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RESEARCH PAPER

Taxable Capacity and Tax Effort: An Analysis for Pakistan

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ABSTRACT

Tax revenue is a major source of income for both developing and developed economies. The primary goal of the present study is to examine the factors of tax revenues in Asian developing economies with GDP levels comparable to Pakistan. Aside from the core goal, other aims include tax effort indices for Pakistan based on regression results from the estimated panel and investigating the impact of financial development and institutional quality on tax performance. Over the period of 1996-2021, a panel dataset of six Asian developing economies including Pakistan, is used. The analysis employs Fixed Effect (FE) and Multiple Linear Regression modeling (MLRM) approaches. The study finds that, for Asian developing economies, agricultural share, manufacturing share, services share and inflation have a negative impact on tax revenues but government expenditures and urbanization have a positive and significant effect on tax revenues. However, intriguing findings are obtained when financial development and institutional quality are included in models. Financial development is most likely is enhancing economy's tax capacity which might indicate why it has a negative impact on estimated tax effort. The same holds true for the negative sign of institutional quality.

KEYWORDS Taxable Capacity, Tax Effort, Pakistan

Introduction

Taxation is an essential driver of income for both developing and developed nations. The primary goal of a tax structure is to raise an adequate quantity of money to pay essential government spending on goods and services. Tax revenue is a major source of income for both developing and developed economies. The core goal of a tax structure is to elevate an adequate amount of revenue to support essential government spendings on the goods and services provided by government. According to Kaldor (1963) "if a country wishes to become 'developed' it needs to collect in taxes an amount greater than the 10-15 percent found in many developing countries." The ability of a state to generate revenue is mostly determined by its adequate tax capacity (tax base).

Developing economies usually acquire a very low volume of tax revenues because these economies face a number of obstacles in revenue collection process. There are various reasons of low tax revenues in developing economies, e.g., narrow tax base, lower industrial and services share, high agricultural share, tax evasion, bad law and order, political instability, corruption, poor tax reforms, and foreign aid. They can reduce tax revenues significantly and hurt development and economic growth (Mawejje and Munyambonera, (2016), Atsan, (2017) and Amoh, (2019)).

As tax revenues are very low in lower income economies which show indication of lower tax effort. Economies with lower tax effort show that they do not use their tax bases well, while a larger tax base is linked with larger taxable capacity (Addison and Levin, (2011) and and Langford and Ohlenburg, (2016) and Amoh, (2019)).

According to Fenochietto and Pessino (2013), taxable capacity is "it's the maximum level of tax revenue that a country can achieve". While, Gillis (1989) explained "tax effort is

the extent to which a country utilizes its taxable capacity". Atsan (2017) defines tax effort as, "proportional relationship between the estimated tax capacity of a country and actual tax collection".

However, tax revenues in most of developing economies don't generate adequate amount to cater revenue for government expenditures. Normally, it is supposed that tax revenue should rise with economic growth, still, this looks not to be true in case of Pakistan. Pakistan reported tax revenue to GDP ratio of 11.8 percent in 2019, 9.3 percent in 2020 and 9.4 percent in 2021. Unluckily, Pakistan is still bridging this gap via mobilization of revenues.

The main objective of the present study is to analyze the determinants for tax revenue of Asian developing economies having GDP level close to Pakistan. Apart from main objective, other objectives are to construct tax effort indices for Pakistan based on regression results of estimated panel and to explore the impact of financial development and institutional quality on tax performance.

To the best of our knowledge, the contribution of the present work may be assessed on the fact that empirical study exists to analyze the determinants of tax revenues in Asian developing economies with GDP levels comparable to Pakistan. In addition, there is no empirical evidence exist on evaluating tax effort indices for Pakistan based on regression findings of estimated panels or on exploring the impact of financial development and institutional quality on tax performance. Our reasoning differs markedly from that of all previous study.

