EP_{t-1}^*) + \gamma \Delta EP_t + \varepsilon_t \quad (3)$$

where:

X – in the long-run equation represents the control variables exchange rates, terms of trade, inflation, interest rates, gross fixed capital formation, GDP growth, as well as the post-apartheid and post-minimum wages dummies, and in the short-run equation
ΔEP_{t-1} – represents market imperfections and
α – is the degree of serial correlation.
$EP_{t-1} - EP_{t-1}^*$ – is the ECM term and δ represents the magnitude by which the equilibrium between export performance and movements in real exchange rates is restored after a shock.

Test for multicollinearity

Ordinary Least Squares (OLS) require the absence of multicollinearity in the explanatory variables. The Variance Inflation Factor (VIF) was used.

Limitations of the study

This study suffers from some limitations. First, the period of the study could not be extended beyond 1971 due to non-availability of data. The second important limitation is the fact that datasets were obtained from different sources. It would have been better if all data variables had been obtained from one source. The last limitation is the fact that it was difficult to provide separate analyses for each type of fruits due to aggregation from available databases.

RESULTS AND DISCUSSION

Phillip-Perron Stationarity Tests

Stationarity is essential for time series analysis. The disadvantage of non-stationary series is that they can result in spurious regressions. The results of the Phillip-Perron stationarity tests on the data are shown in Table 1. If the p-value is less than 5 %, a variable is stationary (that is, the existence of a random walk or unit root). Only interest rates and GDP growth rate are stationary at their current levels, as shown in Table 1. At the first difference, the remaining variables are stationary. This implies that an Error Correction Model (ECM) can be run with variables that are stationary at the first difference, as ECM requires all variables to be stationary at the first difference. This is referred to as long-run co-integration of order 1 – I(1). Given the study's use of multiple regression analysis, the short-run estimation procedure is formally known as the Vector Error Correction Model (VECM).

Table 1. Phillips-Perron unit root test

Variable	Levels		First difference	
	DF test statistic	*P*-value	DF Test Statistic	*P*-value
Totxval	–1.034	0.9236	–5.4379**	0.01
Totxqty	–1.4735	0.7849	–8.2473**	0.01
Indexrate	–1.0061	0.928	–5.307**	0.01
Tot	–2.1919	0.4974	–5.1552**	0.01
Inflation	–3.1224	0.125	–6.1768**	0.01
Interest rate	–3.9809**	0.01789		
Gfcf	–1.4114	0.8098	–4.0768**	0.0142
GDP growth rate	–4.619**	0.01		

Phillips-Ouliaris Cointegration Test

Both ECM and VECM are appropriate only when the variables under investigation exhibit long-run cointegration. I(1) is required for the VECM, which means that the variables must be stationary at the first difference. The Phillips-Ouliaris Test quantitatively examines the long-run relationship between and among the differenced variables. A p-value of less than 5 % for the Phillips-Ouliaris test statistic indicates the existence of long-run cointegration. The results in Table 2, confirm the existence of long-run cointegration, allowing for the continuation of VECM estimation.

Table 2. Phillips-Ouliaris cointegration test

Dependent variable	Independent variables	Phillips-Ouliaris test statistic	P-value
Dtotxval	Dfedxrate, Dtot, Dinf, Dgfcf	–41.527**	0.02563

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

In Table 3, Model 1 is the simplest specification, regressing Total Export Value (the dependent variable) on the exchange rate. Additional controls are gradually added until Model 8 is reached (the full specification). Additional controls include Terms of Trade, Inflation, Interest Rates, GFCF, and GDP Growth, as well as dummy variables for Post-Apartheid and Minimum Wages. Even when additional independent variables are included in the specification, the effect of exchange rate fluctuations on Total Export Value remains robust. By increasing the number of variables in the specification from Model 2 to Model 8, the coefficient of interest (Indirect Exchange Rate) remains robust but shrinks, reducing the amount of noise in the regression. The coefficient of determination (adjusted R^2) also increases to 0.945, indicating that the model accounts for 94.5% of the variations in the Total Export Value (Model 8). As a result, a high degree of goodness of fit has been observed.

