Final

The Quality of Governance and Tax Effort: Evidence from Developed and Developing Countries

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Acronyms and Abbreviations

GDP	Gross Domestic Product
GNP	Gross National Product
GMM	Generalized Method of Moments
HDI	Human Development Index
HDR	Human Development Report
IMF	International Monetary Fund
MPI	Multi-dimensional Poverty Index
OLS	Ordinary Least Square
UNDP	United Nations Development Program
USAID	United States Agency for International Development
WDI	World Development Indicators
WGI	Worldwide Government Indicators

The Quality of Governance and Tax Effort: Evidence from Developed and Developing Countries

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Abstract: The paper argues that the quality of the governance is an important demand side determinant factor for more adequate level of tax effort in developing countries and developed countries. The study will analyze the effect of the quality of governance (institutional capacity and control of corruption) on tax effort using panel data set for 55 developed and developing countries during 2002- 2012. The collected data was analyzed using fixed effect and random effect model. The study result indicates that governance quality matters for tax revenue collection and findings support the hypothesis that willingness to pay taxes depends on the better quality of government i.e. higher institutional capacity and lower corruption enhances more tax revenue in the economy.

Keyword: Tax effort, corruption, governance, institution, random and fixed effect model, poverty, development

Section 1. Introduction

Taxes are inevitable since citizens expect from govt. to provide various goods and services. Wagner's law imply that economic development is associated with an increased request for public goods and services, which need to be financed inter alia by increasing tax revenue since the demand for public services is income elastic (Tanzi, 1987). Developing country requires more expenditure on public infrastructure, health services, education as they can grow and reduce poverty and therefore, they requires to increase their tax effort (tax revenue as percentage of GDP). A low tax efforts is a jointly consequences of both supply side and demand side factors. The supply side factors of tax effort includes tax base like per capita income, composition of the economy, economic activities. Most of the earlier studies emphasis this supply side capacity to increase tax effort of a developing country (Bird, Martinez and Torgler, 2008).

Developing countries are generally unable to collect potential amount of revenue through taxation due to several governance problems. Begum, L. (2007) found that developing countries having low tax effort (less than unity) are not utilizing their full capacity of tax

revenue, and they can reduce the budgetary imbalance through raising tax revenue. Lack of institutional capacity and exercise public power for private gain i.e. corruption are main culprit for this low tax effort.

Tax-GDP ratio as a measure of tax effort is a static measure, which provides a view of tax performance in terms of degree of use of taxable capacity at a given time. The three general perceptions for low Tax-GDP ratio, first: narrow tax base due to dominance of agriculture and informal sectors in the economy, low-income per capita and high poverty rate; second, revenue looses from the on-going tax reforms especially the process of trade liberalization-major reduction of import tariff; and, third, low potentially of tax administration and growing practice of tax evasion and corruption.

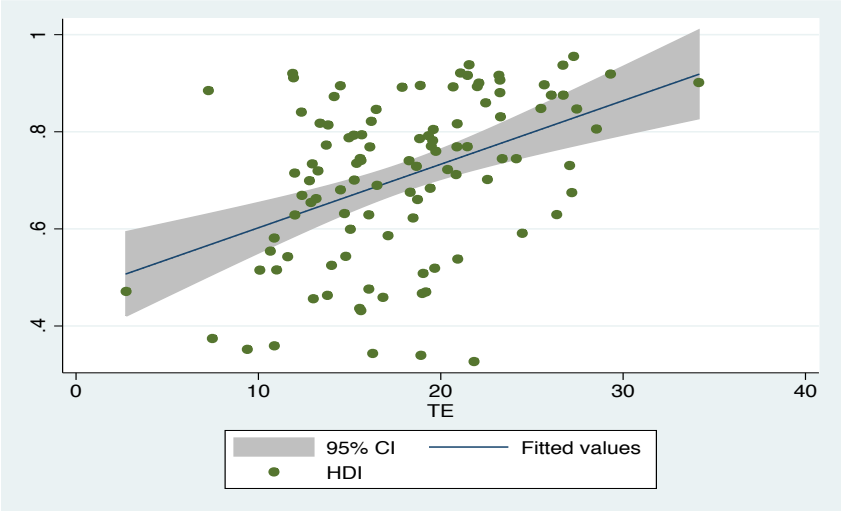
When we say a country has low tax efforts? It's an important question. In the literature we can found some academic evidence. *"Will underdeveloped countries learn to tax?" asked Nicholas Kaldor,1963, fifty year ago.* Underlying assumption of question: A country wishes to become "developed" requires more than 10-15 percent tax-gdp ratio found in many developing countries. Sir Arthur Lewis (Martin and Lewis 1956) said to provide average standard of services a govt. of underdeveloped country needs to raise tax revenue of about 17-19 percent of GNP.

The primary purpose of the taxation is to finance government expenditure and to redistribute the wealth, which increases the development of the country (Ola, 2001, Jhingan, 2004, Musgrave and Musgrave, 2004, Bhartia, 2009). Government needs to collect taxes in order to provide public goods, such as infrastructure, education, public health, securities etc where the market economy fails. Musgrave and Musgrave (2004) stated that the tax revenue has two effects: reduce income inequality and ensure the efficient use of the resources, which he called micro effects, and second, the effects on the level of capacity output, employment, prices, and growth called macro effect. Government can use of tax as an instrument of fiscal policy to boost up economic growth, although this tools are less reliable in the less developed countries due to the diminishing pattern of revenue generation. On the other hand, developed countries have influenced

their economic development through tax revenue such as Canada, United States, Netherland, United Kingdom (Oluba 2008). Worlu and Nkoro (2012) showed that tax revenue stimulates economic growth through infrastructural development.

