



Impact of Trade Openness on Tax Revenue in Transitional Markets

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Abstract: This paper explored the influence of trade openness on tax revenue in transitional markets employing panel methods with data spanning from 2005 to 2020. It also examined the impact of interaction between trade openness and financial development on tax revenue in transitional markets using the same panel methods and data set. The influence of trade openness on tax revenue under fixed effects, random effects and dynamic GMM (generalized methods of moments) was positive and significant. Trade openness' impact on tax revenue was positive but non-significant in transitional markets according to pooled (OLS). Financial development also significantly enhanced tax revenue under dynamic GMM, random and fixed effects and non-significantly increased tax revenue under the pooled OLS. Complementarity variable non-significantly improved tax revenue under the pooled OLS whereas other remaining methods show a significant positive relationship running from the complementarity variable towards tax revenue. Financial development is therefore a channel facilitating trade openness' impact on tax revenue in transitional markets. Policy implication is that transitional markets should implement policies and strategies aimed at enhancing trade openness and financial development to be able to generate more tax revenue.

Keywords: Trade Liberalization; Tax; Transitional Economies; Revenue

JEL Classification: F1; H2; P2

1. Introduction and Background

Trade openness approximate the ease of doing business across borders and is an indicator of how integrated into the global world the economy is (Fenira, 2015; Brueckner & Lederman, 2015). The positive role played by trade openness in the economy is conclusive and is not debatable anymore in literature, consistent with Tetelesti et al. (2022). Sabina and Eldin (2018) argued that trade openness enhance competition which leads to increased productivity and innovation and consequently economic growth. According to Rahman and Islam (2023), trade openness ensures that the cost of trading with other countries becomes lower and that firms can easily specialize hence boosting economic growth. Although it is clear from literature (Banday et al., 2021; Rahman & Islam, 2023; Sabina & Eldin, 2018; Fenira, 2015; Romer, 1990; Krugman, 1980) that trade openness influences tax revenue through

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the economic growth channel, the topic on the direct role of trade openness on tax revenue has not been exhaustively pursued.

Empirical literature on the influence of trade openness on tax revenue produced contradicting results which falls into five different categories. The trade openness-led positive tax revenue, the trade openness-led negative tax revenue, neutrality between the two variables and that tax revenue is affected by trade openness through channels such as economic growth, economic growth, among others. Some empirical studies even suggest the existence of a U-shaped relationship between trade openness and tax revenue (Cage & Gadenne, 2018). These contradictions, divergent and mixed results is an indication of the existence of a gap which still needs to be filled in. This study attempts to add its voice on this unsettled academic discourse using transitional markets as a focal point of analysis.

Contribution of the study: Five ways demonstrating contribution of the study are as follows. Firstly, it gives new evidence on the impact of trade openness on tax revenue in transitional markets. Whilst, trade openness' influence on tax revenue has been widely investigated, none of such prior empirical research used transitional markets as a focal point. Secondly, this paper used the dynamic GMM methodology to address endogeneity and unobserved heterogeneity which were not dealt with in prior similar studies. Thirdly, the results of this study showing a significant positive effect of trade openness on tax revenue contributes to literature by stressing the important role of trade openness in enhancing economic development in transitional markets. Whilst such a result is like previous studies, this study expands the available literature by availing new evidence of trade openness (total goods and services as a ratio of GDP) on total revenue. Fourthly, the focus on transitional markets is quite significant as these nations represents a unique context of studying trade openness-led tax revenue hypothesis. These set of countries have become a significant global economic player and have gone through significant economic transformations. Results from such a study is important in terms of trade openness and tax revenue policy decisions formulation and implementation in other emerging markets.

This paper has got seven sections. Section 2 discusses the theoretical literature on the influence of trade openness on tax revenue, Section 3 is the empirical literature review discussion on the trade openness on tax revenue whereas Section 4 details and explains research methodology. Section 5 discusses data analysis and results interpretation. Section 6 concludes the study. Section 7 is the reference list (Bibliography).

2. Trade Openness' Impact on Tax Revenue - Theoretical Literature

Below is a summary of the theoretical rationales explaining the influence of trade on tax revenue.

