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Keywords: foreign direct investment (FDI), effective average tax rate (EATR) and effective marginal tax rate (EMTR), cross sectional autoregressive distributed lag (CS-ARDL).

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This paper analyzed the impact of taxation on the FDI inflows in the country using the Cross Sectional Autoregressive Distributed Lag (CS-ARDL) for a panel of 52 countries between a period 1999-2017. The results of the CS-ARDL estimates have revealed that both Effective Average Tax Rate (EATR) and Effective Marginal Tax Rate (EMTR) have positive and statistically significant relationship with the FDI inflows in the long-run, whereby, a percentage changes in EATR and EMTR will increase FDI inflows in Tanzania by 0.14 and 0.11 percent respectively. Further, the paper found that in the short-run, a percentage change in the EATR results into an increase of FDI inflows by 0.75 percent, whereas, a unit change of EMTR leads into reduction of FDI inflows by 0.15 percent. These results signify that incentives provided by the Government to attract foreign investment has yielded the anticipated results for the country, as more FDI inflows are concentrated in sectors of accommodation and food services, mining and quarrying, and finance and insurance. Nonetheless, to achieve the level of growth desired, more still needs to be done, which can be done through facilitating the integration of the Tanzanian economy into the regional and global value chains by promoting import-substitution industries and broaden products mix in the niche areas such as: iron and steel industries; manufacturing industries for sugar, soap detergents, cosmetics, textiles; transportation sector; and agriculture sector such as maize seeds and edible oils.

Keywords: foreign direct investment (FDI), effective average tax rate (EATR) and effective marginal tax rate (EMTR), cross sectional autoregressive distributed lag (CS-ARDL).

I. INTRODUCTION

Over the past two decades there has been a renewed interest in the globalization process and one of recently identified important forces of globalization has been private Foreign Direct Investment (FDI). Global FDI inflows over the past two decades have increased significantly worldwide, reaching USD 1.58 trillion in 2021 from USD 159 billion in 1991 (UNCTAD, 2022). From a policy standpoint, Governments seek to attract FDI as it is commonly regarded as advantageous for the host nation through: generating new growth prospects; greater earnings and employment; higher tax revenues; and a better welfare level (Mkonyi, Kirori, & Macheru, 2022; Becker, Fuest, & Rieder, 2012). To attract more FDI, Governments have designed various policy incentives, including fiscal and financial incentives (Mkonyi, Kirori, & Macheru, 2022; Boly, Coulibaly, & Kere, 2019).

The Government of Tanzania, like other developing countries, has been striving to design and implement equitable and efficient taxation system so as to attract FDI, which is seen as a catalyst for fast tracking growth and development (Bigsten & Danielsson, 1999). The Investment Code of 1990 initiated the reform-process in investments but failed due to weak response from the private sector. The New Investment Policy was legislated in 1996 and its implementation led to the enactment of the Investment Act of 1997, which has caused a rapid increase in the amount of foreign capital inflows (URT, 2013). The stock of Foreign Direct Investment (FDI), which is the foremost component of

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foreign private capital, increased from USD 0.01 million in 1990 to USD 921.83 million in 2021[1]. Nonetheless, despite of the rapid increase in the amount of FDI inflows, it is argued that the Government policies and actions have not effectively keep and attract investment[2] to the point of the country being ranked 141 out of 190 countries on the World Bank's 'Doing Business' ranking (Mdee, Aikael, & Luvanda, 2022).

One of the biggest challenges to investment identified is the unfriendly and opaque tax policies, evidenced by the results of investment-climate surveys that found out that more than 50 percent of the firms perceive taxation, as well as access to finance as severe constraints to investment (Levin, 2005). Levin (2004) argue that the issuance of tax incentives to priority sectors have led to increased FDI inflows, as well as, caused a relatively high-tax rate to other sectors and thus discourage investment in those sectors. Therefore, this paper adds to the academic knowledge by econometrically analyzing the impact of taxation on FDI inflows in Tanzania.

The impact of taxes on FDI inflows is analyzed in two ways: First, the paper focuses on FDI inflows in Tanzania for increase policy relevance as FDI is crucial fast tracking the country's growth and development. This is due to the fact that, in spite of this increase in amount of FDI in the country, there are still scant evidence on much has the country's taxation policy contributed to this increase in capital formation. Second, for most African countries, like Tanzania, FDI flows are predominantly one-way, from developed to African countries, unlike previous studies that have used gravity models by assuming bilateral exchanges of FDI between countries (Boly, Coulibaly, & Kere, 2019). Hence, this paper is crucial to the policy dialogues on growth, especially now at the time when the Government is striving to attain industrialization through increased capital formation in the country.

The remainder of this paper is organized as follows. Section Two reviews the literature on taxation and FDI inflows. Section Three presents the methodology. Section Four presents and discusses the estimated results and Section Five provides the conclusion.

