

Tax Capacity and Tax Effort: Extended Cross-Country Analysis from 1994 to 2009

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Abstract: One of the important factors for economic development is the existence of an effective tax system. The paper, which is the second part of Le, Moreno-Dodson, and Rojchaichaninthorn (2008), deals with the concept and empirical estimation of countries' *taxable capacity* and *tax effort* to develop further country tax effort typologies. It employs a cross-country study from a sample of 110 developing and developed countries during 1994-2009. *Taxable capacity* refers to the predicted tax to gross domestic product ratio that can be estimated with the regression, taking into account a country's specific macroeconomic, demographic, and institutional features. *Tax effort* is defined as an index of the ratio between the share of the actual tax collection in gross domestic product and the predicted taxable capacity. The use of tax effort and actual tax collection benchmarks allows us to rank countries into four different groups: low tax collection, low tax effort; high tax collection, high tax effort; low tax collection, high tax effort; and high tax collection, low tax effort. This classification is based on the benchmark of the global average of tax collection and a tax effort index. The analysis provides guidance for tax reforms in countries with various levels of tax collection and tax effort.

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Key words: Taxable capacity, tax effort, tax policies, economic development

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I. INTRODUCTION

A wide development community is increasingly recognizing the centrality of effective taxation to development.² The G-20, multilateral institutions, and the donor community want to ensure that their assistance to developing countries to reinforce their tax systems is effective, coherent, and well harmonized (OECD, 2011).

Higher tax revenues are also important to lower the aid dependency of low-income countries. Tax systems can influence international investment decisions. They also encourage good governance and they are integral to strengthening state building and promote state accountability.

Effective tax systems are not only significant for developing countries but also for developed ones. Given that budget deficits have been dramatically increasing in many countries following the introduction of large stimulus packages to promote economic growth with the financial and economic crisis of 2008, governments have been searching for possible ways of increasing tax revenues to finance public expenditures and narrow the deficit without much distorting economic activities.

The first step to understand public revenue systems is to establish some commonly agreed performance measurements and benchmarks. In this regard the paper deals with the concept and empirical estimation of countries' taxable capacity and tax effort. This paper is the second part of Le, Moreno-Dodson, and Rojchaichanthorn (2008) and intends to develop further country tax effort typologies in order to fulfill emerging needs from developing countries' policy makers.

Measuring taxation performance of countries is both theoretically and practically challenging. The actual tax to GDP collection ratio is generally interpreted as a measure of tax effort and used as the basis for cross country tax comparison. The use of such ratio is reasonable if one attempts to establish trends or to compare tax revenue performance across countries with similar economic structure and at the same level of income. However, when used to compare the effectiveness in revenue mobilization across countries in different income groups, the tax-GDP ratio could provide a "completely distorted" picture due to different economic structures, institutional arrangements, and demographic trends. A number of tax economists have attempted to deal with this problem by applying an empirical approach to estimate the determinants of tax collection and identify the impact of such variables on each country's taxable capacity. The development of a tax effort index, relating the actual tax revenues of a country to its estimated taxable capacity, provides us with a tempting measure which considers country specific fiscal, demographic, and institutional characteristics.

² See World Development Report (1997), World Bank Global Monitoring Report (2005), The United Nations report on Financing for Development (2002), The UN Secretary-General's Report to the Preparatory Committee for Financing for Development (2002).

This paper employs a cross-country study to estimate *tax capacity* from a sample of 110 developing and developed countries during 1994-2009 and the two sub-periods of 1994-2001 and 2002-09. In this study, we extend the empirical methodology applied by Tanzi and Davoodi (1997), and Bird, Vazquez, and Torgler (2004). The estimation results are used as benchmarks to compare taxable capacity and tax effort in different countries. *Taxable capacity* refers to the predicted tax gross domestic product ratio that can be estimated with the regression, taking into account a country's specific macroeconomic, demographic, and institutional features. *Tax effort* is defined as an index of the ratio between the share of the actual tax collection in gross domestic product and the predicted taxable capacity. The concepts of taxable capacity and tax effort are also extended to measure total fiscal revenue capacity and revenue effort.

Calculating tax effort and actual tax collection benchmarks allows us to rank countries into four different groups: (i) low tax collection, low tax effort; (ii) high tax collection, high tax effort; (iii) low tax collection, high tax effort; and (iv) high tax collection, low tax effort. This classification is based on the global average of tax collection and a tax effort index of 1, corresponding to the case when tax collection is exactly the same as the estimated taxable capacity.

The analysis provides guidance for countries with various levels of tax collection and tax effort. The authors argue that while taxation is always a critical dimension of fiscal policy for all countries, countries at various stages of development and with different initial levels of tax collection and effort should rely on different strategies for tax reforms. Our analysis focuses on tax performance and provides broad directions for reforms in developing countries.

Section II provides an overview of the worldwide trend in tax revenue collection across income-groups and geographic regions, using the tax-to-GDP ratio as a measure of tax collection. Section III highlights alternative measures of the tax performance of countries and extends the existing literature to the empirical estimation of a country's taxable capacity and tax effort. This section also investigates the trends in taxable capacity and tax effort across regions. Based on the level of tax collection and the tax effort index, countries are classified into different groups. This section also compares the new results with the ones reported in Le, Moreno-Dodson, and Rojchaichanthorn (2008), which was covering a shorter time period. Some policy implications for fiscal revenue reforms follow. Section IV concludes.

II. TRENDS IN TAXATION

Data

The simplest definition of tax effort, which is commonly used in the literature, is the share of tax revenue in percentage of GDP. It does not give detailed information on tax collection relative to taxable capacity, but still it provides us with a simple measure to see the trends across countries, income groups, as well as regions.

Our dataset includes 110 developing and developed countries and covers the period of 1994-2009.³ Countries are selected based on data availability.⁴ For the purpose of consistency, all series are extracted from World Bank Development Indicator (WDI) Database and they are all for central government only. The average values of the tax rate for each country are reported in the second column of Table A4 in Annex.⁵

Given that differences in income levels and regions can be important factors in determining tax revenues of countries, tax rates are investigated across income groups and regions. Simple averages are calculated for each group. The data points for the years of 1994, 1998, 2003, and 2009 are reported in the following figures. The results confirm the ones presented in Bird (2007), Fox, et al. (2005), and Le, Moreno-Dodson, and Rojchaichanthorn (2008).

Income Classification and Taxation

One important factor determining tax revenue of countries is their income levels. When countries are classified based on the share of tax revenues in percentage of GDP across income groups, it can be seen that differences across groups are sharp (see Figure 1).⁶ The low-income group has the lowest tax-to-GDP ratio, but it has been improving since 1998. The improvement is clearer especially in recent years. For this group of countries, the average share of taxes in GDP increased to 13.6% of GDP in 2009 from 10.5% in 2003 and 10% in 1998. Throughout the years, each group managed to increase their average tax-to-GDP ratio, but this increase is much higher in the low-income group. Even there is still a large room for further improvement, recent developments are very promising, given the fact that that this group of countries always finds it difficult to raise enough public funds to finance enormous development needs.

The share of taxes in percentage of GDP is almost 6 percentage points higher for the middle-income group when compared to the average share in the low-income group. This share in the middle-income group has been consistently rising since 1998; it was 17.1% in 1998, and 19.3% in 2009.

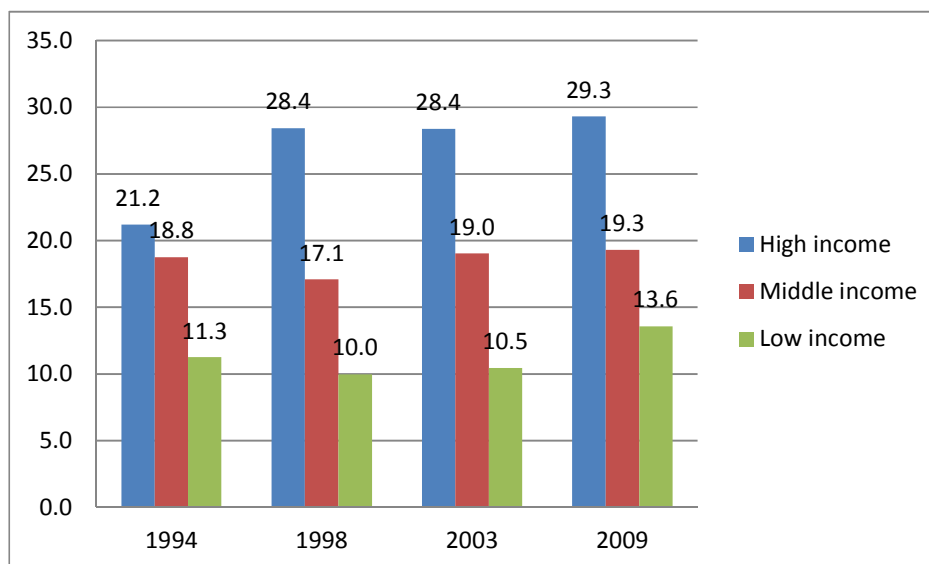
³ Since this paper is the second part of Le, Moreno-Dodson, and Rojchaichanthorn (2008), changes in data need to be emphasized. In the new dataset, new countries have been added and the time period has been extended from 2003 to 2009. The following new countries are added: Bahamas, Benin, Burkina Faso, Cape Verde, Honduras, Hong Kong (China), Israel, Lao PDR, Macao (China), Macedonia, Maldives, Mali, Myanmar, Niger, Singapore, and Togo.

⁴ Since their taxation policies are mainly outliers, the following oil-exporting countries are excluded in the paper: Algeria, Angola, Ecuador, Equatorial Guinea, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela.

⁵ The detailed variable definitions are given in Table A5 in Annex.

⁶ The income groups are defined based on the World Bank definition. High-income economies are those in which 2009 GNI per capita was \$12,196 or more. Low-income economies are those in which 2009 GNI per capita was \$995 or less. Middle-income economies are those in which 2009 GNI per capita was between \$996 and \$12,195. The list of included countries is given in Table A1 in Annex.

Figure 1 – Tax Revenue (in % of GDP) by Income Groups, 1994-2009



Source: The World Bank classification and WDI.

Note: High-income economies are those in which 2009 GNI per capita was \$12,196 or more. Low-income economies are those in which 2009 GNI per capita was \$995 or less. Middle-income economies are those in which 2009 GNI per capita was between \$996 and \$12,195.

The highest tax share belongs to the high-income group. They collect almost 2-3 times higher taxes in percentage of GDP when compared to the low-income group and almost 10 percentage points higher taxes when compared to the middle-income group. Tax collection in this group further increased by 1 percentage point between 2003 and 2009, a rise from 28.4% to 29.3%.

After initial drops in tax collection rates mainly due to the global financial and economic crisis of 2008, the increasing trend in tax collection is expected to continue given that public spending and budget deficit increased enormously in recent years.

Geographical Regions and Taxation

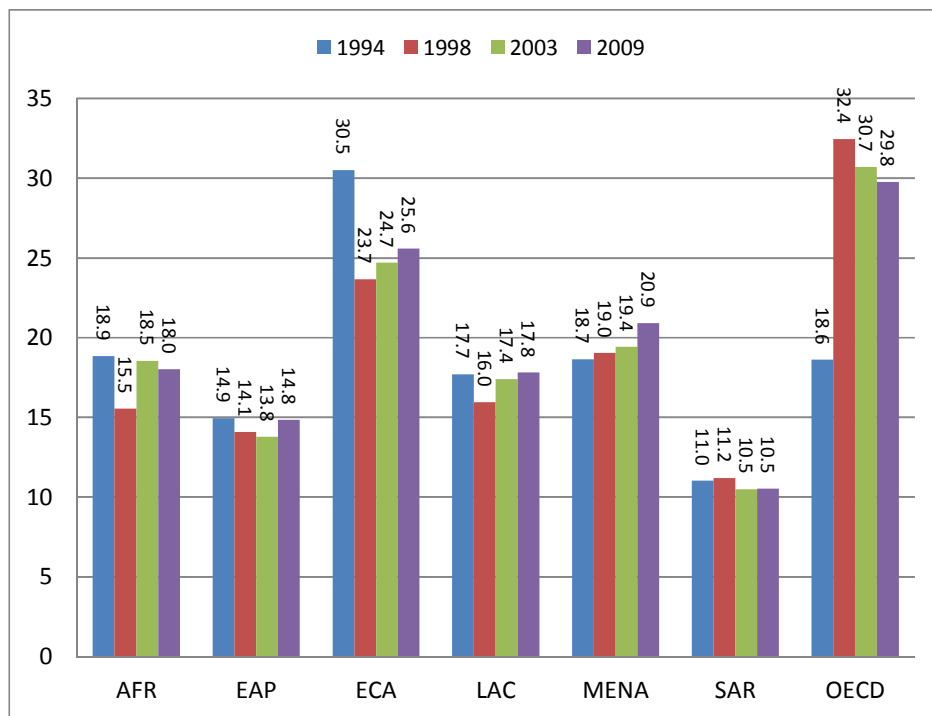
Another factor determining tax rates is the geographic region of countries. Figure 2 presents the share of tax revenues in percentage of GDP across regions.⁷ The lowest tax rate belongs to the South Asia region (SAR); they collect 10.5 to 11.2% taxes as a share of GDP.⁸ The East Asia

⁷ The countries in each region are listed in Table A2 in Annex.

⁸ It should be noted that one reason for why we observe such a low tax ratio in SAR is that these numbers are for central government only and the tax collection in SAR may be more decentralized than in any other regions.

and Pacific (EAP) region has the second lowest tax collection rate in the world. Taxes in EAP are around 4 percentage points higher than the one observed for SAR. The tax share in the Latin America and Caribbean (LAC) region, the Sub-Saharan Africa (AFR) region, and the Middle East and North Africa region (MENA) present similar tax collection, which is around 18% of GDP. But the shares have been consistently rising in the LAC and MENA regions in recent years.

Figure 2 – Tax Revenue (as % of GDP) by Regions, 1994-2009



Source: The World Bank classification and WDI.

Note: AFR is Sub-Saharan Africa, EAP is East Asia and Pacific, ECA is Eastern European and Central Asia, LAC is Latin America and Caribbean, MENA is Middle East and North Africa, SAR is South Asia.

After a sharp drop in taxes in percentage of GDP in the Eastern European and Central Asia region in 1994, the rate has been rising consistently from 23.7% in 1998 to 24.7% in 2003 and to 25.6% in 2009.

OECD countries have the highest tax collections as percentage of GDP, but they are the only group of countries which have a dropping tax on average throughout the period.⁹ It declined from 32.4% of GDP in 1998 to 30.7% in 2003 and to 29.8% share in 2009.¹⁰

III. Taxable Capacity and Tax Effort: Empirical Evidence and Policy Implications

Definitions of Taxable Capacity and Tax Effort

Actual tax revenue as a share of GDP is one of the most commonly used measure of tax effort for cross country tax comparison. The biggest advantages of this measure are that it is easy to obtain and gives quick overview of tax trends across countries. But, as indicated in and endorsed by Musgrave (1987) and Le, Moreno-Dodson, and Rojchaichanthorn (2008), this measure is more suitable for studies focusing on similar economic structures and at the same level of income. Such trends in the tax-to-GDP ratio across income groups and regions are discussed in Section II.

The taxable capacity and/or the tax effort of countries can be more accurately measured if different country characteristics are taken into account.¹¹ For example, the income level of a country can be an important factor determining the tax-to-GDP ratio, as investigated in Section II. Higher-income countries can collect more taxes, while governments in low-income countries have only a limited ability in doing so. Similarly, different economic structures, institutional arrangements, and demographic trends can introduce differences in the taxable capacity of governments (Prest, 1979). Overall, it is not accurate to determine the taxable capacity of countries only by checking their actual tax collection.