In Model 8, the coefficient of the Indirect Exchange Rate is -0.755, which is statistically significant at the 1% level. Given that the equation's Left-Hand Side (LHS) is in the logarithm form (that is, the logarithm of Export Value), the coefficients on the Right-Hand Side (RHS) must be interpreted as elasticities. This is accomplished by first expressing the coefficient as a power of exponent, then subtracting one and multiplying by 100. As a result, a one-unit weakening of the exchange rate increases Total Export Value by 53%. This negative relationship is visible across all columns in Table 3, which is consistent with a priori expectations. This finding is consistent with the finding of Hasan et al. (2015), who discovered a positive correlation between export performance and exchange rates. Hasan et al. (2015) used the direct exchange rate, which resulted in a positive relationship rather than a negative relationship as in our study. Our findings are also consistent with that of Wanguru (2019), who examined the effect of real exchange rates on fruit exportation in Kenya and discovered a negative relationship between the foreign exchange

Table 3. Long-run estimation model for the total values of fruits' exports

Dependent variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Log (Total Export Value)	β/(S.E)	β/(S.E)	β/(S.E)	β/(S.E)	β/(S.E)	β/(S.E)	β/(S.E)	β/(S.E)
Indirect exchange rate	–1.622***	–1.305***	–1.093***	–0.989***	–0.877***	–0.872***	–0.812***	–0.755***
	[0.171]	[0.109]	[0.097]	[0.131]	[0.108]	[0.109]	[0.138]	[0.148]
Terms of trade		0.044***	0.042***	0.045***	0.017**	0.017**	0.017**	0.018**
		[0.005]	[0.004]	[0.005]	[0.007]	[0.007]	[0.007]	[0.007]
Inflation			–0.052***	–0.050***	–0.022**	–0.024**	–0.018	–0.011
			[0.010]	[0.010]	[0.010]	[0.012]	[0.014]	[0.016]
Interest rates				0.015	0.003	0.003	0.001	0.004
				[0.013]	[0.011]	[0.011]	[0.011]	[0.011]
GFCF					0.000***	0.000***	0.000***	0.000**
					[0.000]	[0.000]	[0.000]	[0.000]
GDP growth						–0.006	–0.011	–0.014
						[0.017]	[0.018]	[0.018]
Post-apartheid							0.129	0.188
							[0.178]	[0.187]
Minimum wages								0.219
								[0.206]
Constant	13.972***	10.072***	10.663***	10.302***	11.458***	11.485***	11.365***	11.310***
	[0.115]	[0.433]	[0.369]	[0.478]	[0.449]	[0.459]	[0.490]	[0.492]
N	49	49	49	49	49	49	49	49
R^2	0.656	0.877	0.922	0.924	0.952	0.952	0.953	0.954
adj R^2	0.649	0.872	0.917	0.917	0.947	0.945	0.945	0.945

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

rate and horticultural export performance. While currency depreciation may temporarily reduce exports, it is expected to increase in the long run (Mesagan et al., 2022). Hence, the positive effect of a weakening currency on export performance observed in our long-run estimates is consistent with a priori expectations, although Dincer and Kandil (2009) assert that this relationship may lose some traction over time (at least in the case of Turkey). Whereas Jordaan and Netshitenzhe (2015) assert that the effects of currency movements may be felt differently across sectors in South Africa, our findings indicate that depreciating the currency improves export performance in the fruit sector and vice versa.

Rwenyagila (2013) demonstrated that export performance is influenced by a variety of other factors, including inflation, GDP, interest, and terms of trade, in addition to exchange rate movements. The Terms of Trade (TOT) coefficient is positive, statistically significant, and robust across all model specifications. The TOT coefficient in Model 8 is 0.018, which is statistically significant at 5%. This indicates that increasing the TOT by one unit increases the Total Export Value by 1.82%. As a result, a stronger TOT position benefits Total Exports