If we linking the tax efforts to the Human Development Index (HDI)[1] for 105 developed and developing countries in 2012, we can found there is a positive association among the two (Figure 1.1).

Figure 1.1: Tax efforts and HDI 2012 of 105 countries

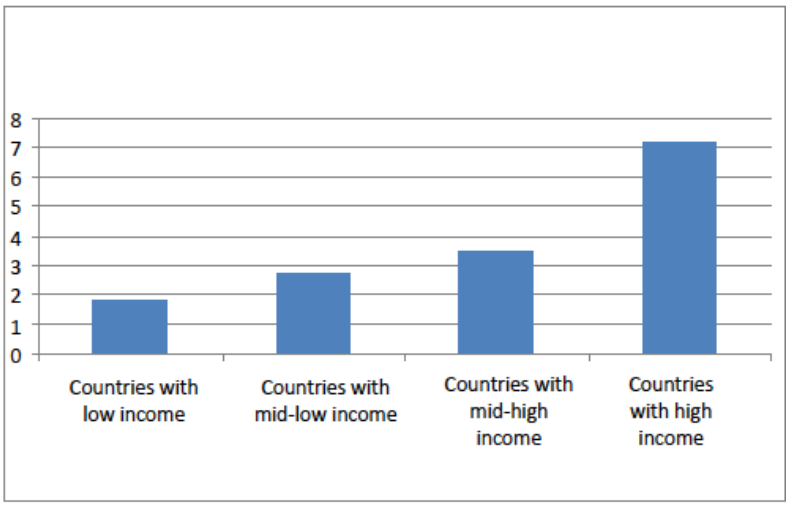


Source: UNDP and WDI, 2012

The developing countries need to achieve in progressive and redistributive taxes in order to ensure public services, such as education and health for all (Itriago, Deborah 2011). Figure 1.2 shows the fact that in developing countries revenue from income tax is still excessively low compared to OECD countries (Adopted from Itriago, Deborah 2011). As Figure shows, the revenue from personal income taxes for low-income countries accounts for less than 2 per cent of GDP.

[1] HDI is a composite statistic of life expectancy, education, and income indices used to rank countries into

Figure 1.2: Revenues from personal income taxes (as % of GDP), 2008-09



Source: Adopted from Itriago, Deborah 2011:(USAID (United States Agency for International Development) Fiscal Reform Project 2008-09 (www.collectingtaxes.net, accessed July 2010)

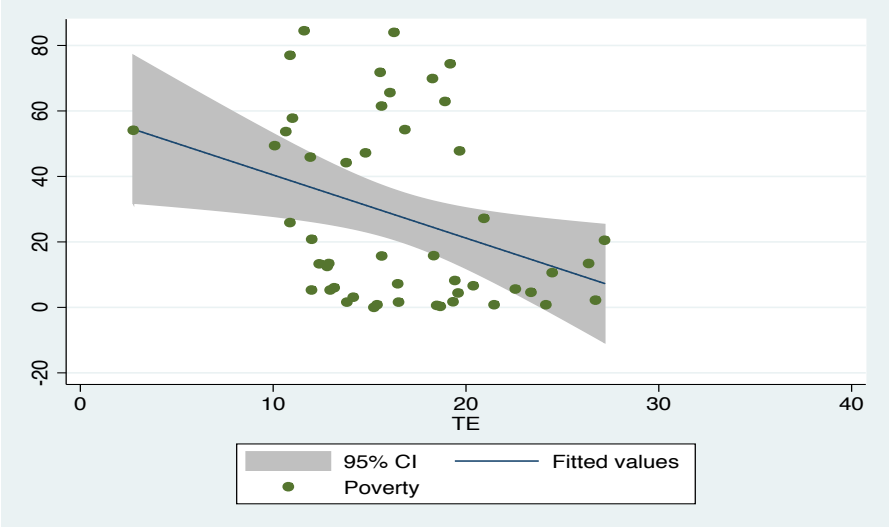
As noted by IMF (cited in TJN, 2012): *"Developing countries must be able to raise the revenues required to finance the services demanded by their citizens and the infrastructure (physical and social) that will enable them to move out of poverty. Taxation will play the key role in this revenue mobilization . . . . ."*

Although recent improvements in tax efforts, half of sub-Saharan African countries still generate less than 15% of their GDP in tax revenues, as against an average of around 35% in OECD countries and 23% in Latin America. This makes difficult for the country to reduce poverty though the development activities.[2] There is a negative association between the tax efforts and Multi-dimensional poverty index (MPI)[3] i.e. the higher the tax efforts in a developing countries has lower rate of poverty or vice versa (Figure 1.3).

[2]http://www.oecdobserver.org/news/archivestory.php/aid/3134/Tax_for_development.html#sthash.k54r4Ki1.dpuf

[3] Multidimensional poverty is made up of several factors that constitute poor people's experience of deprivation – such as poor health, lack of education, inadequate living standard, lack of income (as one of several factors considered), disempowerment, poor quality of work and threat from violence.