In the literature the taxable capacity and the tax effort of countries have been estimated using regression analysis, focusing on possible determinants of taxes.¹² As defined by Le, Moreno-Dodson, and Rojchaichanthorn (2008), *Taxable capacity* is the predicted tax-to-GDP ratio calculated using the estimated coefficients of a regression specification, taking into account the country specific characteristics. *Tax effort* is the index of the ratio between the share of the actual collection to GDP and the predicted taxable capacity. A “high tax effort” is the case when a tax effort index is above 1, implying that the country well utilizes its tax base to increase tax revenues (Stotsky, et al., 1997). A “low tax effort” is the case when a tax effort index is below 1,

⁹ Only OECD countries included in this group are the ones not included in other groups; these are mainly high-income countries.

¹⁰ Changes in EU countries’ fiscal revenues are studied by Morris et al., (2009). They determine possible factors affecting taxes in the region. The listed factors are mostly not macroeconomic variables.

¹¹ Improvements in revenue forecasting is important for governments to better evaluate fiscal balances and financing needs, especially during business cycles. In this regard, it is important to evaluate the response of revenue to output gap. Sancak, Velloso, and Xing (2010) find that as the output gap improves, the efficiency of taxes improves as well, where tax efficiency is defined as (tax revenue/tax base)/standard tax rate.

¹² See Lotz and Mross, 1967; Bahl, 1971; Chelliah et al. 1975; Tait et al., 1979, Tanzi, 1987; Stotsky and WoldeMariam, 1997; Bird et al., 2004; Le, Moreno-Dodson, and Rojchaichanthorn (2008).

indicating that the country may have relatively substantial scope or potential to raise tax revenues.¹³

In addition to taxes, total fiscal revenue can be also analyzed in a similar way. As was the case in Le, Moreno-Dodson, and Rojchaichanthorn (2008), the same estimation techniques are used to calculate the capacity of countries in total fiscal revenue (tax plus non-tax collection) generation, which is named as *fiscal revenue capacity*, and their effort in revenue generation, named as *fiscal revenue effort*.

In this section, the estimation results are reproduced using the regression specifications of Le, Moreno-Dodson, and Rojchaichanthorn (2008). The main difference is that the new dataset covers a longer time period (instead of 1994-2003, it is now 1994-2009) and more countries. We also focus on sub-periods to understand how the tax effort of countries has changed overtime. The first sub-sample is 1994-2001 and the second one is 2002-09.

Empirical Specification, Variables, and Methodology

The study includes 110 developing and developed countries and focuses on the period from 1994 to 2009, as well as two sub-samples 1994-2001 and 2002-09. The empirical specifications used in the paper consist of possible determinants of tax revenue and total fiscal revenue as a share of GDP:¹⁴

$$TAX/GDP_{it} = \alpha_0 + \alpha_1.GDPPC_{it} + \alpha_2.DEMOG_{it} + \alpha_3.TRADE_{it} + \alpha_4.AGR_{it} + \alpha_5.GOVERNANCE\ QUALITY_{it} + \epsilon, \quad (1)$$

$$REV/GDP_{it} = \beta_0 + \alpha_1.GDPPC_{it} + \beta_2.DEMOG_{it} + \beta_3.TRADE_{it} + \beta_4.AGR_{it} + \beta_5.GOVERNANCE\ QUALITY_{it} + \epsilon, \quad (2)$$

TAX/GDP is total tax revenue in percentage of GDP;

¹³ It should be noted that cross-country tax effort calculations presented in the paper cannot substitute for a comprehensive study of taxation, focusing on a particular country. There are potential problems related to this methodology such as the sensitivity of the calculation of the tax-effort index to the predicted results of a country's taxable capacity; systematic errors in measurement of independent variables; regression specifications can calculate the tax collection performance of a country in comparison with the average effort exercised by an average country in the selected sample, and this average may not be the actual tax collection performance. Given these potential problems, the results should be used to assess the feasibility of raising additional revenues, given the tax mix policy and collection effort attained at the average level, rather not the measure of actual performance (Ahmad, et al., 1986; Chelliah et al. (1975); Le, Moreno-Dodson, and Rojchaichanthorn, 2008).

¹⁴ See Tanzi and Davoodi (1997), Bird, Vazquez, and Torgler (2004), and Le, Moreno-Dodson, and Rojchaichanthorn (2008) for details.

REV/GDP is total fiscal revenue in percentage of GDP;

GDPPC is constant GDP per capita (2000 US\$);

DEMOG stands for a demographic variable included in the regression; it is either the growth rate of population between 15-64 years old, or age dependency rate, or share of urban population in total;

TRADE measures trade openness (exports plus imports in percentage of GDP);

AGR is agriculture value added in percentage of GDP;

GOVERNANCE QUALITY stands for bureaucracy quality index or corruption index; it is excluded in the basic specification.

World Bank's World Development Indicators Database and the ICRG Database are the main data sources.¹⁵

The income level of a country is expected to be one of the significant factors determining actual tax collection.¹⁶ As presented in Section II, higher-income countries tend to collect more taxes in percentage of GDP. Thus, it is expected that *GDP per capita* to have a positive and significant impact on tax collection, as well as on fiscal revenue (Bahl, 1971; Fox et. al, 2005; Piancastelli, 2001).

Higher age dependency and *higher population growth* are expected to distort tax collection capacity of countries and lower the share of productive population (Bird et al., 2004). Thus, these two variables are expected to have a negative impact on taxes and total fiscal revenue.

Trade openness is one of the variables commonly considered as an important determinant of taxation (Rodrik, 1998; Piancastelli, 2001; Norregaard and Khan, 2007; Aizenman and JinJarak, 2009). The changing size of international trade has expected to have two opposite effects on taxes. On the one hand, higher trade openness is expected to lower taxes collected on imports and exports; thus, it may have a negative impact on taxes and fiscal revenue. On the other hand, given that higher trade openness is associated with higher economic growth rates, we expect open economies to grow faster; and as a result, more taxes can be collected with increasing this tax base. It is expected that the second effect dominates and trade openness has a positive impact on taxes and total fiscal revenue.¹⁷

¹⁵ See Table A6 in Annex for detailed definitions.

¹⁶ See Le, Moreno-Dodson, and Rojchaichanthorn (2008) for detailed information on variables and their expected effects on taxes.

¹⁷ Financial pressures on governments increased with globalization due to a higher demand for government spending and costly tax collection (Hines and Summers, 2009). Being an open market economy can affect the tax policies such that higher international involvement increases the economic distortions created by taxation, but at the same time can increase the level of taxes due to higher economic growth rates as it is observed in open economies.

Given that it is relatively harder to tax the agricultural sector, it is expected that as the share of *agriculture value added* in percentage of GDP increases, collected taxes in % of GDP drop due to a smaller tax base (Leuthold, 1991; Tanzi, 1992; Piancastelli, 2001). Thus, the expected sign of the agriculture value added ratio is negative.

Institutional and governance quality is considered as one of the most essential factors determining the adequacy of tax collection (Tanzi and Davoodi, 1997; Ghura, 1998; Bird, et al., 2004; Gupta, 2007). Countries can collect higher taxes only if the tax collection process is efficient. In this regard, *bureaucracy quality* index and *corruption* index, which are two possible measures of institutional and governance quality, are expected to have a significant impact on tax collection. The International Country Risk Guide reports several indicators of institutional and governance quality. In the original database, bureaucracy quality index and corruption index are reported as index numbers from 1 to 6. While “1” indicates the lowest bureaucracy quality or highest corruption, “6” corresponds to the highest bureaucracy quality or lowest corruption. Similar to the case in Le, Moreno-Dodson, and Rojchaichanthorn (2008), we re-index both of these measures in this paper, such that lower numbers indicate a higher bureaucracy quality or lower corruption. Rescaling consists of defining a new range where -10 (least corrupt or best bureaucratic quality) and -1 (most corrupt or worst bureaucratic quality). With this new definition, we expect tax revenues to drop with increasing index values, meaning negative estimated coefficients of these variables.

A simple correlation matrix among these variables indicates the expected signs (see Table A3 in Annex). Tax revenue positively correlated with GDP per capita, and trade openness; and negatively correlated with age dependency ratio, population growth, agriculture value added, as well bureaucracy quality index and corruption index as defined in the paper. When we compare these results with the correlation values reported in Le, Moreno-Dodson, and Rojchaichanthorn (2008), which covered a shorter time period, it can be seen that the correlation between tax revenues and all other variables drops; it is especially true for GDP per capita. The only exceptions are bureaucracy quality index and corruption index; their correlation with tax revenues and total fiscal revenue gets higher.

Average values of the variables for each country are reported in Table A4 in Annex, while overall averages and other descriptive statistics of the variables are reported in Table A5 in Annex. When we compare the descriptive statistics reported in Le, Moreno-Dodson, and Rojchaichanthorn (2008) with the new results obtained with an extended dataset from 1994 to 2009, it can be seen that tax revenues increased by 1.5 percentage points on average; total fiscal revenue increase by 1 percentage point; trade openness increase by 4 percentage points; population grows 0.4 percentage point higher; agriculture values added gets lower by 3 percentage points; and both bureaucracy quality index and corruption index improve by 1 index point. The total number of observations for tax revenue increases from 982 to 1,437, corresponding to almost 50% improvement.

The regression methodology is an ordinary least square for panel datasets. We include both regional and time dummies. One potential problem in using this methodology would be the possible endogeneity and/or dual causality problem associated with institutional variables (bureaucracy index and corruption index in this paper) and tax revenues. Higher taxes improve governance and improved governance can further increase taxes. Bird et al (2006), who use a similar specification, test the presence of an endogeneity problem by applying a 2-Stage Least Squares (2SLS) approach and calculating Hausman Chi-square test statistics.¹⁸ They include ethnic fractionalization, language, and latitude as instrumental variables. They show that the Hausman Chi-square tests fail to detect any simultaneity of tax revenues and institutional variables.

Tax Capacity: Estimation Results

The estimation results for the specifications given in Equations (1) and (2) are presented in Tables 1 and 2 for tax revenues and total fiscal revenues, respectively. The tax capacity of countries is defined as the fitted values calculated using the estimated coefficients reported in Table 1, Panel A, equation 2. The definition of the revenue capacity is similar (the predicted value of fiscal revenues, calculated using the estimated coefficients reported in Table 2, Panel A, equation 2).

Panel A in each table presents the results obtained from the specifications with population growth as a proxy for the demographic characteristics of countries, while Panel B includes age-dependency ratios instead of population growth. The regressions capture the entire period of 1994-2009, as well as the two sub-periods of 1994-2001 and 2002-2003 to better understand the dynamics of the tax and total fiscal revenue capacity. In each panel, equation 1 (the first column of the estimated coefficients) represents the regression on traditional tax (includes only demographic and macroeconomic indicators). Equations 2 and 3 (columns 2 and 3) show results when institutional variables (corruption index and bureaucratic quality indicator) are added one at a time as possible determinants of taxes or fiscal revenue.

As reported in Table 1, the estimated coefficients have the expected signs and they are mostly statistically significant. The exception is that in some regression specifications, where institutional variables are included, GDP per capita loses its statistical significance, and even its signs become unexpectedly negative. It can be interpreted as follows: when institutional variables are included together with income, the institutional quality variables can already capture the impact of income. The age dependency ratio has the correct sign, but its estimated coefficients are not significant for the sub period of 1994-2001.

¹⁸ Gupta (2007) either could not find any endogeneity problem in a regression specification similar to the one presented in this paper.

Table 1 – Determinants of Tax Revenues and Taxable Capacity

Panel A: Population growth used as proxy for demographic characteristic

Dependent Variable: Tax Revenue in % of GDP									
	1994-2009			1994-2001			2002-2009		
Constant	22.891 (26.96)***	14.423 (13.235)**	11.133 (9.218)***	21.581 (16.48)***	12.894 (7.306)***	9.289 (5.061)***	23.807 (21.051)**	12.43 (8.054)***	11.935 (7.059)***
GDP per capita (constant)	1.11 (5.126)***	0.503 (2.103)**	0.002 (0.008)	1.23 (3.112)***	0.635 (1.614)*	-0.238 (-0.557)	0.993 (3.716)***	-0.113 (-0.341)	0.199 (0.627)
Population Growth	-0.883 (-4.283)**	-0.672 (-3.044)**	-0.854 (-3.896)***	-0.362 (-1.26)	0.375 (1.191)	0.029 (0.092)	-0.961 (-2.967)**	-1.053 (-3.168)**	-1.289 (-3.796)***
Trade openness (% of GDP)	0.036 (8.099)***	0.024 (5.242)***	0.025 (5.609)***	0.029 (4.056)***	0.011 (1.562)	0.015 (2.084)**	0.04 (6.979)***	0.029 (5.182)***	0.028 (4.97)***
Agriculture value added (% of GDP)	-0.243 (-11.855)*	-0.154 (-7.13)***	-0.067 (-2.794)***	-0.233 (-8.477)**	-0.162 (-5.818)**	-0.089 (-2.896)***	-0.276 (-7.962)**	-0.133 (-3.577)**	-0.029 (-0.685)
CORRUPTION INDEX		-0.824 (-6.739)***			-0.666 (-3.559)***			-1.385 (-7.091)***	
BUREAUCRACY INDEX			-1.273 (-9.056)***			-1.275 (-5.906)***			-1.252 (-6.34)***
OBS	1322	1125	1125	589	483	483	733	642	642
Adjusted R2	0.58	0.65	0.66	6.48	0.69	0.70	0.58	0.64	0.64

Panel B: Age dependency used as proxy for demographic characteristic

Dependent Variable: Tax Revenue in % of GDP									
	1994-2009			1994-2001			2002-2009		
Constant	24.483 (16.979)**	18.864 (12.486)**	15.314 (9.41)***	21.724 (9.467)***	14.233 (5.546)***	10.005 (3.816)***	25.628 (12.414)**	17.145 (7.943)***	16.766 (7.3)***
GDP per capita (constant)	1.01 (4.665)***	0.422 (1.78)*	0.004 (0.016)	1.19 (2.997)***	0.63 (1.596)	-0.251 (-0.588)	0.843 (3.224)***	-0.223 (-0.681)	0.154 (0.483)
Age dependency ratio	-0.045 (-2.438)**	-0.089 (-4.892)**	-0.08 (-4.503)***	-0.011 (-0.396)	-0.009 (-0.343)	-0.01 (-0.363)	-0.046 (-1.642)*	-0.096 (-3.68)***	-0.091 (-3.461)***
Trade openness (% of GDP)	0.033 (7.445)***	0.021 (4.794)***	0.021 (4.92)***	0.027 (3.871)***	0.014 (1.972)**	0.015 (2.214)**	0.036 (6.49)***	0.026 (4.75)***	0.024 (4.391)***
Agriculture value added (% of GDP)	-0.235 (-10.038)*	-0.113 (-4.712)**	-0.04 (-1.557)	-0.231 (-7.316)**	-0.152 (-4.827)**	-0.083 (-2.482)**	-0.29 (-7.885)**	-0.118 (-3.122)**	-0.038 (-0.886)
CORRUPTION INDEX		-0.882 (-7.209)***			-0.675 (-3.607)***			-1.41 (-7.227)***	
BUREAUCRACY INDEX			-1.232 (-8.868)***			-1.28 (-6.064)***			-1.171 (-5.994)***
OBS	1322	1125	1125	589	483	483	733	642	642
Adjusted R2	0.58	0.65	0.66	6.49	0.68	0.70	0.58	0.65	0.64

Note: The estimation technique is panel OLS with regional and time dummies. t-statistics are reported in parenthesis. The estimated coefficients of GDP per capita are multiplied by 10,000. The dependent variable is the share of tax revenue in percentage of GDP. GDP per capita is in constant 2000 US\$; population growth is the growth rate of population between 15 and 64 ages; trade openness is the sum of imports and exports in percentage of GDP; corruption index is recalculated such that lower values indicate lower corruption; bureaucracy index is recalculated such that lower values indicate higher bureaucracy quality.

