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Does the Financial Inclusion Creates Tax Revenue for the Government? Panel analysis on selected Developing Countries

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Abstract

This study examines the impact of financial inclusion (FI) on governmental tax revenue (TR) in 19 developing countries from 2004 to 2020, while also considering the effects of other macroeconomic variables. Earlier literature on FI effects has shown increase in macroeconomic stability, reduction in poverty and enhancement of welfare, however, FI impact on tax revenue remains to be investigated. This study provides valuable insights into the role of FI and other macroeconomic variables in increasing government TR in the context of developing countries. Using panel least square and random effect models, we find that FI has a significant and positive effect on TR, with an estimated coefficient of 1.17 and a t-statistic of 1.12. Additionally, we find that corruption and interest rates also have a significant impact on TR. These findings have important policy implications, highlighting the need for governments to prioritize FI as a means to enhance TR, and increasing welfare and development. Policymakers of developing countries may consider implementing measures such as reducing taxes on banking transactions and promoting cashless transactions to encourage greater FI and boosting TR in the long run.

Key Words: *Financial Inclusion, Tax Revenue, Panel Data, Macroeconomic Variables*
JEL Codes: G21, H24, 016

1 Introduction

For policymakers it is difficult to collect tax and the implementation of tax law for the enforcement agencies is also a major concern. It is, therefore, better to directly raise tax revenues (TR) by taking into account its determinants. This study seeks to

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find out whether Financial inclusion (FI) is a significant factor in increasing TR for a country's government. As people become more financially included and their incomes increase over time, will it lead to increase in government TR? According to the World Bank (WB), since 2011 about 1.2 billion people have been financially included. However, 1.7 billion people are still economically excluded.

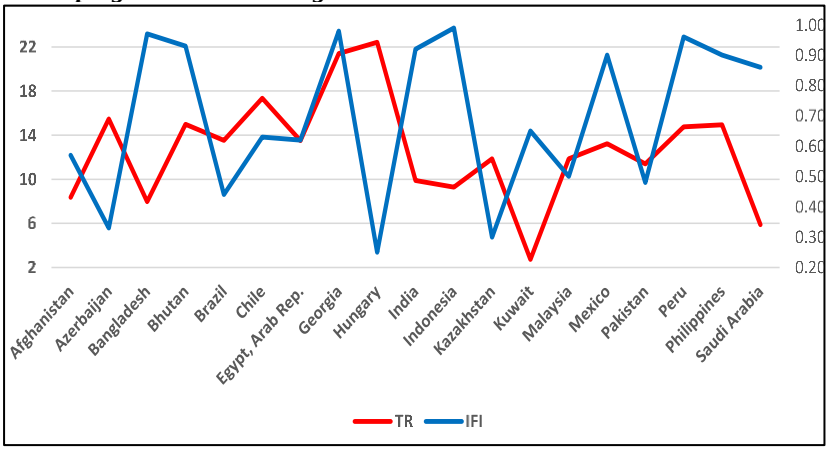
FI formalizes and ensures adequate accessibility of the financial system by the relevant stakeholders. Recent studies such as Martínez, (2011), have shown that FI is an important governmental strategy to boost growth. Considering the government's capacity to ensure that productive resources are efficiently allocated, FI is used to reduce investment costs. This can also be identified as an integrated financing system, as it significantly improves day-to-day financial management and reduces the growth of often exploitative informal sources of credit (such as lenders). Having inclusive financial system is well recognized as a key policy concern in many countries, with the key stakeholders being financial regulators, governments and the banking sector.

The term FI is elucidated by Clámara & Tuesta, (2014) as a means to not only enhance accessibility to formal financial services but also to diminishing barriers. These barriers being perceived by ones not participating in the formal system. Another definition by the International Monetary Fund (IMF) is that "FI is the planned effort to give financial services to all, particularly the poor people." Recently FI has gained much popularity and is focused on making financial services accessible to the disadvantage segment of the society. This is because it is required for inclusive growth which in turn ensures that everyone has access to opportunities. It is elaborated by Park & Mylenco, (2015) that "an inclusive financial system is a key component of inclusive growth that expands access to financial services for families. Improves health by protecting against negative interference and balancing consumption. "

Figure 1 shows selected developing countries and what relationship exists between TR and FI during 2020. The figure indicates presence of positive correlations between the two

variables as they both are moving in the same direction. This figure shows that in order to raise the TR the government must focus towards increasing FI.