Table 4. Long-run estimation model for total fruit export quantities

Dependent variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Log (Total Export Quantity)	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]
Indirect exchange rate	–1.079***	–0.904***	–0.721***	–0.701***	–0.611***	–0.615***	–0.501***	–0.450***
	[0.108]	[0.082]	[0.066]	[0.090]	[0.066]	[0.067]	[0.081]	[0.084]
Terms of trade		0.025***	0.022***	0.023***	0.001	0	0.001	0.002
		[0.004]	[0.003]	[0.003]	[0.004]	[0.004]	[0.004]	[0.004]
Inflation			–0.045***	–0.044***	–0.022***	–0.021***	–0.01	–0.003
			[0.007]	[0.007]	[0.006]	[0.007]	[0.008]	[0.009]
Interest rates				0.003	–0.006	–0.006	–0.009	–0.007
				[0.009]	[0.007]	[0.007]	[0.006]	[0.006]
GFCF					0.000***	0.000***	0.000***	0.000***
					[0.000]	[0.000]	[0.000]	[0.000]
GDP growth						0.005	–0.004	–0.006
						[0.010]	[0.010]	[0.010]
Post-apartheid							0.242**	0.295***
							[0.104]	[0.106]
Minimum wages								0.198
								[0.117]
Constant	14.456***	12.302***	12.809***	12.738***	13.663***	13.644***	13.419***	13.369***
	[0.073]	[0.325]	[0.250]	[0.329]	[0.276]	[0.282]	[0.286]	[0.281]
N	49	49	49	49	49	49	49	49
R^2	0.68	0.839	0.916	0.916	0.957	0.958	0.963	0.965
adj R^2	0.673	0.832	0.91	0.908	0.952	0.952	0.956	0.958

Notes: *p < 0.10, **p < 0.05, ***p < 0.01

Value as well. The result for TOT is consistent with Mendoza (1995), who argued that a "worsening TOT" results in decreased net exports and savings. Samimi et al. (2011) argued that changes in the TOT have a greater impact on trade performance than changes in the level. Nonetheless, our findings demonstrate the critical nature of TOT in South African fruit exports.

Inflation has a negative and significant effect on Models 3–6, which means that as prices rise in the domestic economy, the Total Export Value decreases – possibly reflecting production bottlenecks that drive prices up (cost-push inflation) and reduce exports out of South Africa. In Model 6, the coefficient of inflation is -0.024, indicating that a unit increase in inflation reduces the value of fruit exports by 2.37%, highlighting the critical nature of reining in inflation. The coefficient of GFCF is 0.000, making it statistically significant at 1%. As a result, it has a negligible positive effect on Total Export Value, implying that increases in government investment can also have a negligible effect on fruit export value. Unsurprisingly, GFCF (investment) has a beneficial effect on fruit export performance. Mukhtarov et al. (2019) discovered a positive relationship between investment and exports, though their focus was on FDI

Table 5. Long-run Estimation Model (Stonexval)

Dependent variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Log (Total Fruit Export Val)	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]
Indirect exchange rate	–2.432***	–2.137***	–1.819***	–1.746***	–1.631***	–1.604***	–1.401***	–1.448***
	[0.207]	[0.173]	[0.160]	[0.217]	[0.208]	[0.209]	[0.261]	[0.282]
Terms of trade		0.041***	0.037***	0.039***	0.011	0.012	0.013	0.013
		[0.008]	[0.006]	[0.008]	[0.013]	[0.013]	[0.013]	[0.013]
Inflation			–0.078***	–0.076***	–0.048**	–0.059**	–0.04	–0.046
			[0.017]	[0.017]	[0.020]	[0.022]	[0.026]	[0.030]
Interest rates				0.011	–0.001	–0.005	–0.01	–0.012
				[0.021]	[0.020]	[0.021]	[0.021]	[0.022]
GFCF					0.000**	0.000**	0.000**	0.000*
					[0.000]	[0.000]	[0.000]	[0.000]
GDP growth						–0.035	–0.049	–0.047
						[0.032]	[0.034]	[0.035]
Post-apartheid							0.432	0.384
							[0.336]	[0.355]
Minimum wages								–0.18
								[0.392]
Constant	11.071***	7.442***	8.326***	8.070***	9.256***	9.402***	9.000***	9.045***
	[0.139]	[0.688]	[0.603]	[0.792]	[0.867]	[0.876]	[0.923]	[0.938]
N	49	49	49	49	49	49	49	49
R2	0.747	0.844	0.894	0.895	0.909	0.912	0.915	0.916
adj R2	0.741	0.837	0.887	0.885	0.899	0.899	0.901	0.899

