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THE IMPACT OF INSTITUTIONAL QUALITY ON TAX REVENUE IN DEVELOPING COUNTRIES

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Abstract

This article applies the method of difference panel GMM Arellano-Bond for a dataset of eighty two developing countries (These countries are classified into three economies basing on estimates of gross national income (GNI) per capita for the 2014 year by using the World Bank Atlas method[1]) during a period from 1996 to 2013 to empirically assess the impact of institutional quality (based on six World Bank governance indicators[2]) on government tax revenue. The results show a significantly positive impact of institutional quality on tax revenue in the whole sample, as well as in the low-income and lower-middle income groups while this impact is significantly negative in upper-middle income group. These results are definitely consistent and robust for all six World Bank governance indicators. The findings suggest governments in developing countries should appropriately adjust institutional quality to improve the tax revenue and promote economic activities.

Keywords: Institution, tax revenue, difference GMM, developing countries

1. INTRODUCTION

Developing countries have been facing a variety of institutional problems in terms of generating budget. Among these problems, corruption appears to be the primary reason leading to difficulties in tax management. Accordingly, corruption negatively affects government revenue while good governance contributes more positively (Ajaz & Ahmad, 2010). The amount of tax revenue is the main component of a national budget (Hakim & Bujang, 2011). However, the difference in tax revenue between high income countries and low income countries is 10% (Sttauss, 2001). Hence, institution quality is considered to be the major cause of poor tax collection in developing countries (Chand and Moene, 1997; Ghura, 1998). In addition, some studies indicate corruption causing the loss of more than 50% tax revenue in developing countries (Richupan, 1984; Alm *et al.*, 1991; Bird, 1990 and 1992; Krugman *et al.*, 1992). Behaviour of tax payers also depends on the institutional regulations (Torgler, 2003). In fact, institutional quality plays a crucial role in promoting economic growth. It not only promote economic growth, impacts on economic activities and the allocation of resources in the future but also is an economic success (Efendic *et al.*, 2011).

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[1] On 1 July 2015, low-income economies are determined as those with a GNI per capita, computed using the World Bank Atlas method, of $1,045 or less in 2014; Lower-middle-income economies are those with a GNI per capita of more than $1,045 but less than $4, 125; and upper-middle-income economies are more than $4, 125 but less than $12,736;

[2] Six World Bank governance indicators: (1) Government effectiveness; (2) Control of corruption; (3)Political stability; (4) Quality of regulatory; (5) Rule of law; (6) Voice and accountability.

To find answers to the questions "How does the quality of institution impact on tax revenues in developing countries? Is there any difference in impact on each economies group as divided by World Bank?", this study chooses to use empirical methods by applying estimation method of difference GMM panel data to study the impact of institutional quality on tax revenue with controlled variables, including domestic investment, labor force, government expenditure, inflation, infrastructure and trade openness for eighty two developing countries over the period of 1996-2013, when the economy witnessed two major crises. The financial crisis in Asian countries in 1997 started from Thailand, and then spread to affect stock markets of some countries such as Malaysia, Laos, and Taiwan. The second crisis happened when the real estate bubble burst in the United State of America in 2007, leading to the US financial crisis in 2008 to affect the production and export of a wide range of developing countries. The difference GMM helps to reduce estimation bias due to endogenous phenomenon and serial correlation that is frequently present in the macro panel data (Arellano and Bond, 1991; Ajaz & Ahmad, 2010; Nguyen, 2015). Specifically, this paper tries to:

(1) Evaluate the impact of experimental institutional quality on tax revenues for the overall sample consisting of eighty two developing countries over the period of 1996-2013;
(2) Compare this impact among three economies of group: low-income, lower-middle and upper-middle income.

The paper is structured as follows: Section one introduces the research problems. Section two briefly reviews the results of previous research on the impact of institutional quality on tax revenue. Section three presents the theoretical framework. Section four describes the research methodology and data. Section five shows the results and discussion. Finally, section six is the conclusion and policy implications.

2. LITERATURE REVIEW

Studies on impact of institution quality on tax revenue have been conducted by many empirical researchers for decades. It is also a key objective of most governments' policy makers to develop good institutional regulations to build the optimal tax system for their economic growth.

To gain a better analysis into the direct democracy in Switzerland, where the levels of participation and democracy vary across different states, Torgler (2003) utilized two distinct data sets at individual level within a period from 1996 to 1999 (World Values Survey and International Social Survey Programme.)He argues that direct democracy, local autonomy and people's trust in the government, court, and judicial system significantly support tax compliance.

Similarly, Bird and Martinez-Vazquez (2008) conducted a panel data regression analysis with the use of 2SLS method using data from developing countries from 1990 to 1999 and data from developed countries from 1998 to 2000. The estimated research outcomes signified that low-income countries can only improve taxation by reinforcing their institution together with the enhancement of voice and accountability as well as effective corruption management. Equivalently, high-income countries can also raise their taxation as long as they improve their institution quality.