II. LITERATURE REVIEW

2.1 History of FDI Inflows in Tanzania

The history of FDI promotion in the country has gone through a number of phases. The Government passed the Foreign Investment Act in 1963 to attract FDI but the efforts were unsuccessful because in 1967 the government opted for Socialist path of economic development. During the 1970s and the first half of the 1980s, the country received very little FDI from investors because the majority of the investments were made by the Government either directly or indirectly. For instance, there were about 400 enterprises which were 100 percent owned by the Tanzanian Government by 1980 (UNCTAD, 2002).

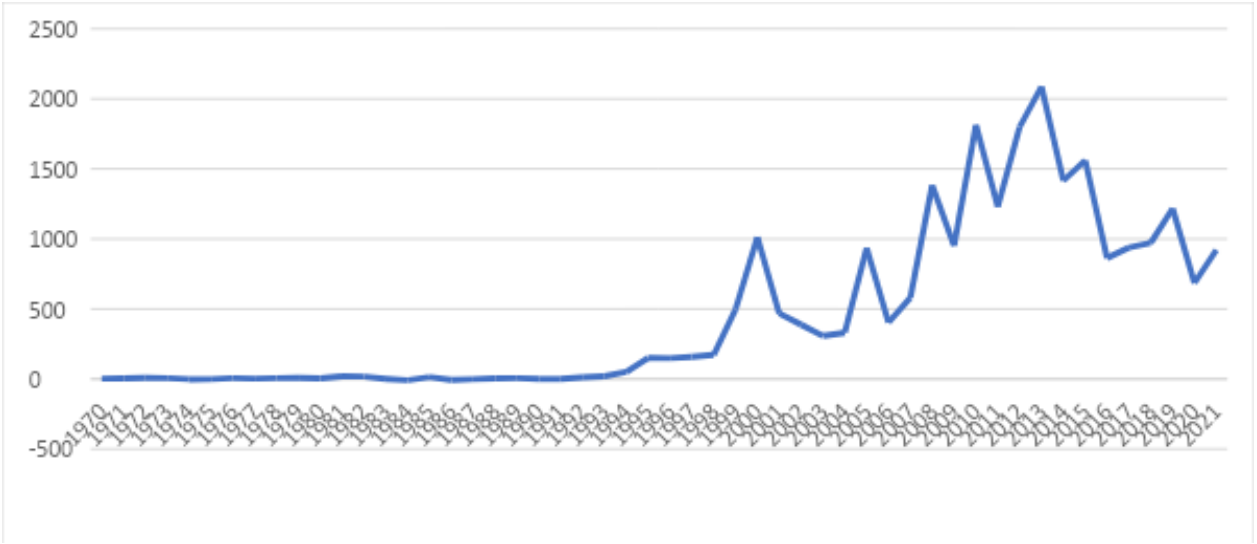
After the failure of Socialism and self-reliance policy, Tanzania had to undertake a number of proactive measures in the 1990s to facilitate the business that foreign investors undertake in the country. The Government enacted a number of investment related laws and policies in recognition of the important role towards creating an enabling environment for the private sector development. Some of the laws enacted were such as (Mnali, 2012); Tanzania Investment Act Number 26 of 1997, Mining Act Number 5 of 1998, Capital Markets and Securities Act Number 5 of 1995, Special Economic Zones Act of 2005, Foreign Exchange Act of 1992 and Public Private Partnership Act of 2010.

[1] https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx
[2] https://www.state.gov/reports/2020-investment-climate-statements/tanzania/

The institutional and legal framework carried out by the Government has resulted in a mixed growth pattern of FDI inflows in the country. During the pre-reform period, Tanzania attracted very little FDI inflows which was on average, about USD 4.4 million (Ngowi, 2012). As the reforms initiated in 1985 appear to have begun to firmly take hold, there was an increase in inflow of FDI into the country from USD 0.01 million in 1990 to USD 496.60 million in 1999. Then it fluctuated up to 2005 where it reached USD 935.52 million.

The inflows of FDI then declined significantly from USD 935.5 million in 2005 to USD 403.04 million in 2006 before rising to USD 581.51 million in 2007. The increase in 2007 originated from new investments in the transport and communication sector, the wholesale and retail trade sector and finance sectors. As a result of global economic and financial crisis, the inflow of FDI declined to USD 952.6 in 2009 million from USD 1,383.3 million in 2008. The decline is also associated with low disbursement from related companies. In 2010 Tanzania recorded the highest FDI inflows amounting to USD 1,813.3, the record that was beaten in 2013 after recording FDI amounting to USD 2,087.30 million (URT, 2013).

The inflows then fell thereafter up to USD 921.83 million in 2021, as depicted in Figure 1.