When we compare these new results with the ones reported in Table 1 of Le, Moreno-Dodson, and Rojchaichanthorn (2008), it can be seen that the number of observations increased from 884 (covering the period of 1994-2003) to 1322 (covering the period of 1994-2009); corresponding to an almost 50% increase. The R-squared are almost 0.15-0.20 points higher in the new results, indicating a better fit of empirical specifications. One interesting difference between these two sets of results is that the significance and the magnitude of the income variable (GDP per capita) drop in the new set of results. It is true especially in the specifications where institutional variables are included as determinants of taxes. While the estimated coefficient of income was around 2.2 in Table 1 of Le, Moreno-Dodson, and Rojchaichanthorn (2008), it becomes only 1.11 in the traditional tax specification; and it gets even lower and insignificant (0.503 and 0.002 with bureaucracy index and corruption index, respectively) when institutional variables are included in the specifications. It means that with the recent improvements in taxation in developing countries and on-going effort by high income countries to rationalize their tax systems toward greater efficiency and lower tax burden, particularly in direct income taxes, the income level becomes less important now in determining their tax revenues. On the other hand, the institutional quality of countries is more important (even more than income levels) in determining tax revenues of countries. The higher significance and magnitude of the estimated coefficients of the institutional variables in the new results support this argument. For example, while the estimated coefficient of the corruption index was only -0.560 in Table 1 of Le, Moreno-Dodson, and Rojchaichanthorn (2008), it is now -1.273 and more statistically significant. This observation is also true for the bureaucracy quality index. Another difference between the old and new estimation results is that the population growth rate has almost 2/3 lower estimated coefficients now, indicating a lower impact of population growth on tax collection.

Table 2 presents similar results: all estimation results are as expected except GDP per capita and population growth rates in some specifications. When we compare these new results with the ones reported in Table 2 of Le, Moreno-Dodson, and Rojchaichanthorn (2008), it can be seen again that GDP per capita is less significant and has lower estimated coefficients now. It is also true for the population growth rate. On the other hand, the institutional quality indicators have higher estimated coefficients, as well as higher statistical significance.

In general, the results support the previous papers' findings, determining the factors affecting of tax and fiscal revenues.¹⁹ Countries with higher income levels, a lower population growth rate, more trade openness, lower agriculture value added in GDP, and higher institutional quality tend to collect higher tax revenues and fiscal revenues as a whole.

¹⁹ See for example Tanzi and Davoodi (1997), Bird et al. (2007), Gupta (2007), Le, Moreno-Dodson, and Rojchaichanthorn (2008).

Table 2 – Determinants of Fiscal Revenue

Panel A: Population growth used as proxy for demographic characteristic

Dependent Variable: Fiscal Revenue in % of GDP									
	1994-2009			1994-2001			2002-2009		
Constant	26.234 (28.464)**	17.798 (15.369)**	17.997 (13.694)***	25.496 (18.179)**	16.519 (8.98)***	16.677 (8.477)***	26.992 (21.484)**	16.932 (9.903)***	19.338 (10.354)***
GDP per capita (constant)	0.811 (3.394)***	0.192 (0.746)	0.305 (1.109)	0.916 (2.163)**	0.139 (0.342)	-0.098 (-0.214)	0.686 (2.249)**	0.116 (0.304)	0.877 (2.418)**
Population Growth	-0.687 (-2.972)**	-0.447 (-1.85)*	-0.519 (-2.117)**	-0.349 (-1.097)	0.623 (1.816)*	0.45 (1.286)	-0.77 (-2.043)**	-1.331 (-3.486)**	-1.506 (-3.856)***
Trade openness (% of GDP)	0.054 (11.135)**	0.031 (6.626)***	0.031 (6.47)***	0.055 (7.111)***	0.028 (3.739)***	0.029 (3.944)***	0.053 (8.442)***	0.031 (5.152)***	0.029 (4.737)***
Agriculture value added (% of GDP)	-0.317 (-14.229)*	-0.219 (-9.695)**	-0.174 (-6.799)***	-0.299 (-10.179)*	-0.236 (-8.232)**	-0.206 (-6.295)***	-0.365 (-9.381)**	-0.158 (-3.871)**	-0.109 (-2.344)**
CORRUPTION INDEX		-0.87 (-6.749)***			-0.736 (-3.806)***			-1.172 (-5.42)***	
BUREAUCRACY INDEX			-0.757 (-4.986)***			-0.743 (-3.236)***			-0.626 (-2.883)***
OBS	1306	1108	1108	582	475	475	724	633	633
Adjusted R2	0.55	0.64	0.64	0.56	0.68	0.68	0.55	0.63	0.61

Panel B: Age dependency used as proxy for demographic characteristic

Dependent Variable: Fiscal Revenue in % of GDP									
	1994-2009			1994-2001			2002-2009		
Constant	24.248 (15.576)**	19.033 (11.983)**	18.529 (10.573)***	21.592 (8.832)***	14.604 (5.514)***	14.125 (5.074)***	27.365 (12.02)***	19.693 (8.382)***	22.071 (8.759)***
GDP per capita (constant)	0.695 (2.935)***	0.12 (0.469)	0.268 (0.978)	0.93 (2.199)**	0.204 (0.499)	-0.095 (-0.208)	0.518 (1.765)*	-0.191 (-0.513)	0.665 (1.846)*
Age dependency ratio	0.014 (0.725)	-0.032 (-1.666)*	-0.018 (-0.966)	0.048 (1.593)	0.043 (1.528)	0.043 (1.523)	-0.019 (-0.635)	-0.073 (-2.585)**	-0.064 (-2.206)**
Trade openness (% of GDP)	0.051 (10.615)**	0.029 (6.409)***	0.029 (6.164)***	0.051 (6.733)***	0.031 (4.367)***	0.032 (4.461)***	0.051 (8.189)***	0.029 (4.749)***	0.026 (4.226)***
Agriculture value added (% of GDP)	-0.344 (-13.61)**	-0.21 (-8.386)**	-0.178 (-6.411)***	-0.331 (-9.841)**	-0.252 (-7.778)**	-0.221 (-6.205)***	-0.388 (-9.565)**	-0.174 (-4.249)**	-0.148 (-3.184)***
CORRUPTION INDEX		-0.896 (-6.866)***			-0.744 (-3.844)***			-1.243 (-5.7)***	
BUREAUCRACY INDEX			-0.735 (-4.844)***			-0.796 (-3.525)***			-0.569 (-2.608)***
OBS	1306	1108	1108	582	475	475	724	633	633
Adjusted R2	0.55	0.64	0.64	0.56	0.68	0.68	0.54	0.62	0.61

Note: The estimation technique is panel OLS with regional and time dummies. t-statistics are reported in parenthesis. The estimated coefficients of GDP per capita are multiplied by 10,000. The dependent variable is the share of fiscal revenue in percentage of GDP. GDP per capita is in constant 2000 US\$; population growth is the growth rate of population between 15 and 64 ages; trade openness is the sum of imports and exports in percentage of GDP; corruption index is recalculated such that lower values indicate lower corruption; bureaucracy index is recalculated such that lower values indicate higher bureaucracy quality.

Robustness Check

For the robustness check of the empirical results, we also run alternative specifications.

The size of shadow economy can be another important variable determining the tax base of countries. The shadow economy measure used in this paper includes all market-based legal production of goods and services that are deliberately concealed from public authorities for any of the following reasons: (1) to avoid payment of income, value added or other taxes, (2) to avoid payment of social security contributions, (3) to avoid having to meet certain legal labor market standards, such as minimum wages, maximum working hours, safety standards, etc., and (4) to avoid complying with certain administrative procedures, such as completing statistical questionnaires or other administrative forms (see Schneider, Buehn, Montenegro, 2010).

As the size of shadow economy increases, governments may not be able to collect taxes efficiently due to the fact that it gets harder to track profit, income, sales etc. Thus, it is expected to have a negative impact on tax collection (Bird, et al., 2004; Davoodi and Grigorian, 2007). The estimation results are reported in Table 3 Panel A. Since the data for the size of shadow economy are limited, the total number of observations drops to 840 from 1322. But the signs and significance of coefficients are robust to the inclusion of this new variable. The size of the shadow economy is a statistically significant and negative determinant of taxes. The main exception is the case where the bureaucracy quality index is included in the regression specification. In this case, the significance of the size of the shadow economy on taxes disappears. This may indicate that the bureaucracy quality index can already well capture the impacts of shadow economy. As the bureaucracy quality drops, it gets harder to monitor the economy efficiently; thus, the size of the shadow economy tends to increase.

Total consumption is also included as an alternative factor determining tax revenues. Higher consumption in percentage of GDP has a positive effect on tax collection. Higher consumption improves tax revenues mainly through higher indirect taxes (Bird, 2008). Thus, the sign is as expected and the other results are robust to the inclusion of this new variable.

Overall, the results are robust to the alternative empirical specifications.

Table 3 – Robustness Check Alternative Determinants of Tax Revenues

Panel A: Size of shadow economy (in % of GDP) used instead of agriculture value added

Dependent Variable: Tax Revenue in % of GDP									
	1994-2009			1994-2001			2002-2009		
Constant	27.452 (18.692)**	14.226 (7.958)**	7.916 (4.359)**	24.83 (8.708)**	9.943 (2.844)**	1.974 (0.59)	28.211 (16.484)**	13.471 (6.308)**	10.229 (4.719)**
GDP per capita (constant)	0.669 (2.049)**	0.485 (1.377)	-0.267 (-0.796)	1.76 (2.61)**	1.57 (2.31)**	0.175 (0.263)	0.395 (1.056)	-0.219 (-0.525)	-0.325 (-0.839)
Population Growth	-1.35 (-4.947)**	-0.759 (-2.806)**	-0.611 (-2.363)**	-1.011 (-1.801)*	0.503 (0.878)	0.513 (0.969)	-1.499 (-4.798)**	-1.156 (-3.811)**	-0.971 (-3.261)**
Trade openness (% of GDP)	0.011 (2.343)**	-0.006 (-1.394)	-0.003 (-0.768)	0.02 (1.958)*	-0.005 (-0.491)	-0.005 (-0.528)	0.009 (1.697)*	-0.006 (-1.331)	-0.003 (-0.733)
Size of shadow economy (% of GDP)	-0.2 (-6.927)**	-0.062 (-2.153)**	0.022 (0.761)	-0.195 (-3.632)**	-0.048 (-0.902)	0.045 (0.864)	-0.196 (-5.71)**	-0.054 (-1.586)	0.013 (0.381)
CORRUPTION INDEX		-0.982 (-5.498)**			-0.782 (-2.495)**			-1.414 (-6.049)**	
BUREAUCRACY INDEX			-1.783 (-10.223)**			-2.037 (-6.282)**			-1.643 (-7.898)**
OBS	840	742	742	244	215	215	596	527	527
Adjusted R2	0.515	0.604	0.639	0.550	0.642	0.691	0.508	0.606	0.624

Panel B: Share total consumption in GDP is added

Dependent Variable: Tax Revenue in % of GDP									
	1994-2009			1994-2001			2002-2009		
Constant	6.159 (3.813)**	6.13 (3.143)**	3.41 (1.724)*	-2.026 (-0.797)	1.872 (0.576)	-3.598 (-1.082)	10.957 (5.271)**	7.299 (2.984)**	7.953 (3.2)**
GDP per capita (constant)	1.67 (7.878)**	0.663 (2.782)**	0.176 (0.705)	2.11 (5.669)**	1 (2.523)**	0.087 (0.205)	1.35 (5.127)**	-0.024 (-0.072)	0.306 (0.954)
Population Growth	-0.616 (-3.123)**	-0.622 (-2.845)**	-0.801 (-3.688)**	-0.147 (-0.555)	0.405 (1.308)	0.049 (0.158)	-0.622 (-1.956)*	-1.027 (-3.102)**	-1.254 (-3.7)**
Trade openness (% of GDP)	0.042 (9.765)**	0.03 (6.488)**	0.031 (6.776)**	0.039 (5.841)**	0.021 (2.8)**	0.026 (3.509)**	0.044 (7.82)**	0.033 (5.726)**	0.031 (5.376)**
Agriculture value added (% of GDP)	-0.312 (-15.311)**	-0.192 (-8.49)**	-0.105 (-4.206)**	-0.321 (-12.102)**	-0.211 (-7.034)**	-0.14 (-4.339)**	-0.348 (-9.861)**	-0.162 (-4.211)**	-0.058 (-1.306)
Total consumption (in % of GDP)	0.191 (11.969)**	0.101 (5.103)**	0.095 (4.9)**	0.272 (10.534)**	0.139 (4.017)**	0.154 (4.607)**	0.146 (7.283)**	0.064 (2.695)**	0.052 (2.181)**
CORRUPTION INDEX		-0.818 (-6.769)**			-0.606 (-3.281)**			-1.369 (-7.043)**	
BUREAUCRACY INDEX			-1.247 (-8.959)**			-1.306 (-6.174)**			-1.204 (-6.075)**
OBS	1318	1125	1125	589	483	483	729	642	642
Adjusted R2	0.621	0.656	0.666	0.652	0.695	0.712	0.608	0.647	0.640

Note: The estimation technique is panel OLS with regional and time dummies. t-statistics are reported in parenthesis. The estimated coefficients of GDP per capita are multiplied by 10,000. The dependent variable is the share of tax revenue in percentage of GDP. GDP per capita is in constant 2000 US\$; population growth is the growth rate of population between 15 and 64 ages; trade openness is the sum of imports and exports in percentage of GDP; corruption index is recalculated such that lower values indicate lower corruption; bureaucracy index is recalculated such that lower values indicate higher bureaucracy quality.

Tax Effort: Estimation Results

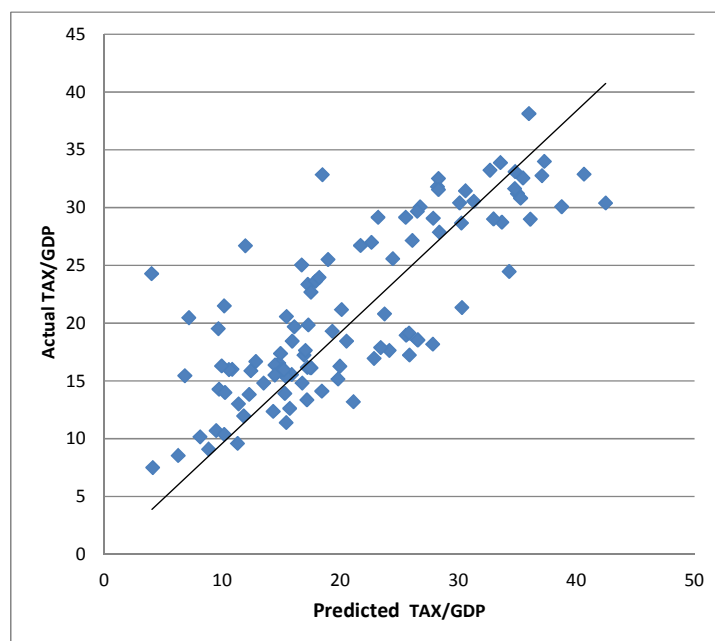
The predicted value of tax collection is the estimated value of tax revenues, calculated using the estimated coefficients given in the second column of Panel A in Table 1. The specification takes tax revenues as a function of GDP per capita, population growth, trade openness, agriculture value added (in percentage of GDP), corruption index, as well as regional and time dummies. Table A7 in Annex shows the actual and predicted taxes (i.e. taxable capacity), as well as the tax effort for each country included in the study. The averages between 1994 and 2009 are reported in the first columns, while the averages belonging to 1994 to 2001 and 2002 to 2009 are presented in the following columns. The same exercise is repeated for total fiscal revenue in Table A8 in Annex. The predicted value of total fiscal revenue is calculated, based on the second estimation results reported in Panel A of Table 2. Most countries' tax effort indexes are relatively stable over the two sub-periods 1994-2001 and 2002-2009. Exceptions are: Albania, Brazil, Bulgaria, China, Democratic Republic of Congo, Cyprus, Guatemala, Kazakhstan, Korea, Lebanon, Mongolia, Nicaragua, Papua New Guinea, Paraguay, Sierra Leona, Trinidad and Tobago, Ukraine and Vietnam (all increased their tax efforts after 2001); Egypt, Ethiopia, Indonesia, Pakistan, Philippines, Sri Lanka, and United States (all lowered their tax efforts after 2001).