Ajaz and Ahmad (2010) made use of difference GMM with a panel data set of 25 developing countries from 1990 to 2005 and concluded that institutional variables are significantly correlated with tax collection. In other words, corruption is reported to have a negative impact on taxation. Nonetheless, efficient public management appears to encourage tax revenue. The low taxation in developing countries, therefore, is put down to the corrupted tax administration and poor-quality public management.

Using the panel data analysis with data taken from 1990, 1995, and 2000 in both developed and developing countries, Torgler *et al.* (2011) conclude that people comply with paying taxes when the authority represents a reliable and fair society.

Dioda (2012), in his empirical research over a panel data set of 32 American countries during the period from 1990 to 2009, applied difference GMM with 2 varied models: random effect model (REM) and fixed effect model (FEM). The result shows that an increase of one percent in free democracy is entitled to an increase of one point two percent of government revenue.

Torrance and Morrissey (2013) also had one empirical evaluation on the effects of GDP, agricultural proportion, industrial proportion, imports and exports rates in comparison with GDP, and institutional impacts on taxation in 36 Sub-Saharan African nations within a period from 1970 to 2010. The consequence then highlights the fact that the impact of institution on tax revenue to GDP ratio is strong and positive; however, the correlation deteriorates with the arrival of many new kinds of institutions and the economic development.

In addition, Feger (2014) argues that the current institution and policies in Sub-Sahara African countries are detrimental to the amount of direct taxation. In fact, even though the institution there is considered to be weak and inefficient, commercial tax revenue is not affected by institutional quality.

Hossain (2014) exploited method of Fixed Effect and Random Effect for 55 developing countries with the data set taken from 2002 to 2012 and confirms that there is correlation between high government and willingness to pay taxes.

Syadullah and Wibowo (2015) took advantage of descriptive statistics and cause-and-effect analysis using an ASEAN countries panel data set from 2003 to 2012. They also come up with a similar result showing that the controls of corruption, voice and accountability, and political stability have a significantly negative impact on tax ratio, while rule of law and the regulatory quality positively impact on tax ratio in these countries.

3. THEORETICAL FRAMEWORK

The theoretical framework is based on arguments of Syadullah and Wibowo (2015) which indicates the influential mechanism of institutional quality on tax revenue.

First, it is the theory of political legitimacy. People's trust or belief level on government will determine tax compliance (Tayler, 2006; Kirchler *et al.*, 2008). So, governments, institutions, and social arrangements should ensure that their political legitimacy has to be appropriate, accurate, fair, and beneficial for all citizens.

Second, Bird *et al.* (2004) find corruption, role of law, and regulations important determinants of tax revenue. Meanwhile, Gupta (2007) shows the significantly negative impact of corruption on tax revenue performance. It also shows that good institution quality may increase revenue performance.
Third, public tax revenue depends on government efficiency. Also, good governance positively influences the tax collection system and increases tax revenue. Benno (2003) noted that democracy, autonomy, trust in government, and the legal system have a significant positive impact on tax morale.

Similarly, Torgler (2003) shed a new light on the perspective that a direct democracy, its local autonomy, and people's trust in judicial system supportively influence tax compliance's motives.

4. METHODOLOGY AND DATA

4.1. Methodology

In order to determine the relationship between quality of institution and tax revenue in developing countries over the period from 1996 to 2013, the study demonstrates and concerns the following model:

$$\Delta TARE_{it} = \alpha_{it} + \beta_1 TARE_{it-1} + \beta_2 INS_{it} + X_{it}\beta_3' + \eta_i + \xi_{it} \quad \ldots\ldots\ldots\ldots\ldots (1)$$

In which, $TARE_{it}$ is tax revenue-to-GDP ratio; INS_{it} denotes the quality of institution which is measured by sixWorld Bank governance indicators; X_{it} stands for vectors of controlled variables in models; η_i is an unobservable error (time-invariant, country-specific effect); ξ_{it} is an observation-specific error term.

In the equation (1), $\Delta TARE = TARE_{it} - TARE_{it-1}$ is the first difference of *TARE*, representing the growth rate of tax revenue; $TARE_{it-1}$ on the right side is the initial level of tax revenue. This study employs difference panel GMM which was originally suggested by Griliches and Hausman (1986) and then developed by Arellano and Bond (1991). This methodology utilizes the lags of instrumented variables and transforms them into instruments. Hence, it enables us to use an appropriate lagged structure to investigate the dynamic feature of panel data. The dynamic feature shown in the equation (1) reveals some fixed effects due to country-specific feature which are positively related to independent variables (lagged variables of taxation) and some explanatory variables, convincingly providing an evidence for the endogenous phenomenon of the model. The endogenous phenomenon results from the correlation of some controlled variables with random errors of the equation. Furthermore, the existence of this correlation is uncertain because the lagged appearance of taxation variable cannot be found, which can cause the inconsistency towards pooled OLS method and wrong estimation (Griliches & Hausman, 1986; Barro, 1990; 1991; Arellano, 1991, 2003).

