Original Research

THE EFFECT OF EXCHANGE RATE VOLATILITY ON INTERNATIONAL TRADE IN TANZANIA

Dominica Mushi
Department of Accounting and Finance
Institute of Accountancy Arusha, Tanzania
dominicamushi30@gmail.com

&

Chalicha Sila
Department of Accounting and Finance
Institute of Accountancy Arusha, Tanzania

INSTITUTE OF
ACCOUNTANCY
ARUSHA

https://repository.iaa.ac.tz

Abstract

International trade is considered among the leading debates taken not only in developing countries but worldwide as well. Empirical studies on the linkage between exchange rates volatility and export performance are considered important in any economy. The current study aims at examining the extent to which the exchange rate affects international trade in Tanzania. Specifically, the study intended to examine the effect of exchange rate on exportation in Tanzania; Data used in the analysis covered the period from 1990-2020. The study employed Ordinary Least Square (OLS) multiple regression analysis to examine the relationship among the variables. The findings show that the exchange rate stood at the magnitude of 8.477 meaning that, there is a positive and significant relationship between export and exchange rate in Tanzania. Any dollar increase in the exchange rate may lead to 8.477 dollars increase in exportation, holding other factors constant. The researcher, therefore, recommended that the government be advised to formulate policies that would make the country's currency competitive in the international market to improve on exports.

Keywords: International Trade, Exchange Rate, Export, OLS, and Multiple Regression Analysis

i. INTRODUCTION

In the business world today, the exchange rate is considered by many to be among the very important determinants and driving forces of international trade. International trade is very important since it enables an economy to access items it cannot produce or items that are produced but insufficient to suffice local demands. International trade also plays an important role in the expansion of an economy's market for goods and services, which are finished products, intermediate goods used in the production of other goods, or as agricultural products and foodstuffs (Aho, 2009).

According to Economics Online (2020), the exchange rate has been elaborated as the price of one currency expressed in terms of another currency or against a basket of other currencies. Generally, exchange rates can either be fixed or floating/flexible. The fixed exchange rate is normally determined by the Government through Central Bank, while the floating exchange rate is determined by market forces of demand and supply in the foreign exchange market. Also, it has been observed that the floating exchange rate system is more volatile as compared to the fixed exchange rate system. However, both exchange rate and international trade have been facilitated much by an even greater driving force, which is globalization.

To the majority of African countries, especially Sub-Saharan Africa (SSA), the exchange rate changes or movements have been observed to have little or insignificant changes to the international trade between such countries and their trading partners (Alege and Osabuohien, 2015). However, most researchers and academicians believe that the relationship between exchange rates and the international trade among African countries or these countries and their non-African trading partners is very hard to predict. For instance, according to Senadza and Diaba (2018), the observed exchange rate volatility among African countries affects the international trades between these countries and their corresponding trading partners in the short-run negatively while a positive relationship has been observed in the long-run respectively.

In the Tanzanian financial system, there are various participants of the foreign exchange market who deal with exchange rates and international trade on a daily basis. Such participants include; commercial banks, central banks, arbitrageurs, hedgers, and other registered participants. According to xe.com (2020), it has been observed that, just like in the majority of foreign exchange markets in the world, the most famous Tanzania Shilling exchange rate is USD to TZS rate. In general, for a while now, we have been observing a persistent devaluation of the Tanzanian Shilling against the US Dollar. Such devaluation policy has been adopted by the government of Tanzania through the Central Bank of Tanzania (BOT) so as to promote exports as well as control imports in the country.

For instance, in January 2020, the average exchange rate was TZS 2295 per USD, while following July 2020, the rate changed to TZS 2314 per USD. As of December 22, 2020, the USD to TZS rate is quoted at TZS 2319.00 per USD (Trading Economics, 2020). From such a trend, it is vividly clear that the Tanzanian Shilling against USD is depreciating, which is good to the international trade for Tanzania since it encourages mass production in the country so as to have enough output to export abroad and hence the creation of more employment opportunities. On the other hand, such depreciation of Tanzanian Shilling helps to control a country's imports and hence to facilitate the government's desire to achieve a favourable Balance of Payment (BOP).