Source: UNCTAD

Figure 1: FDI Inflows in Tanzania, 1970-2021 USD Million

According to the Tanzania Investment Report (2018)[3], FDI inflows to the country in 2017 were concentrated in three main activities namely: accommodation and food (USD 247.2 million); mining and quarrying (USD 202.5 million); and finance and insurance (USD 127.1 million). Together these activities had an aggregated average of 61.5 percent of total inflows in 2017. Additionally, the report[4] identifies the top source countries of FDI Inflows in Tanzania, for the period 2013-2017, to be South Africa (13.9 percent), Canada (12.3 percent), Nigeria (11.0 percent), Netherlands (10.9 percent) and United Kingdom (10.8 percent). The report has recommended that in order to increase FDI Inflows in the country, there is a need for the Government to ensure full implementation of Investment, Customs Union and Common Market protocols in regional economic communities need to be expedited in order to facilitate trade and cross border investments to maximize the benefits associated with ongoing regional integration arrangements.

[3] file:///C:/Users/user/Downloads/Tanzania%20Investment%20-%20_%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%20%202018%20(EN)%20(1).pdf

[4] Ibrid

2.2 Theoretical Review

Theoretically, this paper adopted on various economic theories that determine channels of influence for FDI inflows to a country. The prominent of these theories are the Ownership, Location and Internalization (OLI) framework and the Organization for Economic Co-operation and Development (OECD) policy framework for investment.

The OLI Framework postulates that horizontal FDI involving production abroad can be expected in place of exports or licensing where OLI conditions are met (Cruz, Florian, & Amal, 2020). The conditions are that Multi -National Enterprise (MNE) must: poses ownership advantage; offer location advantage that make local production more profitable than exporting; and internalization advantages that make undertaking a business activity directly through FDI more profitable than licensing to other firms in foreign markets the right to use assets conferring ownership advantage (Oxelheim, Randoy, & Stonehill, 2001). Taxation enters the OLI Framework through the ownership advantage where it is postulated that a firm is more likely to engage in FDI when the firm is able to negotiate reduced taxation (Cruz, Florian, & Amal, 2020; Oxelheim, Randoy, & Stonehill, 2001). The Framework postulates that in an effort to minimize taxes, an MNE might undertake FDI in a tax haven country, or at least in a country with a relatively low tax rate (Jones & Temouri, 2016).

On the other hand, taxation enters the Policy Framework for Investment through policy makers who always provide guidance to potential investors (Brandstetter & Jacob, 2013). It is postulated that (Wilson, 1999; Zodrow & Mieszkowski, 1986) policy makers always have to make a tough decission of whether to cut taxes to FDI inflows while considering the its impact on tax receipts due to relocation of tax base in the home country. Since developing countries consider mostly of the tax-base relocation issues, they have a stronger incentive of reducing the tax rates to FDI inflows than the developed countries (Wilson, 1991; Hines & Rice, 1996; Swenson, 2001; Gresik, 2001). It is further postulated that a tax increase may not have an impact on FDI inflows to developing countries once equilibrium effects are accounted for (Scholes & Wolfson, 1990; Haufler & Wooton, 1999).

This paper has borrowed much on the OLI Framework and the Policy Framework for Investment. This is based on their most desirable characteristics of determining factors for FDI inflows which are location advantage and relocation factors. For a developing world like Tanzania, these factors are crucial in determining the factors for increased FDI inflows in the country.

2.3 Empirical Review

Studies have established a relationship between FDI and taxation for a group of countries. Both (Dollery, & Clark, 2004; Nistor & Gragos, 2013) found that investors from foreign countries responds negatively to the Corporate Income Tax (CIT) rate. Studies that estimated whether taxation affects the choice of location of outward FDI (Devereux & Freeman, 1995; A de Mooji & Ederveen, 2001) concludes that in-order to encourage the increase in inward FDI, then offering a tax credits to foreign shareholders are of paramount importance. Nonetheless, Young (1988) revealed that whereas FDI through retained earnings may be elastic with respect to tax rates and rates of return, FDI through new funds is inelastic with respect to tax rates and rates of return. However, all most of these studies are cross-country in nature, whereas studies on an FDI-importing country like Tanzania which applies the techniques of the Cross Sectional Autoregressive Distributed Lag (CS-ARDL) are scarce.

Studies on impact that taxes have on FDI inflows have provided inconclusive results. A-De-Mooij and Ederven (2001) concluded that, on average, a 1 percentage point increase in the tax rate reduced FDI by 3.3 percent, and (Nguyen & Saleh, 2018; Feld & Heckemeyer, 2008) found that higher tax rates have a significant negative impact on FDI flows. Nonetheless, (Mutti & Grubert, 2004; Desai, Foley, & Hines,

2004; James, 2013; Boly, Coulibaly, & Kere, 2019) found that investments oriented toward domestic markets are less sensitive to changes in tax incentives, while export-oriented investments are more sensitive.

This paper contributes to body of knowledge on the subject matter of role of taxation on FDI in two ways, first by focusing on one of the developing countries (Tanzania) for increased policy-relevance. Second, previous studies have typically used gravity models that assume bilateral exchanges of FDI between countries, whereas, in this paper employs the Cross Sectional Autoregressive Distributed Lag (CS-ARDL) thus reducing the gap in knowledge.

