

ASSESSING OVERALL FISCAL EFFORT IN ECA, 1995-2004

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This paper¹ uses the method of measuring tax capacity and tax effort to analyze how well ECA countries² are utilizing their tax capacities, relative to the average performance across countries. Among the variables that have been identified to be determinants of tax shares are: (i) tax evasion, and (ii) control of corruption, although they are found to be less important than conventional factors. The tax effort indices obtained show that generally the ECA countries are making better use of their tax bases to increase revenue than countries from Latin America or East Asia. However, there are substantial variations in tax effort among ECA countries and several countries have the potential to increase revenues via making better use of their tax bases (increased tax effort), and improving the quality of their institutions. Our results can be used to provide guidance on the proper mix of fiscal policy in the event of budgetary imbalance or growing debt burdens.

Introduction

The assessment of tax performance and the international tax comparisons might be used to see whether a given country could achieve the level of taxation required to attain government targets without seriously “burdening” the economy (Bird, 2006). In this case the levels achieved in other countries may be a sort of a guide to the contribution of tax system to growth. This approach assumes that overly high taxes or badly structured tax system may be associated with higher level of output distortion and hence with lower growth. The need of sustainable fiscal policy brings up another important reason for the considerable attention that has been paid to the measures of tax effort. The tax effort may, for example, be used for judging the potential of taxation for funding public spending increases. High indices would

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¹ The paper is a background note for the World Bank Regional Study ECA Regional Study on Public Finance and Economic Growth (not published yet). The broad goals of the study are (1) to deepen understanding of public finance policies and trends in the Europe and Central Asia (ECA) region, (2) to explore how these policies and trends affect economic growth and poverty reduction in ECA, (3) to benchmark public finance policies and trends in ECA with those of rapidly growing emerging market countries in other regions, and (4) to help ECA countries identify ways to improve the efficiency and enhance the impact on growth of their public finance systems. The study compares fiscal patterns and trends in ECA countries against those in fast-growing economies in other regions. It focuses on 10 ECA countries (Albania, Croatia, Georgia, Kyrgyz Republic, Poland, Romania, Serbia, Slovakia, Turkey, and Ukraine) and 6 comparator countries (Chile, Ireland, Korea, Spain, Thailand and Vietnam). Annex 4 provides the background to the proposed selection of ECA and comparator countries.

² Europe and Central Asia (Albania, Armenia, Azerbaijan, Belarus, Bosnia & Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, FYR Macedonia, Georgia, Hungary, Kazakhstan, Kosovo, Kyrgyz Republic, Latvia, Lithuania, Moldova, Poland, Romania, Russian Federation, Serbia and Montenegro, Slovak Republic, Slovenia, Tajikistan, Turkey, Turkmenistan, Ukraine and Uzbekistan).

indicate that taxation as a funding source is already highly burdened and that either other funding sources should be tapped, or spending increases postponed. Countries have very different philosophies about taxation and very different methods of collecting their revenue. Different tax policy choices affect growth differently and a similar argument applies to the way total government expenditure is used.

Tax policy choices also depend on a country's preference as to such public policy goals as attaining a desired distribution of income and wealth and increasing the rate of economic growth. However, regardless of what a particular country may want to do with its tax system, or what it should do with respect to fiscal objective function, it is always constrained by what it can do. The yield of the tax system is a function of the tax bases available (economic structure), the rates applied to these bases, and the capacity to levy taxes effectively. Given these, the success of the authorities in exploiting the tax potential and in attaining the taxation target will depend on the need and desire for government spending, or willingness to tax.

The determinants of tax performance

During the past decade, some ECA countries have increased taxation quite dramatically, while in the other countries tax rates have remained roughly the same. Similarly, tax structure has changed over time. In fact, tax ratios in ECA range from well under 20 percent in a few countries, most of which are middle income – for example, Georgia, Kyrgyz Republic, and Tajikistan – to roughly 40 percent in a few high-income countries in Europe such as Slovenia and Hungary. Surprisingly, some middle income countries (*i.e.* Belarus, Bulgaria, Macedonia, Turkey, Ukraine, and Uzbekistan) also have high ratios. Similarly, some higher-income countries (*i.e.* Korea, Ireland, the United States), had considerably lower tax ratios than others, with Hong Kong being the extreme case in this respect.

Broadly, tax ratios for countries in the Europe and Central Asia Region (ECA) vary by income levels. Yet, the “income determinism” of the tax level appears to be lower for the rich countries than for the middle income countries (see Figure 1). Some richer countries (in ECA represented by the Baltic countries) have chosen to levy much lower taxes than others. Thus, the high income countries tax ratios seem to reflect more choice than capacity to tax. For various reasons, many countries seem to exempt from taxes a large share of agricultural activities (see Figure 2).³ Additionally, tax evasion, which leads to the loss of tax revenue, is becoming of serious concern to ECA countries governments (see Figure 4). The average size of the untaxed economy in ECA countries was 40.5 per cent of GDP in 2002-03, with Georgia, Azerbaijan, Ukraine and Belarus having by far the largest shadow economies. In addition, many ECA countries are characterized by inefficient

³ For instance, in many developing countries large share of agriculture is normally subsistence, which does not generate sizeable taxable surpluses. On the other hand, in rich countries political reasons dominate. Here the agricultural sector is often taxed in many implicit ways such as; import quotas, tariffs, or controlled prices for output (Bird, 1978; Tanzi, 1992).

Figure 1

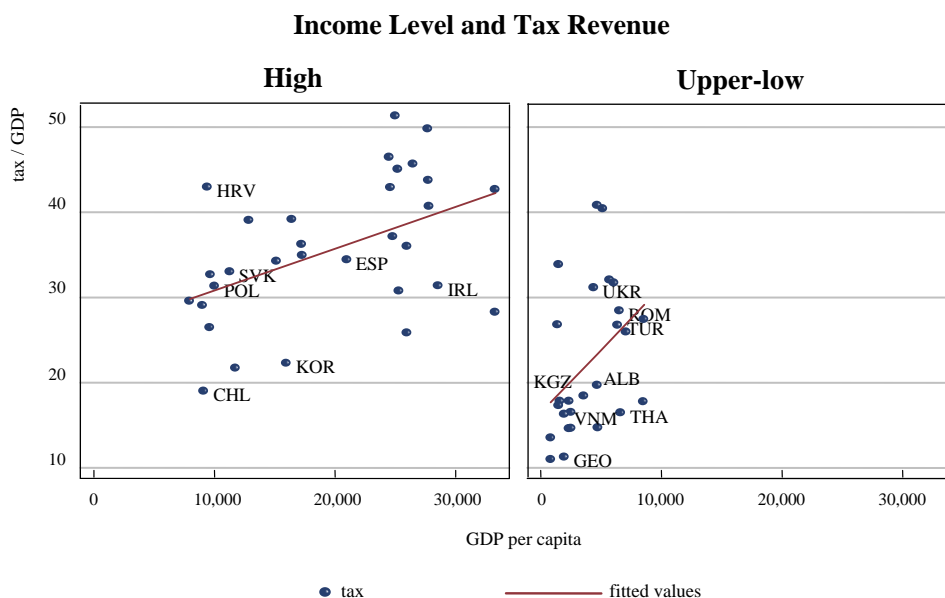
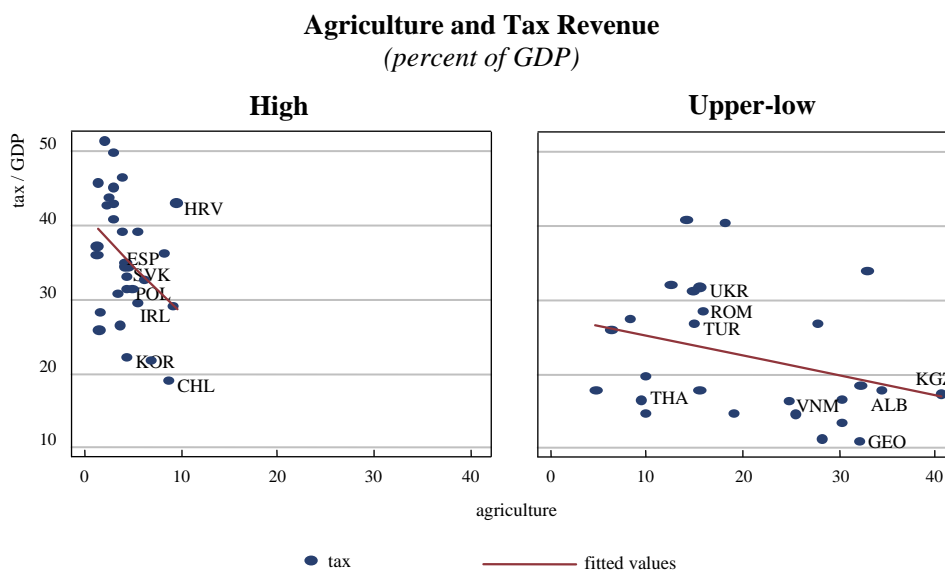