According to Banday et al. (2021), the comparative advantage theory explains the relationship between trade openness and tax revenue. The theory argues that countries can benefit more from trade by specializing in the production of goods and services the country has comparative advantage on. Consistent with Rahman and Islam (2023), high levels of trade openness enhance the country's ability to trade at a lower cost and to specialize, hence leading to increased economic growth and total tax revenue generated. Sabina and Eldin (2018) also noted that high trade openness increase competition which can lead to the enhancement of innovation capabilities and productivity, economic growth and in turn tax revenue for the country. Fenira (2015) further argued that efficient and productive firms generate more revenue which can be taxed by the governments.

Rahman and Islam (2023) further argued that high level of trade openness attract foreign direct investment, which also leads to increased economic growth and consequently tax revenue by the government. Consistent with Romer (1990), high trade openness enhances technology and knowledge transfer right across nations hence improving innovation and productivity, economic growth and consequently tax revenue. In line with Krugman (1980), trade openness enables entry of new companies into the market thus increasing competition, innovation, productivity, economies of scale, economic growth and consequently tax revenue generated. Consistent with Fujita and Krugman (2004), trade openness increases concentration of economic activities in certain provinces of the country thus enabling agglomeration and spillover effects. This consequently enhances economic growth and tax revenue. According to Lin (2011), trade openness enables the industries upgrading and the economy transformation from low to high productivity levels hence facilitating economic growth and tax revenue.

3. Trade Openness - Led Tax Revenue Hypothesis - Empirical View

Table 1. Influence of Trade Openness on Tax Revenue-Empirical Literature Review

Researcher	Country	Timeframe	Approach	Findings
Rahman and Islam (2023)	BRICS	2000-2021	Panel data analysis	Tax revenue was positively enhanced by trade openness. Various forms of trade openness such as trade freedom, average trade and trade ratio were found to have positively affected tax revenue.
Gaalya et al. (2017)	East African countries	1994-2012	Fully modified ordinary least squares and dynamic ordinary least squares	The squared average tariff rate was had a negative influence on tax revenue. Trade openness had a significant positive influence on total tax, trade tax and indirect tax.
Shubati and Warrad (2018)	Middle East and North African countries	2000-2015	Panel fully modified least squares	International trade openness had a deleterious influence on government tax revenue.
Ho et al. (2023)	Developing countries	2000-2020	Generalized least squares and fixed effects model	Trade openness improved the relationship between economic growth and tax revenue. Excessive trade openness affected negatively the tax revenue-economic growth nexus.
Shrestha et al. (2021)	Resource dependent countries	1996-2014	Autoregressive distributive lag with panel data	Trade liberalization negatively affected government tax revenue of resource dependent nations.
Gaalya (2015)	Uganda	1994-2012	Fixed effects model	Trade liberalization significantly improved tax revenue performance in Uganda.
Wulandari and Wijaya (2024)	East Asia and Pacific nations	2008-2019	Panel corrected standard error model	Before moderation by government's expenditure, trade openness' tax revenue influence was negligent. After moderation, trade openness' tax revenue effect was significant.
Asghar and Mehmood (2017)	Pakistan	1980-2015	Autoregressive Distributive Lag (ARDL)	An inverse correlation between tax revenue and trade openness was observed in Pakistan.
Karimi et	Developing	1993-2012	Panel data	An insignificant enhancing effect of trade