III. METHODOLOGY

3.1 Theoretical Framework

FDIs are mainly affected by the effective tax rates, whose assessment are always complicated given the alternative source of financing and the differed characteristics of the involved national tax systems (Leibritz, Thornton, & Bibbee, 1997). The interaction between FDI of different countries and effects of cross-border caused by tax policy, could hypothetically be captured using a Spatial Durbin Model (SDM). The SDM allows identification of both the endogenous effects that is spatially lagged endogenous variables and the circumstantial effects. This produces unbiased estimates even if the underlying data generator process is a Spatial Autoregressive Model (SAR) or a Spatial Error Model (SEM) as defined by Elhorst (2010).

The model includes spatially lagged independent variables, spatially lagged explained variables. Also, the paper expects the existence of spatial autocorrelation given the fact that the decisions for foreigners to invest can be affected not only by different tax rates but also by inflation as a proxy of the macroeconomic condition of Tanzania, bilateral exchange rates and economic growth rate.

3.2 Empirical Model Specification

In testing for the overall impact of taxes on attracting FDI inflows in the country, the paper adopted the theoretical model developed by Yoo (2003) and estimate the following model:

$$FDI_{it} = \beta_0 + \beta_1 EXR_{it} + \beta_2 EATR_{it} + \beta_3 EMTR_{it} + \beta_4 INF_{it} + \varepsilon_{it} \quad (1)$$

where, *FDI* is the FDI inflows to Tanzania, *EXR* is the bilateral exchange rate between Tanzania, and the source country, *EATR* is the Effective Average Tax Rate, *EMTR* is the Effective Marginal Tax Rate, *INF* stands for Inflation rate of Tanzania, *i* stands for the origin country of FDI into Tanzania, *t* stands for the time-period and ε is the stochastic error term.

3.2 The estimation of the Effective Marginal Tax Rate (METR) and the Effective Average Tax Rate (EATR)

The Effective Marginal Tax Rate (EMTR) is defined as the difference between the pre-tax rate of the marginal investment at the level of the investor and the net return on the investment at the level of the saver. The EMTR usually applies to a marginal investment project as it is the one that makes the foreign firm indifferent between investing and not investing in Tanzania.

King and Fullerton (1984) laid down the foundation for the estimation of the EMTR that this paper modified to fit the Tanzanian economy in its estimation of the EMTR. The first step in the estimation of the EMTR is the estimation of the Effective Marginal Tax Wedge (EMTW) which is given by the following formula (King & Fullerton, 1984):

$$EMTW = p_{jlkt} - s_{jt} \quad (2)$$

where p_{jkt} is the required pre-tax real rate of return of an investment project (p) and s_{jt} is the required post-tax real rate of return of the supplier of finance, s. This was calculated for each country, j, asset, l, typed of finance, k, and year t. The pre-tax real rate of return was given by:

$$p_{jlkt} = \frac{\left(1-A_{jlt}\right)}{\left(1-\tau_{jt}^{r}\right)\left(1+\pi_{jt}\right)}\left[\rho_{jkt}^{'} - \pi_{jt} + \delta_{l}\left(1 + \pi_{jt}\right)\right] - \delta_{l} \quad (3)$$

where A_{jlt} is the net present value of depreciation allowance in country j for asset l in year t, τ_{jt}^{r} is the statutory tax rate on retained earnings in country j in year t (this paper used 30 percent statutory tax rate of Corporate Income Tax that applies in Tanzania), π_{jt} is the inflation rate in country j in year t, $\rho_{jkt}^{'}$ is the discount rate for investment in country j financed by k during period t, whereas, δ_{l} is the depreciation rate of asset l (this paper assumed that the discount rates do not differ in accordance to the source of finance). According to King and Fullerton (1984), the post-tax real rate of return is derived from the following formula:

$$s_{jt} = \frac{1+i_{jt}}{1+\pi_{jt}} - 1 \quad (4)$$

where i_{jt} is the nominal interest rate in country j in year t.

Finally, the EMTR was estimated through the following formula:

$$EMTR = \frac{p_{jlkt} - s_{jt}}{s_{jt}} \quad (5)$$

Because FDI involves cross-border investments, this paper introduced the change in the exchange rates between countries j and n during period t $\left(E_{jnt}\right)$ in the formula for the pre-tax rate of return. Therefore, the pre-tax rate of return was estimated through the following formula:

$$p_{jnlkgt} = \frac{\left(1-A_{nlt}\right)}{\left(1-\tau_{nt}^{r}\right)E_{jnt}\left(1+\pi_{nt}\right)}\left[\rho_{jnt}^{'} - \left(1 - \delta_{l}\right)E_{jnt}\left(1 + \pi_{nt}\right)\right] - \delta_{l} \quad (6)$$

Where j represents the resident country (Tanzania) and n the source country.