Figure 1:
Relationship Between Tax Revenue and Financial Inclusion of Selected Developing Countries During 2020

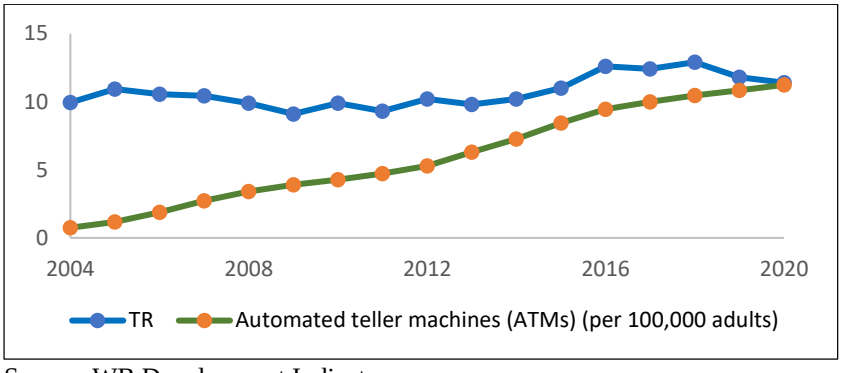


Source: Author's Illustration based on the data collected from the World Bank Development Indicators (WDI)

Figure 2a shows the relationship between TR and ATM of Pakistan during 2004 to 2020. The trend suggests that there is a positive relationship between these two variables because these two variables are moving in same direction. Number of ATM is one of the indicators which we used for the calculation of FI index. Figure 2b shows the relationship between TR and borrowers from commercial bank of Pakistan during 2004 to 2020. The trend suggests that there is a positive relationship between these two variables because these two variables are moving in same direction. Figure 2c shows the relationship between TR and domestic credit to private sector of Pakistan during 2004 to 2020. The trend suggests that there is positive relationship between these two variables because these two variables are moving in same direction[3].

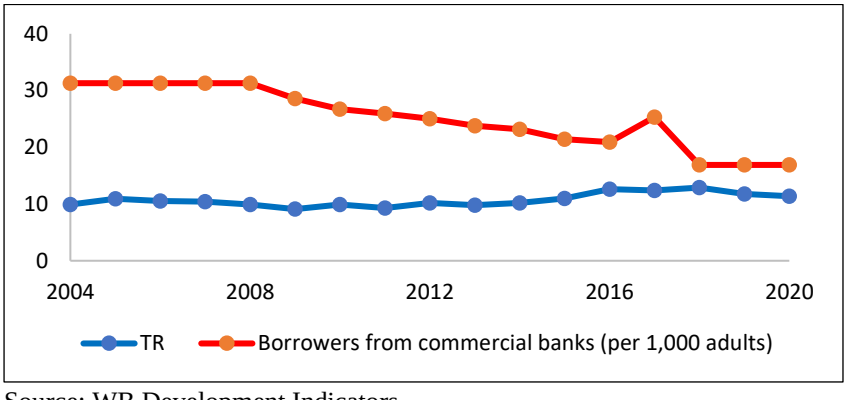
[3] The same analysis is done for all the other selected countries. Overall, they indicate similar results to that of Pakistan.