Literature Review

Lotz and Morss (1967) were the first ones to formulate and measure the theoretical base for tax effort of countries in 72 developing and developed economies. They found a positive and significant impact of per capita GNP and share of foreign trade sector on tax effort. In the later study conducted by them in 1970, they explored that export share and monetization rate improve the tax to GDP ratio significantly.

Afterwards, by following Lotz and Morss (1967), Shin (1969) put forwarded a new model and added three more variables (agricultural sector share, population growth rate and inflation rate. The results showed that, inflation, per capita income and trade openness had significant and positive effects on tax revenues. While, agricultural share and population growth were negatively associated with tax revenues.

Bahl (1971) examined the relationship between tax revenue and various other factors in developing economies. His results suggested that Per capita income, agricultural share, export share and mining share were significant and strong determining factors of tax revenues in developing economies. Export share, mining share and per capita income were positively related to tax revenues while agriculture share was negatively affecting tax revenues. Likewise, Chelliah et al., (1975) came across the matching result.

Ala Ghaleb and Ahmad (2016) analyzed the determinants of tax effort by constructing tax effort index and estimated tax capacity. Their findings showed that trade openness, manufacturing and services sector share were positively related to tax effort. On the other hand, mining and agricultural sector share had negative impact on tax effort.

Epaphra and Massawe (2017) worked on the institutional determinants of tax revenue in Africa. They found that governance and corruption were strong determinants of tax revenue. Their study concluded that corruption exerted a significant but negative impact on tax revenues. On the other hand, regulatory quality, rule of law, government effectiveness and voice and accountability inclines to boost tax revenues.

Okon (2018) examined the role of financial development on tax revenues in Nigeria. For this purpose, he utilized eight measures of financial development with regard to access,

depth, efficiency and stability of financial markets and institutions both. The findings showed that financial development plays a vital role in determining tax revenue. While for Pakistan, Akram (2016) examined the financial markets role on tax revenues. He concluded that market capitalization and number of branches affected tax revenues positively and significantly in long run.

Ikhatua and Ibadin (2019) investigated the determinants of tax effort in Nigeria. The estimation results showed that tourism sector productivity, agricultural sector productivity, human capital development and trade openness were positively and significantly associated with tax effort. While, on the other hand, capital flight, manufacturing productivity and telecommunication productivity affected tax revenue effort negatively and significantly.

Rahim and Asma (2019) explored the impact of sectoral growth on tax revenues in developing economies. They concluded that not only sectoral growth is playing a significant role in determining tax revenues but there are also a number of other control variables which can impact tax revenues potentially such as inflation, trade, government expenditures, trade openness, per capita income urbanization, corruption and voice and accountability.

Hassan et al., (2021) examined the impact of governance on tax revenues in Pakistan. Along with governance they used inflation and industrial sector share as other control variables in their analysis. The findings of the study revealed that government stability, internal and external conflicts and law and order, and internal exerted a positive but significant effect on tax revenue in short and long run. Besides, industrial sector share and inflation also positively linked with tax revenues in Pakistan.

Tsaurai (2021) examined the tax revenue determinants in upper middle income economies. He found that, economic growth, FDI, financial development, human capital development, population growth and urbanization had positive but significant effect on tax revenues. While, exchange rate and trade openness were negatively associated with tax revenues.

Theoretical and Empirical Model

The theoretical model of the study is captured from Lotz and Morss (1967). According to them, tax returns are grounded on foreign trade shares and per capita income an economy. Both variables were significantly and strongly linked with tax to GDP ratio. The linear correlation between tax to GDP, per capita income and trade openness ratio was investigated.

$$Tax/_{GDP_{it}} = f(PCI_{it}, TO_{it})$$

Later, by following Lotz and Morss (1967), Shin (1969) suggested a new model by including additional variables such as inflation, agricultural share and population growth in the model. Bahl (1971) and Chelliah (1975) further worked by extending the model applied by Lotz and Morss (1967) by incorporating some more variables like export ratio, agricultural share, mining share and per capita income. Piancastelli (2001) pursued the similar model by incorporating industrial share in GDP and services share in GDP as new variables.