Similar to tax predictions, average fiscal revenue predictions are reported for the period of 1994 to 2009, as well as for the two sub-samples in Table A8 in Annex.

Figure 3 reports the average values of actual and predicted tax collection in percentage of GDP. Each dot in the figure indicates the position of a country, corresponding to their average tax revenues versus predicted tax revenues. The 45 degree line represents countries with the unitary tax effort. Along this line, tax collection exactly equals the predicted tax capacity. The predicted tax revenues are positively correlated with the actual collection, meaning that higher collection tends to be associated with higher tax effort.²⁰ The countries taking place above the 45° line are the ones with a high tax effort (actual taxes are higher than predicted taxes). In terms of tax collection, given the values of their macroeconomic and demographic indicators, they seem doing well. On the other hand, the countries located below 45° line are the ones collecting taxes below their tax capacity (low effort) and they have a room to improve their tax collection effort.

²⁰ Similar findings are reported in Chelliah et al. (1975) and Stosky and WoldeMariam (1997).

Figure 3 – Actual Tax Collection and Taxable Capacity, averages over 1994-2009



Note: Predicted tax/GDP is the taxable capacity in % of GDP, calculated based on the estimation results given in the second column of the results in Table 1 Panel A. Actual TAX/GDP is actual tax revenue in % of GDP.

The ranking of countries is reported in Table 4. According to this ranking Papua New Guinea has the highest tax effort (1.66), while Bahrain has the lowest (only 0.16). Most developed countries are located around the value of 1 as tax effort index. In the sub-Saharan Africa region, Namibia (1.54) and South Africa (1.44) have the highest tax effort indexes. In the MENA region, Morocco has the highest tax effort score (1.44). In Europe, Malta and Cyprus have the highest scores at 1.40 each. While Vietnam (1.31) has the highest index in East Asia, France (1.29) and Brazil (1.26) also take place in the top 20 list. China has one of the lowest tax effort scores with the value equal to only 0.48. Japan and Switzerland are other countries with a low tax effort index with the values of 0.47 and 0.56, successively.

The average values give us the general picture of tax efforts across countries, but a detailed analysis of countries across regions and overtime can give a better idea on the trends in taxes. Figure 4 present this information across 7 regions.

After 1998, actual taxes in sub-Saharan Africa increased almost continuously, even if the predicted value of taxes is not increasing that dramatically. Since actual taxes have been increasing faster than predicted taxes, the tax effort of the region has improved significantly.²¹ It increased from 0.85 in 1998 to almost 1.2 in 2006, indicating the countries on average were collecting almost 20 percent higher actual taxes relative to predicted taxes given the indicators

²¹ This fact has been also emphasized in Stotsky and WoldeMariam (1997) and Gupta (2007).

Table 4 – Ranking of Countries by Tax Effort Index, Averages 1994-2009

	<u>Tax Effort</u>		<u>Tax Effort</u>		<u>Tax Effort</u>		<u>Tax Effort</u>
Papua New Guinea	1.66	Bolivia	1.13	Ukraine	0.96	Russia	0.81
Namibia	1.54	Norway	1.13	Moldova	0.96	Bangladesh	0.80
Jamaica	1.50	Slovenia	1.13	Senegal	0.96	Latvia	0.80
Morocco	1.44	Hungary	1.12	Peru	0.95	Colombia	0.78
South Africa	1.43	UK	1.10	Egypt	0.95	United States	0.77
New Zealand	1.42	Netherlands	1.10	Argentina	0.95	Canada	0.76
Malta	1.40	Zambia	1.09	Luxembourg	0.94	Armenia	0.76
Cyprus	1.40	Austria	1.09	Jordan	0.93	Mexico	0.75
Trinidad and Tob.	1.36	Honduras	1.07	Botswana	0.93	Turkey	0.74
Togo	1.36	Sri Lanka	1.06	Philippines	0.91	Guatemala	0.74
Zimbabwe	1.36	Finland	1.05	Paraguay	0.91	Albania	0.74
Tunisia	1.36	Belarus	1.04	Indonesia	0.90	Sudan	0.74
Costa Rica	1.35	Syria	1.03	Iceland	0.90	Bahamas	0.74
Uruguay	1.35	Portugal	1.03	Dominican Rep.	0.90	Cameroon	0.70
Mongolia	1.35	Cote d'Ivoire	1.02	Spain	0.90	Guinea	0.68
Vietnam	1.31	Poland	1.02	Korea, Rep.	0.89	Azerbaijan	0.67
Ghana	1.30	Chile	1.00	Slovak Rep.	0.89	Madagascar	0.66
Kenya	1.29	Sierra Leone	1.00	Estonia	0.89	Yemen, Rep.	0.61
France	1.29	Denmark	0.99	El Salvador	0.89	Switzerland	0.56
Brazil	1.26	Burkina Faso	0.99	India	0.88	Congo, DRC	0.55
Italy	1.25	Sweden	0.98	Uganda	0.88	China	0.48
Belgium	1.24	Czech Rep.	0.98	Lithuania	0.88	Japan	0.47
Croatia	1.18	Ethiopia	0.98	Germany	0.87	Congo, Rep.	0.46
Pakistan	1.17	Bulgaria	0.98	Lebanon	0.86	Kazakhstan	0.45
Mali	1.16	Ireland	0.97	Panama	0.84	Oman	0.35
Australia	1.14	Nicaragua	0.97	Romania	0.84	Bahrain	0.16
Greece	1.14	Thailand	0.97	Malaysia	0.82		

Note: See Table A7 in annex for details. Tax effort is the ratio of actual tax revenues in percentage of GDP to predicted tax revenues in percentage of GDP (taxable capacity).

used in the estimation. It is not surprising that this period corresponds to higher growth rates in sub-Saharan Africa. In the region, actual taxes have been always above the predicted values of tax revenues.

In East Asia, the tax effort reaches to 1.15 in 2001 (indicating that actual taxes higher than predicted taxes); but it declines quickly after this pick point in 2001 and stays below 1 after 2003. Given that actual taxes are below predicted values, countries in this region are expected to spend more effort to increase tax revenues.

In Eastern Europe and Central Asia, the gap between actual and predicted taxes was big, in favor of predicted values, between 1996 and 2001. Following this period, predicted taxes declined with declining economic activities in the region; thus the tax effort index increased. At the same time,

these countries started collecting almost 5 percentage point higher taxes on average. This also helped to close the gap between actual and predicted taxes for this group of countries.

Latin American countries show a clearly rising trend in the tax effort after 1998, except the recent years. The tax effort index rose from 0.85 to 1.2 in 2008, at which point the region reached to the pick point. This increasing tax effort is as a result of increasing actual taxes. Throughout the years the ratio of actual taxes to GDP increased by almost 5 percentage points from 15 percent to 20 percent. The more stable economic environment is one of the main factors behind these increasing tax revenues (Fricke and Sussmuth, 2011).

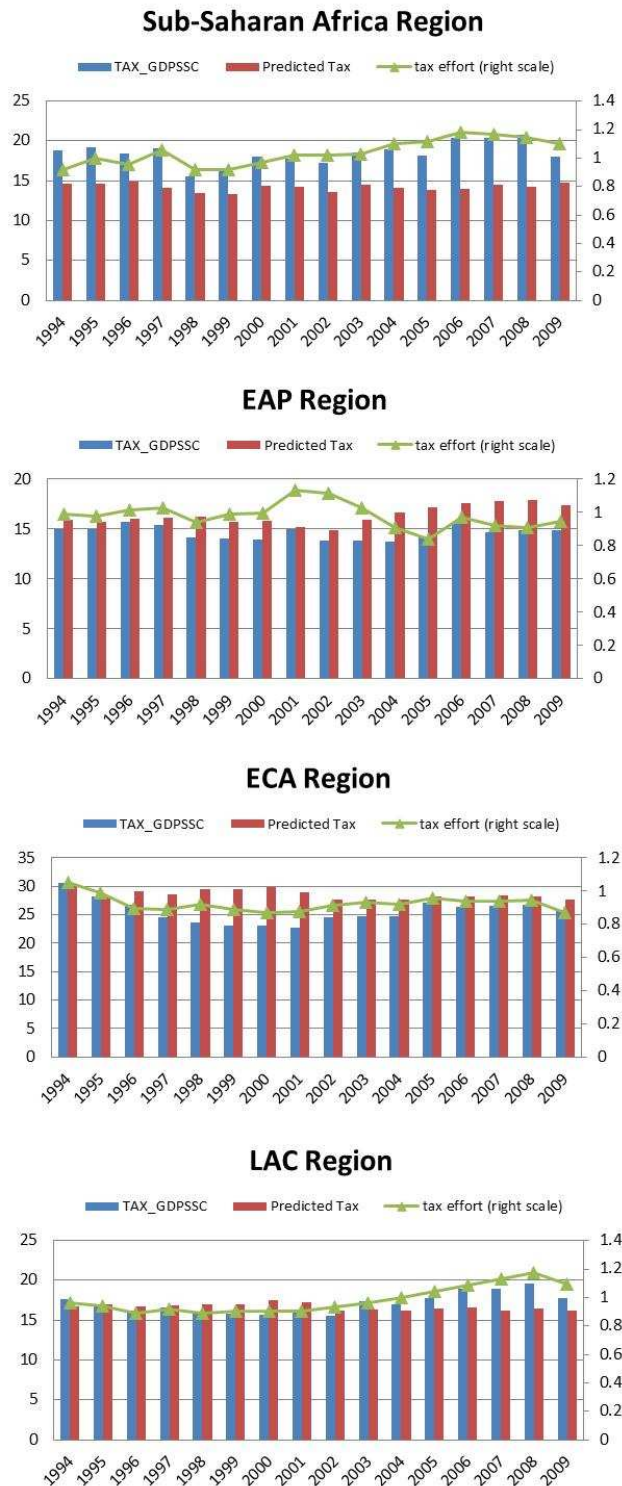
Similar to the case of Latin America, the Middle Eastern and North Africa region presents a clearly increasing trend in the tax effort from 1999 to 2007. The index increased from 0.95 to 1.15 thanks to increasing actual taxes from 17% of GDP in 1999 to 22% on average in 2007.

South Asia has the lowest actual and predicted taxes in the world. The rates are even lower than the ones that are observed in sub-Saharan Africa, which is the poorest region in the world. After hitting the bottom in 2002 with actual taxes only 10.3% of GDP, both actual and predicted taxes increased significantly. Since the magnitude of increasing predicted taxes dominates the magnitude of increasing actual taxes, the tax effort index declined throughout the years from 1.2 in 1994 to 0.8 in 2009. The countries in this region are expected to do more to improve the level of tax collection.

When we focus on OECD countries (high-income countries included), the tax effort is almost flat at the value of 1 in the years following the initial increase. It means that for this group of countries actual and predicted taxes are very similar. Since tax revenues fluctuate only slightly from year to year in these countries, it gives a big advantage to their governments in terms of raising consistent revenues to finance expenditures.

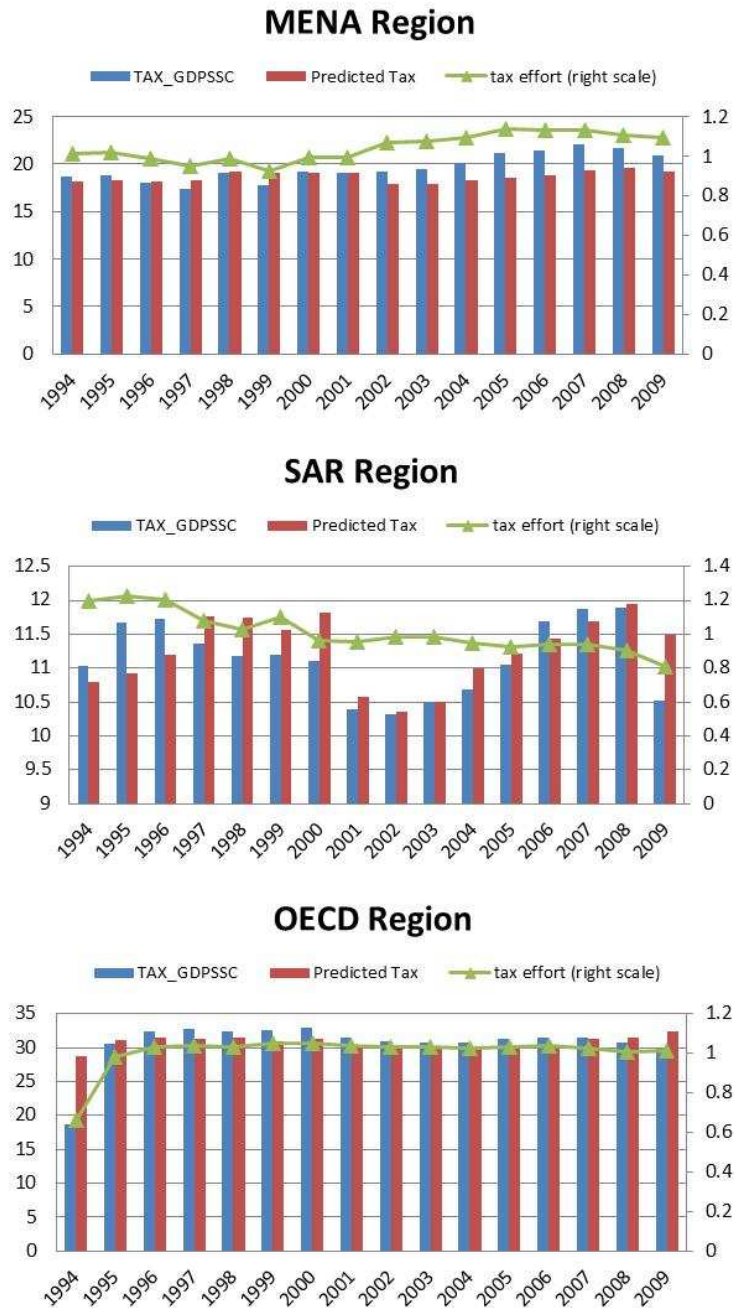
When we focus on recent years, the trend in taxes and the tax effort is clear; it is declining each year. Due to financial and economic crisis of 2008, economic activities declined significantly in almost each country. The expected effect of this change on tax revenues is negative. Thus, it can be said that one reason for the declining trend of taxes is lower economic activities. At the same time, many governments introduced stimulus packages which include measures lowering taxes to promote the economy. This put additional pressure on tax collection.

Figure 4 – Actual Tax Collection, Taxable Capacity and Tax Effort by Regions, 1994-2009



Note: TAX_GDPSSC is actual tax collection in % of GDP; predicted tax is the taxable capacity calculated based on the estimation results given in the second column of the results in Table 1 Panel A. Tax effort is the ratio of actual tax to taxable capacity. Regions are defined in Figure 2.

Figure 4 (cont'd) – Actual Tax Collection, Taxable Capacity and Tax Effort by Regions, 1994-2009



Note: TAX_GDPSSC is actual tax collection in % of GDP; predicted tax is the taxable capacity calculated based on the estimation results given in the second column of the results in Table 1 Panel A. Tax effort is the ratio of actual tax to taxable capacity. Regions are defined in Figure 2.