Figure 2a:
Automatic Teller Machines in Pakistan



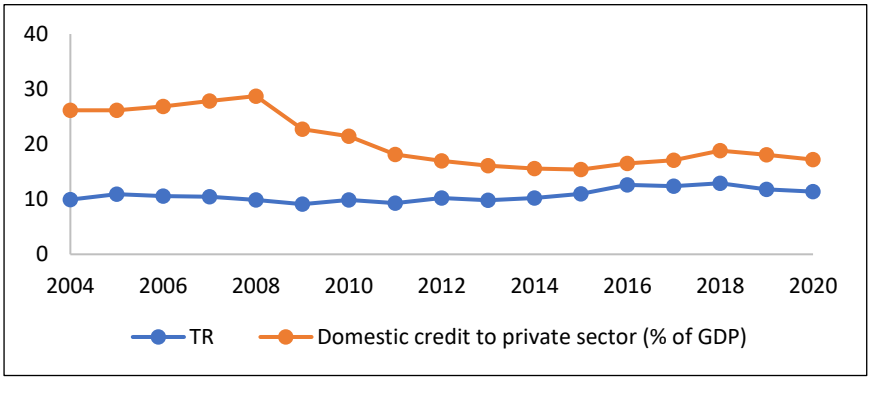
Source: WB Development Indicators

Figure 2b:
Borrowers From Commercial Banks in Pakistan



Source: WB Development Indicators

Figure 2c:
Domestic Credit to Private Sector in Pakistan



Source: WB Development Indicators

The main purpose of this study is to study the relationship between FI and TR. The literature on the impacts of FI has just started to be enriched. Both developed and developing economies find it difficult to implement tax laws and efficiently make collections. Since one of the main objectives of the policymakers is to augment TR, they can do so by focusing on the determinants of TR. Although it is the main source of income for the national exchequer, developing countries have found it difficult to collect sufficient TR. Their tax-to-GDP rate has always been less than 10 percent over the years, which is very low when seen in contrast to their developed counterparts. Considering this important policy objective, it is imperative that policymakers design the policy to stimulate the financial market, which in turn would generate higher revenue.

The main aim of this study is to examine all determinants that can augment TR. For this reason, we use the period 2004 to 2020 to create a panel of 19 developing countries. The variable FI is a computed index. A lower value of the FI index indicates a lower FI, with 0 indicating complete financial exclusion. On the other hand, a higher value indicates a larger FI, and 1 indicates a full FI (more details in the theoretical framework section). Based on research goals, the following question can be answered with the help of empirical extrapolation. Does increasing the FI index significantly increase TR in developing countries?

The structure of the paper is organized into 6 sections. The very next section contains the literature review. Section 3 discusses the theoretical framework and model specification. Section 4 elaborates on the data sources, econometric methodology and the empirical analysis. The last section gives the conclusion and some suggested policy implications.

2 Literature Review

FI plays an important role to increase macroeconomic stability, reduce poverty and enhance welfare in a country (Sarma & Pais, (2011) and Kim, (2016)). We can find many definitions of FI defined by various authors. For example, Sinclair (2011)

explains FI as the ability to access financial services appropriately. On the other hand, Sarma, (2008) explains FI as the ease of access and practice of the formal financial system by all the members of the economy. Mohan, (2006) linked FI with economic growth for the case of India and shows that FI leads to an increase in both the economic growth and development in the country. While Honuhan, (2008) studied that GDP is the key determinant that impact stability of bank stability and FI in Kenya economy. Levine, (1997) examined the views of neo-classical model and suggested that for that economy which has numerous banks and several equities, the market grows more rapidly compared to other nations. Likewise, (Burgess and Pande, 2003) highlighted that the important variables to decrease poverty is to deliver easy access to financial institutions. Allen et al. (2013) suggested that commercial banks should improve easy access to the financial sectors of the underprivileged domestics in Kenya. A rise in financial sector services along with mobilization of rural savings can improve the lives of rural people. This has been confirmed in a study done on Malawian rural population (Brune et al., 2011). This is mainly because the poor family had easy access to finances for agriculture inputs.

A study on Indian financial inclusion states that although India experienced a fast economic growth, it was not comprehensive (Vivek Anandan, 2013). India has low income and high poverty because their financial services are enjoyed by some individuals and for this reason Indian's government adopted some specific policies in order to tackle the problem. This included nationalization of bank direct benefits transfer and bank credit to private sector.

Musau et al. (2018) studied the association between index of FI and credit risk management in Kenya's bank management system by incorporating the data set from 2007-2015 and used econometric technique multiple regression analysis on panel data. The descriptive statistics and result suggested that there is a positive association between credit risk and index of FI in Kenya. The case built so far makes it obvious that by an increase in FI there are various advantages because it ultimately brings enormous income into the economy. One of the main

opportunities, among others, will be for the policymakers that they can use FI as a means to boost TRs.