Material and Methods

This section of the present study deals with sample, data source, model and methodology.

Sample

The present study is based on the panel dataset of 6 Asian developing economies along with timeseries dataset for Pakistan from 1996-2021. The selection of the countries is based upon GDP per capita. The Asian developing economies having less than 2000$ income are selected. Selected Asian developing economies are: Bangladesh, Cambodia, Myanmar, Nepal, Pakistan and Tajikistan.

Data Source

The present analysis tracks down the assessment of Pakistan's tax revenue and evaluate its tax capacity to find an appropriate gauge that reflects tax effort in Pakistan. The data of structural variables (agricultural share in GDP, Manufacturing share in GDP, Services share in GDP, government expenditures, inflation and urbanization rate) is taken from Worldwide Development Indicators (WDI). The data of institutional quality and financial development is collected from Worldwide Governance Indicators (WGI) and Global Financial Development Database (GFDD), respectively.

Model Specification

Based on preceding discussion, three different econometric models are used for the analysis. First model examines the tax revenue determinants of Asian developing economies. Second and third model explore the impact of financial development and institutional quality on tax performance, respectively.

Functional form equation of our model 1 takes the following form,

$$TR_{it} = f(AGR_{it}, MANU_{it}, SERV_{it}, GE_{it}, CPI_{it}, TO_{it}, URBAN_{it})$$

The econometric specification of the above model is given below,

$$TR_{it} = \alpha_0 + \alpha_1 AGR_{it} + \alpha_2 MANU_{it} + \alpha_3 SERV_{it} + \alpha_4 GE_{it} + \alpha_5 CPI_{it} + \alpha_6 TO_{it} + \alpha_7 URBAN_{it} + Z_{it}\sigma' + \mu_i + \pi_t + \varepsilon_{it} \quad (1)$$

Where, AGR= Agricultural sector share in GDP, MANU = Manufacturing sector share in GDP, SERV= Services sector share in GDP, GE= Government expenditures share in GDP, INF= Inflation (Consumer price index is a proxy used for inflation), TO= Trade Openness and URBAN= Urbanization rate. Z_{it}= matrix of all control variables, μ_i = countries fixed effect, π_t = time specific non-stochastic effects and ε_{it}= error term.

For time series analysis,

Functional form equation of our model 2 and 3 takes the following form,

$$TE_{i=} f(AGR, MANU, SERV, INF, TRADE, PCFIN)$$

$$TE_i = f(MANU, SERV, TRADE, GEFF)$$

The multiple linear regression models we used in our study are,

For Model 2,

$$TE_i = \alpha_i + \beta_1 AGR_i + \beta_2 MANU_i + \beta_3 SERV_i + \beta_4 INF_i + \beta_5 TRADE_i + \beta_6 PCFIN_i + \square\square \quad (2)$$

Where PCFIN= Private credit by deposit money banks and other financial institutions to GDP (%). It is used as a proxy for financial development.

For Model 3,

$$TE_i = \alpha_i + \beta_1 MANU_i + \beta_2 SERV_i + \beta_3 TRADE_i + \beta_4 GEFF_i + \square\square \quad (3)$$

Where, GEFF= Government Effectiveness.

Methods

The current study uses both cross sectional and time series data. The Panel estimation technique is required for Asian developing economies dataset. For this, to begin we apply

fixed and random effect modeling techniques in on our analysis. Then we go on to the Hausman test. Hausman test recommends that fixed effect is appropriate for study, so we begin our analysis with a fixed effect specification.

Multiple regression analysis is used for time series analysis. It's a sort of analysis in which the dependent variable is estimated using two or more independent variables that are related to one another. The Durbin Watson test is used to evaluate that if there is an autocorrelation between the variables which are determining tax effort. Durbin Watson test values lies between the range of 1.5 and 2.5. According to our analysis of models 2 and 3 there is no autocorrelation because the Durbin Watson test results fall within the specified range. Durbin Watson test value is 2.18 for model 2 and 1.5 for model 3, respectively.