al. (2016)	countries		analysis	openness on tax revenue was confirmed. Trade liberalization significantly enhanced tax revenue in developing countries.
Agyei and Amankwah (2018)	Ghana	1986-2012	Vector Error Correction Model (VECM)	A uni-directional causality relationship running from trade openness towards tax revenue was observed in Ghana. Forecast error variance decomposition approach also noted that both official development assistance and trade openness enhanced tax revenue in Ghana.
Zafar (2013)	Niger	1980-2003	Time series analysis	Positive effect of trade openness on tax revenue was observed in Niger.
Gnangnon (2019)	Developing countries	1980-2014	Panel data analysis	The study noted that financial development improved generation of tax revenue through the trade openness in developing countries.
Abaneme and Onakoya (2021)	Nigeria	1981-2018	Vector Error Correction Model (VECM)	Trade openness negatively affected tax revenue.
Gnangnon and Brun (2019)	Developing countries	1981-2015	Two-system GMM approach	High levels of trade openness attracted more tax revenue.
Salhi et al. (2021)	Morocco	1985-2019	Two stage least squares	Domestic tax revenue improved in response to an increase in trade openness in Morocco.
Cage and Gadenne (2018)	130 countries	1792-2006	Panel data analysis	Trade liberalization negatively affected tax revenue pre-1970 but improved tax revenue in the 19 th and 20 th centuries.
Moller (2016)	Low income countries	1975-2006	Panel data analysis	Trade liberalization led to an improvement in tax revenue generation efforts in low income countries.
Kabir (2023)	Nigeria	2011-2021	Multiple regression analysis	High trade openness (proxied by export to gross domestic product ratio) led to generation of more tax revenue.
Chemutai (2023)	Kenya	1990-2021	Multiple regression analysis	Trade openness improved tax revenue in Kenya.
Egwakhe et al (2018)	Nigeria	1987-2016	Multiple regression analysis	Trade openness affected tax revenue in Nigeria in a negative manner.
Gnangnon (2021)	Developing countries	1980-2014	Two-step generalized methods of moments (GMM)	Trade openness significantly reduced tax revenue instability.
Tsaurai (2017)	Upper middle-income countries	2007-2017	Panel data analysis	Trade openness negatively affected tax revenue
Gnangnon (2019)	Developing countries	1980-2014	Panel data analysis	Trade openness improved tax revenue in least developed countries than in non-least developed countries.

Source: Author

Theoretical literature produced two major sets of results. Firstly, trade openness positively led to increased tax revenue. Secondly, trade openness negatively affects tax revenue generated in the

economy. Empirical literature produced four sets of findings on the impact of trade openness on tax revenue. Tax revenue was found to be enhanced and or negatively influenced by trade openness. Some empirical researchers noted that the relationship between the variables is quite small and insignificant. The other set of results show that trade openness influence tax revenue indirectly. It is evident that consensus is yet to be established regarding the relationship between the two variables. The empirical literature findings are quite divergent, mixed, different and far from reaching consensus. Moreover, there is no single theory or theoretical rationale which dominates the tax revenue impact of trade openness. This paper aims to help resolve the empirical question using transitional markets as a focal point.

4. Research Methodology

Panel data (2005-2020) extracted from internationally reputable sources such as United Nations Development Programmes, Africa Development Bank and World Development Indicators was used. Transitional countries involved in this study include South Africa, Argentina, Republic of Korea, Turkey, Mexico, Peru, Colombia, Indonesia, Brazil, Singapore, Thailand, Philippines, Malaysia, India, Czech Republic and China. These transitional economies were chosen based on data availability and the fact that they are all upper middle-income countries. Equation is the general model specification, which generally outlines the relationship between tax revenue and its independent variables.

$$TR=f(\text{OPEN, FIN, HCD, URBAN, POP, FDI, GROWTH}) \quad [1]$$

Tax revenue (TR) was measured by tax revenue as a ratio of gross domestic product (GDP). The abbreviations for the explanatory variables of tax revenue and their measurement proxies are described in Table 2 below. Similar empirical research work by Rahman and Islam (2023), Gaalya et al. (2017), Shubati and Warrad (2018), Ho et al. (2023), Shrestha et al. (2021), Wulandari and Wijaya (2024), Asghar and Mehmood (2017), Asghar and Mehmood (2017), and Gaalya (2015) influenced the choice of both the explanatory variables to include in the model and their proxies.