Figure 2



Note: The sample size was mainly determined by the availability of information, set of 57 countries was used (including 26 ECA, 6 Non-ECA comparators). Data were averaged over the 10 year period.
 Source: World bank database, staff calculations.

Figure 3

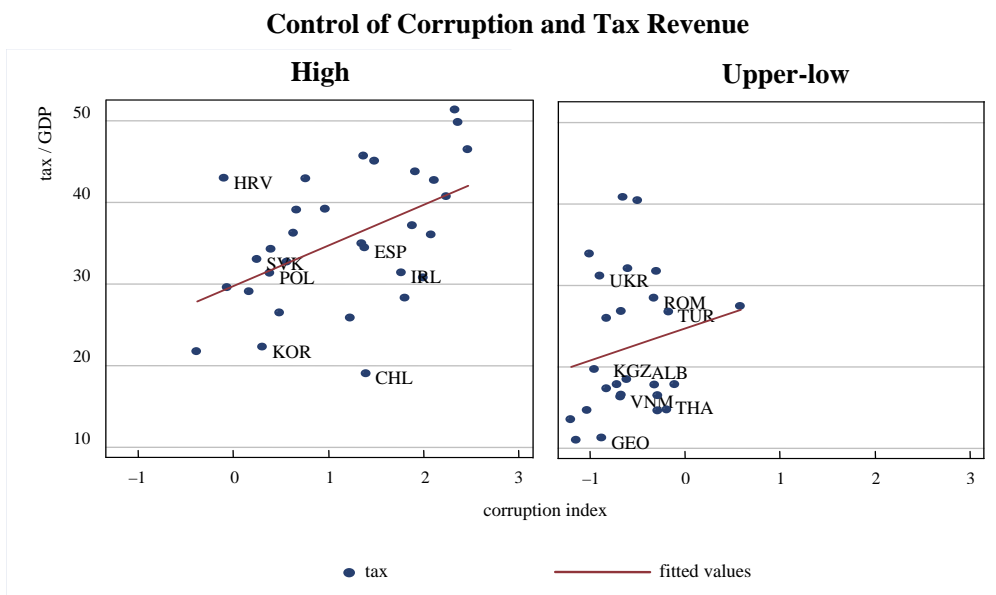
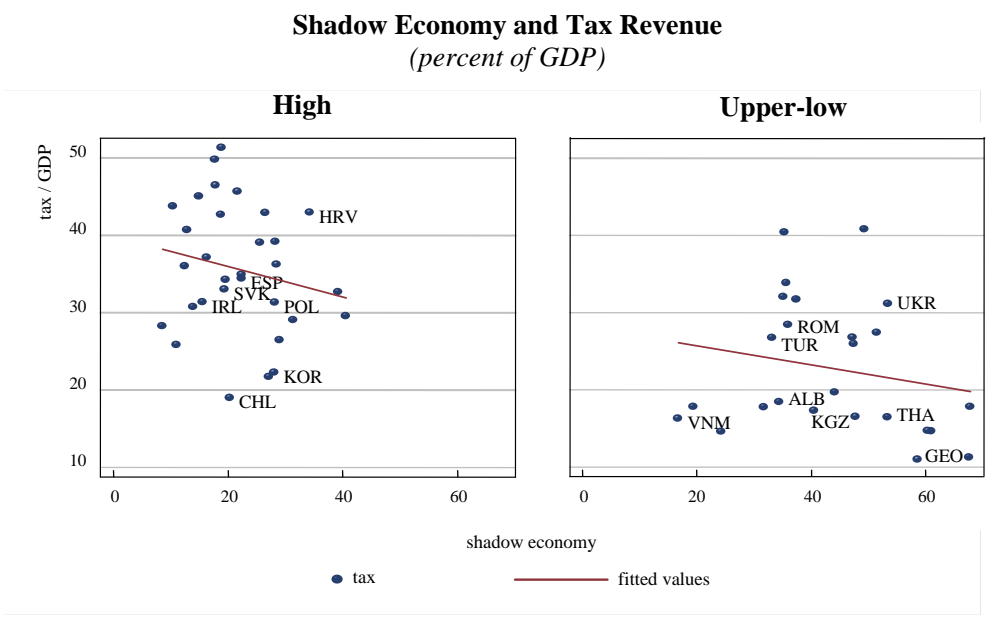


Figure 4



Note: The sample size was mainly determined by the availability of information, set of 57 countries was used (including 26 ECA, 6 Non-ECA comparators). Data were averaged over the 10 year period.
 Source: World bank database, staff calculations.

tax administrations and weak domestic legal and institutional structures, which create opportunities for corruption and impair efforts to raise tax revenues (see Figure 3).

A more formal analysis of the tax performance across ECA countries in the period 1995-2004 confirms that per capita income, the share of agriculture in GDP, and the ratio of trade to GDP, are the most consistent explanatory variables of the tax ratio in the region (see Annex 1).

Regression results prove the greater ease of taxing the profits of industry, than the income from agriculture. Nevertheless, as countries become richer, the importance of manufacturing as a source of tax revenue declines. On top, the agriculture sector is much more difficult to tax for less developed countries. We also find support for Tanzi's hypothesis stating that the larger is the share of agriculture in GDP the lower is the need to spend on governmental activities and services, as many public sector activities are city based. On the contrary to the earlier studies (*i.e.* Teera, 2004) we observe that the trade as a source of revenue is not inversely related to the level of economic development.

In line with common observation we find that the high income countries⁴ have a statistically significant higher tax ratio than other countries in our sample. Generally, our findings are robust to the inclusion of additional variables that have been used to model the tax ratio in the literature (inflation, external debt, rural population), while more sophisticated empirical models tend to yield slightly higher elasticities of the key explanatory variables with respect to the tax share.

In addition, improving the quality of institutions (*i.e.* reducing corruption) and public services' provision, which promote formality and willingness to pay taxes, appears to have a positive, albeit statistically insignificant, impact on tax performance. However, this apparent weak relationship may arise from potential endogeneity of regressors (the level of development, the shadow economy, and the quality of institutions). For example, there is a tendency for quality and quantity of public services' provision to be higher at higher levels of per capita GDP. Further, typically the size of the untaxed economy is in part a function of tax policy (*i.e.* in Belarus the high labor taxes discourage formal employment, and create an incentive for a large informal economy).

Presentation and discussion of the results

ECA countries on average have a "good" tax effort⁵ (index close to 1.0), collecting very similar tax revenue to those that would be predicted, given its

⁴ Above \$10,065 GNI per capita (31 countries in our sample).

⁵ Tax effort is measured by comparing the actual tax ratio of a country with that predicted by using panel regression, equation 2 of Table A.1. An index of one means the country's tax effort is at the expected level, given the structural factors of the country. In other words, the country is using its taxable capacity at level consistent with the average of the other countries in the sample.

economic structure. In terms of tax effort the ECA region looks better than both Latin America and East Asia and Pacific (see Annex 3). However, the aggregate outcome for the whole ECA results from diverse tax performance across countries. Our analysis shows that the high tax effort⁶ indices characterize Uzbekistan, Bosnia and Herzegovina, Belarus and Croatia, followed by Macedonia, Moldova and Turkey. In contrast, in Georgia, Tajikistan, and Armenia tax effort index is below 0.8. At the same time, most of the non-ECA comparator countries are in the lower range of the index, *i.e.* below unity.