Results and Discussion

In this part of the study, we will discuss about the estimated results of all models one by one. Table 1 elucidates the results of model 1 which is about tax revenue determinants of Asian developing economies.

Table 1
Panel data analysis using Fixed Effects

Variables	**Model 1 (TR)**		
AGR	-.759265*** (0.0581)		
MANU	-1.04573*** (0.1002)		
SERV	-.4423296*** (0. 0514)		
GE	.3340466*** (0.1161)		
INF	-.0129671** (0.0057)		
TRADE	.0146564 (0.0175)		
URBAN	.2145996* (0.1180)		
Diagnostics			
No of Observations	101	Hausman Test	22.91** (0.001)

Note: z-statistics in parentheses
*** 1%, ** 5% and * 10%

From the analysis of table 1, we find that agricultural sector share is negative. The results are well matched with the findings of Chelliah et al., (1975); Mawejee and Munaymbonera, (2016) and Asma and Rahim, (2019). Our findings are also supported by the theory that the tax revenues are low in most of developing economies where agriculture sector is difficult to tax and influenced by a large share of subsistence farming.

Theory suggests a positive correlation between manufacturing sector share and tax revenues as manufacturing companies' holders have a tendency to retain better books and accounting records. So, this sector is positively contributing to the export of any economy which further leads the way to higher profits and income and boost tax revenues. Our results are consistent with the findings of Ikhatua and Ibadin (2019).

The result of the model indicates that services sector is negatively correlated with tax revenues. Theoretical and empirical evidences claim that services sector is informal in most developing economies. Because of informal sector, chances of tax evasion and corruption are also high. So, this sector is not collecting enough revenue in developing

economies. The result is similar to the findings of Ahmed and Muhammad, (2010) and Asma and Rahim, (2019).

Trade Openness is statistically insignificant in our panel model.

Inflation exerts deleterious effect on tax revenue in the present study. Theory justifies that when prices go up, demand for product and services decline which further reduce consumer purchasing power. As a result, collection of tax revenues falls. The results regarding inflation are similar to the findings of Gaalya, (2015) and Amoh, (2019).

Government expenditures has a favorable impact on tax revenues. Theory also confirms that if the government expenditures will grow if tax revenues increase. High government expenditures and tax revenues may further increase economic growth. The result is confirmed by the theoretical evidence that high government spending leads to higher tax revenue which may boost economic expansion further. The results are comparable to the literature such as (Mawejje and Munaymbonera, (2016) and Rahim and Asma (2019)).

The rate of urbanization is positively related to tax revenues. Increased urbanization is associated with a substantial informal sector, which creates additional needs as and demands for public services that improve the ability of government to collect tax revenues. Karagoz (2013) and Rahim and Asma (2019) also confirm the same relationship between urbanization and tax revenues.

By applying the values of tax revenue values to Pakistan data, we get the estimated tax capacity for Pakistan as shown in table 2.

$$\widehat{TR} = 56.34 + (-0.759)AGR + (-1.045)MANU + (-0.442)SERV + (0.334)GE + (-0.012)INF + (0.214)URBAN \quad (4)$$

As a result, the tax effort can now be computed by dividing tax revenue over calculated tax capacity.

$$TE = {}^{TR}/_{\widehat{TR}} \quad (5)$$

Table 2
Taxable Capacity and Tax Effort for Pakistan

Years	TC	TE	Years	TC	TE
1996	13.90	1.036	2009	12.23	0.744
1997	12.81	1.046	2010	11.39	0.869
1998	12.03	1.098	2011	9.75	0.954
1999	11.89	1.119	2012	10.51	0.971
2000	13.21	0.802	2013	10.79	0.908
2001	13.18	0.797	2014	10.87	0.938
2002	13.74	0.779	2015	11.47	0.959
2003	13.87	0.822	2016	13.85	0.910
2004	13.35	0.824	2017	13.83	0.896
2005	12.03	0.840	2018	13.93	0.926
2006	13.21	0.795	2019	13.09	0.901
2007	12.49	0.817	2020	13.59	0.685
2008	10.06	0.984	2021	12.69	0.741

Table 3 shows the findings of model 2 and 3 which explore the impact of financial development and institutional quality on tax performance.