The main issue in the equation (1) is that the dependent variable (tax revenue) and its lag correlate with country-specific effects. Torgler and Schneider (2009) shows that the tax revenue is an endogenous variable. Accordingly, difference panel GMM with lagged endogenous variables is selected to give solutions to these problems. Ahmed (2012) also argues that using GMM and instruments help to reduce the errors in panel data forecast. The further details about the procedure are presented in Griliches and Hausman (1986); Arellano and Bond (1991), and Roodman (2009).

4.2. Data

This study uses an unbalanced panel data set, which is allowed for difference panel GMM. Also, with unbalanced data set bias may occur when the number of samples is small (Bruno, 2005). Research dataset was extracted from the annual data of the World Bank (World Development Indicators) (Kaufmann *et al.*, 2010) and the International Monetary Fund (World Economic Outlook) (Nguyen, 2015) in the period 1996 to 2013 for 82 developing countries (large sample) as following.

4.2.1. Low-income countries (GNI is under US$1,045 in 2014)

There are 18 countries: Burundi, Burkina Faso, Cambodia, Central African Republic, Chad, Comoros, Congo Dem. Rep., Ethiopia, Guinea-Bissau, Haiti, Madagascar, Mozambique, Nepal, Niger, Rwanda, Tanzania, Togo, and Uganda. The majority of preceding countries come from Africa (15 countries) whilst there are only two Asian countries and an American nation.

4.2.2. Lower-middle income countries (GNI ranges from US$1,045 to under US$4,125)

Bangladesh, Bhutan, Bolivia, Cabo Verde, Cameroon, Congo Rep., Côte d'Ivoire, Djibouti, Egypt Arab Rep., El Sanvador, Georgia, Ghana, Guatemala, Guyana, Honduras, India, Indonesia, Kenya, Kyrgyz Republic, Lesotho, Moldova, Morocco, Nicaragua, Nigeria, Pakistan, Philippines, Sri Lanka, Tajikistan, Tanzania, Ukraine, Vietnam, and Zambia. (32 countries).

4.2.3. Upper - Middle income countries: (GNI ranges from US$4,125 to under US$12,736)

There are 32 nations coming from Asia, Europe, Africa, and America (Albania, Algeria, Angola, Azerbaijan, Belarus, Belize, Bosnia-Hezgovina, Brazil, Bulgaria, China, Colombia, Costa Rica, Dominican Republic, Ecuador, Gabon, Iran Islamic Rep., Jordan, Kazakhstan, Lebanon, Libya, Malaysia, Mexico, Mongolia, Panama, Paraguay, Peru, Romania, Serbia, South Africa, Thailand, Tunisia, and Turkey).

The following variables are to present the details

- $TARE_{it}$: General Government Revenue (a share of GDP (%)). This value has been utilized by many researchers in their papers such as Ajaz & Ahmad (2010); Bird & Martinez-Vazquez (2008); Dioda (2012); Torrance & Morrissey (2013).
- INS_{it}: institution (the value calculated by 6 World Bank governance indicators) (statistics from the reports of World Bank in reference to a set of values of World Government Indicators (WGI) These variables range between -2.5 (low index) and 2.5 (high index) (Ajaz & Ahmad, 2010; Torgler *et al.*, 2011, Alonso & Garcimartín, 2013; Law *et al.*, 2013; Lee & Kim, 2009; Syadullah & Wibowo, 2015). The institutional values were examined every two years from 1996 to 2001. Since 2002, these examination has taken place annually; therefore, the data from 1997, 1999, and 2001 in this paper was added up and divided to get the average value. The figures of preceding even year and the following even years are added up with the figures of the investigated year; then, the sum is divided in half (Torgler *et al.*, 2011; Law *et al.*, 2013).
  1. $Ins1_{it:}$ Institution 1: Government effectiveness;
  2. $Ins2_{it}$: Institution 2: Control of corruption;
  3. $Ins3_{it}$: Institution 3: Political stability and absence of violence/ Terrorism;
  4. $Ins4_{it}$: Institution 4: Regulatory quality;
  5. $Ins5_{it}$: Institution 5: Rule of law;
  6. $Ins6_{it}$: Institution 6: Voice and accountability;