Intertemporal comparisons of tax effort indices over the period 1995-2004 present that these countries that had a high/medium tax effort index in 1995 experienced a downward trend in their index (excluding Turkey and Moldova), see Figure 6. There was no clear pattern observed within the group of countries with initially low tax effort. Some of them have substantially increased their tax effort in the recent years (*i.e.* Tajikistan, Georgia, Armenia, and Albania) while others have experienced further declines (*i.e.* non-ECA countries Ireland, Japan, Thailand, Vietnam).

The disaggregated model attributes the decline in tax effort indices more to reduction in the direct than indirect tax effort (*i.e.* Slovakia, Poland, Romania, Ireland, Macedonia), with only Hungary and Vietnam being notable exceptions. The tax performance improvement was more balanced, with Tajikistan, Turkey, Georgia, and Armenia relying mainly on indirect tax effort recovery. Differently, the improved tax effort of Armenia and Kazakhstan appears to result mainly from an increase in direct tax effort.

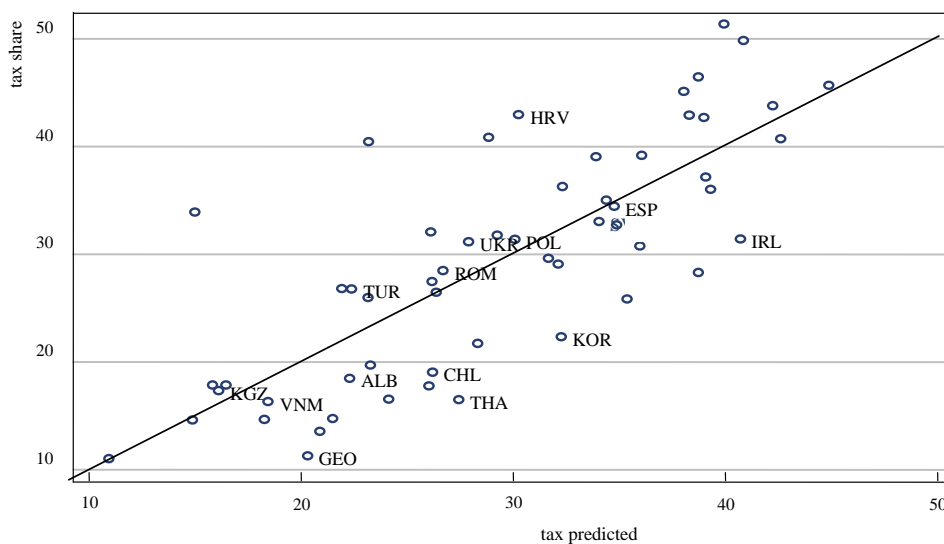
The results for selected 10 ECA countries and 6 comparator countries (reported in Table 1) identify Croatia and Turkey as countries of high tax effort, and Georgia, Thailand, Ireland and Korea as low tax effort countries. For the other countries, most recently their tax effort is not significantly different from one (Spain is a perfect case). Within this group tax effort indices seem to be relatively stable over the 1995-2004, though some countries have either upward (Turkey, Albania) or downward trend (Slovakia, Ireland, Vietnam).

As shown in Figure 7, the tax effort has been on the rise in Turkey due to an increase in indirect tax effort – indicating the tax collection being above the potential – and reached its peak in 2001. Since then, it has trended down slightly, on the back of lower direct tax collection *vis-à-vis* the potential. In contrast, in Albania a rise in tax effort index has trailed better than potential collection of direct taxes. Slovakia, Ireland and Poland have experienced a downward trend in their tax effort index, due to sizeable decline in direct tax effort (with some help from the lower indirect taxation).

⁶ We consider following classification: high index ($\Rightarrow 1.2$), medium index ($1.1 > x > 0.9$) and low index (≤ 0.8).

Figure 5

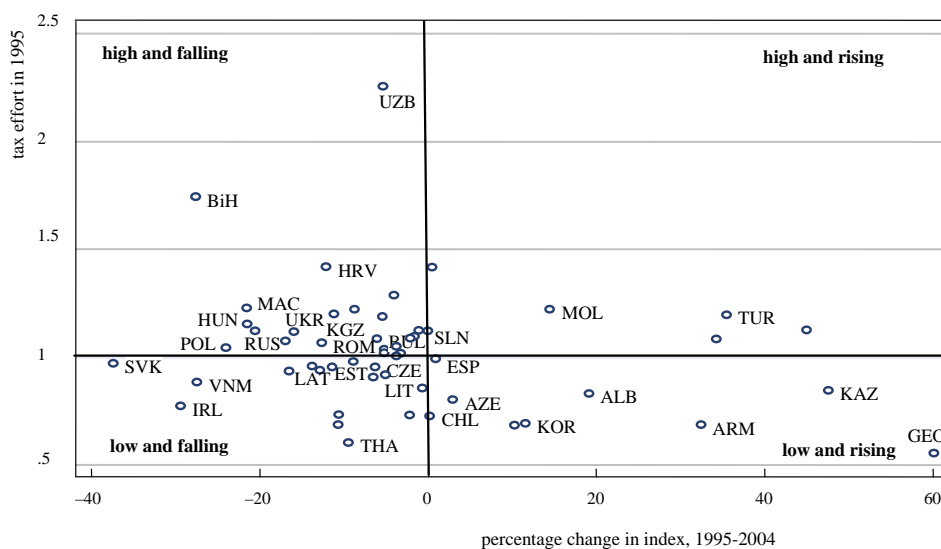
Relationship of Actual Tax Share to Predicted Tax Share, Average 1995-2004



Source: WDI, Staff calculations.

Figure 6

Percentage Change in Tax Effort Index, 1995-2004



Source: Staff calculations.

Table 1

Tax Effort Trends in Selected ECA and Non-ECA Countries

ECA countries	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Albania	0.8	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0	n.a.
Croatia	1.6	1.2	1.6	1.5	1.6	1.2	1.5	1.3	1.3	1.4
Georgia	0.3	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	n.a.
Kyrgyz Republic	1.3	1.2	1.1	1.2	1.0	0.9	0.9	1.1	1.1	n.a.
Poland	1.2	1.2	1.1	1.1	1.0	1.0	0.9	1.0	1.0	0.9
Romania	1.1	1.2	1.0	1.1	1.2	1.1	1.0	0.9	1.0	n.a.
Slovak Republic	1.2	1.2	1.1	1.0	1.0	0.9	0.8	0.9	0.8	0.8
Turkey	0.9	1.0	1.1	1.2	1.2	1.3	1.4	1.2	1.3	1.3
Ukraine	1.2	1.3	1.3	1.2	1.1	1.0	1.0	1.1	1.0	1.0
Non-ECA comparators										
Chile	0.7	0.7	0.7	0.7	0.7	n.a.	n.a.	n.a.	n.a.	n.a.
Ireland	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.6	n.a.	n.a.
Korea	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	n.a.
Spain	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	n.a.
Thailand	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.6	0.6	n.a.
Vietnam	1.1	1.1	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8

Source: Staff calculations.

As for policy implications, care must be taken in the interpretation of the tax effort index. It is dangerous to use such an index to separate the “bad guys” from the “good guys” because understanding of the underlying factors that determine tax effort is complicated. The tax effort index at any given point of time is determined by a complex combination of factors reflecting both abilities (economic, political and institutional) as well as needs (e.g., to smooth output fluctuation, to equalize distribution of income, to service debt). For instance, low tax effort can result from ineffective use of country’s potential tax base; weak institutions (e.g., tax administration) but also from a “preference” for a low level of taxation (which is linked to the demand for government services).