Table 3
Multiple Linear Regression Model for Tax Effort with Financial Development and Institutional Quality

Variables (TE)	Model 2 (FD)	Model 3 (IQ)
AGR	-.0360555** (.01753)	…….
MANU	.118424*** (.02401)	.0559264*** (.02139)
SERV	-.0175778** (.00724)	-.0237114*** (.00737)
INF	-.0016325*** (.00059)	…….
TRADE	-.028306*** (.00852)	-.0125432* (.00685)
FD/IQ	-.0151247** (.00605)	-.2028088* (.11625)
Constant	2.474774*** (.73835)	1.657057*** (.45799)
Number of Obs.	26	23
F Value	14.05 (0.000)	10.16 (0.000)
R-Squared	0.81	0.69
Adj. R-Squared	0.75	0.62

Note: t statistics are in parenthesis, *** 1%, ** 5% and * 10%

The results of agricultural sector share, services sector share and inflation of model 2 are identical to model 1.

Tax revenues are positively linked to manufacturing sector share in both model 2 and 3. Our findings are compatible with theory and also with those of Teera and Hudson, (2004) and Ala Ghaleb and Ahmed (2016).

The trade openness indicator shows negative sign. Foreign trade contributes significantly in most developing economies via export duties, imports quotas, tariffs and so on. The outcome of this variable contradicts not just theory but also the findings of Gaalya, (2015); Brun and diakite (2016) and Ikhatua and Ibadin (2019).

Financial development is most likely increasing tax capacity in the economy which might be a reason that it has a negative relationship with estimated tax effort. As we all know, tax effort is a ratio of actual tax collections to tax capacity. The same may be said for the negative sign of institutional quality. We found considerable evidence in favor of this logic when we calculated averages of all tax efforts. As we have included financial development and institutional quality in the linear regression model one by one, the overall average tax effort has increased. The results of model 2 Akram are congruent with those of (2016) and Okon (2018). The findings of model 3 are consistent with the literature of Epaphra and Massawe (2017) and Hassan et al., (2021).

Table 4
The Estimated Tax Capacity and Tax Effort along with Financial Development and Institutional Quality

Years	TR	TC	TE	TEFD	TEIQ
1996	14.4	13.90	1.036	1.106	1.072
1997	13.4	12.81	1.046	1.095	0.966

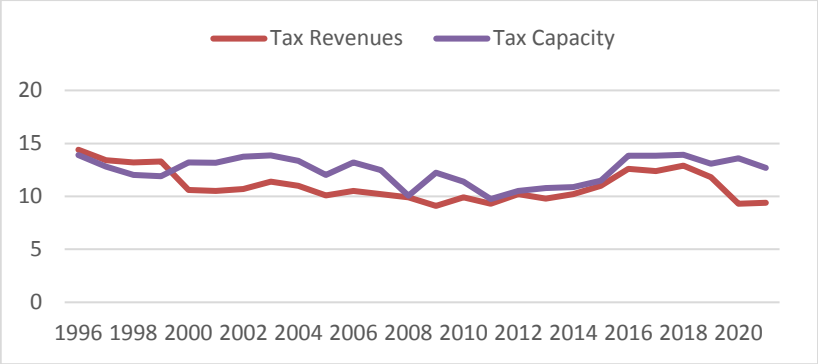
1998	13.2	12.03	1.098	1.157	1.114
1999	13.3	11.89	1.119	1.161	1.008
2000	10.6	13.21	0.802	0.846	0.857
2001	10.5	13.18	0.797	0.869	0.729
2002	10.7	13.74	0.779	0.885	0.806
2003	11.4	13.87	0.822	0.824	0.809
2004	11	13.35	0.824	0.954	0.917
2005	10.1	12.03	0.840	0.924	0.879
2006	10.5	13.21	0.795	0.871	0.808
2007	10.2	12.49	0.817	0.953	0.874
2008	9.9	10.06	0.984	1.002	0.969
2009	9.1	12.23	0.744	0.928	0.913
2010	9.9	11.39	0.869	0.941	0.922
2011	9.3	9.75	0.954	1.031	1.019
2012	10.2	10.51	0.971	1.104	1.005
2013	9.8	10.79	0.908	1.027	0.967
2014	10.2	10.87	0.938	1.099	0.995
2015	11	11.47	0.959	1.090	0.964
2016	12.6	13.85	0.910	1.008	0.896
2017	12.4	13.83	0.896	0.986	0.869
2018	12.9	13.93	0.926	0.944	0.874
2019	11.8	13.09	0.901	1.042	0.907
2020	9.3	13.59	0.685	0.918	0.839
2021	9.4	12.69	0.741	0.970	0.870
Averages	11.04	12.45	0.891	0.990	0.917