Figure 1.3: Tax efforts and Poverty (MPI) of developing countries, 2012



Source: World Bank, 2013

In this study we analyze the effects of the demand side and supply side effects on the tax efforts in the 55 developed and developing countries, using panel data set from the period 2002-2012. The most important contribution of this study is to extend the literature (model presented by Imran and Jacobs 2007) by using supply side i.e. the quality of governance that can affect tax efforts. The main purpose of this paper is to justify whether the quality of governance (better institution and low corruption) leads to a higher tax efforts. The first hypothesis focuses on better institutions (expecting positive impact) while the second one will lead explore the impact of corruption (expecting negative impact).

The rest of the paper is organized as follows. In section 2, we review some relevant studies, which provide the theoretical and empirical background for the study. In section 3, we explain the methodology. In section 4 explains the data and variable construction and estimation technique. Section 5 comprises of the study results and discussions of the study. In section 6 we conclude the study with some policy suggestions.

Section 2. Literature Review

In the public service, the incentives of being engaged in corrupt behavior has two fold: first, government official who wanted to be enrich themselves by taking bribe and second, bribe payers who wanted to obtain undue benefits as tax evasion. The degree of the complexity of the tax system encourages the public official to exercise their administrative power and increase the corruption (Ajaz and Ahmed 2010).

Sandmo (2004) uses the concept of tax evasion in the following words. "Tax evasion is a violation of the law: When the taxpayer refrains from reporting income from labour or capital which is in principal taxable, he engages in an illegal activity that makes him liable to administrative or legal action from the authorities"

What matters is not only how high taxes are (revenue adequacy), but also how the tax level has been chosen, how the taxes are imposed, and how the funds thus raised are used. Taxation matters are, in democratic states, resolved through political channels. Indeed, history suggests that the need to secure an adequate degree of consensus from the taxed is one of the principal ways in which, over the centuries, democratic institutions have spread. State legitimacy thus rests to a considerable extent on citizens' 'quasi-voluntary compliance' (Levi 1988) with respect to taxation. To secure such compliance, tax systems must, over time, in some sense represent the basic values of at least a minimum supporting coalition of the population. Thus, the key aim of the paper is to explain whether better institutions lead to a higher tax effort. The first hypothesis focuses on voice and accountability while the second one will explore the impact of corruption.

Good governance brings good tax system and state legitimacy, taxpayers' willingness to pay tax, and the effectiveness of tax administration are the main pillars for the good tax system. Phillips and Sandali (2008) describe the relationship between governance and tax reforms. The study explains that three key dynamics reflects the relationship between governance, taxation and investment climate. The better governance can design good and investment friendly tax system, which foster the economic growth.

The quality of the governance is crucial for proper planning and efficient revenue generation. When the tax evasion and corruption of public officials is a general perception than it negatively effects on tax revenue and as well as economic growth and development (Ajaz and Ahmed 2010). A more legitimate and responsive state is the precondition for a more adequate level of tax effort in developing countries and high-income countries. For poor countries tax rate raises are not efficient to increase tax revenue, more feasible solution for them to improve their governing institutions (Bird, R. M., Jorge M. V., and B. Torgler, 2008). By improving the governances structure i.e. institutions high-income countries can increase their tax revenue, so tax efforts of a country is highly responsive to governance structure or institution.

Hypothesis 1: The presence of an effective and efficient government is an essential precondition for a more adequate tax system. If taxpayers perceive that the institutions (civil, law and regulatory bodies) are capable and independent enough from political influence to address their interests (preferences) having meaningful 'good governance' is motivates the state their willingness to contribute increase. The study assume that if a country "A" has better has good governance system than country "B" than it is expected that country "A" have more tax efforts than country "B".

With a good governance the country offers the people a good tax system– better in the sense of giving the people what they want- which encourage to the people to pay taxes for better public services.

Some studies have found that institutional factors determine the revenue performance of an economy. Bird, et al. (2004) showed that factors such as corruption, rule of law, entry regulations is important determinant of tax revenue. Gupta (2007) found that corruption has a significantly negative effect on tax revenue. Ajaz and Ahmed (2010) investigate the relationship between corruption and tax efforts using panel data set for 25 developing countries during 1990- 2005. The GMM regression results suggest that corruption has adverse effect on tax collection, while good governance contributes to better performance in tax collection.

Tanzi and Dvoodi (1997) found evidence that countries with high level of corruption tend to have low tax revenue which imply that some portion of the taxes paid by taxpayers are diverted away. Tanzi (1999) suggested separation of tax collection and receiver authority i.e. taxes should be collected by the tax administrators and taxes should received by the treasury.

Hypothesis 2: In order to explain the country level variation in the tax efforts we have to take into consideration on the degree of corruption exercise by the institutions. If the taxpayers believe that they live in a state where institutions are corrupt and control of corruption is low, the willingness to contribute decrease. The study assume that if a country "A" has better has less corrupt public sector than country "B" than it is expected that country "A" have more tax efforts than country "B".