According to Nicita (2013), the price of a foreign currency in terms of a domestic currency (exchange rate) plays an important role in international trade. It has been argued that, whether determined by exogenous shocks or by policy, the relative valuations of currencies and their volatility often have important results on international trade, the balance of payments, and overall economic performance. Despite the fact that many studies have already been conducted so far on the relationship between exchange rate and international trade and how they affect one another, still, it can easily be observed that most of these studies, both from Tanzania and from other countries, have not studied these variables under consideration more recently. Nevertheless, the previous studies concentrated much on trade balances as a measure of international trade. This study examines export independently as the key element of international trade on how it is affected by exchange rate.

2.0 LITERATURE REVIEW

Balance of Payments theory or demand-supply theory of exchange was proposed by David Ricardo, and it stresses that an exchange rate in an economy is mainly influenced by the balance of payments of the country concerned (Chipman, 1984). Balance of Payment has been elaborated as the difference between a country's earnings from abroad and a country's payments to abroad, respectively. Balance of payment can either be favourable, unfavourable, or balanced. A favourable balance of payment occurs provided the country's earnings from abroad exceed the country's payments abroad. An unfavourable balance of payment occurs in case a country's payments abroad exceed an economy's earnings from abroad. Balance of payment is said to be balanced provided a country's payments to and from abroad coincide respectively.

The J-Curve effect was first observed in 1973 by Stephen Magee when the U.S. trade balance deteriorated in 1972 despite the devaluation of the dollar in 1971. One question researchers have been raising is how long it takes for the trade balance to experience an improvement after devaluation. In an effort to provide an answer to this question, in 1985, Mohsen Bahmani-Oskooee was the first to introduce a method of testing the J-Curve phenomenon by directly relating the trade balance to the exchange rate in addition to other determinants. Early studies employed aggregate trade data (i.e., export and import data between one country and the rest of the world) to test the phenomenon.

Generally, these studies provided mixed results and were criticised as suffering from aggregation bias. To overcome the problem, the second group of studies concentrated on the trade between one country and each of its major trading partners, a disaggregation at the bilateral level. This group was able to discover more evidence in support of the J-Curve.

Regardless of that, several studies have been assessed in justifying the existing gap, including Sugiharti, Esquivias and Setyorani (2020) on the basis of monthly data covering from 2006 to 2018 examined the impact of exchange rate volatility on Indonesia's primary export commodities to the top five export destination countries, namely China, India, Japan, South Korea, and the United States. The findings suggest that exchange rate volatility has a significant effect on exports of commodities under code 26 (ores), 38 (chemicals), 40 (rubber), and 47 (pulp paper) to India, Japan, South Korea, and the United States, either in the short or long-run.

The exchange rate volatility of exports to China only affects plastics goods (code 39), although many goods experience negative effects due to exchange rate depreciation. In India, exchange rate volatility affects the largest number of export commodities.

According to Senadza and Diaba (2018), who studied the effect of exchange rate volatility on trade in Sub-Saharan Africa using the pooled mean-group estimator of dynamic heterogeneous panels technique to data for eleven Sub-Saharan African economies over the period 1993 to 2014, this paper uncovered no significant effects of exchange rate volatility on imports. In the case of exports, however, the study found a negative effect of volatility in the short-run, consistent with the above view, but a positive impact in the long-run. Chaudhary, Hashmi and Khan (2016) examine the relationship of the exchange rate with exports and imports of major South-Asian and Southeast Asian Economies. The Autoregressive Distributed Lag (ARDL) approach to co-integration and error correction model is employed to investigate the long-run and short-run relationship between the variables in sample economies over the period of 1979-2010. The results show that the long-run relationship between exchange rate and exports exists in more than half of the sample countries; however, the relationship between exchange rate and imports is found only in one sample country.

3.0   CONCEPTUAL FRAMEWORK

The conceptual framework is the narrative outline presentation of variables to be studied and hypothetical relationships between and among variables. In order to meet the objectives of the research and identify the variables for data collection, a conceptual framework has been developed. The below conceptual framework describes the relationship between the independent variables, namely exchange rate, interest rate and Inflation rate, and dependent variable, namely import and export. The established conceptual framework follows the following relationship.