- X_{it}: vectors of below controlled variables.
  1. $RGDP_{it}$: logarithm of a real gross domestic product per capita (constant 2005 US$), proxy for the economic growth of a country. (Barro, 1991; Bird & Martinez-Vazquez, 2008; Kathavate & Mallik, 2012).
  2. $TINV_{it}$: National investment (Total Investment (a share of GDP (%)) (consisted of both state's and private investment). (Tanzi & Davoodi, 1997).
  3. $LABF_{it:}$ labor force estimated via ILO's model (calculated by the division of the number of population in working ages ranging from 15 to 64 and the total population of a whole nation). (Temple, 1999; Haque, 2013; Flachaire *et al.*, 2014; Gravelle & Marples, 2014).
  4. $GEXP_{it}$: (Government Expenditure (a share of GDP (%)) (Ghura, 1998; Rea, 2009; Mehmood & Sadiq, 2010; Elyasi & Rahimi, 2012).
  5. $INFL_{it}$: Inflation (Inflation, consumer prices (annual %) (Feldstein *et al*., 1983; Ajaz & Ahmad, 2010; Hakim & Bujang, 2011).
  6. $INFR_{it}$: infrastructure to be assessed by many methods including the measurement of railway's length (Kuzmina *et al.*, 2014) or highway's length over the area (Du *et al.*, 2008). In this paper, infrastructure is determined by the fixed telephone subscription per 100 people (Bissoon, 2011; Nguyen, 2015)
  7. $OPEN_{it}$: Economic Openness (Trade) (% GDP) (Ajaz & Ahmad, 2010; Nwosa *et al.*, 2012; Mustaq *et al.*, 2013; Salahodjaev, 2015).

  The statistical description of all variables is presented in the following table

Table 1: Statistical description (The whole sample: 82 developing countries)

Variables	Obs.	Mean	Std. Dev.	Min	Max
Real GDP per capita (rgdp)(USD per year)	1394	2030.231	1983.822	129.782	9870.486
Tax revenue (tare) (%GDP)	1394	23.858	10.258	.563	72.299
Institution 1 (ins1) (Index)	1394	-.513	.543	-1.974	1.247
Institution 2 (ins2) (Index)	1394	-.581	.475	-2.057	.869
Institution 3 (ins3) (Index)	1394	-.583	.753	-2.995	1.308
Institution 4 (ins4) (Index)	1394	-.428	.553	-2.413	.815
Institution 5 (ins5) (Index)	1394	-.621	.525	-2.205	.638
Institution 6 (ins6) (Index)	1394	-.491	.635	-1.936	1.099
Total investment (tinv)(% of GDP)	1394	23.733	9.207	3.081	68.463
Labor force (labf)(%GDP)	1394	68.476	11.272	41.9	90.8
Government expenditure(gexp) (%GDP)	1394	25.863	9.567	2.129	69.786

Inflation (infl.) (%)	1394	10.804	29.064	-18.109	513.907
Real Infrastructure (infr.) (Fixed telephone subscriptions per 100 people)	1394	8.654	9.207	.006	47.758
Trade openness (open) (%GDP)	1394	79.366	39.168	15.580	220.407

It can be observed from the table that there is a big gap in GDP per capita between low-income countries and upper middle-income countries. In details, the smallest real GDP per capita is US$129.783(The Ethiopia country) while the maximum GDP per capita is US$9,870.486(The Lebanon country). Also, tax revenue to GDP ratio varies from 0.563 percent (The Congo, Rep. Country) to 72.299 percent (The Libya country).In low-income group, there is the Congo Dem. Rep. country which owns most of the lowest indicators of institution quality.

Table 2: Matrix of correlation coefficients (The whole sample: 82 developing countries)

	tare	ins1	rgdp	Tinv	labf	Gexp	Infl	infr	Open
tare	1.000								
ins1	0.064	1.000							
rgdp	0.350	0.502	1.000						
tinv	0.221	0.29	0.197	1.000					
labf	-0.320	-0.18	-0.533	-0.070	1.000				
gexp	0.881	0.189	0.339	0.230	-0.356	1.000			
infl	0.017	-0.17	-0.059	-0.059	0.034	-0.010	1.000		
infr	0.371	0.519	0.789	0.238	-0.481	0.429	-0.076	1.000	
open	0.340	0.205	0.260	0.192	-0.142	0.346	-0.021	0.323	1.000

From the table, it can be said that quality of institution positively impacts on government revenue. Moreover, the correlation between institution and independent variables appears to be weak. Hence, institutional variables can be equated to independent variables in the model.

Table 3: The correlation coefficients matrix of six institutional variables (The whole sample: 82 developing countries.)

	INS1	INS 2	INS 3	INS 4	INS 5	INS 6
ins1	1.000					
ins2	0.792	1.000				
ins3	0.44	0.542	1.000			
ins4	0.77	0.615	0.387	1.000		
ins5	**0.839**	**0.83**	0.57	0.703	1.000	
ins6	0.543	0.535	0.421	0.662	0.584	1.000

According to the correlation coefficient matrix, the six institutional variables are closely related, especially the high closeness between the first institution (government effectiveness), the second institution (control of corruption) and the fifth institution (rule of law) with a correlation rate of more than 0.8. In other words, government effectiveness and rule of law can contribute to higher authority efficiency and a more meticulous control of corruption. Accordingly, a highly effective management and a good corruption control, in turn, support the rule of law. It is advisable that the analysis of each individual institution be conducted separately (it is not proper to place the first institution, the second institution and the fifth institution in the same model) to avoid bias caused by multi-correlation among variables.