In case of the developing countries corruption is widespread phenomena and it shirks the country's revenue so the state failed to full the social obligation and its creates negative impression from the public which again goes like vicious circle. Literature shows that more than 50 percent of tax revenue goes uncollected because of fiscal corruption and tax evasion in the developing countries (Richupan, 1984; Alm,et al, 1991; Bird, 1990, 1991; and Krugman, et al, 1992).

Section 3: Methodology

Efficiency of the government determines the revenue collection. Good governance provides an adequate tax system, improved tax administration, a better macroeconomic policy, which generates more revenues (Ajaz and Ahmed, 2010). Benno (2003) showed direct democratic rights, local autonomy, trust in government and courts and legal system has a positive and significant effect on tax morale. To test weather the quality of the governance fosters tax efforts of the South and East Asian countries, the following model will be used:

Tax effort= Government quality (demand side) + Economic control variables (supply side)

$$TE_{it} = \alpha + \beta_1 GOVQ_{it} + \beta_2 Exp_{it} + \beta_3 Open_{it} + \beta_4 M2_{it} + \beta_5 Urban_{it} + \mu_i + \in_{itj}$$

$$TE_{it} = \alpha + \beta_1 Inst_{it} + \beta_2 Corr_{it} + \beta_3 Exp_{it} + \beta_4 Open_{it} + \beta_5 M2_{it} + \beta_6 Urban_{it} + \mu_i + \in_{itj}$$

where i indexes the countries in the sample, *t* refers to a year; TE_{it} indicates the country's level of tax effort measured as the tax revenue to GDP ratio; $GOVQ_{it}$ are indicators for institutional capacity and control of corruption; Exp_{it} represents the annual government expenditure as percent of GDP; $Open_{it}$ define as export plus import as ratio of GDP; $M2_{it}$ stands for share of broad money as share of GDP; $Urban_{it}$ represents share of population live in urban areas; μ_i stands for country effect and $\in_{itj}$ is an error term.

Suppose country A has better institution with less corruption than country B with same economic structure. It is expected that country A can effectively exercise its economic policy to collect more tax, and the people in country A suppose that government agencies are quite efficient to find out the underestimate of the tax return so they have tendency to tax evasion. In this paper, I am expecting positive relationship with institution and tax efforts.

The previous year spending behavior highly influenced the current year expenditure and to meet up the expenditure the government has to collect more tax. It is expected that those countries be expected to spend more they will collect more tax.

The important traditional determinants in the literature of the tax efforts are controlling the economic structure of an economy. The trade taxes are important source of revenue for the less developed countries because for the government it is easier to collect than the income taxes. The tax effort is expected to positive relation to the degree of openness of the economy.

The sectorial composition of the domestic economy also influences the degree of tax effort. To tax on traditional sector like agriculture are more difficult than taxed on manufacturing or service sectors. Some researchers argue that to tax on agricultural sector are not so difficult (Bahl 2003), and as public sector activities are city based so this large sector demands lower public intervention (Tanzi 1992). Furthermore, some countries exempt agriculture activities from taxes to favor a large group of people.

The urbanization creates more demands for public goods and services, and the as the demands increase its also raise the price of the public goods i.e. tax. It is expected that a country with higher urbanization will generate more taxes than lower urbanization country. Growth in monetization is represented by M2, also influences significantly and positively the buoyancy of the indirect taxes. When the people of a country transact its economic transaction more through the banking channels its easier to tax on those activities than manual or cash transaction. It also expected that there is a positive relationship between the broad money and the tax efforts.

3.1 Institutional Capacity: Construction

- Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
- Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract

enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

- Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development

Institutional capacity

=1/3(government effectiveness+ rule of law+ regulatory quality)

= higher value represent strong institutional capacity

3.2 Control of corruption: Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. All the indicators value range from -2.5 to 2.5 and they also transformed into percentile form, which ranges from 0 to 100. Higher the value the country has lower corruption in the economy

Section 4: Data and Estimation Procedure

This section explains the list of indicators are included in this analysis and also the how this variable are constructed. First, we explain about the dependent variable; second, we explain the list of independent variable, in which both the economic control variables and institutional variables are included.

4.1 Dependent Variable

Dependent variable is tax effort (tax revenue ratio to GDP): as an adequate volume of government revenue is essential for public expenditure and economic growth, the ratio of tax revenue to GDP has been used to measure and judge the success of a country's fiscal management.

4.2 Structural or economic factors

The expenditure as percentage of GDP indicates the capacity of the government both on expenditure and revenue perspective. This expenditure is equivalent to per years

government budget, and expressed as ratio of GDP. We used the economic outcome measure of trade openness, which is export plus imports divided by GDP, all measured at current prices in USD. The M2 or broad money refers the currency in circulation plus deposit divided by the GDP, all measures at current in USD. The people living in the urban area divided by the total population in the country is referred urbanization.

4.3 Institutional Factors

Corruption refers the abuse of public power for private benefit. It is captured by an index that measures the extent to which bribes are generally expected by government officials in relation to provide public service (Tanzi, 1998). The World Bank Research Institute forms the Worldwide Governance Indicators (WGI), which consists of six aggregate indicators of governance covering 200 countries, with cross-country data from 30 organizations. Measuring six dimensions of governance starting in 1996: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption (for details see appendix). The aggregate indicators are based on several hundred underlying variables taken from a wide variety of existing data source. The data reflects the views on governance of survey respondents and public, private, and NGO sector experts worldwide.