Table 2. Apriori Expectation of the Independent Variables

Variable	Theoretical explanation	Proxy used	Expected influence
Financial development (FIN)	Masiya et al. (2015) argued that increased economy's monetization (broad money increase) leads to the availability of more tax revenue in the economy.	Domestic credit by financial sector (% of GDP)	+
Human capital development (HCD)	Castro and Camarillo (2014) noted that highly educated, skilled and healthier personnel contribute more towards increased economic growth and tax consequently more tax revenue base. According to Chilima (2005), high levels of human capital development means that the people are more able to understand and follow tax rules, codes and procedures for the betterment of the economy.	Human capital development index	+
Complementarity variable (OPEN.FIN)	According to Masiya et al (2015), foreign capital flowing through more structured and developed financial systems increases government's revenue collection figures in a more open economy.	Exports of goods and services (% of GDP) x Domestic credit by financial sector (% of GDP)	+
Urbanization (URBAN)	According to Chilima (2005), urbanization drags the economy more towards formal, away from informal format, hence allowing the economy to collect more	Urban population (% of total population)	+

	tax revenue.		
Population growth (POP)	Awasthi et al (2020) argued that the increase in tax base in response to the surge in the consumption of goods and services can only happen when population and economic growth happens.	Population growth (annual %)	+
Foreign direct investment (FDI)	Foreign direct investment enhances expansion and economic growth activities, competitiveness and formalization of the domestic economy. This contributes to the ability of the economy to collect more tax revenue (Amoh and Adom. 2017).	Net FDI inflows (% of GDP)	+
Economic growth (GROWTH)	According to Gupta (2007), companies tend to make more profit and pay more tax (value added tax, sales tax and income tax) to the government in a high economic growth environment.	GDP per capita	+

Source: Author

$$TR_{it} = \beta_0 + \beta_1 OPEN_{it} + \beta_2 FIN_{it} + \beta_3 (OPEN_{it} \cdot FIN_{it}) + \beta_4 HCD_{it} + \beta_5 URBAN_{it} + \beta_6 POP_{it} + \beta_7 FDI_t + \beta_8 GROWTH_{it} + \mu + \epsilon \tag{2}$$

Intercept is represented by β_0 whilst β_1 to β_8 stands for co-efficients of the explanatory variables. Three panel methods (Random effects, pooled OLS, fixed effects) were employed. To deal away with the dynamic effect of tax revenue data and autocorrelation influence, Masiya et al. (2015) suggested that the lag of tax revenue need to be included in the model (refer to third equation).

$$TR_{it} = \beta_0 + \beta_1 TR_{it-1} + \beta_2 OPEN_{it} + \beta_3 FIN_{it} + \beta_4 (OPEN_{it} \cdot FIN_{it}) + \beta_5 HCD_{it} + \beta_6 URBAN_{it} + \beta_7 POP_{it} + \beta_8 FDI_t + \beta_9 GROWTH_{it} + \mu + \epsilon \tag{3}$$

Equation 3 included the complementarity variable (OPEN x FIN), consistent with Lin (2011), Rahman and Islam (2023), and Krugman (1980), whose studies argued that trade openness only influence tax revenue through the economic growth and other channels. The dynamic GMM approach is the econometric approach employed to estimate equation 3. The argument that tax revenue is enhanced by its prior values is in line with the Keynesian view, was promoted by Castro and Camarillo (2014).

5. Data Analysis

Table 3. Correlation analysis

	TR	OPEN	FIN	HCD	URBAN	POP	FDI	GROWTH
TR	1.00							
OPEN	-0.01	1.00						
FIN	0.29***	0.36***	1.00					
HCD	-0.03	0.51***	0.18***	1.00				
URBAN	0.1	0.34***	-0.06	0.74***	1.00			
POP	0.06	0.34***	-0.17***	-0.13**	0.12*	1.00		
FDI	-0.09	0.79***	0.14**	0.43***	0.44***	0.24***	1.00	
GROWTH	0.0002	0.77***	0.33***	0.74***	0.64***	0.06	0.77***	1.00

Source: Author

Table 3 shows that there is a multicollinearity problem between data sets, in line with Stead (2007). The problem exists between (1) trade openness and FDI, (2) trade openness and economic growth, (3) human capital development and urbanization, (4) human capital development and economic growth and (5) FDI and economic growth because their correlation value is more than 70%.