Thus, in addition to studying the conventional factors (tax handles), now we turn our attention to the governance and corruption related problems as potential reasons behind poor governments’ revenue record. We found some evidence that there might be a relationship between tax performance and institutions or informal/shadow economy⁷ (see Figure 9, Annex 1). It seems that in our group of countries weak governance and high corruption influence the tax revenue, possibly through their contribution to tax evasion, improper tax exemptions, and weak tax and customs administration.

⁷ A more formal analysis of the relationship between the institutional variables and tax revenue show that not only do conventional factors matter, but that institutions could also determine tax effort to a some extent, see Annex 1, Table 5).

Figure 7

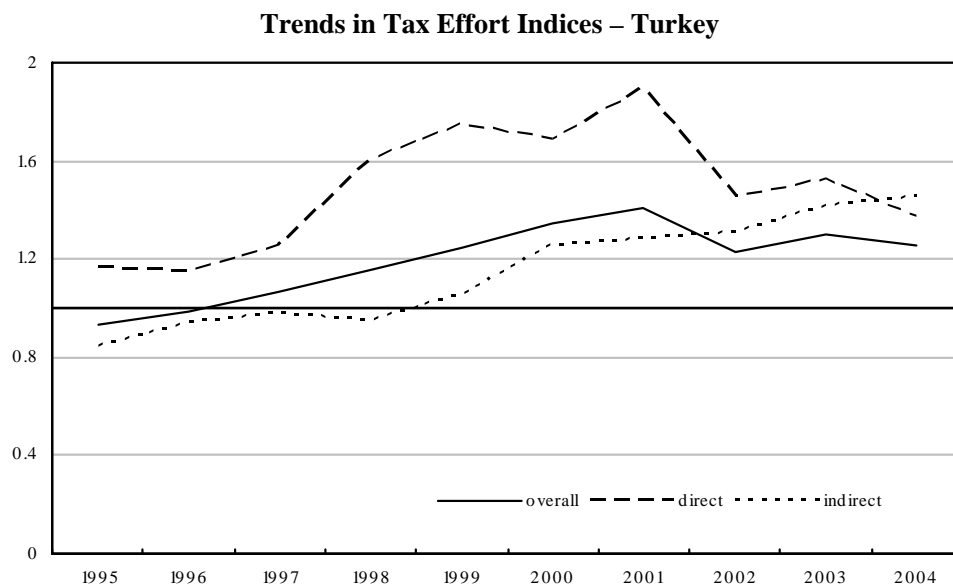


Figure 8



Note: For more countries, see Annex 2.
 Source: Staff calculations.

Figure 9

Tax Effort and Public Sector Governance Indicators – 57 Countries⁽¹⁾

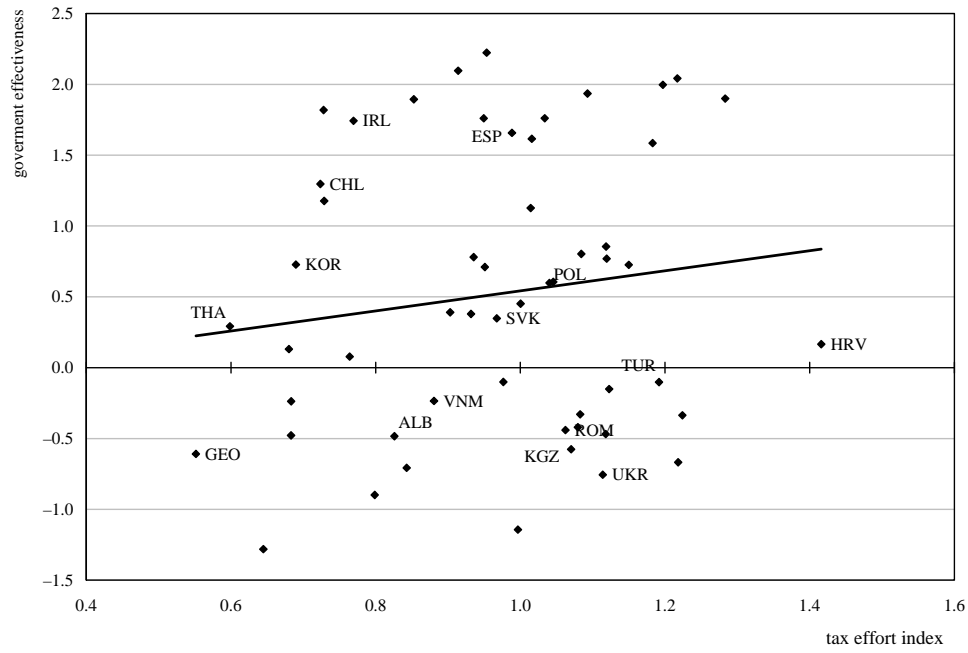
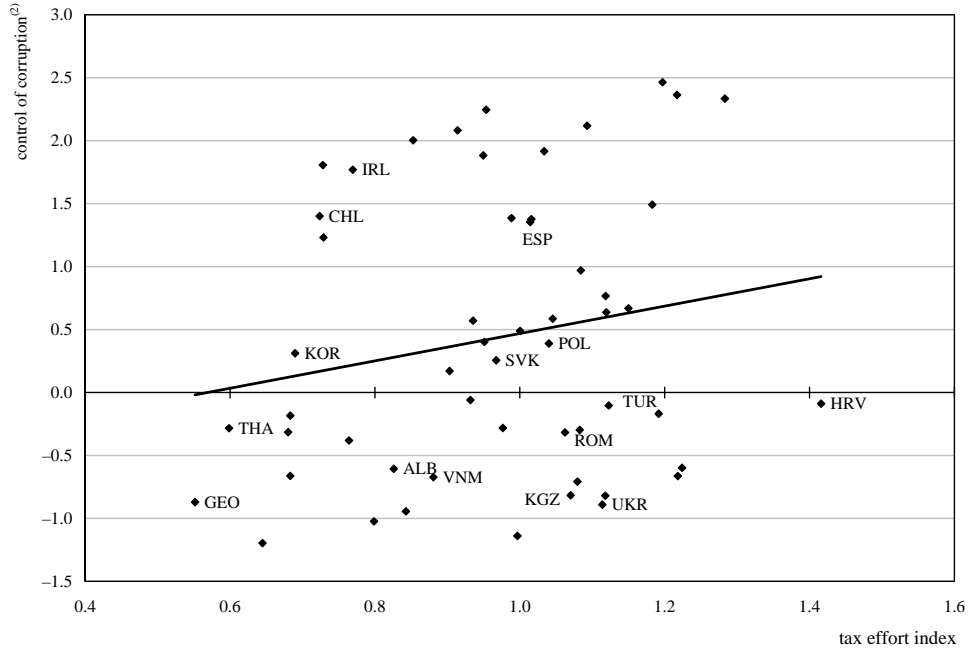
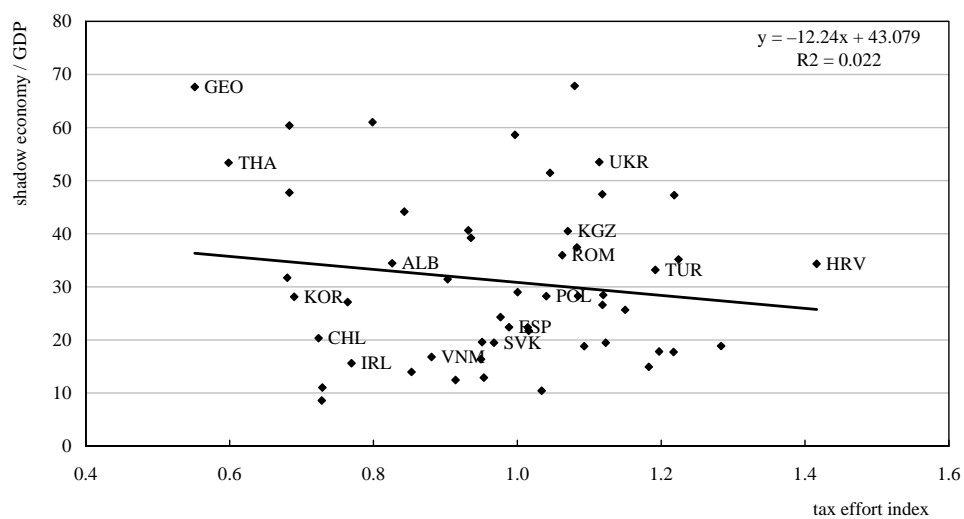
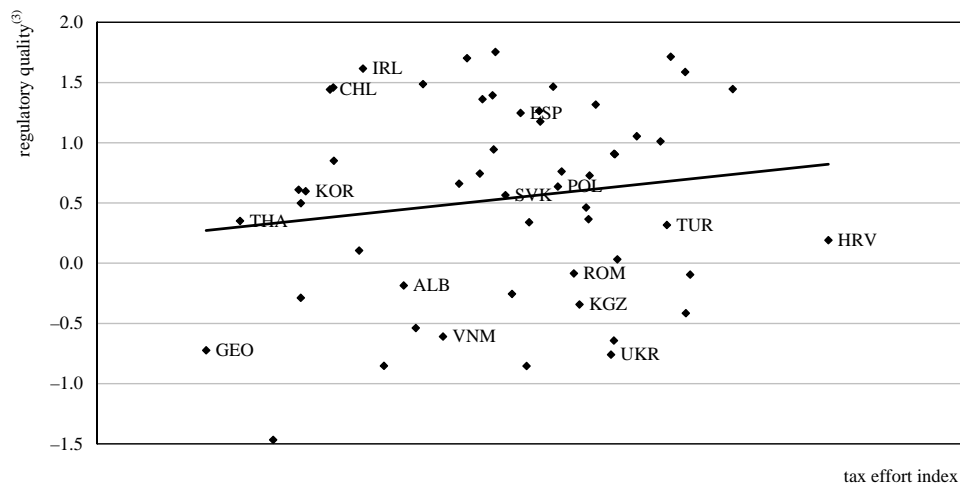