5: RESULTS AND DISCUSSION

5.1. Impacts of institutional quality on tax revenue based on overall research data (The whole sample: 82 developing countries from Asia, Europe, Africa, and Latin America)

Before executing xtabond2 order, the "real GDP per capita" variable and the variable of "infrastructure" were taken logarithm to reduce bias when analyzing the macro data. Solving

logarithm with two indicators has been applied by many previous researchers such as Mehrara *et al.* (2011); Ahmed (2012); Nguyen (2015).

So to solve endogenous phenomenon and serial auto-correlation of residuals, this research choses "institution" variable or "labor force" variable as one endogenous variable and exposes it to GMM procedure. The remaining variables are considered as instruments and used in procedure IV.

To evaluate the validity of instruments in first-difference GMM estimation and auto-correlation of residual, this paper applies the Sargan test (the test to identify rejection of the null hypothesis "the model has an endogenous phenomenon") as well as testing for serial auto - correlation by Arellano - Bond test (AR2) (the test tries to check the repudiation of the null hypothesis "the variables in a model have serial auto-correlation of residual"). Examining the model has brought about the results in which p-value is higher than ten percent. These results display that there is enough evidence to reject the null hypothesizes (H_0). After being tested there is not any endogenous phenomenon and serial auto-correlation of residuals. (See table four, table five, table six and table seven.)

To verify the robustness of difference panel GMM Arellano – Bond estimation, the estimated outcomes are always checked by reducing or adding some variables. Equally, this estimation starts with the overall data: eighty two developing countries and then with a data set of eighteen low-income countries, a data set of thirty two lower-middle income countries and finally with a data set of thirty two upper-middle income countries. All of these data sets give expected similar and significant results as displayed in table number four, table number five, table number six and table number seven. It says that the results of difference panel GMM guessing are strongly robust.

Table 4: The estimated results of difference GMM with the use of Arellano-Bond over the groups of developing countries (whole sample: 82 developing countries) Dependent variable: Δ Tax revenue

	INS1	INS2	INS3	INS4	INS5	INS6
Tax revenue (-1)	-1.189***	-1.212***	-1.247***	-1.266***	-.958***	-1.315***
Institution	27.572**	26.043***	20.659**	47.753***	32.999**	56.705***
GDP per capita	0.368***	0.235***	0.1707***	0.004	0.208	0.087*
Total investment	0.810**	0.634**	0.538**	0.076	0.633	0.233
Labor force	-0.491	-0.454	-2.437	5.840**	-1.721	-2.408
Government expenditure	-1.178***	-0.802***	-0.666***	-0.563	-1.041**	0.054
Inflation	-0.011	0.018	-0.005	0.077	0.201	0.048
Infrastructure	-0.066	-0.046	-0.026	0.117**	-0.060	-0.018
Trade openness	-0.089	-0.050	-0.012	0.020	-0.086	-0.003
Obs.	1148	1066	1148	902	656	1066
AR(2) test	0.111	0.142	0.115	0.242	0.146	0.112
Sargan test	0.403	0.255	0.190	0.317	0.588	0.561

***, ** and *stand for significance at 1%, 5% and 10% respectively

Table number four, table number five, and table number six show the high robustness of the model when conducting the estimations with a data set from eighty two developing countries (a general result) as well as conducting analysis with data set from eighteen low-income countries and thirty two lower-middle income countries. The consistency is exemplified by six World Bank governance indicators. Accordingly, the institution quality has a significantly positive impact on governmental tax revenue at rates of ten percent, of five percent, and of one percent respectively. It is conclusive that a good institutional quality then can help the government to control corruption better. The result shows the good institution quality with six World Bank governance indicators listed as government effectiveness, control of corruption, political stability, regulatory quality, rule of law, voice and accountability helps government reduce corruption, and sequentially eliminates tax evasion. This finding is consistent with the previous results provided by Richupan (1984); Bird (1990 and 1992); Alm *et al.* (1991); Krugman *et al*. (1992); Ghura (1998); Bird *et al*. (2006 and 2008); Imam and Jacobs (2007); Davoodi and Grigorian (2007); Mahdavi (2008); Attila (2009); Minea and Villieu

(2009); Bornhorst *et al*. (2009); Ajaz and Ahmad (2010); Botlhole (2011); Dioda (2012). Hossain (2014) shares an opinion that an effective institution and authority will account for a proficient taxable system and high tax effort. Moreover, as noted by Syadullah and Wibowo (2015), a high rate of corruption will give rise to a poor performance of taxation; thus, a good control of corruption will both enrich tax revenue and avoid tax evasion.