Country Classification Based on Tax Collection and Tax Effort

Countries are classified into different groups, based on their tax efforts and actual tax collection. The value of one is used as the benchmark for the tax effort and 18.31 % (median of the tax-to-GDP ratio in the sample) for actual tax revenues. A country is regarded as a low-collection country if its actual collection is lower than 18.31 percent, and regarded as a high-collection country if its collection is above this level. Based on these definitions, the countries are ranked into four different categories: (i) low tax collection, low tax effort; (ii) high tax collection, high tax effort; (iii) low tax collection, high tax effort; and (iv) high tax collection, low tax effort.

Table 5 gives the list of the countries in each group. Given that actual and predicted taxes are positively correlated as indicated in Figure 3, the tax effort is positively linked to the actual tax collection as well. Thus, most countries take place in the low tax collection and low tax effort or high tax collection and high tax effort groups.

When we compare the country classification reported in Table 3 of Le, Moreno-Dodson, and Rojchaichanthorn (2008), focusing on 1994-2003, and Table 5 below (extended period from 2003 to 2009), it can be seen that the classification of most countries is stable. But there are some interesting changes.

Group 1: Low Collection and Low Effort

This group includes the highest number of countries from all geographic region; they are mostly low-income countries. The exceptions are Canada, Japan, Korea, and United States. Given low levels of actual tax collections, most Asian countries, not surprisingly, take place in this group.

When we compare the findings of Le, Moreno-Dodson, and Rojchaichanthorn (2008) and the ones reported in Table 5, it can be seen that Canada is a new developed country in the low-effort, low-collection group. It was initially in low effort, but high collection group. In the developing country group, Egypt, Ethiopia, Senegal, and Uganda are new members. In the original table, Egypt was in high effort and high collection group. All other remaining new countries were in the high effort but low collection group.

Given the importance of effective taxes in development, an improvement in the tax collection requires that the developing countries in this group to undertake comprehensive reforms of both tax policy and tax administration.

Table 5 – Classification of Countries Based on Tax Efforts and Tax Collection, 1994-2009

		TAX EFFORT			
		LOW		HIGH	
TAX COLLECTION	LOW	<u>Developing Countries</u> Albania Dominican Rep. Oman Argentina Egypt, Arab Rep. Panama Armenia El Salvador Paraguay Azerbaijan Ethiopia Peru Bahamas, The Guatemala Philippines Bahrain Guinea Senegal Bangladesh India Sierra Leone Burkina Faso Indonesia Sudan Cameroon Kazakhstan Thailand China Lebanon Uganda Colombia Madagascar Yemen, Rep. Congo, Dem. Rep. Malaysia Congo, Rep. Mexico	<u>Developed Countries</u> Canada Japan Korea, Rep. United States	<u>Developing Countries</u> Bolivia Cote d'Ivoire Ghana Honduras Kenya Mali Nicaragua Pakistan Sri Lanka Syrian Arab Republic Togo Zambia	<u>Developed Countries</u>
	HIGH	<u>Developing Countries</u> Bulgaria Estonia Jordan Latvia Lithuania Moldova Romania Russian Federation Slovak Republic Turkey Ukraine	<u>Developed Countries</u> Czech Republic Denmark Germany Iceland Ireland Luxembourg Spain Sweden Switzerland	<u>Developing Countries</u> Belarus New Zealand Botswana Papua New Guinea Brazil Poland Chile Slovenia Costa Rica South Africa Croatia Trinidad and Tobago Hungary Tunisia Jamaica Uruguay Mongolia Vietnam Morocco Zimbabwe Namibia	<u>Developed Countries</u> Australia Austria Belgium Cyprus Finland France Greece Italy Malta Netherlands Norway Portugal United Kingdom

Note: Taxable capacity is calculated based on the estimation results given in the second column of Table 1 Panel A.

Group 2: High Collection and High Effort

Mainly, middle- and high-income countries are included in this group. When we compare the findings of the previous paper with the ones reported in Table 5, it can be seen that Australia appears as a (new) developed country in the high-effort, high-collection group. Initially, this country was collecting high taxes, but its tax effort index was low. Now both collection and effort are high for Australia. When we check the developing countries, Botswana, Chile, Trinidad and Tobago, and Vietnam are also new countries in the group. Both Botswana and Chile were originally in the low-effort, low-collection group, but they made it to the high-effort, high-collection group after recent improvements. Trinidad and Tobago was initially collecting tax revenues, but the tax effort was low, while Vietnam was in high effort, but low tax collection group.

Given that tax rates are already high in these countries, further increases in tax revenue collection may cause high economic distortions. But it does not mean that there is no room for improvement. Some countries face tax deficiencies; for example, Brazil. Some countries need to find a way of lowering the overall tax burden. As suggested by Le, Moreno-Dodson, and Rojchaichanthorn (2008), tax reforms can aim to raise the efficiency of tax collection, including reducing tax-induced distortions and improving the business climate through further rationalizing the tax regimes, rebalancing the tax mix, and simplifying administration procedures.

Group 3: Low Collection and High Effort

All countries in this group are either low-income or lower-middle income countries. There is no single developed country reported in this group. The number of countries in this group is also the lowest when compared to other groups. Nicaragua and Sri Lanka are the two new countries in this group. Both of these countries were in low-effort and low-tax-collection group. With recent improvements they moved to high effort, but still low-collection group.

Given that in the lower-income countries, the tax regime and tax administration are not as efficient, the tax collection rates are low for this group. On the other hand, they deploy high tax efforts through enforcing easy taxes and/or imposing high taxes on the formal sector, as suggested by Le, Moreno-Dodson, and Rojchaichanthorn (2008). Some short-term tax reform measures may include “streamlining tax policy and tax administration procedures to reduce compliance costs and encourage formality, and to lower tax barriers to firms’ entry and operations”. Similarly medium- to long-term reforms may cover “expanding the scope for raising revenue by broadening the effective tax base and enhancing the functioning of the tax administration”.

Group 4: High Collection, Low Effort

Almost all countries in this group come from the upper-middle income group (11 countries) or high-income group (9 countries). Most developing countries in the group are located in ECA. These countries collect high taxes relative to the world average, but given their macroeconomic and demographic features, their tax effort remains low.

The new developing countries in the group are Bulgaria, Jordan, and Russia, while the new developed countries are Czech Republic, Denmark, Spain, and Sweden. When we compare the findings of Le, Moreno-Dodson, and Rojchaichanthorn (2008) and the ones reported in Table 5, it can be seen that all new countries come from the high-effort, high-collection group. It means that in all these new countries tax efforts have worsened.

Given that these countries are already collecting high tax ratios, they may need to restructure their tax mix from production to consumption sources. These countries mostly impose high factor income taxes, especially on labor (see Rutkowski, et al., 2005). This can be shifted towards consumption, in order not to discourage economic activity and employment.

IV- Conclusion

Measuring taxation performance of countries is both theoretically and practically challenging. The development of a tax effort index, relating the actual tax revenues of a country to its estimated taxable capacity, provides us with a tempting measure which considers country specific fiscal, demographic, and institutional characteristics. It should be noted that the results in this paper need to be interpreted with care due to potential caveats in the modeling of tax capacity and effort, as well as in the measurement of the actual tax-GDP ratio. This study can be complimentary to but not substitute detailed analysis of a country's tax system, which can consider the country's overall fiscal policy taking in to account public expenditures needs and the overall level of development. It is recognized that making fundamental changes in a tax structure is a challenge due to possible public resistance and political weakness. The design of tax revenue reforms must be country specific and constructed after comprehensive analysis of the country's taxable capacity, revenue performance, and its top leadership political commitment.

As presented in the empirical analysis, several variables are important in determining the level of taxes in a country, but in recent years both the significance and the magnitude of the impact of institutional quality indexes on tax collection have increased strongly. This finding indicates that countries with better institutional quality such as bureaucracy quality or corruption can collect higher taxes. Countries need to consider improving the quality of governance if they want to increase the level of tax revenues.

Taxation is considered the best reliable way to finance public expenditures in the long run. Despite this fact, many developing countries experience a chronic gap between the actual and desirable levels of tax revenues. Taxation reforms are needed to close this gap, but such reforms cannot be the same for different countries. Taxable capacity and tax efforts present significant deviations across countries, income groups and regions, as well as overtime. But overall, developing countries seem to have more limitations to expand the scope for taxation, efficiently and equitably, which is determined by their taxable capacity. On the one hand, countries with a low level of actual tax collection and low tax effort may have more room to increase tax revenues to reach their taxable capacity without causing major economic distortions or costs. Finally, low-income countries with a low level of tax collection but high tax effort have less opportunity to increase tax revenues without creating distortions or high compliance costs.

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TABLE A1 – Income groups

High-income countries	Middle-income countries	Low-income countries	
Australia	Albania	Mauritius	Bangladesh
Austria	Argentina	Mexico	Benin
Bahamas, The	Armenia	Moldova	Burkina Faso
Bahrain	Azerbaijan	Mongolia	Burundi
Belgium	Belarus	Morocco	Cambodia
Canada	Belize	Namibia	Congo, Dem. Rep.
Croatia	Bhutan	Nicaragua	Ethiopia
Cyprus	Bolivia	Pakistan	Guinea
Czech Republic	Bosnia and Herzegovina	Panama	Kenya
Denmark	Botswana	Papua New Guinea	Kyrgyz Republic
Estonia	Brazil	Paraguay	Madagascar
Finland	Bulgaria	Peru	Mali
France	Cameroon	Philippines	Myanmar
Germany	Cape Verde	Romania	Nepal
Greece	Chile	Russian Federation	Niger
Hong Kong SAR, China	China	Senegal	Rwanda
Hungary	Colombia	Seychelles	Sierra Leone
Iceland	Congo, Rep.	South Africa	Tajikistan
Ireland	Costa Rica	Sri Lanka	Togo
Israel	Cote d'Ivoire	St. Kitts and Nevis	Uganda
Italy	Dominican Republic	St. Vincent and the Grenadines	Zimbabwe
Japan	Egypt, Arab Rep.	Sudan	
Korea, Rep.	El Salvador	Swaziland	
Luxembourg	Fiji	Syrian Arab Republic	
Macao SAR, China	Georgia	Thailand	
Malta	Ghana	Tunisia	
Netherlands	Guatemala	Turkey	
New Zealand	Honduras	Ukraine	
Norway	India	Uruguay	
Oman	Indonesia	Vanuatu	
Poland	Jamaica	Vietnam	
Portugal	Jordan	Yemen, Rep.	
Singapore	Kazakhstan	Zambia	
Slovak Republic	Lao PDR		
Slovenia	Latvia		
Spain	Lebanon		
Sweden	Lesotho		
Switzerland	Lithuania		
Trinidad and Tobago	Macedonia, FYR		
United Kingdom	Malaysia		
United States	Maldives		

Source: The World Bank classification.

Note: High-income economies are those in which 2009 GNI per capita was \$12,196 or more. Low-income economies are those in which 2009 GNI per capita was \$995 or less. Middle-income economies are those in which 2009 GNI per capita was between \$996 and \$12,195.

Table A2 – Regional Classification

AFR	EAP	ECA	LAC	MENA	SAR
Botswana	Cambodia	Albania	Argentina	Egypt, Arab Rep.	Bangladesh
Burundi	China	Armenia	Bahamas, The	Jordan	Bhutan
Cameroon	Fiji	Azerbaijan	Belize	Lebanon	India
Congo, Dem. Rep.	Indonesia	Belarus	Bolivia	Morocco	Maldives
Congo, Rep.	Japan	Bosnia and Herzegovina	Brazil	Syrian Arab Rep.	Nepal
Cote d'Ivoire	Korea, Rep.	Bulgaria	Chile	Tunisia	Pakistan
Ethiopia	Lao PDR	Croatia	Colombia	Yemen, Rep.	Sri Lanka
Ghana	Malaysia	Czech Republic	Costa Rica		
Guinea	Mongolia	Estonia	Dominican Republic		
Kenya	Myanmar	Georgia	El Salvador		
Lesotho	Papua New Guinea	Hungary	Guatemala		
Madagascar	Philippines	Kazakhstan	Honduras		
Mauritius	Singapore	Kyrgyz Republic	Jamaica		
Namibia	Thailand	Latvia	Mexico		
Rwanda	Vanuatu	Lithuania	Nicaragua		
Senegal	Vietnam	Macedonia, FYR	Panama		
Seychelles		Moldova	Paraguay		
Sierra Leone		Poland	Peru		
South Africa		Romania	St. Kitts and Nevis		
Sudan		Russian Federation	St. Vincent and the Grenadines		
Swaziland		Slovak Republic	Trinidad and Tobago		
Uganda		Slovenia	Uruguay		
Zambia		Tajikistan			
Zimbabwe		Turkey			
		Ukraine			

Source: The World Bank classification.

Note: AFR is Sub-Saharan Africa, EAP is East Asia and Pacific, ECA is Eastern European and Central Asia, LAC is Latin America and Caribbean, MENA is Middle East and North Africa, SAR is South Asia.

Table A3 – Correlation Matrix, 1994-2009

	<i>Tax revenue in % of GDP</i>	<i>Fiscal revenue in % of GDP</i>	<i>GDP per capita</i>	<i>Age dependency ratio</i>	<i>Population growth</i>	<i>Trade openness</i>	<i>Agriculture value added (in % of GDP)</i>	<i>Bureaucracy Quality Index</i>	<i>Corruption index</i>
Tax revenue in % of GDP	1.00								
Fiscal revenue in % of GDP	0.91	1.00							
GDP per capita	0.45	0.44	1.00						
Age dependency ratio	-0.45	-0.44	-0.49	1.00					
Population growth	-0.48	-0.36	-0.28	0.52	1.00				
Trade openness	0.21	0.31	0.22	-0.29	-0.02	1.00			
Agriculture value added (in % of GDP)	-0.59	-0.61	-0.54	0.66	0.40	-0.30	1.00		
Bureaucracy Quality Index	-0.58	-0.56	-0.75	0.58	0.37	-0.21	0.68	1.00	
Corruption index	-0.47	-0.46	-0.64	0.32	0.24	-0.15	0.45	0.64	1.00

Note: GDP per capita is in constant 2000 US\$; population growth is the growth rate of population between 15 and 64 ages; trade openness is the sum of imports and exports in percentage of GDP; corruption index is recalculated such that lower values indicate lower corruption; bureaucracy index is recalculated such that lower values indicate higher bureaucracy quality. 110 countries are included and the number of observations is 1,322.