Figure 9 (continued)

Tax Effort and Public Sector Governance Indicators – 57 Countries⁽¹⁾



Based on Kaufmann’s Governance Indicators, Schneider’s estimations of shadow economy.

All data: period average.

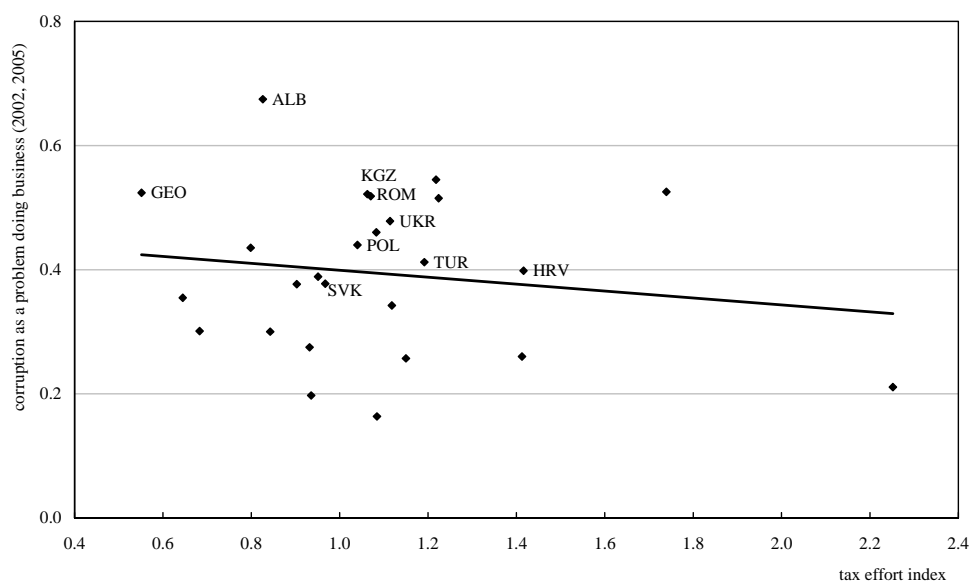
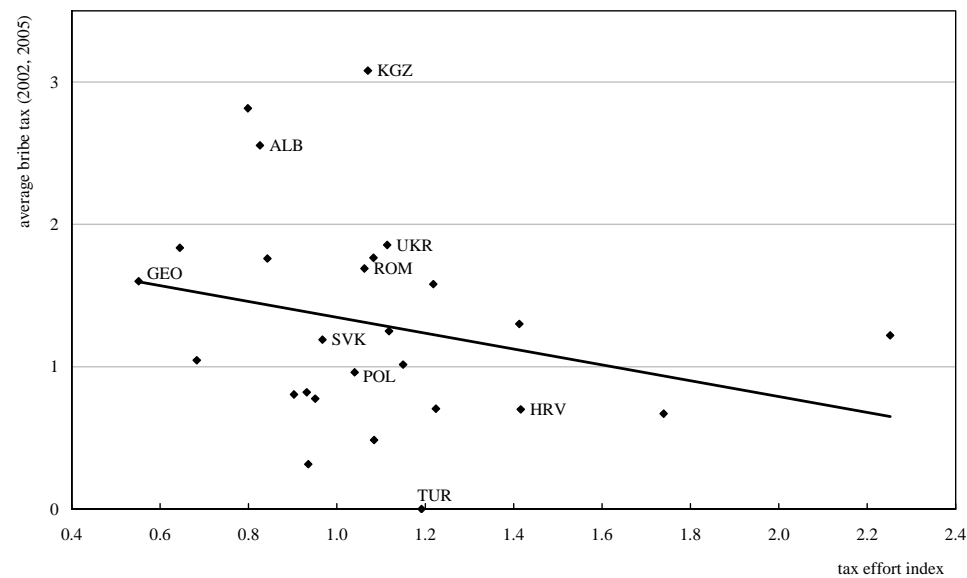
Note: Government effectiveness reflects, the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies.

⁽¹⁾ Excluding 2 outliers: Uzbekistan and Bosnia-Herzegovina.

⁽²⁾ “Control of corruption” contains the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests.

⁽³⁾ “Regulatory quality” embraces the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

Figure 10

Tax Effort and Public Sector Governance Indicators – ECA Countries⁽¹⁾

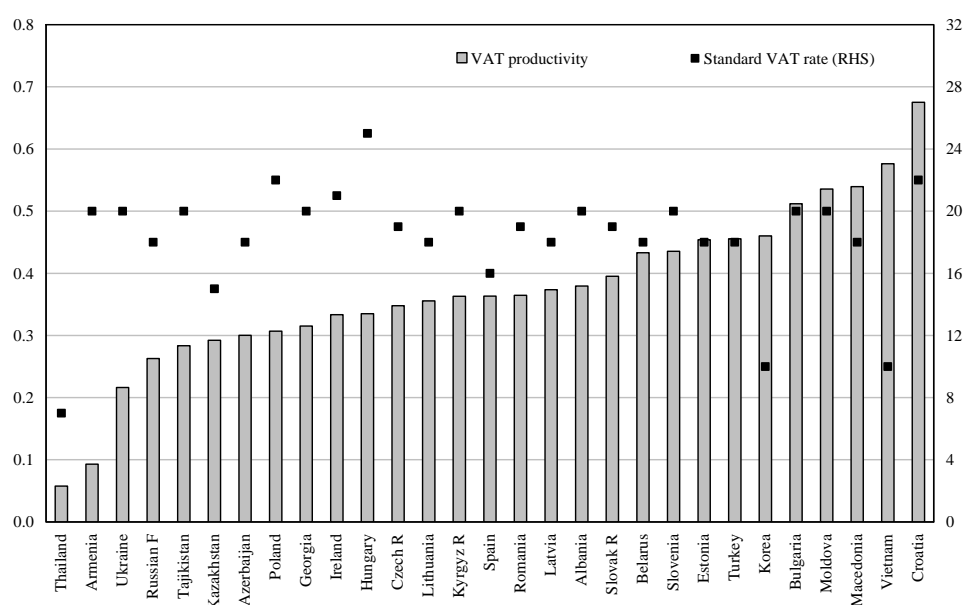
Based on the Business Environment and Enterprise Performance Survey (BEEPS).