Furthermore, controlled variables including total investment, real gross domestic product per capita, labour force, and infrastructure create significantly positive impacts on tax revenue. In more detail, real GDP per capita variable has a positive impacts on tax revenue with significance of one percent for three World Bank governance indicators: government effectiveness, control of corruption and political stability. When GDP percapita increases, people will spend more and government can collect more tax. It should be noted that for a low GDP per capita countries this also means a negative impact on government tax revenue. Pesendorfer (2008) showes that GDP per capita in Australia hasa significantly negative impact on the tax revenue when compared with other countries, where GDP per capita is higher.

While the total investment variablehas significantly a positive impact on tax revenue at five percent for the same three above indicators. In general, the result in table number four proves the high appropriateness and reliability of the investigated model, owing to the fact that the increase in investment can generate more government revenue.

Moreover, the labor force variable has a positive impact on tax revenue with significance of five percentfor only regulatory quality indicator. The tax revenue can be spread to other types of tax collection constituted by sale tax and direct tax such as personal income tax or corporate income tax (Gwartney & Lawson, 2006). The large number of labour force indicates an increase in the number of individual workers whose personal income taxes are consequently rising as well. Gravelle and Marples (2014) suggestthat the income tax is based on working hours. Hence, when the number of employees rises, working hours expand, which then fosters tax revenue.

With the regulatory quality indicator, infrastucture positively impacts on tax revenue with significance offive percent. Cohen *et al.* (2012) arguethatwith infrastructure improvement, more investment will be attracted, and it will eventually lead to increase tax revenue.

On the other hand, government expenditure has a negative impact on tax revenue with significance of one percent and of five percent. Another explanation to this might indicate that government spendingon public investment can overwhelm private investment ceteris-paribus. When private investment plunges, national budget is certainly to drop also since there will be a loss of tax revenue taken from private business' investment activities and profits. In addition, Ghura (1998) and Elyasi and Rahimi (2012) figure out that in order to promote the revenue source, Iranian citizens and governments must reduce government spending or cut down on unnecessary expenses.

The impact of initial tax revenue (lagged variable of tax revenue) is significantly negativeatone percent on tax revenues. This notion can be found in the data set that included eighty two investigated developing countries as well as groups of low-income, lower-middle income, and upper-middle income. This result is consistent for all six institutional variables, which can be implied that in the long term, the proportion of tax revenue to GDP ratio in all developing countries in the study are converging. As concluded by Kenny (2005), a majority of reports have clarified that in order for poor countries to develop and catch up with rich countries, there should be a convergence condition. Hence, it is fundamental that each developing country concentrate on self-training for greater experience and send a certain amount of workforce to observe and study more about how to establish good institutions in developed countries.

5.2. Impacts of quality of institution on taxrevenue in groups of different economies by income (low income, lower-middle income, andupper - middle income)

5.2.1. Effects of institutional quality on tax revenue as a whole sample: 82 developing countries.

Table 5: The estimated results using difference GMM for Arellano – Bond panel data in a group of low-income countries (sub-sample = 18 low-income countries) Dependent variable: ΔTax revenue

	INS1	INS2	INS3	INS4	INS5	INS6
Tax revenue (-1)	-1.01***	-1.398***	-1.250***	-1.274***	-1.348***	-1.379***
Institution	21.495*	22.884**	15.593***	25.206**	20.091**	16.514**
GDP per capita	0.253**	0.077	0.257***	0.242**	0.211**	0.296***
Total investment	-0.144	-0.285**	-0.102	-0.204*	-0.283	-0.421
Labor force	1.787	2.335	-1.283	0.028	-7.963	12.672*
Government expenditure	0.433***	0.661***	-0.376	-0.294	0.516	-0.261
Inflation	0.017	0.012	0.007	0.019	0.0175	0.015
Infrastructure	-0.070*	-0.050	0.001	0.025	0.006	-0.088
Trade openness	0.133	0.376***	0.0623	0.345***	0.242*	0.025
Obs	264	246	264	228	264	282
AR(2) test	0.544	0.164	0.168	0.129	0.945	0.527
Sargan test	0.356	0.469	0.163	0.549	0.647	0.879

***, ** and *stand for significance at 1%, 5% and 10% respectively

Table 6: The estimated results using difference GMM for Arellano – Bond panel data in a group of lower-middle income countries (sub sample: 32 lower-middle income countries) Dependent variable: ΔTax revenue