Table A4 – Variables by country, averages over 1994-2009

	<i>Fiscal</i>		<i>Age</i>			<i>Agriculture</i>		<i>Bureaucracy</i>	<i>Corruption</i>
	<i>Tax revenue in % of GDP</i>	<i>revenue in % of GDP</i>	<i>GDP per capita</i>	<i>dependency ratio</i>	<i>Population growth</i>	<i>Trade openness</i>	<i>value added (in % of GDP)</i>	<i>Quality Index</i>	<i>Corruption index</i>
ORIGINAL COUNTRIES									
Albania	17.28	20.77	1308	57.09	0.50	62.19	29.69	-4.94	-5.00
Argentina	15.03	16.46	8000	59.51	1.38	31.89	7.47	-7.56	-5.31
Armenia	17.92	20.12	850	54.51	-0.01	72.99	27.98	-4.00	-4.25
Australia	23.77	26.18	22073	49.22	1.47	39.32	3.44	-10.00	-8.63
Austria	35.50	37.96	23832	47.99	0.38	91.50	2.04	-10.00	-8.69
Azerbaijan	16.74	27.29	1019	52.94	2.17	87.86	16.26	-4.00	-4.58
Bahrain	3.86	27.18	13139	42.66	6.18	155.11	0.86	-6.25	-5.75
Bangladesh	8.15	10.32	362	68.39	2.61	35.85	22.94	-5.56	-4.50
Belarus	29.89	31.97	1546	46.25	0.04	126.56	12.50	-4.00	-5.75
Belgium	40.67	41.86	22585	51.46	0.35	145.39	1.20	-10.00	-7.50
Belize	19.38	21.66	3331	80.20	4.03	115.22	15.86	..	..
Bhutan	8.36	19.92	866	72.99	3.17	87.31	27.12	..	..
Bolivia	16.79	21.14	1037	76.53	2.38	56.86	15.07	-5.56	-5.50
Bosnia and Herzegovina	34.09	38.21	1513	43.36	0.26	106.04	14.87	..	..
Botswana	17.08	41.01	3448	68.27	2.69	86.00	2.80	-6.00	-6.19
Brazil	20.35	21.94	3855	53.77	1.86	22.43	6.17	-6.44	-5.63
Bulgaria	28.10	34.26	1869	46.76	-0.48	113.05	12.58	-6.00	-6.19
Burundi	15.18	16.94	113	88.14	2.88	34.90	43.90	..	..
Cambodia	8.72	10.46	349	78.00	3.29	108.64	38.60	..	..
Cameroon	9.86	12.60	643	85.52	2.84	43.85	22.36	-5.00	-5.50
Canada	18.23	19.75	23429	45.74	1.16	73.74	2.36	-10.00	-9.31
Chile	19.34	22.99	5149	52.21	1.69	65.95	5.55	-7.69	-7.38
China	7.38	8.28	1205	45.58	1.30	50.44	14.77	-6.19	-4.88
Colombia	12.45	18.07	2712	58.98	2.19	35.84	10.65	-6.38	-5.31
Congo, Dem. Rep.	4.37	5.14	95	101.25	2.98	53.90	48.23	-1.69	-2.69
Congo, Rep.	9.10	29.17	1097	82.89	2.95	134.11	6.78	-4.00	-6.06
Costa Rica	22.88	25.01	4227	56.39	2.93	92.18	10.08	-6.00	-6.94
Cote d'Ivoire	15.90	17.28	578	82.75	2.35	80.03	24.14	-3.38	-5.44
Croatia	33.84	36.15	5260	48.17	-0.31	86.38	6.55	-7.67	-5.50
Cyprus	42.50	64.61	13552	47.30	2.33	101.92	3.59	-9.81	-8.31

Table A4 (cont'd) – Variables by country, averages over 1994-2009

	<i>Fiscal</i>		<i>Age</i>		<i>Population growth</i>	<i>Trade openness</i>	<i>Agriculture</i>	<i>Bureaucracy</i>	<i>Corruption index</i>
	<i>Tax revenue in % of GDP</i>	<i>revenue in % of GDP</i>	<i>GDP per capita</i>	<i>dependency ratio</i>			<i>value added (in % of GDP)</i>	<i>Quality Index</i>	
Czech Republic	29.77	31.49	6026	43.09	0.48	126.53	3.61	-8.00	-6.50
Denmark	33.59	37.28	29720	50.24	0.23	85.36	2.23	-10.00	-10.00
Dominican Rep.	14.81	16.05	2798	66.01	2.03	73.79	7.77	-4.44	-6.13
Egypt, Arab Rep.	16.15	27.91	1465	66.14	2.54	50.86	15.84	-6.00	-4.94
El Salvador	14.50	17.05	2274	75.23	1.22	66.03	11.77	-5.44	-6.00
Estonia	28.27	32.41	4874	49.12	-0.50	153.57	4.74	-7.33	-6.92
Ethiopia	9.40	12.75	140	92.48	3.01	37.26	49.66	-3.88	-5.00
Fiji	21.94	24.89	2148	58.93	1.40	121.63	16.31	..	..
Finland	34.83	39.49	23847	49.76	0.29	74.18	3.39	-10.00	-10.00
France	38.77	42.56	21660	53.46	0.52	50.77	2.69	-8.94	-7.38
Georgia	14.16	15.98	824	51.14	-0.31	77.15	24.86	..	..
Germany	28.33	29.48	23067	48.24	-0.16	66.49	1.11	-10.00	-8.81
Ghana	16.59	18.17	272	79.14	2.92	83.17	38.22	-6.69	-5.00
Greece	33.00	38.05	12341	47.85	0.41	52.71	5.99	-8.00	-7.00
Guatemala	10.50	10.77	1724.83	91.19	2.73	56.31	17.20	-5.50	-5.50
Guinea	10.86	11.59	377	89.79	2.40	57.00	21.93	-5.56	-6.06
Hungary	35.03	38.29	4937	46.44	-0.04	127.35	5.25	-9.06	-7.31
Iceland	28.33	32.71	31847	52.62	1.45	76.40	8.78	-10.00	-9.69
India	9.54	12.19	514	62.36	2.12	32.32	22.35	-8.00	-5.31
Indonesia	13.32	17.06	901	54.32	1.87	60.40	15.75	-6.31	-4.56
Ireland	30.63	32.90	25319	49.64	1.83	156.42	3.35	-10.00	-6.88
Italy	36.12	37.94	18902	49.07	0.10	50.24	2.66	-7.75	-5.75
Jamaica	25.89	30.78	3658	65.67	1.06	101.22	6.89	-8.00	-4.94
Japan	10.18	..	37413	48.26	-0.34	23.29	1.72	-10.00	-6.88
Jordan	19.90	26.12	1961	73.78	3.19	122.74	3.07	-6.38	-6.63
Kazakhstan	11.99	13.34	1582	51.50	0.42	86.92	9.14	-6.00	-4.50
Kenya	17.25	19.14	420	88.31	3.31	59.55	28.58	-6.44	-5.00
Korea, Rep.	17.63	21.04	12202	49.45	0.79	73.86	4.37	-8.25	-6.50
Kyrgyz Republic	14.00	16.88	297	64.95	1.86	97.69	37.56	..	..
Latvia	23.22	26.62	3964	48.62	-0.62	97.51	4.91	-6.75	-5.33

Table A4 (cont'd) – Variables by country, averages over 1994-2009

	<i>Fiscal</i>		<i>Age</i>			<i>Agriculture</i>		<i>Bureaucracy</i>	<i>Corruption</i>
	<i>Tax revenue in % of GDP</i>	<i>revenue in % of GDP</i>	<i>GDP per capita</i>	<i>dependency ratio</i>	<i>Population growth</i>	<i>Trade openness</i>	<i>value added (in % of GDP)</i>	<i>Quality Index</i>	<i>Corruption index</i>
Lebanon	14.97	19.75	4954	56.71	2.29	62.36	6.78	-5.56	-3.69
Lesotho	46.48	55.02	411	82.49	2.04	158.39	13.15	..	..
Lithuania	25.55	27.76	3953	49.25	-0.35	111.23	6.96	-6.75	-5.33
Luxembourg	35.99	38.59	46581	48.40	1.40	261.61	0.66	-10.00	-9.19
Madagascar	10.60	11.25	248	91.52	3.22	63.31	28.25	-4.00	-7.94
Malaysia	16.13	21.43	4232	59.45	2.69	198.19	10.30	-7.75	-6.13
Malta	34.32	38.29	9649	45.93	1.12	169.82	2.63	-7.94	-7.25
Mauritius	20.15	23.47	3941	46.24	1.33	123.42	7.11	..	..
Mexico	12.66	14.52	5828	61.80	2.03	57.26	4.54	-7.56	-5.38
Moldova	24.48	28.63	439	48.04	0.50	125.81	23.39	-5.08	-4.25
Mongolia	20.06	26.79	547	59.80	2.33	122.78	30.65	-6.00	-6.13
Morocco	26.60	31.90	1412	60.72	2.10	64.55	16.58	-6.00	-5.94
Namibia	27.53	30.37	2293	76.41	2.91	97.33	10.87	-6.69	-5.69
Nepal	9.12	11.07	227	78.21	2.78	51.17	38.42	..	..
Netherlands	37.30	40.40	23931	47.48	0.35	125.93	2.59	-10.00	-9.50
New Zealand	30.32	35.55	13841	51.70	1.29	59.25	7.08	-10.00	-9.69
Nicaragua	14.92	16.08	779	78.17	2.57	78.04	20.79	-4.00	-6.63
Norway	37.11	48.64	37699	53.26	0.90	72.50	1.99	-10.00	-9.19
Oman	7.36	26.66	8640	60.59	3.06	87.06	2.35	-6.44	-5.50
Pakistan	11.13	14.79	565	79.29	3.00	34.02	23.83	-6.00	-4.69
Panama	15.44	23.67	4222	58.97	2.22	152.16	7.24	-5.94	-5.00
Papua New Guinea	21.56	23.62	681	74.57	2.72	119.78	36.32	-6.44	-4.44
Paraguay	12.56	17.30	1404	72.45	2.74	102.64	19.65	-4.44	-3.94
Peru	15.23	17.66	2242	62.74	1.91	37.74	8.05	-5.56	-5.56
Philippines	14.34	16.14	1108	70.53	2.51	94.09	16.58	-7.31	-5.38
Poland	28.42	31.48	4693	45.42	0.51	64.17	5.30	-8.19	-6.50
Portugal	31.32	35.27	11037	48.42	0.43	65.50	3.67	-8.00	-8.13
Romania	22.66	25.68	2022	45.64	-0.08	68.92	14.11	-4.00	-5.75
Russian Federation	21.75	30.75	2090	43.71	0.24	55.97	5.91	-4.44	-4.50
Rwanda	..	..	247	90.33	4.31	37.07	39.94	..	..

Table A4 (cont'd) – Variables by country, averages over 1994-2009

	<i>Fiscal</i>		<i>Age</i>			<i>Agriculture</i>		<i>Bureaucracy</i>	<i>Corruption</i> index
	<i>Tax revenue</i> in % of GDP	<i>in %</i> of GDP	<i>per</i> capita	<i>dependency</i> ratio	<i>Population</i> growth	<i>Trade</i> openness	<i>value added</i> (in % of GDP)	<i>Quality</i> Index	
Senegal	15.25	16.05	485	90.84	3.03	67.10	17.60	-4.44	-5.50
Seychelles	34.01	42.78	7203	..	..	174.46	2.97	..	..
Sierra Leone	10.10	10.80	208	80.86	2.37	49.73	50.69	-1.25	-4.75
Slovak Republic	26.78	30.86	6050	44.03	0.78	146.86	4.51	-8.19	-6.13
Slovenia	34.91	37.55	10577	43.02	0.33	114.87	3.31	-8.00	-6.58
South Africa	26.56	28.69	3226	58.96	2.31	54.45	3.54	-6.75	-6.31
Spain	26.54	28.48	14420	46.22	1.07	54.12	3.95	-8.69	-7.75
Sri Lanka	14.99	16.90	916	49.97	1.24	75.26	17.10	-6.00	-6.31
St. Kitts and Nevis	24.87	32.74	7492	..	..	116.43	3.67	..	..
St. Vincent and the Gren.	22.32	28.93	3370	60.53	0.95	113.59	9.69	..	..
Sudan	6.29	7.58	389	82.77	2.81	31.43	37.70	-4.00	-3.31
Swaziland	25.45	26.79	1383	88.35	2.48	162.19	10.65	..	..
Sweden	32.71	38.36	28259	54.70	0.56	83.40	2.13	-10.00	-9.63
Switzerland	18.51	20.60	34791	47.77	0.70	83.72	1.52	-10.00	-8.69
Syrian Arab Republic	17.08	22.78	1239	78.61	3.35	69.49	24.97	-4.56	-6.19
Tajikistan	10.31	11.33	178	82.00	1.93	123.40	27.29	..	..
Thailand	17.08	19.79	2182	45.07	1.36	118.64	10.06	-6.63	-4.75
Trinidad and Tobago	25.77	29.22	7508	46.52	1.50	98.81	1.36	-7.56	-5.50
Tunisia	26.05	29.80	2165	55.09	2.23	97.40	11.57	-6.00	-5.50
Turkey	18.98	23.80	4197	54.95	2.08	47.33	12.00	-6.44	-5.38
Uganda	11.40	11.72	276	105.32	3.19	38.53	32.71	-5.56	-5.13
Ukraine	26.13	31.13	807	46.37	-0.37	98.59	12.72	-4.00	-4.50
United Kingdom	34.79	36.35	25413	52.75	0.56	56.20	1.08	-10.00	-8.50
United States	17.53	18.13	34864	50.51	1.19	25.04	1.33	-10.00	-8.25
Uruguay	23.85	26.34	6970	59.47	0.42	46.46	9.06	-5.75	-6.00
Vanuatu	18.38	21.14	1241	79.58	2.96	92.10	22.71	..	..
Vietnam	18.46	22.09	457	57.49	2.56	120.63	23.71	-5.94	-5.19
Yemen, Rep.	10.14	25.05	521	102.76	4.28	85.08	15.99	-4.44	-5.44
Zambia	17.57	18.49	344	94.47	2.44	70.45	20.97	-4.00	-5.88
Zimbabwe	23.57	25.94	454	82.35	1.22	80.82	19.03	-6.13	-3.19

Table A4 (cont'd) – Variables by country, averages over 1994-2009

	<i>Fiscal</i>		<i>Age</i>		<i>Agriculture</i>		<i>Bureaucracy</i>		
	<i>Tax revenue in % of GDP</i>	<i>revenue in % of GDP</i>	<i>GDP per capita</i>	<i>dependency ratio</i>	<i>Population growth</i>	<i>Trade openness</i>	<i>value added (in % of GDP)</i>	<i>Quality Index</i>	<i>Corruption index</i>
NEW COUNTRIES									
Bahamas, The	15.48	17.15	17198	50.38	2.02	98.03	2.26	-8.00	-8.00
Benin	16.10	17.06	337	92.63	3.34	43.60	35.07	..	..
Burkina Faso	11.83	12.87	232	94.74	3.19	35.86	34.94	-4.00	-5.19
Cape Verde	25.68	30.12	1290	83.42	3.01	81.66	10.31	..	..
Honduras	17.23	21.14	1215	83.06	2.91	114.49	16.37	-5.56	-4.94
Hong Kong SAR, China	12.05	19.11	27533	37.76	1.52	320.42	..	-8.25	-7.63
Israel	33.15	38.51	19401	61.61	2.40	74.04	..	-9.94	-6.75
Lao PDR	11.57	13.06	356	80.39	2.76	72.56	47.79	..	..
Macao SAR, China	20.72	24.17	19534	38.56	3.12	149.65	0.00	..	..
Macedonia, FYR	29.67	33.95	1795	46.63	0.70	100.24	12.49	..	..
Maldives	15.57	32.53	2542	73.50	3.61	168.08	8.80	..	..
Mali	14.34	16.07	228	98.71	3.12	65.09	41.78	-1.00	-5.31
Myanmar	3.21	6.05	..	53.56	1.71	1.40	57.16	-4.00	-3.50
Niger	10.75	12.38	169	103.01	3.44	41.25	39.92	-4.13	-3.25
Singapore	14.37	23.58	24086	39.39	2.71	406.46	..	-9.81	-8.00
Togo	15.44	16.36	252	84.83	3.22	81.73	38.61	-1.69	-4.50

Table A5 – Descriptive statistics, averages over 1994-2009

	<i>Tax revenue in % of GDP</i>	<i>Fiscal revenue in % of GDP</i>	<i>GDP per capita</i>	<i>Age dependency ratio</i>	<i>Population growth</i>	<i>Trade openness</i>	<i>Agriculture value added (in % of GDP)</i>	<i>Bureaucracy Quality Index</i>	<i>Corruption index</i>
Mean	21.53	25.50	7185.32	63.23	1.80	88.67	14.98	-6.68	-6.17
Standard Deviation	10.10	10.51	10205.22	17.99	1.52	51.39	13.57	2.34	1.92
Minimum	1.35	3.00	80.62	25.63	-5.85	0.31	0.00	-10.00	-10.00
Maximum	68.56	78.47	56389.21	117.77	17.45	438.09	65.86	-1.00	-1.00
Count	1437	1421	2157	2144	2144	2121	2046	1748	1748