Figure 1 Conceptual Framework
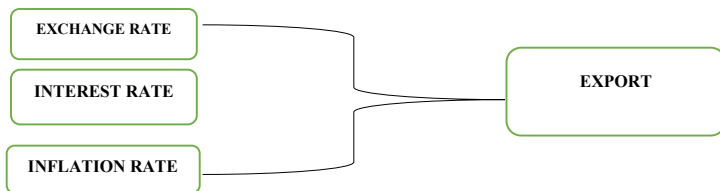
3.0 METHODOLOGY

The study employed secondary time series data from the year 1990 to 2020. The most recent period with a sample size of 31 years is preferred by the researcher since it would make it easy to investigate the long-run relationship among the variables. All the data in the current study were extracted from the World Bank - World Development Indicators. Moreover, the study employed descriptive and non-experimental research designs in carrying out study. The descriptive research design allows the researcher to provide a clear picture of the characteristics of the phenomenon (data) (Adam, 2016). In comparison, the non-experimental research design permits the researcher to establish cause and effect affiliation between one dependent variable and more than one independent variable. The quantitative approach was employed by the researcher since it is not subjective to individuals opinions, while it is rather based on facts since it utilises numerical information.

A multiple linear regression analysis was applied to the study using secondary data, which were gathered from the World Bank (World Development Indicators). OLS method was used by the researcher to estimate the relationship between the variables enumerated in the study because OLS is believed to produce the best linear unbiased estimators (BLUE), which are efficient with minimum variance. Moreover, a diagnostic test will also be employed in order to make the variables free from problems associated with the time series.

To examine the effect of exchange rate on export trade, the model was specified as follows;

EXP = f (EXCH, INFL, INTER) …………………………………………..i

$EXP_t = \beta_o + \beta_1 EXCH_t + \beta_2 INFL_t + \beta_3 INTER_t + \varepsilon_t$

  Where;

    EXP= Export

    EXCH = Exchange rate ε_t= Error term

    INFL = Inflation rate

    INTER = Interest rate

    $\beta_o, \beta_1, \ldots\ldots\ldots\beta_3$ = Estimated parameters in a model

To ensure the model validity and that the coefficient produced by the model is consistent, the researcher performed a model stability test to ensure that the estimated parameters in a regression model are stable. The stability of parameters satisfies the stability of the model, which enhance validity and reliability. Furthermore, the reliability of information and data was ensured as the data set was collected from known and accredited websites and databases. Moreover, the higher the predictive power of the model (R2), R-squared was considered as a criterion for accepting the model. When R-squared exceed 0.64, the better the model, otherwise more variable should be added to capture the degree of variation of the outcome variable.

4.0 FINDINGS AND DISCUSSIONS
4.1 Descriptive Statistics
The results in Table 1 provide the descriptive statistics of the variables at their level from using raw data. The test is under the null hypothesis that there is a normal distribution of data. The findings report the average exportation of goods and services to stand at 29.6 with a standard deviation of 0.75802. The variable for export was also observed to be normally distributed with a probability for Jarque-Bera of 0.241481, which is greater than 0.05 level of significance; as a result, we fail to reject the null hypothesis of normality.

Table 4.1: Descriptive Statistics

	EXPO	IMPOR	EXCH	INTER	INFL
Mean	29.60989	3.368582	1.925139	1.945537	2.224111
Median	29.80481	3.369154	1.950049	2.068499	1.981136
Maximum	30.52689	3.427420	2.046158	2.790451	3.578695
Minimum	28.08765	3.275766	1.662654	0.459672	1.190976
Std. Dev.	0.758021	0.049563	0.103449	0.624575	0.723059
Skewness	-0.549372	-0.209145	-0.965031	-0.726116	0.473292
Kurtosis	2.003524	1.668707	3.307997	2.782053	1.956140
Jarque-Bera	2.841929	2.515274	4.934173	2.426041	2.564820
Probability	0.241481	0.284325	0.084832	0.297298	0.277368
Sum	917.9066	104.4260	59.67930	52.52950	68.94744
Sum Sq. Dev.	17.23788	0.073695	0.321052	10.14243	15.68442
Observations	31	31	31	31	31

Source: *Research findings, 2021*

Moreover, the result shows that the average import and exchange rate stood at the rate of 3.3685 and 1.925 and the standard deviation of 0.0495 and 0.1034, respectively. The variables have the probability values for Jarque-Bera of 0.2843 and 0.0848, respectively. This indicates that the variables for import and exchange rate are normally distributed and can be used for further analysis. Interest rate and inflation rate stood at the mean value of 1.94 and 2.22 with the maximum value of 2.79 and 3.57 per annum, respectively. Moreover, the interest rate and inflation rate were normally distributed since they have probability value that is greater than 5% level of significance. A conclusion that can be drawn from the data is that all data are normally distributed, and therefore further analysis can be carried out using the data.