*$p <$ 0.10, **$p < 0.05$, ***$p < 0.01$.

in this case. Interest rates, GDP growth, post-apartheid, and minimum wage dummies (introduced in 2003) are all statistically insignificant.

The same models and specifications are presented in Table 4, with the dependent variable changed to Total Export Quantity. The findings are largely consistent and robust. Exchange rates have a negative relationship with export performance. The only difference between Models 7 and 8 is that the post-apartheid dummy is positive and becomes statistically significant at 5% and 1%, respectively. In Model 8, the coefficient for the Post-Apartheid dummy is 0.295, indicating that fruit exports increased following South Africa's democratic transition. The end of international isolation and the opening up of more sectors of the economy to the majority of South Africans resulted in a positive effect on Total Export Quantity.

The long-run results for Stone Fruit Export Value and Stone Fruit Export Quantity are presented in Tables 5 and 6, respectively. The results corroborate those of the major long-run regressions that take into account total export values and quantities for all fruits. When both Stone Fruit Export Values (Table 5) and Stone Fruit Export Quantity (Table 6) are used as endogenous

Table 6. Long-run Estimation Model (Stonexqty)

Dependent variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Log (Stone Fruity Export Qty)	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]
Indirect Exchange Rate	–2.036***	–1.865***	–1.574***	–1.598***	–1.501***	–1.493***	–1.258***	–1.314***
	[0.148]	[0.137]	[0.115]	[0.157]	[0.146]	[0.148]	[0.179]	[0.192]
Terms of Trade		0.024***	0.020***	0.020***	–0.004	–0.004	–0.003	–0.003
		[0.006]	[0.005]	[0.006]	[0.009]	[0.009]	[0.009]	[0.009]
Inflation			–0.071***	–0.072***	–0.048***	–0.052***	–0.03	–0.038*
			[0.012]	[0.013]	[0.014]	[0.016]	[0.018]	[0.020]
Interest Rates				–0.003	–0.014	–0.015	–0.021	–0.023
				[0.015]	[0.014]	[0.015]	[0.014]	[0.015]
GFCF					0.000***	0.000***	0.000**	0.000**
					[0.000]	[0.000]	[0.000]	[0.000]
GDP Growth						–0.012	–0.029	–0.026
						[0.023]	[0.023]	[0.024]
Post-Apartheid							0.498**	0.439*
							[0.231]	[0.243]
Minimum Wages								–0.218
								[0.268]
Constant	11.014***	8.908***	9.716***	9.799***	10.798***	10.847***	10.383***	10.438***
	[0.100]	[0.543]	[0.436]	[0.574]	[0.610]	[0.622]	[0.634]	[0.640]
N	49	49	49	49	49	49	49	49
R2	0.801	0.851	0.915	0.915	0.932	0.932	0.939	0.94
adj R2	0.797	0.844	0.91	0.908	0.924	0.922	0.928	0.928

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

variables, the results are broadly consistent with those in Tables 3 and 4. The coefficient of the Indirect Exchange Rate is negative and statistically significant at the 1% level in both Table 5 and Table 6 eight columns. This illustrates the expected inverse relationship between export performance and exchange rate fluctuations. The terms of trade (TOT) are largely positive and significant, while the inflation rate (INF) is negative and significant – also in line with expectations.