Source: Authors own calculations

Both financial development and institutional quality may boost Pakistan's tax effort. On average, there is a gap of 11 % between tax revenues and tax capacity (tax potential).

Graph 1

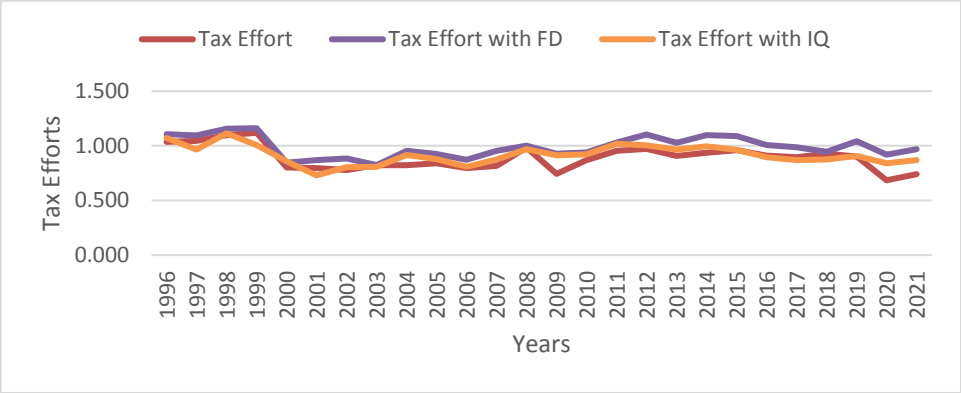
Tax Revenues and Tax Capacity



Graph 1 shows clearly indicates a gap between tax revenue collected and tax potential (tax capacity).

Graph 2

Tax Efforts, Financial Development and Institutional Quality



The estimated tax effort is improved by 10% when financial development is included in model ad it improves by 2 % when institutional quality is incorporated in the model.

Conclusion

The study examines the factors of tax revenues in Asian developing economies with GDP levels that are comparable to Pakistan. In addition, based on regression results from the estimated panel, we determine tax effort indices for Pakistan based on regression results from the estimated panel and evaluate the impact of financial development and institutional quality on tax performance. Our findings are consistent with the literature. According to the study finds that, for Asian developing economies, all structural variables are strong and important drivers of tax revenues. Surprisingly, Financial development is anticipated to strengthen tax capacity in economy which might indicate why it has a negative influence on estimated tax effort. The same can be said for the negative sign of institutional quality.

Policy Recommendations

The present analysis suggests vital policy implications. By encouraging the development of a country's financial sector not only enhances economic growth, but also increases tax revenue collection. This may also boost a country's welfare. Furthermore, the findings support tax reforms that aim to broaden the tax base and increase a country's tax revenue mobilization. Yet, our findings suggest that targeted strategies depending on the quality of institutional environment in developing economies such as Pakistan, will ensure favorable outcomes. As institutional quality improves, financial development enhances tax revenues.

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