4.2   Correlation Analysis

The researcher conducted a correlation analysis in order to measure the strong association between the variables. Table 4.2 below shows the correlation among the study variables.

Table 4.2: Pairwise Coefficient of Correlation

	EXPO	**IMPOR**	**EXCH**	**INTER**	**INFL**
EXPO	1.000000				
IMPOR	0.967934	1.000000			
EXCH	0.982099	0.946692	1.000000		
INTER	0.442970	0.323859	0.532095	1.000000	
INFL	-0.704746	-0.570829	-0.749690	-0.674414	1.000000

Source: Research findings, 2021

Table 4.2 above exhibits the correlation coefficients of the variables for the period between 1990 and 2020. The correlation analysis revealed that the correlation among most of the independent variables used in the study are generally quite high, implying that data sets were highly correlated with each other, meaning a change of most of the variables would not result in a substantial change on other variables. However, if the relationship among these variables is non-linear, then we cannot rely on the coefficient of correlation as a measure of linear association between the two variables. The largest correlation coefficients exist between exchange rate and import as well as exchange rate and export with the positive correlation coefficient of 94.6 percent and 98.2 percent, respectively. This shows that the variables to be examined have a very good coefficient of correlations that means an increase in one variable leads to an increase in another variable.

4.3   Regression Analysis

The researcher employed the multiple linear regression analysis to examine the effect that one independent variable has on the dependent variable. The technique was used to test the hypothesis for the objectives enumerated in chapter one, which include, to examine the relationship between exchange rate and exportation in Tanzania; and examining the relationship between exchange rate and importation in Tanzania. To be able to examine the first and second specific objectives, the multiple regression model was employed.

4.3.1   Relationship between Exchange rate and Export

The researcher examined the first specific objective by analysing the relationship between exchange rate and export. The multiple regression analysis was performed, and the result was presented in Table 4.3 below.

Interest rate and inflation rate were not part of the objectives but were included in the model to avoid the model specification bias and also to have a model with good predictive power.

Table 4.3 Regression Model One

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.46967	0.904236	14.89618	0.0000
EXCH	8.477866	0.418747	20.24578	0.0000
INTER	-0.119151	0.050021	-2.382022	0.0259
INFL	0.002778	0.058509	0.047487	0.9625

R-squared	0.973359	Mean dependent var	29.72916
Adjusted R-squared	0.969884	S.D. dependent var	0.676787
F-statistic	280.1126	Durbin-Watson stat	1.750845
Prob(F-statistic)	0.000000		

Source: Research findings, 2021

The regression model shown in Table 4.3 above shows that there is a positive and significant relationship between the study variables. The predictive power of the model stands at 0.973, meaning that the variation of the dependent variable (export) in Tanzania is explained by independent variables (exchange rate, inflation rate and interest rate) while the remaining percent, 3%, is not explained in the model. This depicts that the model can well be predicted and be studied by the selected independent variables. Moreover, the exchange rate stood at the magnitude of 8.477 meaning that, there is a positive relationship between export and exchange rate in Tanzania. Any dollar increase in the exchange rate may lead to 8.477 dollars increase in exportation, holding other factors constant. The exchange rate was also observed to be statistically significant at a 5 percent level of significance. This is because it has p-values of 0.0000, which is less than 0.05 level of significance. The interest rate has revealed a negative but significant relationship with the export in Tanzania; however, the inflation rate has proved a positive relationship, but the result was insignificant over the study period.

The findings in this study are in line with (Kang and Dagli, 2018; Chaudhary, Hashmi and Khan, 2016), who found the existing positive relationship between exchange rate and export. When a country's currency increases in terms of other countries currency, it implies devaluation. When a country is devaluing its currency, a country makes its exports cheaper in terms of foreign currency and its imports more expensive in terms of domestic currency, leading to an increase in export volume (ROMERO, 2012) which resembles the study. However, under the J-Curve phenomenon (Magee, 1973), expansion in exports and retardation of imports are expected to improve the trade deficit. However, for several reasons, after devaluation, the trade balance often worsens before improving.