The VECM estimation was carried out using the VECM function included in the tsDyn package of R. In contrast to ECM, which uses a single equation, VECM estimates a set of equations equal to the number of variables in the dataset. In other words, the VECM function solves equations by treating each variable as a dependent variable. The results in Table 7 are only for the equations in which the dependent variables are Total Export Value (Totxval), Total Export Quantity (Totqty), Stone Fruit Export Value (Stonexval), and Stone Fruit Export Quantity (Stonexqty). The Totxval, Stonexval, and Stonexqty columns in Table 7 is not statistically significant, which means that changes in exchange rates, TOT, inflation, and total export value from the previous year do not affect the current year's Total Export Values,

Table 7. VECM estimates

	Totxval	Totxqty	Stonexval	Stonexqty
	β/[S.E]	β/[S.E]	β/[S.E]	β/[S.E]
Indexrate (–1)	–13029.9510	66116.9969	–1671.4377	6057.8561
	[308882.4231]	[266068.7990]	[25878.2770]	[18201.1744]
Tot (–1)	1757.5781	–4720.8413	–175.2878	–287.3548
	[5128.7600]	[4468.6719]	[437.3513]	[309.3739]
Inf (–1)	3727.4175	15884.2020	191.8555	821.3330
	[7974.6937]	[7700.5196]*	[673.8813]	[495.2657]
Totxval (–1)/Totxqty (–1)	0.1258	–0.1031	–0.1335	–0.0980
	[0.1749]	[0.1430]	[0.1654]	[0.1733]
ECT	–0.1193	–0.2178	–0.2136	–0.1463
	[0.0936]	[0.0664]**	[0.1247]	[0.1187]
Constant	–378549.6732	–176945.8923	–38347.0560	–2932.0629
	[329648.6002]	[76114.5167]*	[24039.0848]	[4215.2527]
N	49	49	49	49
AIC	1036.276	1043.77	818.7302	788.0282
BIC	1086.23	1093.724	868.6842	837.9822
SSR	606484571403	475445674193	4516716511	2281213983

Stone Fruit Export Values, and Stone Fruit Export Quantities. However, for Total Export Quantity (Totxqty) (the final column in the Table), inflation from the previous year [Inf (-1)] has a positive effect on the current year's Total Export Quantity. Inf (-1) has a positive coefficient of 15884.2020 in the Totxqty column, which is significant at the 10% level.

CONCLUSION

South Africa has gone through periods of major change in the past years. The structural changes could have a positive significant relationship with fruit export and real exchange rates. The study examined the effect of the real exchange rate and its determinants on South Africa's fruit export performance. The long-run OLS estimation indicated that the inverse relationship between a country's currency value and export performance is indeed true. It was discovered that a depreciating real exchange rate improves export performance and vice versa. Therefore, the study's findings emphasize the critical importance of prudent currency management, given the statistically significant and robust relationship between currency movements and fruit export performance. Exports' sensitivity to currency depreciation enables the South African Reserve Bank (SARB) to devalue the currency to boost fruit export revenue and contribute to GDP growth within an expansionary monetary/fiscal policy framework.

Additionally, the study discovered that strong Terms of Trade (TOT) benefited exports, whereas high rates of inflation harmed them. There is therefore the need for favourable Terms of Trade (TOT) as a prerequisite for promoting South Africa's fruits exports. Thus, international political engagements that lead into favourable TOT will benefit exportation of fruits. This also underscores the need for South Africa to play her political games with major fruit importers and avoid sanctions that can affect any favourable trade agreements.

The study also established the importance of inflation in the domestic market, demonstrating that an increase in the price of goods and services results in a decrease

in exports, as inflation reduces the competitiveness of goods relative to substitutes and alternatives from other countries. As a result, inflation is a critical variable that policymakers such as the SARB and the departments of Finance and Agriculture may need to consider carefully. This underscores the need to promote economic growth through productivity enhancement and increase in investment. This is also buttressed by the fact that Gross Fixed Capital Formation (GFCF) has a small but significant effect on stimulating fruit exports.

The limitations of the study also highlight the directions for future studies. First, access to disaggregated data based on specific type of fruit exports would provide more authentic findings for promoting exportation of specific fruits. Morevoer, efforts can be made to consider a panel analysis of the determinants of fruit importation by focusing on some of South Africa's trade partners.

ACKNOWLEGMENT

The administrative support and assistances from University of South Africa (UNISA) staff members in the course of this study are gratefully acknowledged.

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