All data: period average.

⁽¹⁾ excluding 2 outliers: Uzbekistan and Bosnia-Herzegovina.

Figure 11

VAT Revenue Productivity, 2004



Note: VAT/CIT productivity is defined as VAT/CIT revenue as a share of GDP divided by the standard top rate.

Source: Various, staff calculations.

The basic bivariate results⁸ confirm some priors and offer useful insight in setting up a stage for further analytical work. The selected figures in the following pages are informative. The government effectiveness and regulatory quality are seen to be an increasing function of tax effort, which likely reflect the fact that countries with more legitimate, efficient and credible governments tend to have on average higher capacity to ensure tax compliance, and thus exert higher tax effort. Similarly, different measures of corruptions (e.g. a bribe tax, a corruption as a problem of doing business and a control of corruption) seem to support the view that corruption lowers the tax collection. In other words, in a corrupt regime there are a variety of situations in which the government may suffer net revenue loss as an unanticipated outcome of intensified tax effort. A less clear-cut, but still intuitive, negative relationship is seen between shadow economy and tax effort index. It seems that

⁸ Results of the bivariate regressions should be interpreted with cautious given a number of problems that are commonly encountered in this type of relationships (e.g. omitted variables bias, outliers).

Table 2

Tax Effort vs Tax Productivity, Average Values, 1995-2004

	High Tax Effort Good Administration	High Tax Effort Bad Administration	Low Tax Effort Good Administration	Low Tax Effort Bad Administration
VAT	Croatia, Macedonia, Moldova, Turkey, Bulgaria, Bielarus	Russia, Kazahstan	Vietnam, Korea, Estonia, Slovakia, Ireland	Tajikistan, Armenia, Thailand
CIT	Belarus, Bulgaria, Croatia, Moldova	Macedonia, Kyrgyz R.	Ireland, Vietnam, Korea, Slovakia, Lithuania	Tajikistan
PIT	Turkey, Croatia, Macedonia	Hungary, Slovenia	Thailand, Korea, Azerbaijan	Armenia, Georgia, Vietnam, Tajikistan

Source: staff calculations.

countries with a large shadow economy (which is a proxy for low tax morale⁹ and high tax evasion) collect smaller tax revenue to this that could be predicted given their economic structure.

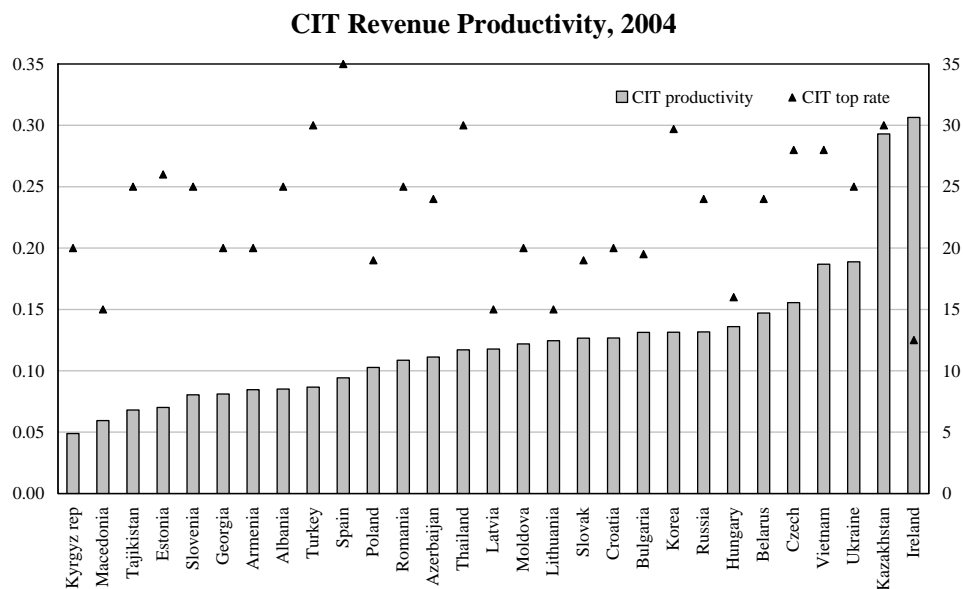
Another approach to look at institutional quality is to examine effectiveness of tax administration. Historically, many approaches for measuring effectiveness of tax administration have been used (Gallagher 2004). That is why we decided to use “revenue productivity”,¹⁰ measure which is the most common and easiest to calculate.

While measuring the effectiveness of tax administration, by comparing statutory tax rates with effective tax yields (*i.e.* using “productivity” indices, see Figure 11, Figure 12, Annex 2) we find either “low tax effort” countries with relatively effective tax administration (the Baltic countries, Ireland, Korea, Slovakia, Vietnam) or weak tax administration (Armenia, Georgia, Tajikistan), see Table 2. For the latter countries, low tax effort may become a serious obstacle in their attempts to embrace effective fiscal policy. These countries have the potential to increase tax revenues through making better use of their tax bases (increased tax effort) and strengthening tax administration (by strengthening institutional arrangements, technical capacities, etc.). They may want to consider widening the tax base by subjecting previously exempt income to taxation, reducing credits and allowances and, where possible, implementing lower marginal tax rates (to discourage tax avoidance and evasion).

⁹ The tax morale is usually to be correlated with low tax morale (see, for example, Alm and Torgler, 2004) partly through lower moral cost of tax evasion and otherwise weaker motivation to pay taxes.

¹⁰ VAT/CIT productivity rate is merely the ratio of VAT/CIT collections to GDP divided by the nominal VAT rate. PIT productivity measure is calculated by dividing the personal income tax revenue as percent of GDP by the top marginal tax rate, and multiplied by the top income tax bracket value. Measuring PIT productivity is fraught with difficulties stemming from different treatment of capital gains, corporate dividend income, and the levels and types of tax deductions and credits that are available from country to country. Thus we treat it with cautious.

Figure 12

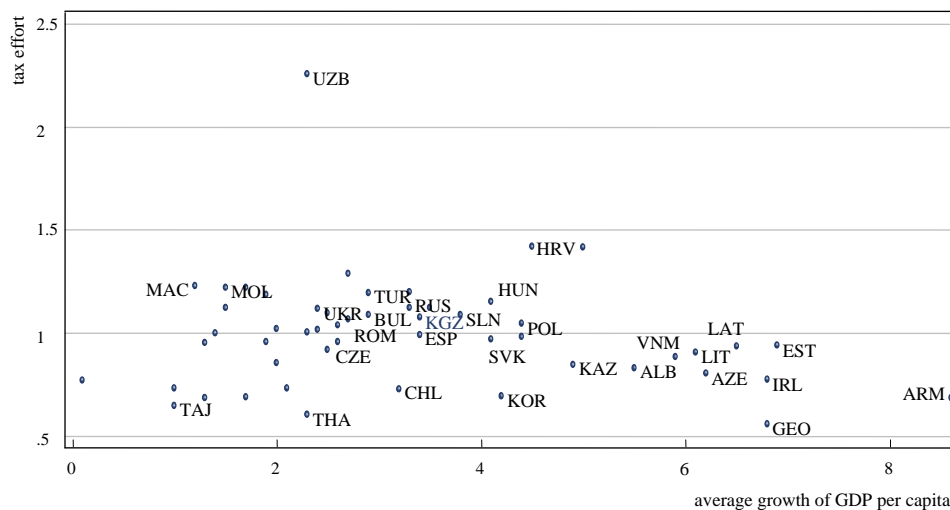


Note: VAT/CIT productivity is defined as VAT/CIT revenue as a share of GDP divided by the standard top rate.

Source: Various, staff calculations.

Figure 13

Tax Effort Index vs GDP Per Capita Growth, Average Values, 1995-2004



Source: Staff calculations.