The Effective Average Tax Rate (EATR) can be defined as the difference in present value of the investment project in the absence of tax, as a proportion of the present value of the project in the absence of tax. It is usually applied to an investment project that earns economic rent. This paper estimated the EATR on an investment project with a fixed pre-tax real rate of return as:

$$EATR = \frac{V^{*} - V}{V^{*}} = 1 - \frac{\left(\rho_{jt}^{*} + \delta_{l} - \pi_{jt}\right)}{\rho_{jt}^{'} + \delta_{l} - \pi_{jt}}\left[1 - \tau_{jt} + \frac{A_{jlt}\left(\rho_{jt}^{*} + \delta_{l} - \pi_{jt}\right)}{\left(\rho + \delta_{l}\right)}\right] \quad (7)$$

where V is the present value of the income stream, * stands for an absence of tax, whereas other variables are defined as before.

3.3 Estimation Techniques

This paper explored the impact of taxes on FDI inflows in Tanzania in the long run for a panel of 52 countries (N=52) with annual data for the period 1999-2017 (T=18) using the Cross Sectional Autoregressive Distributed Lag (CS-ARDL), that was first proposed by Chudik et al., (2013). The

CS-ARDL as proposed by Chudik et al., (2013) has several special features including being appropriate for the long-run heterogeneous panel time data as well as the assumption of short-run heterogeneity and long-run homogeneity. Further, the CS-ARDL addresses the challenge of cross-sectional dependence and endogeneity in empirical models (Ameer & Sohag, 2020).

In order for the study to attain unbiased estimators, the choice of appropriate model, (Cross Sectional Autoregressive Distributed Lag (CS-ARDL)) for the empirical analysis in the panel data was vital. The paper was driven by the belief that the correct model produces not only efficient, but also consistent results (Ameer & Sohag, 2020).

Therefore, the recent econometric literature recommends applying the CS-ARDL approach to analyse long heterogeneous data in the presence of common correlation effects over panel dynamic OLS, panel fully modified OLS approach and panel pooled and mean group approaches. These models not only address the issue of cross-country dependence, but they also solve the problems of heteroscedasticity and serial correlation in the panel data (Chudik, Mohaddes, Peasaran, & Raissi, 2013).

Prior to the estimation of the CS-ARDL, the paper tested for the Unit Root by applying both Levin–Lin–Chu test, Im–Pesaran–Shin unit-root test and the Fishertype Tests (Levin, Lin, & Chu, 2002). The paper further used the Kao and Pedroni Tests to test for cointegration.

3.4 Data Type and Choice of Variables

The paper employed secondary panel data for estimation covering the period 1999 -2017. The FDI data were sourced from the Tanzania Investment Reports (various editions), the inflation rate, discount rate, interest rate and exchange rate were sourced from the Bank of Tanzania (BoT), the statutory tax rate on retained earnings was sourced from the Tanzania revenue Authority (TRA). The share of FDI to GDP ($\frac{FDI}{GDP}$) was used as a proxy for FDI inflows. The bilateral exchange rate between Tanzania and FDI source countries was used as a proxy for exchange rate, whereas, the annual end of the period inflation rate of Tanzania was used as a proxy for the inflation rate. The Bank of Tanzania (BoT)'s discount rate was used as a proxy for the discount rate, the BoT's lending interest rate was used as a proxy for the interest rate, whereas the Corporate Income Tax rate in Tanzania (30%) was used as a proxy for the statutory tax rate on retained earnings.

IV. DISCUSSION OF THE EMPIRICAL ESTIMATION OF RESULTS

4.1 Descriptive Statistics of the Variables Used

Initial inspection of the variables of interest show that they are normally distributed with skewness of almost around 2 and a kurtosis of above 2. Table 1 presents the descriptive statistics of the variables.

Table 1: Descriptive Statistics

Variable	N	Mean	Std.dev	Skewness	Kurtosis
Foreign Direct Investment	969	0.9153	2.0642	0.5037	3.2368
Exchange rate	969	5.4244	2.6289	-1.2826	4.2155
Inflation rate	969	0.0752	0.0394	1.7826	5.5027
Effective Marginal tax rate	969	1.0594	2.3139	2.0312	9.2134
Effective Average tax rate	969	0.7217	1.4575	-2.6463	90.8635

Source: Author's computation

A correlation matrix was then done for the explanatory variables. This is important in establishing the potential multicollinearity problem. Table 2 depicts the correlation matrix between FDI as dependent variable and its explanatory variables. Evidently, FDI is positively associated with the all-independent variables.

Table 2: Correlation Matrix

Variable	Foreign Direct Investment	Exchange rate	Inflation	Effective Marginal Tax Rate	Effective Average Tax Rate
Foreign Direct Investment	1.000				
Exchange rate	0.129	1.000			
Inflation rate	0.105	0.011	1.000		
Effective Marginal tax rate	0.011	-0.008	0.170	1.000	
Effective Average Tax Rate	0.158	0.004	0.003	0.018	1.000

Source: Author's computation

4.2 Results of the Pre-Estimation Results

As a starting point of the integration analysis, the paper applies the first-generation panel unit root tests which neglect the presence of both structural breaks and cross-section dependence, but are commonly used in the panel data literature on the FDI-tax nexus. Without exception, all unit root tests assume non-stationarity under the null hypothesis. Table 3 shows test for unit root using ADF, Philip Peron and Levin, Lin and Chu test from which all of the variables are stationary at level. The test results show the order of integration is zero. The test results from IPS strongly reject the null hypothesis of non-stationarity at level for all variables. Similar results are obtained using Fisher-type ADF test and LLC.