Several papers have investigated the factors of TR. The different factors include GDP, inflation rate, corruption index, investment, savings, growth of agriculture and industrial sector, etc (Bird et al., (2008), Chaudhry and Munir, (2010), Dioda, (2012), Karagoz, (2013) and Castro & Camarillo, (2014)). However, currently, no specific study can be found which studies the relationship between TR and FI. Although we can find some literature which studies the relationship of TR with only financial development. Taha et al., (2013) examined the Malaysian data to deduce the relationship between TR and financial activity. Their study suggested presence of unidirectional causality from the stock market to the TR. While Ilieski, (2015) examined the relationship between TR and the stock market by making a panel of 96 nations using data from 1990-2008. Their study concluded that there is a positive and significant association between TR and the stock market. Similarly, Bayer and Karamelikli, (2017) analysed the link, in Turkey, between TR and financial development by incorporating the period 2006-2016. The authors used the stock market and banking sector development as a proxy for financial development and concluded a positive relationship between TR and financial development. Joia and dos Santos, (2017) found that e-government companies meet the requirement for access to financial system. Sethi and Sethy, (2019) established that significant and positive effects of FI on economic growth by examining supply and demand for financial services. Anarfo et al., (2019) used VAR technique and studied the relationship between FI, financial sector development, and economic growth. The sub-Saharan Africa data shows that IF is a vital determinant for the development of the financial sector. Another African study analyzing impact of ICT on economic inequality over the dimensions of the depth, efficiency, and size of the financial sector shows that it reduces income inequality (Tchamyou, Erreygers and Cassimon, 2019). This is possible by enacting the financial services sector.

3 Theoretical Framework and Model Specification

This study adopted the method of Sarma (2008) for constructing the FI index. The FI Index was created using three key indicators, including the number of ATMs per 100,000 adults, commercial bank borrowers per 1,000 adults, and the domestic credit-to-GDP ratio. Whereas the first two indicators show banks accessibility, the latter variable indicates the usage of FI. The data for the indicators are from WB development indicators and from the year 2004 to 2020. Following Sarma, (2008), the specifications given below show that the first step to calculating FI is to find its dimension by the following procedure.

$$\text{Di} = \frac{Ai - mi}{Mi - mi} \tag{1}$$

Where Ai dimension represents the actual value, and mi and Mi dimensions represent minimum and maximum value respectively. Following Khatoon, & Ahmed, (2019), the FI for country i is calculated by Normalized Inverse Euclidean (NIE). NIE distance is pointed di and put in equation 1, from the ideal point which is 1. The general specification of the formula is given in (2). The term Di used in equation (2) is the dimension that was calculated in (1).

$$\text{FIIi} = 1 - \sqrt{\frac{(1-d1)2 + (1-d2)2 + (1-d3)2 + \cdots\ldots\ldots (1-dn)2}{\sqrt{n}}} \tag{2}$$

The above formula is used to get the index of FI. The value of the index lies from 0 to 1. High FI is deduced if the index is closer to 1. Correspondingly, a country having a low index indicates that the role of FI is little in the economy. In line with the objectives of our study, the following model was developed.

$$GTRit = \alpha 0 + \alpha 1\, FIIit + \alpha 2\, SaVit + \alpha 3\, GDPit + \alpha 4\, FDIit + \alpha 5\, POPit + \alpha 6\, CORit + \alpha 7\, INTRit + \mu it \tag{3}$$

Where, GTRit is Government tax revenue for developing countries at time t. IFIit is the index of Financial Inclusion for developing countries at time t. SaVit is saving rate for developing Countries at time t. GDPit is gross domestic product for developing countries at time t. FDIit is foreign direct investment

for developing countries at time t. POPit is population for developing countries at time t. CORit is corruption for developing countries at time t. INTRit is interest rate for developing countries at time t. μit is the error Term at time t.