	INS1	INS2	INS3	INS4	INS5	INS6
Tax revenue (-1)	-1.377***	-1.269***	-1.213***	-1.400***	-1.061***	-1.174***
Institution	36.093**	11.152**	13.168*	30.469**	-9.929	30.910***
GDP per capita	-0.040	0.003	-0.103	0.141*	-0.019	-0.036
Total investment	0.725***	0.391	0.425*	-0.717	0.748**	0.122
Labor force	-0.176	0.370	-0.818	-0.970	-0.984	1.438
Government expenditure	0.072	-0.397*	0.632	-0.460	0.149	-0.629
Inflation	-0.027	-0.009	0.012	0.002	-0.044	0.070
Infrastructure	0.036	0.097***	-0.029	0.012	0.057	0.124***
Trade openness	-0.168	0.009	0.0253	0.143**	-0.079	-0.001
Obs.	354	450	290	418	418	450
AR(2) test	0.158	0.141	0.899	0.971	0.436	0.233
Sargan test	0.167	0.106	0.973	0.431	0.165	0.542

***, ** and *stand for significance at 1%, 5% and 10% respectively

Table number five and table number six showthat the impacts of institutional quality on tax revenue in low-income and lower-middle income countries areconsistent with the overall result. Low-income countries especially attain the most consistent result. Benneth (2007) shares that the governments with more proficient institutions certainly have better policies regarding to rebalancing the income of the better-off and the poorest citizens, which obviously can improve taxation.

Furthermore, being consistent with the overall result, the variable representinga real GDP per capita in the three groups of countries: low income, lower-middle income, and upper-middle income has a significant positive impact on tax revenue. Especially in the upper-middle income countries, the GDP per capita has an extremly significantly positive impact on tax revenues at one percent for all six World Bank governance indicators. (Table number four, table number five, table number six, and table number seven; Explanation provided at 5.1).

As for low income countries (Table number five), the result is also consistentwith the overall result for a whole sampleeighty twodeveloping countries in terms of labor force variable (explanation provided at 5.1).

When it comes to lower-middle income economies (Table number six), consistency with the general result is illustrated by the effect of the governmental expenditure variable. Specifically, governmental expenditure has negatively affected tax revenue with significance of ten percent, whereas, infrastructure has got a significantly positive impact on tax revenue at one percent with control of coruption and voice and accountbility indicators. Also, the total investment variable has a significantly positive impact on tax revenue atone percent for the government effectivenesindicator, at five percent for rule of law and the ten percentfor the indicator of political stability (explanation provided at 5.1). The mentioned findings once again show the robustness of the model.

5.2.2. The differences of the effects of institutional quality on tax revenueby group countries and overall result

Table 7: The estimated results using difference GMM for Arellano – Bond panel data in a group of upper middle income countries (32 nations) Dependent variable: ΔTax revenue

	INS1	INS2	INS3	INS4	INS5	INS6
Tax revenue (-1)	-1.24***	-1.48***	-1.375***	-1.605***	-1.464***	-1.400***
Institution	-6.161**	-7.183	-3.104*	-27.158*	-26.416***	-9.450**
GDP per capita	0.165***	0.064***	0.184***	0.157***	0.100***	0.172***
Total investment	0.403**	0.656***	-0.042	0.603***	0.320***	-0.122
Labor force	-1.261	-0.245	-0.048	-1.892	-0.728	-0.110
Government expenditure	-0.216	0.105	0.271***	0.469	0.236*	0.501**
Inflation	0.158	-0.0246	-0.164***	-0.009	-0.179***	-0.013
Infrastructure	-0.023	-0.020	-0.009	0.028	-0.012	-0.037*
Trade openness	-0.002	0.090*	0.086***	0.053	0.090*	0.367***
Obs.	466	338	434	338	434	402
AR(2) test	0.896	0.975	0.528	0.619	0.178	0.222
Sargan test	0.951	0.142	0.361	0.646	0.465	0.435

***, ** and *stand for significance at 1%, 5% and 10% respectively

The wealthiest point of this paper is properly that among upper-middle income countries, the institution quality with sixWorld Bank governance indicators has a significantly negative impact on tax revenue. It is quite opposite tothe overallgroup and the other two groups, low-income countries and lower-middle income countries. Institutional quality has a significantly negative impacton tax revenue in the cases of following governance indicators: the first institution (government effectiveness), the third institution(political stability), the forth institution(regulatory quality), the fifth institution (rule of law) and the sixth institution (voice and accountability). Morespecifically, the first institution and the sixth institution have significantly negative impacts on tax revenue at five percent, while the fifth institution has a negative impact with significance of one percent. The findings are consistent with optimal tax theory which was reviewed by Mankiw *et al.* (2009) that superlative marginal tax agenda could descend at high-income countries.We all know that private investors are extremely sensitive to governmental tax ratio as argued by Harberger (1962); He arguesthe high tax burden and tax policy can extend the impact on the marginal productivity of capital by distorting investment,and investors shift from high taxation field to low taxation field as a result. The act of increasing or descreasing tax revenuehighly affects the expanding or contracting of one business and consequently casts a great influence over economic growth (Ghura, 1997; Tzougas, 2013). Therefore, the regulatory environment must be established so that the operation of the government (such as issuance of tax policy) must take into account private-sector investment and economic growth. The estimated results show that upper-middle income countries' institutional quality has been always considered to be of great efficiency. In more details, it is geared towards reducing tax revenue to attract investment from the private sector and promote economic activities