Table 3: Unit Root tests

Variable	IPS (t-bar statistics)	Fisher-type (ADF - Z)	Levin-Lin-Chu	Order of Integration
	Level	Level	Adjusted t*	
Foreign Direct Investment	-4.7391***	-18.4427***	-4.2748***	I(0)
Exchange rate	-2.9543***	-12.4621***	-11.7519***	I(0)
Inflation	-2.9327***	-12.3656***	-5.3508***	I(0)
Effective Marginal tax rate	-3.2412***	-15.0201***	-14.2833***	I(0)
Effective Average tax rate	-3.9154***	-20.4218***	-11.3725***	I(0)

Source: Author's computation[5]

Therefore, the consideration of structural breaks and, additionally, cross-section dependence should provide more reliable results. Consequently, this paper applies the second-generation panel unit root test proposed by Bai and Carrion-i-Silvestre (2009) as a second step. This test allows for structural breaks in the level, slope or both, which can occur at different dates for different countries and may

[5] Probabilities for the Fisher-type tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality. The choice of lag levels for IPS and Fisher-ADF test are determined by empirical realisations of the Schwarz Information Criterion. The LLC test was computed using the Bartlett kernel with automatic bandwidth selection. *** indicates significance at the 1% levels.

have different magnitudes of shift. Furthermore, the common factor approach enables the common shocks to affect countries differently via heterogeneous factor loadings.

The results of the test developed by Bai and Carrion-i-Silvestre (2009) are presented in Table 4 and confirm the finding of non-stationarity in the Effective Marginal Tax Rate and Inflation variables without trend and in the presence of trend Exchange Rate, Effective Marginal Tax Rate and Inflation become non-stationary. The null hypothesis of a unit root cannot be rejected for all tests in the model without any trend, with a trend. This also confirms the presence of Cross-sectional dependence among variables.

Table 4: Pesaran (2007) Panel Unit Root test (CIPS)

Variable	Specification without trend		Specification with trend	
	Zt-bar	P-value	Zt-bar	P-value
Foreign Direct Investment	-13.058***	0.000	-10.291***	0.000
Exchange rate	-3.597***	0.000	2.211	0.986
Effective Average tax rate	-14.733***	0.000	-12.058***	0.000
Effective Marginal tax rate	30.386	1.000	28.141	1.000
Inflation rate	30.386	1.000	28.141	1.000

Source: Author's computation

Once integration of order one is established, the next step is to determine whether a long-run relationship between FDI and tax exists. To examine the existence of a cointegration relationship this study repeats both types of tests, with and without structural breaks and cross-sectional dependence. Firstly, the first-generation panel cointegration tests proposed by Kao (1999) and Pedroni (1999, 2004), are applied. Kao (1999)'s test is a generalisation of the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) tests in the context of panel data. Pedroni proposes seven test statistics that can be distinguished in two types of residual based tests. Four tests are based on pooling the residuals of the regression along the within-dimension of the panel (panel tests), while three are based on pooling the residuals along the between-dimension (group tests). Both Kao and Pedroni assume the null hypothesis of no cointegration and use the residuals determined by a panel regression to construct the test statistics and determine the asymptotically normal distribution.

Table 5: reports the empirical results of Kao's and Pedroni's panel cointegration tests. With the exception of the panel rho-statistic in the case with trend, none of the test statistics result into failure to reject of the null hypothesis of no cointegration. Hence, the results of these first-generation panel cointegration tests that neither allow for structural breaks nor cross section dependence provide evidence for a long-run equilibrium relationship between FDI and Tax.

Table 5: Cointegration test

	Test Statistics	Without trend	With Trend
		FDI	FDI
Pedroni Test	Panel-*v*	-5.353***	-7.8909***
	Panel-*rho*	1.130	3.2774***
	Panel-PP	-13.676***	-16.2736***
	Panel-ADF	-12.344***	-14.6621***
Kao	*t*	-7.2757***	-7.8909***

Source: Author's computation

4.3 Results of the Empirical Estimations

This section presents the econometric results of the effect of Foreign direct investment and tax policy changes.

4.3.1 GMM Estimation Technique

Table 6 presents the estimated empirical results using the Arellano and Bover GMM two-stage estimates. The Windmeijer (2005) WC- robust estimator is used to correct heteroskedasticity in our data. The test for serial autocorrelation shows that the specified model is free from autocorrelation problem with the p-value greater than the threshold of 5 percent hence failing to reject the null hypothesis of no autocorrelation. Sargan test of over-identification as well fail to reject the null hypothesis of over-identification meaning that the used instrumental variables are valid. It implies that instrumental variables are uncorrelated to some sets of residuals therefore are acceptable. Based on the above diagnostic tests, the model is well specified and inference can be made.