Table A6 – Variable Definitions and Sources

Variables	Description	Source
Tax revenue in % of GDP	Series : Tax revenue (% of GDP) (GC.TAX.TOTL.GD.ZS) PLUS Social contributions (% of revenue) (GC.REV.SOCL.ZS) when available. Tax revenue refers to compulsory transfers to the central government for public purposes. Certain compulsory transfers such as fines, penalties, and most social security contributions are excluded. Refunds and corrections of erroneously collected tax revenue are treated as negative revenue. Social contributions include social security contributions by employees, employers, and self-employed individuals, and other contributions whose source cannot be determined. They also include actual or imputed contributions to social insurance schemes operated by governments.	WDI (2011)
Fiscal revenue in % of GDP	Series: Revenue, excluding grants (% of GDP) (GC.REV.XGRT.GD.ZS). Revenue is cash receipts from taxes, social contributions, and other revenues such as fines, fees, rent, and income from property or sales. Grants are also considered as revenue but are excluded here.	WDI (2011)
GDP per capita		WDI (2011)
Age dependency ratio	Age dependency ratio (in %) is the ratio of dependents--people younger than 15 or older than 64-- to the working-age population--those ages 15-64.	WDI (2011)
Population growth	Total population between the ages 15 to 64 is the number of people who could potentially be economically active.	WDI (2011)
Trade openness	Series: Trade (% of GDP) (NE.TRD.GNFS.ZS). Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	WDI (2011)
Agriculture value added (in % of GDP)	Series: Agriculture, value added (% of GDP) (NV.AGR.TOTL.ZS). Cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. Note: For VAB countries, gross value added at factor cost is used as the denominator.	WDI (2011)
Bureaucracy Quality Index	The institutional strength and quality of the bureaucracy is a shock absorber that tends to minimize revisions of policy when governments change. The original score ranges from 1 to 4. High points are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. The score is recalculated to -10 to -1 where low points are countries with strength bureaucracy and high points are countries with weak bureaucracy.	ICRG (2011)
Corruption index	The assessment of corruption refers to the political system. Corruption index ranges from 1 to 6. High points are given to low corruption countries and low points are given to high corruption countries. The scores are recalculated to -10 to -1 where low points mean low corruption and high points mean high corruption.	ICRG (2011)
Size of shadow economy	The shadow economy includes all market-based legal production of goods and services that are deliberately concealed from public authorities for any of the following reasons: (1) to avoid payment of income, value added or other taxes, (2) to avoid payment of social security contributions, (3) to avoid having to meet certain legal labor market standards, such as minimum wages, maximum working hours, safety standards, etc., and (4) to avoid complying with certain administrative procedures, such as completing statistical questionnaires or other administrative forms.	Schneider, Buehn, Montenegro (2010)
Total consumption	Series: Final consumption expenditure, etc. (% of GDP) (NE.CON.TETC.ZS). Final consumption expenditure (formerly total consumption) is the sum of household final consumption expenditure (private consumption) and general government final consumption expenditure (general government consumption). This estimate includes any statistical discrepancy in the use of resources relative to the supply of resources.	WDI (2011)

Table A7 – Actual Taxation, Taxable Capacity (Predicted Tax) and Tax Effort by Country

Country	1994-2009			1994-2001			2002-2009		
	Predicted			Predicted			Predicted		
	Tax/GDP	tax/GDP	Tax Effort	Tax/GDP	tax/GDP	Tax Effort	Tax/GDP	tax/GDP	Tax Effort
Albania	17.28	23.34	0.74	14.60	23.11	0.63	20.86	23.63	0.88
Argentina	15.03	15.85	0.95	..	..	..	15.03	15.85	0.95
Armenia	17.92	23.61	0.76	..	..	..	17.92	23.61	0.76
Australia	23.77	20.77	1.14	23.35	21.19	1.10	23.92	20.59	1.16
Austria	35.50	32.54	1.09	35.55	31.91	1.11	35.46	33.09	1.07
Azerbaijan	16.74	25.01	0.67	..	..	..	16.74	25.01	0.67
Bahamas, The	15.48	21.02	0.74	15.84	21.11	0.75	14.99	20.88	0.72
Bahrain	3.86	24.05	0.16	4.96	24.05	0.21	2.61	..	..
Bangladesh	8.15	10.15	0.80	7.60	9.13	0.83	8.22	10.28	0.80
Belarus	29.89	28.65	1.04	28.47	29.37	0.97	31.31	28.29	1.11
Belgium	40.67	32.86	1.24	41.50	32.39	1.28	39.95	33.27	1.20
Belize	19.38	..	..	19.38	..	..	..	..	..
Benin	16.10	..	..	15.47	..	..	16.19	..	..
Bhutan	8.36	..	..	7.92	..	..	8.80	..	..
Bolivia	16.79	14.80	1.13	..	..	..	16.79	14.80	1.13
Bosnia and Herz.	34.09	..	..	..	..	..	34.09	..	..
Botswana	17.08	18.39	0.93	17.08	18.39	0.93	..	..	..
Brazil	20.35	16.13	1.26	18.75	16.11	1.16	21.55	16.15	1.33
Bulgaria	28.10	28.82	0.98	26.68	29.16	0.91	29.53	28.48	1.04
Burkina Faso	11.83	11.95	0.99	..	..	..	11.83	11.95	0.99
Burundi	15.18	..	..	15.18	..	..	..	..	..
Cambodia	8.72	..	..	..	..	..	8.72	..	..
Cameroon	9.86	14.14	0.70	9.86	14.14	0.70	..	..	..
Canada	18.23	23.94	0.76	18.88	24.42	0.77	17.58	23.17	0.76
Cape Verde	25.68	..	..	..	..	..	25.68	..	..
Chile	19.34	19.29	1.00	18.09	19.20	0.94	19.65	19.31	1.02
China	7.38	15.27	0.48	5.83	14.94	0.39	9.14	15.64	0.58
Colombia	12.45	15.87	0.78	11.03	15.17	0.73	12.62	15.96	0.79
Congo, Dem. Rep.	4.37	7.92	0.55	4.13	7.89	0.52	6.32	8.09	0.78
Congo, Rep.	9.10	19.81	0.46	9.28	19.93	0.47	8.74	19.58	0.45
Costa Rica	22.88	16.93	1.35	..	..	..	22.88	16.93	1.35
Cote d'Ivoire	15.90	15.53	1.02	..	..	..	15.90	15.53	1.02
Croatia	33.84	28.72	1.18	35.55	29.10	1.22	32.13	28.53	1.13
Cyprus	42.50	30.38	1.40	35.44	30.38	1.17	48.68	30.38	1.60
Czech Republic	29.77	30.34	0.98	30.16	31.07	0.97	29.38	29.61	0.99
Denmark	33.59	33.88	0.99	33.26	33.48	0.99	33.89	34.23	0.99
Dominican Republic	14.81	16.52	0.90	..	..	..	14.81	16.52	0.90
Egypt, Arab Rep.	16.15	17.00	0.95	19.24	17.63	1.09	14.61	16.68	0.88
El Salvador	14.50	16.36	0.89	..	..	..	14.50	16.36	0.89
Estonia	28.27	31.79	0.89	29.26	33.15	0.88	27.40	31.01	0.88

Table A7 (cont'd) – Actual Taxation, Taxable Capacity (Predicted Tax) and Tax Effort by Country

Country	1994-2009			1994-2001			2002-2009		
	Predicted			Predicted			Predicted		
	Tax/GDP	tax/GDP	Tax Effort	Tax/GDP	tax/GDP	Tax Effort	Tax/GDP	tax/GDP	Tax Effort
Ethiopia	9.40	9.63	0.98	9.41	8.99	1.05	9.38	10.75	0.87
Fiji	21.94	..	..	21.63	..	..	22.24	..	..
Finland	34.83	33.09	1.05	35.49	32.77	1.08	34.17	33.41	1.02
France	38.77	30.05	1.29	37.53	29.93	1.25	39.86	30.16	1.32
Georgia	14.16	..	..	9.61	..	..	17.00	..	..
Germany	28.33	32.50	0.87	28.83	32.25	0.89	27.89	32.72	0.85
Ghana	16.59	12.79	1.30	17.19	13.95	1.23	16.52	12.65	1.31
Greece	33.00	28.99	1.14	32.67	30.15	1.08	33.29	27.99	1.19
Guatemala	10.50	14.15	0.74	9.24	14.37	0.64	11.76	13.98	0.84
Guinea	10.86	15.98	0.68	10.86	15.98	0.68	..	..	..
Honduras	17.23	16.15	1.07	..	..	..	17.23	16.15	1.07
Hong Kong (China)	12.05	..	..	..	..	..	12.05	..	..
Hungary	35.03	31.19	1.12	36.01	31.84	1.13	34.18	30.54	1.12
Iceland	28.33	31.55	0.90	28.08	31.64	0.89	28.46	31.49	0.90
India	9.54	10.83	0.88	8.89	10.47	0.85	10.18	11.18	0.91
Indonesia	13.32	14.78	0.90	14.52	14.41	1.01	12.27	15.10	0.81
Ireland	30.63	31.43	0.97	31.36	30.84	1.02	30.00	31.94	0.94
Israel	33.15	..	..	34.73	..	..	32.75	..	..
Italy	36.12	28.98	1.25	37.18	29.76	1.25	35.20	28.30	1.24
Jamaica	25.89	17.21	1.50	..	..	..	25.89	17.21	1.50
Japan	10.18	21.47	0.47	..	..	..	10.18	21.47	0.47
Jordan	19.90	21.40	0.93	19.41	21.29	0.91	20.38	21.52	0.95
Kazakhstan	11.99	26.67	0.45	10.34	27.73	0.37	13.02	26.15	0.50
Kenya	17.25	13.34	1.29	16.66	13.02	1.28	17.84	13.66	1.31
Korea, Rep.	17.63	19.72	0.89	16.52	20.26	0.82	18.74	19.18	0.98
Kyrgyz Republic	14.00	..	..	13.18	..	..	15.63	..	..
Lao PDR	11.57	..	..	..	..	..	11.57	..	..
Latvia	23.22	29.14	0.80	23.99	29.58	0.81	22.45	28.93	0.78
Lebanon	14.97	17.36	0.86	12.18	17.05	0.71	15.67	17.44	0.90
Lesotho	46.48	..	..	42.89	..	..	50.59	..	..
Lithuania	25.55	29.14	0.88	23.57	29.39	0.80	26.05	29.06	0.90
Luxembourg	35.99	38.11	0.94	36.89	37.70	0.98	35.66	38.26	0.93
Macao SAR, China	20.72	..	..	16.56	..	..	23.84	..	..
Macedonia, FYR	29.67	..	..	..	..	..	29.67	..	..
Madagascar	10.60	15.96	0.66	10.53	16.09	0.65	10.62	15.92	0.67
Malaysia	16.13	19.68	0.82	16.90	20.08	0.84	15.55	19.38	0.80
Maldives	15.57	..	..	13.78	..	..	17.36	..	..
Mali	14.34	12.34	1.16	13.55	12.08	1.12	14.53	12.43	1.17
Malta	34.32	24.44	1.40	..	..	..	34.32	24.44	1.40
Mauritius	20.15	..	..	..	..	..	20.15	..	..

Table A7 (cont'd) – Actual Taxation, Taxable Capacity (Predicted Tax) and Tax Effort by Country

Country	1994-2009			1994-2001			2002-2009		
	Predicted			Predicted			Predicted		
	Tax/GDP	tax/GDP	Tax Effort	Tax/GDP	tax/GDP	Tax Effort	Tax/GDP	tax/GDP	Tax Effort
Mexico	12.66	16.78	0.75	12.66	16.78	0.75	..	..	..
Moldova	24.48	25.55	0.96	22.20	24.64	0.90	26.19	26.00	1.01
Mongolia	20.06	14.91	1.35	15.63	14.68	1.06	25.98	15.21	1.71
Morocco	26.60	18.53	1.44	..	..	..	26.60	18.53	1.44
Myanmar	3.21	..	..	3.48	..	..	2.49	..	..
Namibia	27.53	17.87	1.54	28.61	18.72	1.53	26.10	16.72	1.56
Nepal	9.12	..	..	8.68	..	..	9.56	..	..
Netherlands	37.30	33.97	1.10	38.00	34.07	1.12	36.69	33.89	1.08
New Zealand	30.32	21.34	1.42	29.29	20.94	1.40	30.49	21.42	1.42
Nicaragua	14.92	15.37	0.97	13.09	15.99	0.82	16.75	14.75	1.14
Niger	10.75	..	..	..	..	..	10.75	..	..
Norway	37.11	32.75	1.13	36.21	32.86	1.10	37.34	32.72	1.14
Oman	7.36	21.04	0.35	7.36	21.04	0.35	..	..	..
Pakistan	11.13	9.54	1.17	12.34	9.45	1.31	9.92	9.63	1.03
Panama	15.44	18.35	0.84	15.44	18.35	0.84	..	..	..
Papua New Guinea	21.56	12.97	1.66	21.62	13.26	1.63	21.05	10.63	1.98
Paraguay	12.56	13.83	0.91	12.43	14.68	0.85	12.69	12.98	0.98
Peru	15.23	16.02	0.95	14.98	16.03	0.93	15.47	16.01	0.97
Philippines	14.34	15.68	0.91	15.45	15.84	0.98	13.24	15.51	0.85
Poland	28.42	27.85	1.02	27.25	28.26	0.96	28.56	27.80	1.03
Portugal	31.32	30.53	1.03	30.31	30.66	0.99	32.22	30.41	1.06
Romania	22.66	26.97	0.84	..	..	..	22.66	26.97	0.84
Russian Federation	21.75	26.69	0.81	..	..	..	21.75	26.69	0.81
Rwanda	..	..	..	..	..	..	..	..	..
Senegal	15.25	15.95	0.96	15.25	15.95	0.96	..	..	..
Seychelles	34.01	..	..	33.59	..	..	34.43	..	..
Sierra Leone	10.10	10.13	1.00	9.30	10.82	0.86	10.90	9.44	1.15
Singapore	14.37	..	..	15.84	..	..	12.89	..	..
Slovak Republic	26.78	30.04	0.89	..	..	..	26.78	30.04	0.89
Slovenia	34.91	30.81	1.13	35.05	31.27	1.12	34.76	30.54	1.14
South Africa	26.56	18.52	1.43	24.91	18.34	1.36	26.97	18.56	1.45
Spain	26.54	29.65	0.90	28.64	29.83	0.96	24.70	29.49	0.84
Sri Lanka	14.99	14.12	1.06	16.01	14.16	1.13	13.83	14.07	0.98
St. Kitts and Nevis	24.87	..	..	23.52	..	..	25.55	..	..
St. Vincent and the Gren.	22.32	..	..	23.13	..	..	20.17	..	..
Sudan	6.29	8.53	0.74	6.29	8.53	0.74	..	..	..
Swaziland	25.45	..	..	25.07	..	..	26.03	..	..
Sweden	32.71	33.22	0.98	35.00	33.34	1.05	30.70	33.12	0.93
Switzerland	18.51	32.79	0.56	19.77	33.23	0.59	17.07	32.29	0.53
Syrian Arab Republic	17.08	16.62	1.03	17.08	16.62	1.03	..	..	..