Furthermore, the regression model has shown the probability of F-statistics given by 0.0000, indicating that the overall model is also statistically significant at 5 percent level (because it has a lower p-value 0.0000 compared to the level of significance 0.05). The model further indicated the Durbin-Watson statistics of 1.75, which is approximately approaching 2. This gives a clear picture that the model does not suffer from the problem of autocorrelations. Among the important assumption of the classical linear regression model is to make sure that there is no autocorrelations, no multicollinearity problem. Also, the variance of the errors have to be constant throughout the observations, and also the normality assumptions of the residue must be archived; that is, the residue has to be normally distributed with zero mean and constant variances ($\mu \sim N(0, \delta^2)$).

Any violation of classical linear regression assumption will result in model specification errors (bias). For this case, the researcher performed a necessary test to make sure the regression model did not suffer from any of the problems, and the result confirmed no problem existed in the model.

5.0 CONCLUSION

The data being used in the analysis cover the period starting 1990-2020. The data being used in the study has been collected through World Bank -World Development Indicators (WDI) for the entire study period. Thereafter, the study employed Ordinary Least Square (OLS) multiple regression analysis in the examination of the relationship among the variables. The predictive power of the model stood at 0.973, meaning that the variation of the dependent variable (export) in Tanzania is explained by independent variables (exchange rate, inflation rate and interest rate); while the remaining percent 3% is not explained in the model. This depicts that the model can well be predicted by the selected independent variables. Moreover, the exchange rate stood at the magnitude of 8.477 meaning that, there is a positive relationship between export and exchange rate in Tanzania. Any dollar increase in the exchange rate may lead to 8.477 dollars increase in exportation, holding other factors constant. The exchange rate was also observed to be statistically significant at a 5 percent level of significance. This is because it has p-values of 0.0000, which is less than 0.05 level of significance.

5.1   RECOMMENDATIONS

The findings from the current study can be quite essential to authorized departments dealing with policy formulation. The monetary authority is advised to use its monetary policies to deliver a suitable exchange rate management, to encourage more export and, in one way or another, to reduce excessive importation. The government is advised to formulate policies that would make the county's currency competitive in the international market to improve on exports. In addition to that, the current study examined the effect of exchange rate on international trade. The study employed data from 1990 to 2020, therefore comprising of a total sample size of 31 years. Other researchers may concentrate on other factors that influence international trade, such as tariffs and trade barriers. Transportation costs, language, culture, change in technology, change in test and piracy, to mention a few. Also, on examining the relationship among the variables, the study employed OLS multiple regression analysis. Other researchers may employ other econometric techniques to examine the long-run relationship among the variables and study the short-run dynamics of exchange rate on international trade. Moreover, the study concentrated on the effect of the exchange rate on international trade in Tanzania. Other studies may focus on the effect of the exchange rate on international trade in Africa or East Africa.

REFERENCES

Aho, C. M. (2009) 'Foreign Trade', Microsoft Encarta.

Alege, P. O. and Osabuohien, E. S. (2015) 'Trade-Exchange Rate Nexus in Sub-Saharan African Countries: Evidence from Panel Cointegration Analysis', SAGE Journals, 50(3), pp. 151–167. Available at: https://doi.org/10.1177/0015732515589440.

Bahmani, M. (2008) 'J – Curve'. Available at: http://www.foxitsoftware.com.

Bank of Tanzania (2020) MONTHLY ECONOMIC REVIEW. Available at: http://repositorio.unan.edu.ni/2986/1/5624.pdf.

Chaudhary, G. M., Hashmi, S. H. and Khan, M. A. (2016) Exchange Rate and Foreign Trade: A Comparative Study of Major South Asian and South-East Asian Countries, Procedia - Social and Behavioral Sciences. Elsevier Ltd. doi: 10.1016/j.sbspro.2016.09.011.

CHEGE, K. (2020) 'East African Trends: Trade, Investments, Forex and Policies –2020', 2 March. Available at: https://theexchange.africa/regional-markets/east-african-trends-trade-investments-forex-and- policies-2020/.

Chipman, J. S. (1984) 'Balance of payments theory', in Economic Analysis in Historical Perspective, pp. 186– 217. Available at: https://doi.org/10.1016/B978-0-408-11430- 1.50013-8.

Dubey, D.. et al. (2015) Business Economics. First Edit. Himalaya Publishing House.