Table 6: GMM two-step results of the effect of EMTR and EATR on FDI in Tanzania

Variables	Coefficient	Std. Err.	z	P>z	[95% Conf. Interval]	
Lag Foreign Direct Investment	0.1507***	0.0301	5.00	0.000	0.0917	0.2097
Exchange rate	-0.0320	0.1306	-0.25	0.806	-0.2879	0.2238
Effective Average tax rate	0.0784***	0.0200	3.91	0.000	0.0392	0.1177
Effective Marginal tax rate	-0.0335***	0.0075	-4.46	0.000	-0.0483	-0.0188
Inflation rate	1.8189***	0.5457	3.33	0.001	0.7494	2.8884
Constant	0.7575	0.7493	1.01	0.312	-0.7112	2.2261
N= 918						
AR(1) P-value = 0.000						
AR(2) p-value = 0.577						
Sargan Test p-value = 1.000						

Source: Author's computation
*Asterisks ***, ** and * means significance level of 1%, 5% and 10%, respectively.*

The empirical results in Table 6 show that all variables display appropriate sign as anticipated. The GMM-two step estimates show that coefficient of exchange rate is negatively but not statistically significant. The coefficient of the EATR is positive and statistically significant at 5 percent. This implies that on average, one-point change in the EATR leads to a 0.078 percentage increase in the FDI of Tanzania. However, the coefficient of EMTR is negative and statistically significant at 1 percent. This means that a point change of EMTR reduces FDI by 0.034 percent. Nevertheless, Inflation coefficient is positive and statistically significant at 1 percent level. This indicates that a change in Inflation results into an increase in FDI by 1.82 percent.

4.3.2 Pooled Mean Group (PMG), Mean Group (MG) and Dynamic Fixed Effect (DFE) Estimates

Table 7 shows the effects of EATR and EMTR on Foreign Direct Investment being estimated using the PMG, MG and DFE model. Reference is made on PMG results as evidently by the houseman tests. Nonetheless, the error correction term has the expected negative sign and is statistically significant at 1 percent, insisting that there exists a long-run relationship between commodity price volatility and trade tax. Also, the paper cannot rely on PMG results since the model is being affected by cross-sectional dependence problem.

Specifically, the correlation coefficients between the time-series for each panel member were used. CD statistic is standard normally distributed under the null hypothesis of cross-section independence; thus, the null hypothesis is rejected when the p-value is less than 0.05. This implies that the PMG estimator fail to address the cross-units' dependence which solidifies the accuracy of PMG estimates to be questionable.

In order to address this shortcoming, the paper employed the CS-ARDL, which involves the inclusion of additional lagged cross-sectional averages of both the dependent and independent variables in the estimation and thus solve the cross-sectional dependence problem.

Table 7: PMG, MG and DFE Estimates

	PMG	MG	DFE
Long-run Estimates			
Exchange rate	-0.0083***	1.0692***	0.9054***
	(0.0024)	(0.2382)	(0.2044)
Effective Average tax rate	0.0310***	0.4422	0.0526
	(0.0039)	(0.5399)	(0.0544)
Effective Marginal tax rate	-0.0044***	0.1696***	0.1784***
	(0.0011)	(0.0578)	(0.0316)
Inflation	0.1721**	5.9016	8.0690***
	(0.0734)	(4.0557)	(1.7878)
Error Correction Term	-0.7277***	-1.0298***	-0.8405***
	(0.0416)	(0.0456)	(0.0313)
Short-run Estimates			
D.Exchange rate	0.0571	-0.4402**	-0.3377**
	(0.1924)	(0.2081)	(0.1472)
D. Effective Average Tax Rate	0.9217***	0.1283	0.0082
	(0.2068)	(0.2873)	(0.0320)
D. Effective Marginal Tax Rate	-0.1320***	-0.1788***	-0.1841***
	(0.0263)	(0.0319)	(0.0198)
D.Inflation	3.3157**	-2.0072	-3.2781***
	(1.6389)	(2.0118)	(1.2451)
Constant	0.6560***	-5.3837***	-4.0603***
	(0.1625)	(1.6145)	(0.9310)
N	918	918	918
Hausman Test PMG & MG	0.0094***	0.05	
Hausman Test PMG & DFE	0.000***		0.05
Pesaran CD Test	0.000***		

Source: Author's computation
*Standard errors in parentheses * p<0.10, ** p<0.05, *** p<0.010*

4.3.3 CS-ARDL Estimates

According to Chudik and Pesaran (2013), the "CS-ARDL model augments the ARDL model with the linear combination of the average cross-sectional of both the dependents variables and independent variables to capture the cross-sectional correlation in the error term". Chudik and Pesaran (2015) added that in the estimation of the CS-ARDL, both "mean group (MG)" and "pooled mean group (PMG)" estimators were used. It has to be noted that the time dimension is required to be large enough for the model to be calculated for each cross-country unit. Nevertheless, a sufficient number of lagged cross-section averages is required to be included so that validity of the estimators can be ensured. In reference to previous studies, some suggested a lag length of 2 (Eberhardt and Presbitero 2015), while

Chudik and Pesaran (2013) suggests that the lag length should not exceed 3. Therefore, 2 lags were selected for our estimation. Table 8 presents CS-ARDL estimates.