The institution variable will be form as a weighted mean of government effectiveness, rule of law, and regulatory quality. On the other hand, Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests, this index will represents the corruption variable.

The study uses a panel dataset covering 55 developed and developing countries over a 11 years period: 2002-2012. The countries are chosen on the basis of availability of the economic and institutional data (see sample countries in appendix). All the data related to economic or control variables are taken from *World Development Indicator (WDI)*, which

data are widely used in the literature. Data related to corruption and institutional variables data are constructed from the *Worldwide Governance Indicators (WGI)*. The World Bank start to collect WGI data from 1996, but they start to conduct this survey annually from 2002. To avoid the missing data in this study used the data from 2002.

4.4 Estimation Technique

Endogenity arises when right hand side variable are correlated with the random error term of the equation. Model uncertainty arises when we cannot fully capture the determinants of tax revenues. The problem of omitted variable bias and endogeneity arises in Random Effects model. Exogeneity assumption in random effect models that the residuals are independent of the covariates. In order to test for this form of endogeneity, the Housman test (Hausman, 1978) is often used. This takes the form of a comparison between the parameter estimates in both the fixed effect and the random effect model (Greene, 2012, Wooldridge, 2002). The Hausman test is regularly deployed as a test for whether RE can be used, or whether FE estimation should be used instead (for example Greene, 2012 p421). To avoid the problem of endogeneity, all higher-level variance is controlled out by the higher-level entities themselves (Allison, 2009).

Section 5: Regression results and Findings

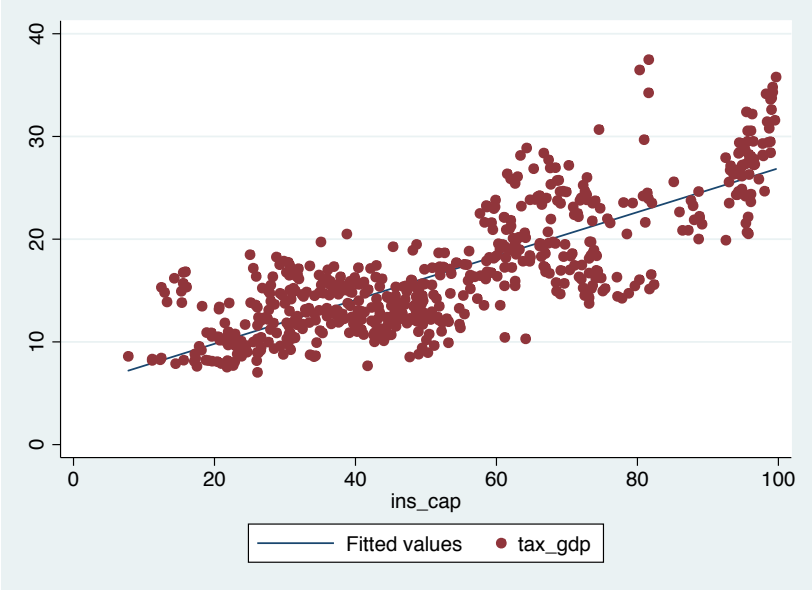
We start our empirical findings to revisit the significance of the demand side determinates of the tax efforts in the literature. The capacity to pay taxes depends on the level of development, and generally we expect a positive relationship among the level of per capita income and the level of tax efforts. In this study, we drop the per capita income variable as it has a high correlation with the government index. We may say that in the higher level of development brings by good governance, through effective administration with lower corruption.

In the traditional basic tax effort model that has ignored the role of demand factors in explaining relative revenue performance. We use the Kaufmann, Kraay, and Mastruzzi (2003) data set to measure institutional capacity and corruption. All scores lie between –2.5 and 2.5, with higher scores corresponding to better governance. Because of high correlation (0.93) between

institutional capacity and control of corruption variable, I use these two sets of indexes in alternate estimations in equation 1 and 2.

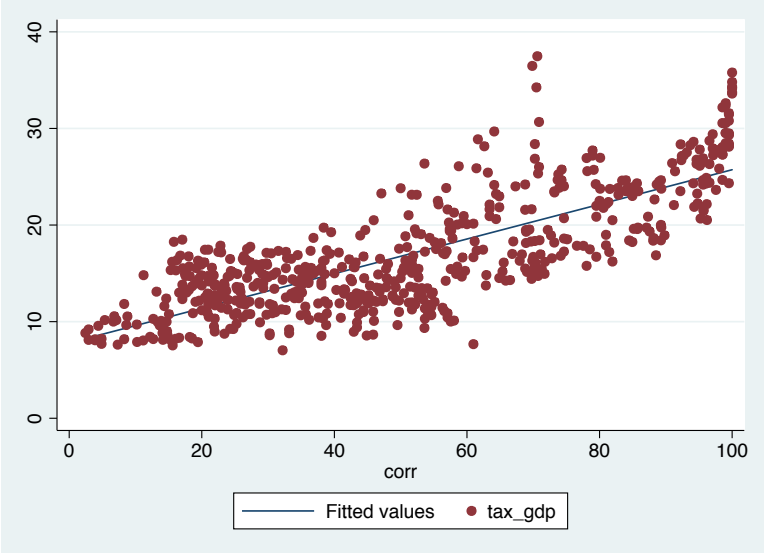
The correlation between tax efforts and institutional capacity shows positive liner association, which imply the first hypothesis. It is expected that those countries that have higher institutional capacity may generates more tax revenues (Figure 1.4).