Table 4. Statistics of a descriptive nature

	TR	OPEN	FIN	HCD	URBAN	POP	FDI	GROWTH
Mean	13.97	87.47	70.20	0.76	68.59	1.13	3.78	11287
Median	13.57	55.84	50.33	0.76	73.58	1.17	2.57	7619.92
Maximum	25.05	437.33	165.39	0.94	100.00	5.32	32.17	66679
Minimum	8.57	22.11	10.65	0.52	29.24	0.03	0.06	729.00
Standard deviation	3.35	82.26	44.13	0.09	18.37	0.61	4.96	12214
Skewness	1.42	2.55	0.48	0.04	-0.37	1.98	3.63	2.57
Kurtosis	5.55	9.38	1.70	2.64	2.28	14.1	16.48	9.91
Jarque-Bera	145.65	667.01	26.07	1.39	10.85	1390	2343	740.15
Probability	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00

Source: Author

Table 4 shows that Jarque-Bera criteria's probability is zero except for human capital development, an indication of the existence of abnormal distribution of the data. Only urbanization data set is negatively skewed whilst the remaining data sets are positively skewed. This is another evidence of data not normally distributed. Only economic growth data (more than 100) is characterized by the presence of extreme values using standard deviation as a yardstick. The range values for trade openness, financial development and economic growth also exceeds 100, an indication of the existence of extreme values.

The conversion of all data sets into natural logarithm which was done at this stage before unit root testing resonate with Aye and Edoja (2017). Spurious results, multicollinearity, extreme values, abnormal data distribution and autocorrelation are decisively dealt with, by such an econometric decision. First difference panel stationarity results indicate that all the data sets were integrated of first order.

Table 5. Panel Root Tests - Individual intercept

Level	LLC	IPS	ADF	PP
TR	-0.8387	-0.3794	35.5425	35.9322
TOPEN	-2.9074***	-0.3396	31.8301	45.2189
TFIN	-3.6993***	-0.9503	39.9555	77.7230***
THCD	-8.7230***	-4.5334***	76.7402***	76.7620***
TURBAN	-4.7196***	1.6072	23.5714	63.9850
TPOP	-4.2723***	-1.8701**	66.4835***	24.4738
TFDI	-4.7610***	-3.2935***	61.9092***	110.922***
TGROWTH	-6.9766***	-3.4610***	62.6737***	135.941***
First difference				
TR	-4.8168***	-4.5570***	76.3673***	135.948***
TOPEN	-7.9644***	-5.4605***	88.1510***	202.887***
TFIN	-5.2155***	-4.3391***	75.7007***	115.365***
THCD	-19.7411***	-16.6440***	236.186***	175.019***
TURBAN	-5.6268***	-5.6823***	81.7052***	172.671***
TPOP	-3.1349***	-2.8263***	60.7726***	85.2044***
TFDI	-10.6960***	-9.7249***	146.057***	336.009***
TGROWTH	-8.5074***	-4.9180***	82.0121***	100.550***

Source: Author's compilation from E-Views

Note: LLC, IPS, ADF and PP stands for Levin, Lin and Chu (2002); Im, Pesaran and Shin (2003); ADF Fisher Chi Square and PP Fisher Chi Square tests respectively. *, ** and *** denote 10%, 5% and 1% levels of significance, respectively.

Kao (1999) methodology to panel co-integration was used and produced results in Table 6.

Table 6. Kao co-integration tests

Series	ADF t-statistic
TR OPEN FIN HCD URBAN POP FDI GROWTH	-2.0322***

Source: Author

At one percent significance level, a long run relationship among the variables was observed, resonating with Tembo (2018). Such results paved way for the next stage, which is main data analysis (econometric estimation using panel methods such as the dynamic GMM, random effects, fixed effects and pooled OLS).

Table 7. Main data analysis results

	Dynamic GMM	Fixed effects	Random effects	Pooled OLS
TR _{it-1}	0.9712***	-	-	-
OPEN	0.0482**	0.5076***	0.4349***	0.0461
FIN	0.0467**	0.2593*	0.2994**	0.0759
OPEN.FIN	0.0248***	0.0532**	0.0246*	0.0090
HCD	0.0923	0.0476	0.0866	0.5218
URBAN	-0.0022	-0.3628**	-0.2237*	-0.1825
POP	0.0034	-0.0400***	-0.0305**	-0.0245
FDI	0.0017	0.2596	0.1849	0.1174
GROWTH	0.4824***	0.1271***	0.0472*	0.0387*
Adjusted R-squared	0.61	0.64	0.54	0.58
J-statistic/F-statistic	231	73.45	59.14	-
Prob(J-statistic/F-statistic)	0.00	0.00	0.00	0.00