Table 8: CS-ARDL Estimates (Selected Model: ARDL (2, 2, 2, 2, 2))

Variable	Coefficient	Std.Error	t-Statistic	Prob.*
Long-run				
Exchange rate	1.4421***	0.1430	10.09	0.000
Effective Average Tax rate	0.1357**	0.0588	2.31	0.022
Effective Marginal Tax rate	0.1106***	0.0186	5.93	0.000
Inflation	0.1937	1.0135	0.19	0.849
Error Correction Term (ECT)	-0.6317***	0.0620	-10.19	0.000
Short-Run				
D(Foreign Direct Investment(-1))	-0.0085	0.0493	-0.17	0.864
D(Exchange rate)	-0.8342***	0.3117	-2.68	0.008
D(Exchange rate (-1))	-0.7733**	0.3619	-2.14	0.033
D(Effective Average Tax rate)	0.7547**	0.3392	2.22	0.027
D(Effective Average Tax rate (-1))	0.2587	0.2422	1.07	0.286
D(Effective Marginal Tax rate)	-0.1474***	0.0418	-3.53	0.001
D(Effective Marginal Tax rate (-1))	0.0783**	0.0305	2.57	0.011
D(Inflation)	5.6583**	2.2455	2.52	0.012
D(Inflation(-1))	4.0997*	2.3837	1.72	0.086
Constant	-4.5806***	0.6130	-7.47	0.000

Source: Author's computation

*Asterisks ***, ** and * means significance level of 1%, 5% and 10%, respectively.*

From Table 8, the estimated coefficient of Error Correction term (ECT) (-0.6317) is negative and significance, which shows the ability to return to equilibrium in the cause of a shock or disequilibrium, the ECT coefficient must be negative and significant (Odugbesan and Rjoub, 2019). In addition, the negative and significance of the ECT coefficient indicate a stable long-run cointegration among the variables in the estimation.

The estimates results, as presented in Table 8, show Exchange Rate, Effective Average Tax Rate (EATR) and Effective Marginal Tax Rate (EMTR) to have positive and significant coefficients. The result shows that a percentage increase in exchange rate will increase FDI inflows by about 1.44 percent in the long-run, holding all other variables constant at 1 percent significance level. Similarly, the coefficients for EATR and EMTR are positive statistically significant at 5 percent and 1 percent meaning that holding other variables constant, a percentage change in EATR and EMTR will increase FDI in Tanzania by 0.14 percent and 0.11 percent respectively in the long-run.

In the short-run estimates, the coefficients of change in Exchange Rate and change in its lag are negative and statistically significant. The negative sign indicates that change in Exchange Rate and change in its lag reduces the FDI inflows by 0.83 percent and 0.77 percent, respectively. However, the coefficient of change in EATR is positive and statistically significant which implies that a point change in the change of EATR results into an increase of FDI inflows by 0.75 percent. Nevertheless, the coefficients of change in EMTR and change in its lag are statistically significant with a negative and positive signs respectively. This implies, a unit change in the change of EMTR leads into reduction of FDI by 0.15 percent while a change of its lag results into an increase of 0.08 percent in FDI.

Nonetheless, the coefficients of change in inflation and its lag is positive and statistically significant. It indicates that a unit change in the change of inflation and its lag results into an increase of FDI by 5.66 percent and 4.1 percent, respectively.

V. CONCLUSION

This paper analysed the impact of taxes on the FDI inflows in the country. The results of the CS-ARDL estimates have revealed that both EMTR and EATR have positive and statistically significant relationship with the FDI inflows in the country. The result shows that in the long-run, a percentage changes in EATR and EMTR will increase FDI inflows in Tanzania by 0.14 percent and 0.11 percent. The short-run results indicate that a percentage change in the EATR results into an increase of FDI inflows by 0.75 percent, whereas, a unit change in the change of EMTR leads into reduction of FDI inflows by 0.15 percent.

These results signify that incentives provided by the Government to attract foreign investment has yielded the anticipated results for the country but more still needs to be done to achieve the level of growth desired. This, among others, can be done through facilitating the integration of the Tanzanian economy into the regional and global value chains by promoting import-substitution industries and broaden products mix in the niche areas such as: iron and steel industries; manufacturing industries for sugar, soap detergents, cosmetics, textiles; transportation sector; and agriculture sector such as maize seeds and edible oils.

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