4 Data Sources and Methodology

In this research, we make a panel of 19 developing counties by incorporating the period from 2004 to 2020. The dependent variable is the GTR while explanatory variables are namely IFI, net FDI inflows (log form), current GDP USD (log form), population (log form), corruption perception index, interest rate, and saving rate current US dollar (log form). We obtained the data of these variables mainly from the WB Development Indicator. For construction of the FI index, we used three indicators namely number of ATMs per 100000 adults, borrowers from commercial banks per 1,000 adults and domestic credit to GDP ratio.

The panel data model is a regression model that accounts for both within-group variation and between-group variation. In this study, we have a panel of 19 developing countries observed over a period of time (2004-2020), so we have used a panel regression model to estimate the relationship between the independent variables and GTR.

We have used panel least squares (PLS) to estimate the panel data model. PLS is a method for estimating panel data models that takes into account both within-group variation and between-group variation. PLS involves estimating separate regression coefficients for each individual or group in the panel. The PLS estimator is consistent and efficient when the disturbances are assumed to be homoscedastic and uncorrelated with the regressors. We have then used test for heteroscedasticity in the panel data model using the Breusch-Pagan LM test. The null hypothesis is that there is no heteroscedasticity in the data. If the null hypothesis is rejected, it means that there is heteroscedasticity in the data. In our case we have p-value less than 0.05 so we rejected null hypothesis and move to random effect model (see table 04 for Breusch-Pagan LM test). In our study, heteroscedasticity is found, thus providing us evidence to use a

random effects model instead of the fixed effects model. The random effects model is a method for estimating panel data models that takes into account both within-group variation and between-group variation, as well as heteroscedasticity in the data. The random effects model assumes that the unobserved heterogeneity is uncorrelated with the regressors (see table 05 for Huasman test result). Table 01 show the result for panel least square and random effect model.

5 Results and Discussion

Table 1 shows the results of the panel least square model show that the coefficient of FII is positive and statistically significant at the 1% level, indicating that an increase in financial inclusion leads to an increase in government TR for developing countries.

Table 1:
Panel Least Square and Random Effect Model

Macroeconomic Variables	Results for Panel Least Square	Random Effect Model
FII	1.17 (1.12)	3.18 (5.68)*
LnSV	0.56 (2.81)*	0.42 (1.50)
LnGDP	-3.46 (-4.1)*	-4.83 (-4.48)*
LnFDI	0.04 (0.50)	-0.02 (-0.73)
LnPOP	0.92 (2.85)*	1.16 (1.43)
CORRUP	2.06 (4.07)*	1.06 (2.05)*
INTER	0.07 (2.48)*	-0.02 (-1.46)
R-Square	13%	11%

Note: Figures in parenthesis indicate t-statistics. * is 1% level of significance.
Source: Author's calculation.

This finding supports the hypothesis that financial inclusion creates TR for the government. The coefficient of LnSV is positive but not statistically significant, indicating that savings rate has no significant effect on government tax revenue for

developing countries. The coefficient of LnGDP is negative and statistically significant at the 1% level, indicating that as GDP increases, government TR decreases. The coefficient of LnFDI is positive but not statistically significant, indicating that foreign direct investment has no significant effect on government tax revenue for developing countries. The coefficient of LnPOP is positive and statistically significant at the 1% level, indicating that as population increases, government tax revenue also increases.

The coefficient of CORRUP is positive and statistically significant at the 1% level, indicating that corruption has a significant positive effect on government TR for developing countries. The coefficient of INTER is positive and statistically significant at the 1% level, indicating that interest rate has a significant positive effect on government TR for developing countries. Overall, the panel least square model explains 13% of the variation in government TR for developing countries.

The results of the random effect model show that the coefficient of FII is positive and statistically significant at the 1% level, indicating that an increase in financial inclusion leads to an increase in government tax revenue for developing countries. This finding supports the hypothesis that financial inclusion creates TR for the government. The coefficient of LnSV is positive but not statistically significant, indicating that savings rate has no significant effect on government tax revenue for developing countries. The coefficient of LnGDP is negative and statistically significant at the 1% level, indicating that as GDP increases, government tax revenue decreases.