Economics Online (2020) Exchange rates. Available at: https://www.economicsonline.co.uk/Definitions/Exchange_rate.html (Accessed: 17 December 2020).

Export Entreprises (2020) COUNTRY RISK OF TANZANIA: INTERNATIONAL TRADE. Available at:https://import-export.societegenerale.fr/en/country/tanzania/trade-country-r isk?accepter_cookies=oui (Accessed: 20 December 2020).

FCDO Economics Unit (2020) Tanzania.

Govil, R. (2014) Exchange Rates: Concepts, Measurements and Assessment of Competitiveness. BANGKOK, THAILAND. Available at: https://www.imf.org/external/region/tlm/rr/pdf/Nov5.pdf.

Hassan, D. N., Aboki, H. and Audu, A. A. (2014) 'INTERNATIONAL TRADE: A MECHANISM FOR EMERGING MARKET ECONOMIES', International Journal of Development and Emerging Economies, 2(4), pp. 24–32. Available at: www.eajournals.org.

IG (2020) Why trade forex? Available at: https://www.ig.com/en/forex/benefits-of-forex-trading#:~:text=Foreign exchange (forex%2C or FX,ability to trade on margin. (Accessed: 20 December 2020).

Kang, J. W. and Dagli, S. (2018) 'International trade and exchange rates', Journal of Applied Economics, 21(1), pp. 84–105. doi: 10.1080/15140326.2018.1526878.

Lawyers for Britain (2018) 3.1 Brexit and International Trade. Available at: https://lawyersforbritain.org/brexit- legal-guide/wto-and-international-trade/brexit-and international-trade (Accessed: 20 December 2020).

Mbowe, W. E., Mrema, A. and Shayo, S. (2020) 'Determinants of Bank Lending Interest Rates in Tanzania', American Journal of Industrial and Business Management, 10(07), pp. 1206–1236. doi: 10.4236/ajibm.2020.107081.

Mganza, N. S. (2015) EFFECT OF EXCHANGE RATE ON TRADE BALANCE IN TANZANIA 1970 -2014. OPEN UNIVERSITY OF TANZANIA.

Ministry of Foreign Affairs (2020) Brexit: where do we stand? Available at: https://www.government.nl/topics/brexit/brexit-where-do-we-stand (Accessed: 20 December 2020).

Nicita, A. (2013) Exchange rates, international trade and trade policies, International Economics. doi: 10.1016/j.inteco.2013.10.003.

Oner, C. (2017) INFLATION: Measure Types Causes Effects.

Pembleton, R. (2020) COVID-19: What's the impact on forex trading? Available at: https://www.refinitiv.com/perspectives/market-insights/covid-19-whats-the-impact-on-forex- trading/ (Accessed: 20 December 2020).

ROMERO, J. (2012) Balance of Trade, Guide to Economic Indicators. doi: 10.4324/9781315703916-11.

Senadza, B. and Diaba, D. D. (2018) 'Effect of exchange rate volatility on trade in Sub-Saharan Africa☆', Journal of African Trade, 4(1–2), p. 20. doi: 10.1016/j.joat.2017.12.002.

Siraji, F. (2014) ANALYSIS OF TANZANIA' S FOREIGN EXCHANGE RISK MANAGEMENT IN COMMERCIAL BANKS ANALYSIS OF TANZANIA' S FOREIGN EXCHANGE RISK. Mzumbe University.

Sugiharti, L., Esquivias, M. A. and Setyorani, B. (2020) 'The impact of exchange rate volatility on Indonesia's top exports to the five main export markets', Heliyon, 6(1), p. e03141. doi: 10.1016/j.heliyon. 2019.e03141.

Tanzania Railways Corporation (TRC) (2019) Standard Gauge Railway Line (SGR) Project Assessment Environmental and Social Impact Assessment Final Report.

Trading Economics (2020) Tanzania Shilling. Available at: https://tradingeconomics.com/tanzania/currency (Accessed: 22 December 2020).

Vijayasri, G. V (2013) 'The Importance of International Trade in the World', International Journal of Marketing, Financial Services & Management Research, 2(9), pp. 111–119.

World Bank Group (2020) Tanzania Economic Update: Addressing the Impact of COVID-19 with a special section on the role of ICT.

xe.com (2020) TZS - Tanzanian Shilling. Available at: https://www.xe.com/currency/tzs-tanzanian shilling (Accessed: 22 December 2020).