Relatively low tax effort in the countries with good tax administration may result from their lower demand for publicly provided goods and services, which could explain why they choose to expand less “tax effort” (as measured by the model) on their potential tax bases, relative to the others.

On the other hand, Bulgaria, Belarus, Croatia, Turkey and Moldova, represent countries with relatively high tax effort and effective tax administration. Given the fact that some of them still have fairly large untaxed sector, our results seem to suggest over-taxation. Thus, these countries may need to consider lowering the taxes, to enhance their growth rates.¹¹ None of them had an average growth rate higher than 5 per cent in the last decade (see Figure 13). For Russia, Kazakhstan, Kyrgyz Republic, Hungary and Slovenia addressing institutional weaknesses in tax and customs administration may be a viable option to enhance the economy’s tax-generating capacity, which may allow for tax/deficit reduction. In these countries, there is also a scope for encouraging tax compliance. In case of Hungary, Macedonia, Slovenia it can be done by reduction in the rates and progressivity of the individual and corporate income tax, which should promote formalization of the grey economy, as well as act on the perception that tax rates are “fair”.

The measures of tax effort do have implications for country’s economic policy not only in the event of low growth but also may indicate appropriate policy for dealing with a fiscal imbalance. If a country is facing a budget deficit imbalance, and already making the maximum use of its taxable capacity, this would suggest that regaining budget balance (and/or reducing a debt level) would require expenditure rationing rather than tax increases. This is true for several ECA countries, mainly for Turkey, Kyrgyz Republic, Hungary, Croatia, but also for Albania and Poland (see Figure 14, Figure 15). One might conclude that a country with a high tax effort index has little potential for financing additional government spending through taxation as opposed to countries with low tax effort indices.

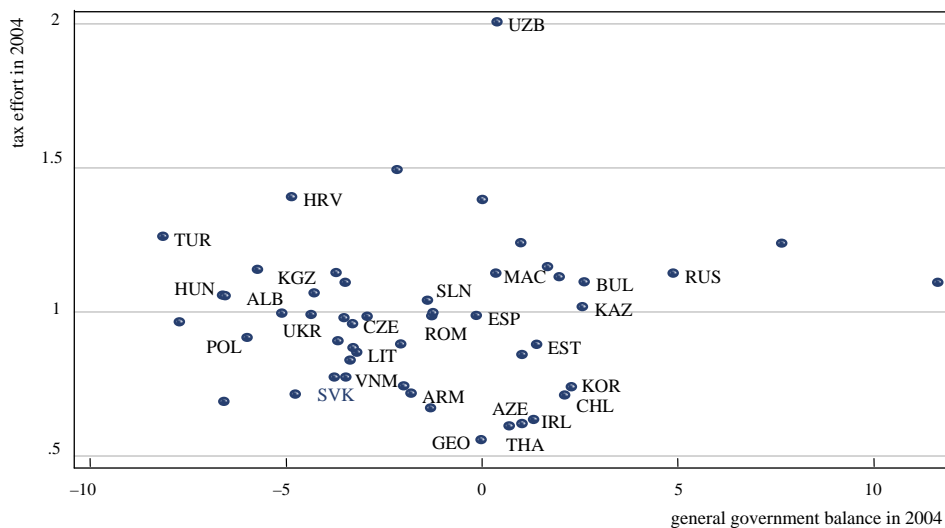
The non-ECA comparator group reveals a favorable picture in terms of budget position, despite fairly low tax effort. Here again, the low tax effort indices appear to be more a matter of choice than any particular difficulty in rising tax revenue (predominantly, they are characterized by strong institutional structures, and low shadow economy).

As for policy implications, it is important to emphasize that neither a low index of tax effort necessarily indicates that the country should raise taxes nor does a high index indicate that taxes should be lowered. Our findings indicate that such a decision should emerge from a careful consideration of expenditure needs, alternative sources of finance, the effects of the particular taxes that would be changed, and administrative capability.

¹¹ The international empirical evidence on the links between taxes and growth is inconclusive, although some findings seem relatively robust. Many studies found a significant negative relation between aggregate tax-to-GDP ratio and growth although the size of the effect differs considerably (Engen and Skinner, 1996; Cashin, 1995; Fölster and Henrekson, 2001, World Bank, 2006).

Figure 14

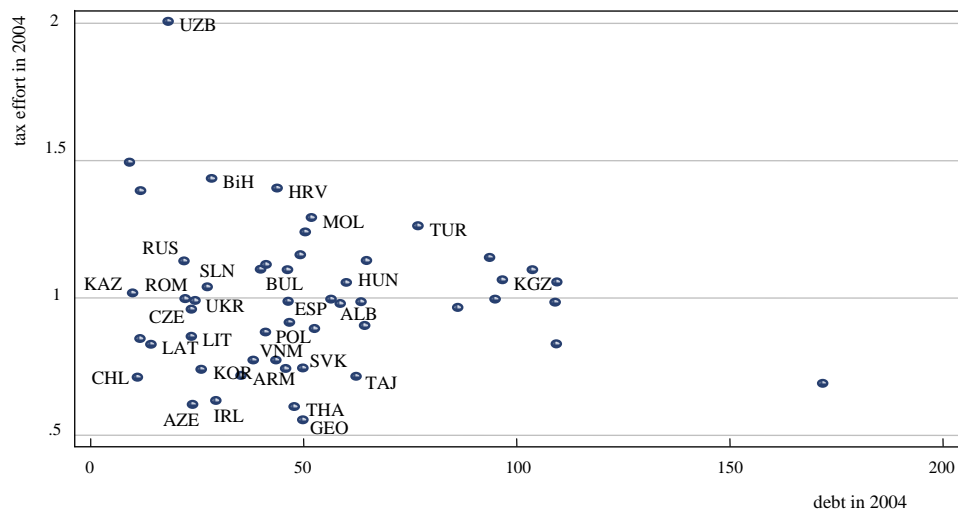
Tax Effort Index in 2004 vs General Government Balance
(percent of GDP)



Source: IMF WEO, staff calculations.

Figure 15

Tax Effort Index in 2004 vs Debt
(percent of GDP)



Source: IMF WEO, staff calculations.

Tentative conclusions

An important finding is that, broadly, the ECA countries now make use of their tax bases that is not out of line with international norms, although for some individual countries the tax effort (at least of that covered by the formal transactions) has stayed small by international standards, while in a few others, it remains excessive.

Looking ahead, therefore, the main fiscal challenge on the revenue side is to improve the efficiency of tax system and make it more growth oriented. Broadening the tax base (by subjecting previously exempt income to taxation and reducing exemptions and allowances) as well as strengthening tax administration, which could allow some further reduction of rates in limited cases, should address this challenge. For countries with relatively effective tax administration and high tax effort lowering the tax rates or changing their structure could be a viable option.

Building technical capacity and institutions to further improve the economic aspects of governance is a must. Stronger institutions can allow countries to sustain relatively lower tax effort index and higher growth rate. While further work may be necessary to determine the exact channels of influence of institutions on tax collection and shadow economic activity – this study helps to provide evidence of the above links and highlight the need for a more ambitious research agenda.

TAX EFFORT: THE ROLE OF INSTITUTIONS

ANNEX 1 – REGRESSION ANALYSIS

Estimation methodology

There has been only limited effort to develop comprehensive tools for assessing tax performance across countries so far. Typically, there are two main approaches used to measure a country's tax effort. In its simplest form comparisons can be based on differences between the effective tax rates and the standard tax yield following the methodology developed in Tanzi (1981), Schaffer and Turley (2000). An alternative is to calculate a tax effort index as a ratio of actual tax share to the predicted (or potential) tax share (regression approach). The predicted tax ratio is determined from regression relating tax shares to various explanatory variables that serves as proxies for tax bases or other factors that might affect country's ability to tax.