that lead to higher economic growth. Hence, there is a institutional distinction between upper-middle income group and the other remain groups. Pfister (2009) also claimes that economic growth and domestic investment are enormously affected by taxation. Foreign investors as well as small businesses both pay a great deal of attention to deal with tax payment. OECD (2012), Goolsbee (2000), Piketty and Saez (2003), and Roine *et al*. (2009) reach a consensus on the issue that tax deduction supports economic growth. Felix (2007), on the other hand, discovers that the increase in business income tax would diminish the investment.

The second discrepancy is at trade openness. In fact, trade openess of the three economies: low-income, lower-middle income, and upper-middle income has a signicantly positive impact on tax revenue at one percent, five percent and ten percentwhile in overall data (eighty two developing countries) the variable of trade openness has no statistical significance. As a result, it is conclusive that effective government together with proper imports-exports activities and good control of corruption can boost tax revenue. Nwosa *et al.* (2012) also shows that there is a positive correlation with market openness rating and taxation in Nigeria. Sharing a same viewpoint, Mustaq *et al*. (2013) describesa similar situation in Pakistan.

Another discrepancy with overall data is found in upper-middle income countries and low-income countries. In fact, governmental expendituresin these groups have significant positive impacts on tax revenue at one percent, at five percent and ten percentrespectively while the overall group and lower-middle income group have a negative impact on tax revenue with significance of one percentand ten percent respectively. Mehmood and Sadiq (2010) also argue that the act of cutting down on expenditure in some developing countries by the government will adversely interfere with working productivity. Consequently, the tax revenue is also affected.

The final difference is that inflation has a significantlynegative impact on tax revenueat one percentamong upper-middle income countries but not in the other groups. It can be seen that inflation is accompanied by the downfall in investment and production, so a fall in tax payment is inevitable. According to Feldstein *et al*. (1983), inflation encourages decrease in saving and investment that has brought about a negative relation between inflation and taxation.

In addition to the mentioned discrepancies, this article also finds out one difference from the whole sample (eighty two developing countries) and two other groups. To low-income countries, especially the ones in Africa, total investment has a significantly negative impact on tax revenue at five percent and ten percent respectively. Investment in low-income countries is, therefore, inefficient. Tanzi & Davoodi (1997) also argue that corruption can help to enhance public investment (one section in the whole domestic investment) but deteriorate total domestic investment effectiveness.

6. CONCLUSION AND IMPLICATION

This study evaluates empirically the impacts of institutional quality on tax revenue by using panel data set from eighty two developing countries spreading all over the world. Among those eighty two countries, there are eighteen low-income countries, thirty two lower-middle countries, and thirty two upper-middle income in a period from 1996 to 2013 via difference GMM and Arellano-Bond test as well as Sargan test.

With a whole sample of eighty two developing countries and three classified economies by income, the quality of institution with sixWorld Bank governance indicatorshas a positive impact withstatistical significance on tax revenue. Effective control of corruption and good quality of regulations have a significantlypositive impact on tax revenues at five percent. Focusing on rule of law with no emotional ties to govern well also hasa significantly positive impact on tax revenue at five percent. Especially, within upper-middle income countries, among the sixworld Bank govenrance indicators, five factors have singnicantly negative impactson tax revenue except the second instituional varialble (Control of coruption), which has no significant impact. This fact shows the high stability of quality of institution in these countries. As a matter of fact, these countries have

performed very well to reduce taxation rates for the purpose of attracting total investment opportunities.

All these aforementioned features are to remind the board of governors as well as policy planners of the importance of constructing high-quality judicial system and meticulously dealing with corruption, especially the malpractice of some tax officers. Furthermore, the board of governors should bring in appropriate tax regulations to ensure their validity and practicality. Those regulations should be able to eliminate the act of taking advantage of close relationships in business exchanges, which is very typical in ASEAN settings, to actually increase taxation. In order to enhance the income per capita, it is crucial to have one proper taxation system which requires a reasonable amount of tax in order to radiate the business attraction and then make it possible to foster domestic investment together with the establishment of proficient authority. Hence, developing countries can be developed to join higher income groups.

As for lower-middle income countries, the governors should faciliate some criteria including freedom of press management, freedom of speech, and freedom of voting because the preceding criteria are profoundly important and capable of generating tax revenue well. Also, for low-income countries, there is a strong need for macro-economic management policies to construct one unblemished authority and eradicate corruption so that the quality of institution and domestic investment can hopefully be better, accounting for better income per capita.

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