Table A7 (cont'd) – Actual Taxation, Taxable Capacity (Predicted Tax) and Tax Effort by Country

Country	1994-2009			1994-2001			2002-2009		
	Predicted			Predicted			Predicted		
	Tax/GDP	tax/GDP	Tax Effort	Tax/GDP	tax/GDP	Tax Effort	Tax/GDP	tax/GDP	Tax Effort
Tajikistan	10.31	..	..	9.75	..	..	11.42	..	..
Thailand	17.08	17.62	0.97	..	..	..	17.08	17.62	0.97
Togo	15.44	11.37	1.36	..	..	..	15.44	11.37	1.36
Trinidad and Tobago	25.77	18.97	1.36	22.96	18.75	1.22	26.97	19.06	1.42
Tunisia	26.05	19.23	1.36	25.59	19.10	1.34	26.52	19.35	1.37
Turkey	18.98	25.49	0.74	..	..	..	18.98	25.49	0.74
Uganda	11.40	12.99	0.88	10.59	11.94	0.89	11.81	13.52	0.87
Ukraine	26.13	27.13	0.96	21.79	27.11	0.80	27.76	27.14	1.02
United Kingdom	34.79	31.63	1.10	34.54	32.01	1.08	35.02	31.29	1.12
United States	17.53	22.66	0.77	19.52	22.24	0.88	17.28	22.72	0.76
Uruguay	23.85	17.67	1.35	24.19	17.63	1.37	23.51	17.71	1.33
Vanuatu	18.38	..	..	18.38	..	..	..	..	..
Vietnam	18.46	14.10	1.31	17.63	14.00	1.26	20.67	14.35	1.44
Yemen, Rep.	10.14	16.65	0.61	10.14	16.65	0.61	..	..	..
Zambia	17.57	16.07	1.09	18.02	16.19	1.11	17.06	15.92	1.07
Zimbabwe	23.57	17.36	1.36	23.57	17.36	1.36	..	..	..

Table A8– Actual Fiscal Revenue, Revenue Capacity (Predicted Revenue) and Revenue Effort by Country

Country	1994-2009			1994-2001			2002-2009		
	Predicted			Predicted			Predicted		
	Revenue/GDP	revenue/GDP	Tax Effort	Revenue/GDP	revenue/GDP	Tax Effort	Revenue/GDP	revenue/GDP	Tax Effort
Albania	20.77	23.80	0.87	18.57	23.92	0.78	23.71	23.63	1.00
Argentina	16.46	15.85	1.04	..	..	..	16.46	15.85	1.04
Armenia	20.12	23.61	0.85	..	..	..	20.12	23.61	0.85
Australia	26.18	20.77	1.26	25.94	21.19	1.22	26.28	20.59	1.28
Austria	37.96	32.54	1.17	38.06	31.91	1.19	37.86	33.09	1.14
Azerbaijan	27.29	25.01	1.09	..	..	..	27.29	25.01	1.09
Bahamas, The	17.15	21.02	0.82	17.53	21.11	0.83	16.65	20.88	0.80
Bahrain	27.18	24.05	1.13	24.46	24.05	1.02	30.28	..	..
Bangladesh	10.32	10.15	1.02	9.83	9.13	1.08	10.38	10.28	1.01
Belarus	31.97	28.65	1.12	30.09	29.37	1.02	33.85	28.29	1.20
Belgium	41.86	32.86	1.27	42.53	32.39	1.31	41.28	33.27	1.24
Belize	21.66	..	..	21.66	..	..	..	..	..
Benin	17.06	..	..	16.47	..	..	17.15	..	..
Bhutan	19.92	..	..	20.64	..	..	19.20	..	..
Bolivia	21.14	14.80	1.43	..	..	..	21.14	14.80	1.43
Bosnia and Herz.	38.21	..	..	..	..	..	38.21	..	..
Botswana	41.01	18.39	2.23	41.01	18.39	2.23	..	..	..
Brazil	21.94	16.13	1.36	21.28	16.11	1.32	22.44	16.15	1.39
Bulgaria	34.26	28.82	1.19	34.05	29.16	1.17	34.47	28.48	1.21
Burkina Faso	12.87	11.95	1.08	..	..	..	12.87	11.95	1.08
Burundi	16.94	..	..	16.94	..	..	..	..	..
Cambodia	10.46	..	..	..	..	..	10.46	..	..
Cameroon	12.60	14.14	0.89	12.60	14.14	0.89	..	..	..
Canada	19.75	23.94	0.82	20.56	24.42	0.84	18.94	23.17	0.82
Cape Verde	30.12	..	..	..	..	..	30.12	..	..
Chile	22.99	19.29	1.19	21.68	19.20	1.13	23.32	19.31	1.21
China	8.28	15.27	0.54	6.22	14.94	0.42	10.63	15.64	0.68
Colombia	18.07	15.87	1.14	15.11	15.17	1.00	18.44	15.96	1.16
Congo, Dem. Rep.	5.14	7.92	0.65	4.79	7.89	0.61	7.93	8.09	0.98
Congo, Rep.	29.17	19.81	1.47	26.71	19.93	1.34	34.10	19.58	1.74
Costa Rica	25.01	16.93	1.48	..	..	..	25.01	16.93	1.48
Cote d'Ivoire	17.28	15.53	1.11	..	..	..	17.28	15.53	1.11
Croatia	36.15	28.72	1.26	37.30	29.10	1.28	35.00	28.53	1.23
Cyprus	64.61	30.38	2.13	..	30.38	..	64.61	30.38	2.13
Czech Republic	31.49	30.34	1.04	31.74	31.07	1.02	31.24	29.61	1.06
Denmark	37.28	33.88	1.10	36.80	33.48	1.10	37.70	34.23	1.10
Dominican Republic	16.05	16.52	0.97	..	..	..	16.05	16.52	0.97
Egypt, Arab Rep.	27.91	17.00	1.64	31.59	17.63	1.79	26.08	16.68	1.56
El Salvador	17.05	16.36	1.04	..	..	..	17.05	16.36	1.04
Estonia	32.41	31.79	1.02	33.13	33.15	1.00	31.78	31.01	1.02

Table A8 (cont'd)– Actual Fiscal Revenue, Revenue Capacity (Predicted Revenue) and Revenue Effort by Country

Country	1994-2009			1994-2001			2002-2009		
	Predicted			Predicted			Predicted		
	Revenue/GDP	revenue/GDP	Tax Effort	Revenue/GDP	revenue/GDP	Tax Effort	Revenue/GDP	revenue/GDP	Tax Effort
Ethiopia	12.75	9.63	1.32	13.03	8.99	1.45	12.26	10.75	1.14
Fiji	24.89	..	..	25.20	..	..	24.59	..	..
Finland	39.49	33.09	1.19	40.11	32.77	1.22	38.86	33.41	1.16
France	42.56	30.05	1.42	43.25	29.93	1.44	42.04	30.16	1.39
Georgia	15.98	..	..	11.06	..	..	19.05	..	..
Germany	29.48	32.50	0.91	30.10	32.25	0.93	28.93	32.72	0.88
Ghana	18.17	12.79	1.42	18.11	13.95	1.30	18.18	12.65	1.44
Greece	38.05	28.99	1.31	38.39	30.15	1.27	37.74	27.99	1.35
Guatemala	10.77	14.15	0.76	9.47	14.37	0.66	12.08	13.98	0.86
Guinea	11.59	15.98	0.73	11.59	15.98	0.73	..	..	..
Honduras	21.14	16.15	1.31	..	..	..	21.14	16.15	1.31
Hong Kong (China)	19.11	..	..	..	..	..	19.11	..	..
Hungary	38.29	31.19	1.23	39.46	31.84	1.24	37.27	30.54	1.22
Iceland	32.71	31.55	1.04	32.46	31.64	1.03	32.83	31.49	1.04
India	12.19	10.83	1.13	11.87	10.47	1.13	12.51	11.18	1.12
Indonesia	17.06	14.78	1.15	16.65	14.41	1.16	17.42	15.10	1.15
Ireland	32.90	31.43	1.05	33.93	30.84	1.10	32.00	31.94	1.00
Israel	38.51	..	..	39.84	..	..	38.18	..	..
Italy	37.94	28.98	1.31	39.29	29.76	1.32	36.76	28.30	1.30
Jamaica	30.78	17.21	1.79	..	..	..	30.78	17.21	1.79
Japan	..	21.47	..	..	..	..	..	21.47	..
Jordan	26.12	21.40	1.22	26.21	21.29	1.23	26.03	21.52	1.21
Kazakhstan	13.34	26.67	0.50	11.30	27.73	0.41	14.62	26.15	0.56
Kenya	19.14	13.34	1.43	18.75	13.02	1.44	19.52	13.66	1.43
Korea, Rep.	21.04	19.72	1.07	19.51	20.26	0.96	22.56	19.18	1.18
Kyrgyz Republic	16.88	..	..	15.75	..	..	19.14	..	..
Lao PDR	13.06	..	..	..	..	..	13.06	..	..
Latvia	26.62	29.14	0.91	27.16	29.58	0.92	26.07	28.93	0.90
Lebanon	19.75	17.36	1.14	16.02	17.05	0.94	20.69	17.44	1.19
Lesotho	55.02	..	..	53.11	..	..	57.21	..	..
Lithuania	27.76	29.14	0.95	25.65	29.39	0.87	28.28	29.06	0.97
Luxembourg	38.59	38.11	1.01	39.72	37.70	1.05	38.16	38.26	1.00
Macao SAR, China	24.17	..	..	20.48	..	..	26.94	..	..
Macedonia, FYR	33.95	..	..	..	..	..	33.95	..	..
Madagascar	11.25	15.96	0.71	10.92	16.09	0.68	11.35	15.92	0.71
Malaysia	21.43	19.68	1.09	21.09	20.08	1.05	21.68	19.38	1.12
Maldives	32.53	..	..	27.42	..	..	37.64	..	..
Mali	16.07	12.34	1.30	14.00	12.08	1.16	16.59	12.43	1.33
Malta	38.29	24.44	1.57	..	..	..	38.29	24.44	1.57
Mauritius	23.47	..	..	..	..	..	23.47	..	..

Table A8 (cont'd)– Actual Fiscal Revenue, Revenue Capacity (Predicted Revenue) and Revenue Effort by Country

Country	1994-2009			1994-2001			2002-2009		
	Revenue/GDP	Predicted		Revenue/GDP	Predicted		Revenue/GDP	Predicted	
		revenue/GDP	Tax Effort		revenue/GDP	Tax Effort		revenue/GDP	Tax Effort
Mexico	14.52	16.78	0.87	14.52	16.78	0.87	..	..	..
Moldova	28.63	25.55	1.12	26.06	24.64	1.06	30.87	26.00	1.19
Mongolia	26.79	14.91	1.80	21.38	14.68	1.46	34.00	15.21	2.24
Morocco	31.90	18.53	1.72	..	..	..	31.90	18.53	1.72
Myanmar	6.05	..	..	6.27	..	..	5.47	..	..
Namibia	30.37	17.87	1.70	31.69	18.72	1.69	28.62	16.72	1.71
Nepal	11.07	..	..	10.44	..	..	11.69	..	..
Netherlands	40.40	33.97	1.19	40.79	34.07	1.20	40.06	33.89	1.18
New Zealand	35.55	21.34	1.67	33.83	20.94	1.62	35.84	21.42	1.67
Nicaragua	16.08	15.37	1.05	14.02	15.99	0.88	18.13	14.75	1.23
Niger	12.38	..	..	..	..	..	12.38	..	..
Norway	48.64	32.75	1.49	47.89	32.86	1.46	48.83	32.72	1.49
Oman	26.66	21.04	1.27	26.66	21.04	1.27	..	..	..
Pakistan	14.79	9.54	1.55	15.83	9.45	1.68	13.76	9.63	1.43
Panama	23.67	18.35	1.29	23.67	18.35	1.29	..	..	..
Papua New Guinea	23.62	12.97	1.82	23.76	13.26	1.79	22.47	10.63	2.11
Paraguay	17.30	13.83	1.25	17.07	14.68	1.16	17.53	12.98	1.35
Peru	17.66	16.02	1.10	17.49	16.03	1.09	17.84	16.01	1.11
Philippines	16.14	15.68	1.03	17.14	15.84	1.08	15.14	15.51	0.98
Poland	31.48	27.85	1.13	31.54	28.26	1.12	31.48	27.80	1.13
Portugal	35.27	30.53	1.16	34.15	30.66	1.11	36.26	30.41	1.19
Romania	25.68	26.97	0.95	..	..	..	25.68	26.97	0.95
Russian Federation	30.75	26.69	1.15	..	..	..	30.75	26.69	1.15
Rwanda	..	..	..	..	..	..	..	..	..
Senegal	16.05	15.95	1.01	16.05	15.95	1.01	..	..	..
Seychelles	42.78	..	..	43.12	..	..	42.43	..	..
Sierra Leone	10.80	10.13	1.07	9.89	10.82	0.91	11.70	9.44	1.24
Singapore	23.58	..	..	27.47	..	..	19.68	..	..
Slovak Republic	30.86	30.04	1.03	..	..	..	30.86	30.04	1.03
Slovenia	37.55	30.81	1.22	36.94	31.27	1.18	38.16	30.54	1.25
South Africa	28.69	18.52	1.55	26.89	18.34	1.47	29.13	18.56	1.57
Spain	28.48	29.65	0.96	31.39	29.83	1.05	25.94	29.49	0.88
Sri Lanka	16.90	14.12	1.20	18.16	14.16	1.28	15.47	14.07	1.10
St. Kitts and Nevis	32.74	..	..	30.26	..	..	33.97	..	..
St. Vincent and the Gren.	28.93	..	..	29.71	..	..	26.85	..	..
Sudan	7.58	8.53	0.89	7.58	8.53	0.89	..	..	..
Swaziland	26.79	..	..	26.68	..	..	26.95	..	..
Sweden	38.36	33.22	1.15	40.85	33.34	1.23	35.86	33.12	1.08
Switzerland	20.60	32.79	0.63	22.53	33.23	0.68	18.39	32.29	0.57
Syrian Arab Republic	22.78	16.62	1.37	22.78	16.62	1.37	..	..	..

Table A8 (cont'd)– Actual Fiscal Revenue, Revenue Capacity (Predicted Revenue) and Revenue Effort by Country

Country	1994-2009			1994-2001			2002-2009		
	Revenue/GDP	Predicted revenue/GDP	Tax Effort	Revenue/GDP	Predicted revenue/GDP	Tax Effort	Revenue/GDP	Predicted revenue/GDP	Tax Effort
Tajikistan	11.33	..	..	10.34	..	..	13.31	..	..
Thailand	19.79	17.62	1.12	..	..	..	19.79	17.62	1.12
Togo	16.36	11.37	1.44	..	..	..	16.36	11.37	1.44
Trinidad and Tobago	29.22	18.97	1.54	26.81	18.75	1.43	30.26	19.06	1.59
Tunisia	29.80	19.23	1.55	29.60	19.10	1.55	30.01	19.35	1.55
Turkey	23.80	25.49	0.93	..	..	..	23.80	25.49	0.93
Uganda	11.72	12.99	0.90	10.90	11.94	0.91	12.14	13.52	0.90
Ukraine	31.13	27.13	1.15	25.56	27.11	0.94	33.22	27.14	1.22
United Kingdom	36.35	31.63	1.15	36.07	32.01	1.13	36.59	31.29	1.17
United States	18.13	22.66	0.80	20.12	22.24	0.90	17.88	22.72	0.79
Uruguay	26.34	17.67	1.49	26.46	17.63	1.50	26.22	17.71	1.48
Vanuatu	21.14	..	..	21.14	..	..	..	..	..
Vietnam	22.09	14.10	1.57	21.42	14.00	1.53	23.89	14.35	1.66
Yemen, Rep.	25.05	16.65	1.50	25.05	16.65	1.50	..	..	..
Zambia	18.49	16.07	1.15	19.30	16.19	1.19	17.55	15.92	1.10
Zimbabwe	25.94	17.36	1.49	25.94	17.36	1.49	..	..	..