Figure 1.4: Positive linear association between tax effort and institutional capacity



The control of corruption and tax efforts also has positive linear association which implies lower the corruption of the public official expected to higher tax revenue. These also support our second hypothesis that a country with lower corruption has more tax revenue than a country that has higher corruption (Figure 1.5). This two correlation shows that the demand side determinants are relevant in explaining tax performance in the developed and transition economies.

Figure 1.5: Positive linear association between tax effort and control of corruption



We have panel data on tax efforts and we need to account for variation over time (within) and across individuals (between). Tax effort is the dependent variable and exp_gdp, openness, M2_gdp, urban, inst_cap, and cont_corr are independent variables. To analyze the panel data we can use following estimators:

- Pooled OLS
- Between (if the between variation dominates)
- Fixed effects (within variation dominates)
- First differences
- Random effects

The id and t variables are not real variable, id shows the cross section dimension and t shows the time dimension of the data set. This two variable decides how to classify our panel data; it said that we have 55-observation 11 years data point starting from 2002 to 2012.

In the summary table 1.1 each variable have mean, standard deviation and min-max. The standard deviations are gives in three categories: overall, between and within. The between variation implies the variation of the same variable over time. On the other hand, within variation refers to the variable among the different countries in different time periods. The mean of the tax_gdp variable is 16.9, the minimum is 7.0 and maximum is

37.5. Lets see the overall variation is 6.1, if we see between and within variance- the within variation dominates. All the independent variable (except control of corruption) are explained by within variation that's mean the variable vary across countries over time. The control of corruption has more between than within variation among the observation over time (Table 1.1). Therefore, the most of the variables variability in this data set can be explained by the within variation.

Table 1.1: Summary Statistics-within and between variation for panel data

Variable	Variation	Mean	Std. Dev.	Min	Max
id	overall	28.2	16.0	1	55
	between		16.1	1	55
	within		0.0	28.2	28.2
t	overall	2007	3.2	2002	2012
	between		3.3	2002	2012
	within		0.0	2007	2007
tax_gdp	overall	16.9	6.1	7.0	37.5
	between		0.9	15.2	18.0
	within		6.0	7.2	36.7
exp_gdp	overall	22.6	8.7	7.6	53.7
	between		1.2	21.2	24.5
	within		8.6	7.3	52.6
m2_gdp	overall	61.9	40.0	11.9	247.8
	between		4.1	55.6	67.1
	within		39.8	15.2	243.5
openness	overall	81.1	35.6	29.0	256.0
	between		3.6	74.9	85.9
	within		35.5	28.6	259.1
urban	overall	53.5	22.5	12.5	100.0
	between		1.0	52.1	55.1
	within		22.5	13.7	101.4
ins_cap	overall	53.3	23.1	7.8	99.7
	between		0.5	52.4	53.9
	within		23.1	8.7	99.5
Cont_corr	overall	50.9	26.8	2.4	100.0
	between		26.4	10.1	99.7
	within		5.9	12.5	71.0

Table1.2: Comparing estimators for panel data model: Equation 1

Tax effort	Pooled OLS	Within or Fixed effect	Random effect
Govt. Expenditure	0.146** (0.0284)	0.188** (0.0285)	0.187** (0.285)
M2_gdp	-0.0100** (0.0031)	-0.038** (0.0092)	-0.025** (0.007)
Openness	0.0134** (0.0049)	0.029** (0.006)	0.028** (0.005)
Urban pop	0.0285** (0.0093)	0.215** (0.055)	0.062** (0.019)
Institutional Capacity	0.169** (0.0077)	0.138** (0.018)	0.140** (0.014)
Constant	2.599** (0.477)	-6.27* (3.06)	1.164 (1.17)
R-sq (within)		0.24	0.23
R-sq (between)		0.62	0.72
R-sq (overall)	0.70	0.58	0.67
Sigma u		4.855	3.037
Sigma e		1.705	1.705
Rho		0.890	0.760
Observation	583	583	583

Notes: Significance levels: * $0.01 < p < 0.05$, ** $p < 0.01$.

Results shows (Table 1.2) that higher values of expenditure, trade openness, urbanization and institutional capacity are associated with higher values of tax efforts for all estimators while the M2 or monetization has negatively influenced on tax efforts.

According to the pooled OLS, across individuals and over time, an additional unit of institutional capacity improvement leads to 0.17 units of higher tax revenue. In within regression, each additional unit of improvement of the institutional capacity above the average for an individual country leads to 0.14 unit higher tax revenue (Table 1.2). In 2nd model (Table 1.3), the control of corruption has expected positive sign with the tax efforts, implies that as the government can increase control over the degree of corruption, the tax revenue will increase more.