The coefficient of LnFDI is negative but not statistically significant, indicating that foreign direct investment has no significant effect on government TR for developing countries. The coefficient of LnPOP is positive and statistically significant at the 5% level, indicating that as population increases, government tax revenue also increases. The coefficient of CORRUP is positive and statistically significant at the 5% level, indicating that corruption has a significant positive effect on government tax revenue for developing countries. The coefficient of INTER is negative but not statistically significant, indicating that interest

rate has no significant effect on government tax revenue for developing countries. Overall, the random effect model explains 11% of the variation in government tax revenue for developing countries.

In summary, the results of both models indicate that FI has a significant positive effect on government TR for developing countries, while GDP, corruption, and population also have significant effects on government TR. The findings suggest that policymakers should focus on promoting financial inclusion to increase government TR, while also addressing issues related to corruption and population growth.

6 Conclusion and Policy Recommendations

Based on the results and the above discussion, it can be In this study, we aimed to explore the relationship between financial inclusion (FI) and tax revenue (TR) in a panel of 19 developing countries using data from 2004-2020. Our results showed a significant and positive relationship between FI and TR in the long run. This finding highlights the importance of increasing access to FI for enhancing macroeconomic stability, increasing welfare, and decreasing poverty in developing countries.

The policy implications of these results are significant. The government should consider implementing policies that prioritize FI, such as waiving taxes on banking transactions and imposing taxes on cash withdrawals from banks. Such policies can contribute to increasing TR in the long run and discouraging corruption. The results of this study are particularly useful for regulators and government bodies striving to enhance TR, as prioritizing FI can lead to a significant increase in collections.

However, the study's limitations highlight the need for more coherent data to be available in the future. Subdividing TR according to sources such as income tax, corporate tax, withholding tax, sales tax, stock exchange tax, bank tax, etc., would provide a more detailed analysis of the relationship between FI and TR. Overall, this study emphasizes the importance of prioritizing FI to enhance TR and improve economic conditions in developing countries.

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Appendix

Table 2:
Descriptive Statistics

	TR	IFI	Gross Saving	Net FDI Inflow	GDP	Corruption	Real Interest Rate	Population
Mean	12.49	0.49	10.20	9.67	11.19	-0.28	6.99	17.39
Median	12.83	0.48	10.65	9.75	11.28	-0.39	5.03	17.24
Maximum	24.89	0.99	11.93	24.82	12.46	1.65	47.90	21.04
Minimum	0.72	-0.00	0.00	1.00	8.83	-1.64	-11.72	13.37
Std. Dev.	5.32	0.28	2.09	2.98	0.76	0.74	9.30	1.76
Skewness	-0.12	0.08	-3.45	1.71	-0.89	0.66	1.87	-0.22
Kurtosis	3.06	1.99	15.22	14.64	3.75	3.01	7.57	2.80
Jarque-Bera	0.77	13.92	2643.61	1977.22	50.15	23.46	468.76	3.13
Probability	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.21
Sum	4024.78	156.74	3284.65	3113.92	3601.73	-89.61	2250.35	5616.56

Sum Sq. Dev.	9079.13	25.72	1405.06	2847.08	184.96	174.09	27764.64	994.75
Observations	322	322	322	322	322	322	322	322

Source: Author's Calculation

Table 3:
Correlation Matrix

	TR	**IFI**	**Gross Saving**	**Net FDI Inflow**	**GDP**	**Corruption**	**Real Interest Rate**	**Population**
TR	1.00							
IFI	0.06	1.00						
Gross Saving	0.08	0.08	1.00					
Net FDI Inflow	0.01	0.10	0.18	1.00				
GDP	-0.13	0.17	0.63	0.30	1.00			
Corruption	0.27	0.18	0.25	-0.07	-0.15	1.00		
Real Interest Rate	0.10	0.04	-0.06	0.13	0.03	-0.07	1.00	
Population	-0.14	0.02	0.29	0.27	0.78	-0.48	0.04	1.00

Source: Author's Calculation

Table 4:
Breusch-Pagan LM

Test	Statistic	D.F	Prob.
Breusch-Pagan LM	516.9961	171	0.000

Source: Author's Calculation

Table 5:
Husman Test Result

Test Summary	Chi-Sq. Statistic	Chi-Sq. D.F.	Prob.
Cross-section random	3.188076	7	0.8671

Source: Author's Calculation