***, ** and * denote 1%, 5% and 10% levels of significance, respectively

Source: Author's compilation from E-Views

According to the dynamic GMM, tax revenue was significantly enhanced by its lag, in support of an argument put forward by Masiya et al. (2015) which says that increased tax revenue is a panacea for economic growth, which provides a favourable macro-economic environment for firms to thrive. Trade openness's impact on tax revenue was significantly positive under the fixed effects, random effects and dynamic GMM whilst pooled OLS shows that tax revenue was non-significantly improved by trade openness. These results are consistent with Rahman and Islam (2023) whose study argued that high levels of trade openness enhance the country's ability to trade at a lower cost and to specialize, hence leading to increased economic growth and total tax revenue generated.

The positive influence of the financial sector on tax revenue was found to be (1) significant under the fixed effects, dynamic GMM and random effects and (2) non-significant under the pooled OLS approach. These results support an argument by Masiya et al. (2015) which says that increased economy's monetization (broad money increase) leads to the availability of more tax revenue in the economy.

The complementarity between the two variables influenced tax revenue in a significant positive way under random effects, dynamic GMM and fixed effects whereas the same complementary variable's positive influence on tax revenue under the pooled OLS was found to be non-significant. Both set of results resonate with Masiya et al. (2015) whose study argued that foreign capital flowing through more structured and developed financial systems increases government's tax revenue collection figures in a more open economy.

Across all the four panel methods, tax revenue was non-significantly improved by human capital development, in line with Chilima (2005) who argued that high levels of human capital development mean that people are more able to understand and follow tax rules, codes and procedures for the betterment of the economy.

Urbanization negatively affected tax revenue in a significant way under the fixed and random effects whereas the negative impact of urbanization on tax revenue was insignificant under the pooled OLS and the dynamic GMM. The results contract Chilima (2005) whose argument is that urbanization drags the economy more towards formal, away from informal format, hence allowing the economy to collect more tax revenue.

The dynamic GMM show a non-significant positive impact of population growth on tax revenue, consistent with Awasthi et al (2020) which explained that an increase in tax base in response to the surge in the consumption of goods and services can only happen when population and economic growth happens. Pooled OLS shows that population growth non-significantly reduced tax revenue whereas fixed and random effects indicates a significant negative relationship running from population growth to tax revenue. Such results are consistent with Shubati and Warrad (2018)'s findings and reasoning that increase in population size forces the government to divert financial resources away from economic growth tailored projects towards consumptive expenditure to meet the needs of the people.

FDI's impact on tax revenue was positive and non-significant, in line with Amoh and Adom (2017) whose study observed that FDI improves economic growth activities, formalization and competitiveness of the domestic economy hence facilitating more tax revenue generalization.

Economic growth's impact on tax revenue was positive and significant across all panel methods. Results agree with Gupta (2007) whose study noted that firms tend to make more profit and pay more tax (value added tax, sales tax and income tax) to the government in a high economic growth environment.

6. Conclusion

This paper explored the influence of trade openness on tax revenue in transitional markets employing panel methods with data spanning from 2005 to 2020. It also examined the impact of interaction between trade openness and financial development on tax revenue in transitional markets using the same panel methods and data set. The influence of trade openness on tax revenue under fixed effects, random effects and dynamic GMM (generalized methods of moments) was positive and significant. Trade openness' impact on tax revenue was positive but non-significant in transitional markets according to pooled (OLS). Financial development also significantly enhanced tax revenue under dynamic GMM, random and fixed effects and non-significantly increased tax revenue under the pooled OLS. Complementarity variable non-significantly improved tax revenue under the pooled OLS whereas other remaining methods show a significant positive relationship running from the complementarity variable towards tax revenue. Financial development is therefore a channel facilitating trade openness's impact on tax revenue in transitional markets. Policy implication is that transitional markets should implement policies and strategies aimed at enhancing trade openness and financial development to be able to generate more tax revenue. Future studies should examine threshold levels of trade openness enough to significantly enhance tax revenue in transitional markets.

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