Table 1.3: Comparing estimators for panel data model: Equation 2

Tax effort	Pooled OLS	Within or Fixed effect	Random effect
Govt. Expenditure	0.173** (0.027)	0.2097** (0.029)	0.210** (0.0264)
M2_gdp	0.0007 (0.003)	-0.0355** (0.0094)	-0.0184* (0.0075)
Openness	0.0186** (0.0049)	0.028** (0.006)	0.028** (0.005)
Urban pop	0.0354** (0.0099)	0.212** (0.057)	0.084** (0.0194)
Control of corruption	0.131** (0.0053)	0.0585** (0.018)	0.078** (0.0106)
Constant	2.950** (0.487)	-2.195 (3.149)	2.632* (1.149)
R-sq (within)		0.19	0.17
R-sq (between)		0.55	0.69
R-sq (overall)	0.70	0.51	0.65
Sigma u		4.548	2.960
Sigma e		1.764	1.764
Rho		0.869	0.738
Observation	583	583	583

Notes: Significance levels: * $0.01 < p < 0.05$, ** $p < 0.01$.

Housman test: To test whether Random or Fixed effect model are appropriate.

Null: Random effect model is appropriate

Alt: Fixed effect model is appropriate

Equation 1:Institutional capacity

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 15.20

Prob>chi2 = 0.0095

We reject the null and we can accept that fixed effect model will be efficient for panel regression.

Equation 2: Control of corruption

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 26.72

Prob>chi2 = 0.0001

We reject the null and we can accept that fixed effect model will be efficient for panel regression.

The Hausman test shows significant differences between the coefficients for the fixed effects and random effects model. Therefore, we need to use the fixed effects model.

Table 1.4: Fixed effect model estimation: the Impact of governance (institutional capacity and control of corruption) in developed and developing countries

Tax effort	Equation 1	Equation 2
Govt. Expenditure	0.1878** (0.0812)	0.2097** (0.1008)
M2_gdp	-0.0377 (0.0094)	-0.0355 (0.0448)
Openness	0.0298*** (0.009)	0.0281*** (0.1002)
Urban pop	0.215** (0.0904)	0.2125** (0.0853)
Institutional Capacity	0.0138** (0.0623)	
Control of corruption		0.0584* (0.0334)
Constant	-6.270 (5.721)	-2.195 (4.583)
R-sq (within)	0.24	0.19
R-sq (between)	0.62	0.55
R-sq (overall)	0.58	0.51
Sigma u	4.855	4.548
Sigma e	1.705	1.764
Rho	0.890	0.869
Observation	583	583

Notes: Significance levels: * 0.05 < p < 0.10, ** 0.01< p < 0.05, *** p < 0.01.

In the next step we explore the whether we also observe a robust relationship between governance quality (institutional capacity and control of corruption) and tax effort in the developed and developing countries. The results are reported in Table 1.4, we observed that the demand side determinates are highly relevant to explaining the tax revenue performance. The regression coefficient of institutional capacity and control of corruption variable is positive and significant. Interestingly, institutional capacity has a stronger impact on tax efforts than controlling of corruption. This result implies the conformity of our earlier expectation. The study result indicates that governance quality matters for tax revenue collection. These finding support the hypothesis that willingness to pay taxes depends on the better quality of government i.e. higher institutional capacity and lower corruption enhances more tax revenue in the economy.

Section 6: Conclusion and Policy Implication

The ultimate conclusion of this paper is that a more capable institution and less corrupt administration is likely an important precondition for more adequate level of tax efforts in the developing and also in developed countries. The main contribution of this paper is to show the quality of governance matter for tax revenue collection. The study results suggest that institutional capacity and control of corruption has positive and significant effect on tax effort i.e. good governance has a positive effect on tax system and revenue collection.

The fixed effect model (robust) show that institutional capacity variables have significant effect on tax effort. The results suggest that developing countries can improve their tax performance through improving their institutional structure. In particular, an improvement in institutional capacity will lead to higher tax efforts. The control of corruption coefficient is positive and so we can say if a country takes measures to control corruption, which will enhance their tax effort. Efforts need to be made by the government to make improvement to institutional capacity (effectiveness of administration, regulatory quality, rule of law and control the corruption in all level especially in public service.

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Appendix

Annex Table 1: Summary of Previous Studies on Tax Effort

Studies	Dependent variable	Explanatory Variables			
		Sectoral Composition of Value-Added	Openness of the Economy	Per Capita Income/ Demographic Characteristics	Foreign Debt/ Tax Evasion
Lotz and Morss (1967) developed and developing countries	Ratio of tax revenue to GNP		Trade Share in GNP (positive, significant for the entire sample and for the low income countries, not significant for the high income countries)	Per capita GNP (positive, significant for the entire sample and for the low income countries, not significant for the high income countries)	
Shin (1969) Developed and developing countries	Tax ratio	Agricultural share in GNP (negative, not significant)	Trade Share in GNP (positive, not significant)	Per Capita GNP (positive, significant)	Rate of change in prices (positive, significant only for the low income countries)
Bahl (1971) Developing countries	Taxable capacity	Agricultural share (negative, significant) Mining share (positive, significant)	Export share (positive, not always significant)	Per capita income (positive, not significant)	
Chelliah, Baas, and Kelly (1975) 47 countries during 1969-1971	Tax share in GNP	Agricultural share (negative, significant) Mining share (positive, significant)	Export share (positive, not significant)		
Tait, Grätz, and Eichengreen (1979) 47 countries during 1972-1976	Tax share in GNP	Agricultural share in GNP(negative, not significant) Mining share in GNP (positive, significant)	Non-mineral export share in GNP (positive, significant)		
Tanzi (1981) 34 sub-Saharan African Countries for 1977	Tax ratio	Mining share (positive, significant)	Non-mineral export share (positive, significant)		
Tanzi (1987) 86 developing Countries for 1977	Tax share in GDP				Per capita income (positive, significant)

Tanzi (1992) 83 Countries for 1978-1988	Tax share in GDP	Agricultural share (negative, significant)	Import share in GDP (positive, significant)	Per capita income (positive, not significant for some years)	Foreign debt share in GDP (positive, not significant in all estimations)
Stotsky and WoldeMariam (1997) 43 sub-Saharan African Countries for 1990-1995	Tax share in GDP	Agricultural share (negative, significant) Mining share (negative, significant) Manufacturing share Positive and (negative, not significant)	Import share in GDP (negative/positive, not significant) Export share in GDP (positive, significant)	Per capita income (positive, significant)	
Piancastelli (2001) developed and developing countries	Total tax revenue share in GDP	Agricultural share in GDP (negative, significant in a panel analysis) Industry share in GDP (positive, significant in a time-series analysis) Service share in GDP (positive, not always significant)	Trade Share (positive, significant)	GNP per capita (positive, not always significant)	
Teera (2002) developed and developing countries	Tax share in GDP	Agricultural share in GDP (negative and positive depending on the estimation, strong negative impact for low income countries) Manufacturing share in GDP(negative, not significant)	Trade share in GDP (negative and positive, not significant, strong positive effect for lower middle income countries)	GDP per capita (negative and positive, not always significant)	Debt share in GDP (negative and positive, mostly significant, Shadow economy (positive, not always significant; negative and significant in one estimation)
Alm and Martinez-Vazquez (2003); developed and developing countries	Ratio of tax revenue to GDP	Agricultural share in GNP (negative, not significant) Mining share in GNP (positive, significant)	Trade Share in GNP, (negative, not significant)	GNP per capita, (negative, significant)	Shadow economy share in GDP, (negative, significant)

Bahl (2003) OECD and less developed economies	Ratio of tax revenue to GDP	Non-agricultural share in GDP (positive, significant)	Trade Share (positive, significant)	Population growth rate (positive, significant)	Simple correlation between tax effort and the size of shadow economy (positive, not significant)
Ahsan and Wu (2005) developed and developing countries for 1979-2002	Tax share in GDP	Agricultural share in GDP (negative, significant)	Trade Share in GDP (positive, significant)	GDP per capita (negative, significant) Population growth rate (negative, not significant)	Corruption Level (negative, not significant)

Source: Lutfunnahar Begum, 2007

Annex Table 2: Variable Descriptions and Sources

Variables	Description	Source
Tax effort	Tax revenue as share of GDP	WDI
Govt. Expenditure	Annual government expenditure as share of GDP	WDI
M2 or Broad money	Broad money (M2) as share of GDP	WDI
Openness	Import plus Export dived by GDP	WDI
Urban pop	Urban population as share of total population	WDI
Institutional Capacity	Average of government effectiveness, rule of law, regulatory quality indices and converted into 0-100 range	World Bank, WGI
Control of corruption	Control of corruption perception index, in 0-100 range	World Bank, WGI

Annex Table 3: Sample countries

Antigua and Barbuda	Egypt, Arab Rep.	Maldives	St. Lucia
Armenia	El Salvador	Mali	St. Vincent and the Grenadines
Australia	Georgia	Nepal	Thailand
Bangladesh	Grenada	New Zealand	Togo
Benin	Guatemala	Nicaragua	Uganda
Botswana	Honduras	Norway	Ukraine
Bulgaria	Iceland	Pakistan	United Kingdom
Burkina Faso	India	Paraguay	Uruguay
Cambodia	Indonesia	Peru	Zambia
Caribbean small states	Korea, Rep.	Philippines	
Colombia	Lebanon	Poland	
Croatia	Macao SAR, China	Romania	
Denmark	Macedonia, FYR	Sierra Leone	
Dominica	Madagascar	South Africa	
Dominican Republic	Malaysia	Sri Lanka	

Annex 4: Worldwide Government Indicators

The Worldwide Governance Indicators (WGI) is a long-standing research project to develop cross-country indicators of governance. The WGI consist of six composite indicators of broad dimensions of governance covering over 200 countries since 1996: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. These indicators are based on several hundred variables obtained from 31 different data sources, capturing governance perceptions as reported by survey respondents, non-governmental organizations, commercial business information providers, and public sector organizations worldwide. The six indicators are given in following table.

1. Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
2. Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Estimate gives the country's score on the

	aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
3.	Political Stability and Absence of Violence/Terrorism captures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
4.	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
5.	Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
6.	Voice and Accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.

Annex 5: Multi-dimensional Poverty Index (MPI)

The Multidimensional Poverty Index or MPI is an international poverty measure developed by the Oxford Poverty and Human Development Initiative (OPHI) for the United Nations Development Programme's flagship Human Development Report in 2010. The innovative index reflects the multiple deprivations that a poor person faces with respect to education, health and living standards. This brief explains how the MPI is constructed and how it can be used, and summarizes a number of analyses of the MPI figures published in the HDR 2013.