Following recent tax effort literature (e.g., Stotsky and WoldeMariam, 1997, Piancastelli, 2001, Eltony and Nagy, 2002, Bird, Martinez-Vazquez and Torgler, 2004, and Hudson and Teere, 2004), we use a stochastic model for estimating tax revenue, where T/Y is the tax ratio and X_i ($i = 1 \dots n$) represent various independent variables expected to influence the tax ratio, while U is the error term:

$$T/Y = f(X_1 \dots X_n, U)$$

The independent variables employed in the basic model, trailing those used in the most recent literature, are: gross national product per capita, the ratio of trade to GDP (import plus export values over GDP), the share of the mining sector and the agricultural sector in GDP, and population growth (an overview of the variables applied in previous empirical studies is provided in Table 3). The other variables, including external debt; CPI, rural populations etc. are variables which are expected to check robustness of the base results. The role of the time trend is to capture any global trend in taxation.

The analysis uses panel data for 57 developed and developing countries, including 26 ECA and 6 non-ECA comparator countries over the period 1995-2004. The choice of sample is motivated by the need to obtain data set composed of countries with similar characteristics to ECA and comparator countries, as well as data availability. Data were obtained from World Development Indicators, IMF Regional Fiscal Data Set, IMF Country Profile Chapter IV, Schneider and Klinglmair 2003 and the Government Finance Statistics from MOFs in respective countries. A set of 57 countries was taken into account and divided into three groups: 10 in the lower middle income group,¹² 16 in the upper middle income group and 31 in the higher income group,¹³ as defined by the World Development Indicators 2004.

¹² \$825-\$3,255 GNI per capita.

¹³ Above \$10,065 GNI per capita (31 countries in our sample).

Table 3

Summary of Selected Previous Studies of Tax Effort

Variable	Piancastelli (2001)	Torgler (2004)	WoldeMariam (1997)	Grigorian (2005)	Teera (2004)	Eltony (2002)
1. Economic development						
GDP per capita	+	+/-	+	+	+/-	+
Population density					+	
Population growth		-				
Urban population				+		
2. Economic structure						
Agriculture, Value added (percent of GDP)	-	+	-	-	-	-
Manufacturing, Value added (percent of GDP)	+		+		+/-	
Mining, Value added (percent of GDP)			-			-
Services, Value added (percent of GDP)	+					
3. Openness						
Import (percent of GDP)			+/-			+
Export (percent of GDP)			+			-
Trade (Export + Import) (percent of GDP)	+	-		-	+	
4. Control variables						
External Debt (percent of GDP)					-	
Consumer Price Index				-		
Inequality		-				
Aid (percent of GDP)					+	
Share of Fuel in total export				+		
5. Institutions						
Shadow economy (percent of GDP)		-		-	+/-	
Index governance		+				
Regulation to entry		-				
Composite institutional quality				+		
Tax morale		+/-				
Method of estimation	Fix effect model	OLS	Fix and Random models	Fix effect model	Fixed effects model, Heteroskedasticity-consistent standard errors	Fix effect model

Source: Author's collections.

Empirical results

Table 4

Panel Regression Outcome (Prais-Winsten Estimation), 1995-2004

	EQ1	EQ2 Base	EQ3 Sensitivity	EQ4 Sensitivity	EQ5 Sensitivity	EQ6	EQ7
GDP per capita	.001* (.000)	.001* (.000)	.001* (.000)	.001* (.000)	.000* (.000)	.001* (.000)	.001* (.000)
Trade	.059* (.007)	.056* (.006)	.056* (.007)	.051* (.007)	.046* (.010)	.056* (.009)	.025** (.013)
Agriculture	-.137* (.048)	-.113* (.046)	-.112* (.051)	-.149* (.062)	-.185* (.049)	-.104* (.039)	-.224* (.033)
Manufacturing	.098 (.064)					.161* (.082)	.222* (.091)
Population growth	-1.881* (.320)	-1.767* (.309)	-1.729* (.329)	-1.720* (.342)	-1.356* (.373)	-1.643* (.318)	-1.781* (.306)
Dummy lower middle income	-3.368* (1.232)	-3.135* (1.028)	-1.324* (1.119)	-.719* (1.119)		-3.249* (1.161)	0.734 (0.100)
Dummy high income	.438 (.432)	1.028* (.410)	1.618* (.248)	1.691* (.375)		1.467* (.539)	1.598* (.518)
Oil dummy	-5.437* (1.285)	-4.742* (.927)	-5.356* (.966)	-5.147* (.966)	-6.863* (.928)	-5.410* (1.320)	-3.817* (1.312)
Trend	-.151 (.099)						
Population rural			-.008* (.001)	-.008* (.001)	-.010* (.001)		
CPI				-.039* (.015)	-.031* (.019)		
External Debt					-.046* (.012)		
GDP per capita Manufacturing						-.00002* (2.391)	-.000* (1.750)
GDP per capita Agriculture							.000* (5.690)
GDP per capita Trade							2.740* (4.150)
Const.	324.56 (198.52)	20.96* (.867)	22.26* (.867)	25.72* (1.754)	29.59* (2.271)	17.38* (1.386)	16.51* (1.337)
No. of observ.	485	509	426	426	282	485	485
R-square	0.59	0.59	0.59	0.60	0.44	0.60	0.63

* significant at 5 per cent level, ** significant at 10 per cent level.

Standard errors reported in brackets.

Note: external debt variable only available for developing countries.

The panel data model uses both time series and cross section data. The model was firstly estimated with both “fixed effects” (using the least squares dummy variable (LSDV) approach) and “random effects” (applying generalized least squares (GLS) approach). The Hausman test consistently rejects the random effects model in favor of the fixed effects model.

However, in the next step the normal distribution of the error term was rejected and diagnostic tests revealed problems of cross-sectional correlation. To deal with the problem of cross-sectional correlation, the Prais-Winsten estimators¹⁴ were employed.

The model performs generally well with estimated coefficients for the explanatory variables in line with the previous findings in the literature (see Table 4). Higher GDP per capita is associated in our results with higher tax ratio. The structure of the economy seems to matter. The tax ratio is negatively related to the share of agriculture in GDP and positively related to the share of manufacturing sector in GDP, but the latter variable proved to be statistically insignificant (equation 1). This reflects, no doubt, the greater ease of taxing the profits of industry than the income from agriculture. The insignificance of manufacturing is somewhat surprising, although it may potentially be explained by a negative correlation with agricultural share or the impact of variables such as manufacturing share is not the same for all countries at all stages of development. Thus we repeat our regression with interactive terms between manufacturing and GDP per capita (equation 6) included. Accordingly, manufacturing has become significant. Moreover, the significantly negative coefficient on the manufacturing-GDP per capita interactive term may mean that as countries become richer so the importance of manufacturing as a source of tax revenue declines. Moreover, the agriculture sector is much more difficult to tax in less developed countries (the significantly positive coefficient on the agriculture-GDP per capita interactive term). A faster rate of population growth leads to a lower tax ratio, while openness is associated with a higher tax effort. Inclusion of dummy variables controls for differences in stage of development in our sample and reveals that the lower middle income countries have statistically significant lower tax ratio than other countries in the sample. On the contrary, we observe that high income countries have a statistically significant higher tax ratio than other countries in our sample.

Moreover, in order to paint a more realistic picture of the country’s taxable capacity *vis-à-vis* its natural resource base we included dummy variable¹⁵ for important oil producers countries. The easiness of taxing natural resource extraction is likely to generate more tax revenue than non-fuel activities. The coefficient for oil dummy has the predicted negative signs and is statistically significant in all

¹⁴ The method is an alternative to feasible generalized last squares for fitting the linear cross-sectional time – series models when disturbances are not assumed to be independent and identically distributed, and it is preferable to the feasible GLS when the number of observations and time span are limited.

¹⁵ OIL dummy takes value of 1 if the share of fuel (and related products) in total merchandize exports exceeds 40 per cent is negative and insignificant.

equations. Finally, the trend variable is generally negative, indicating that *ceteris paribus* tax ratios are falling, but not statistically (equation 1).

A similar exercise was carried out with respect to the indirect and direct taxes collection across countries.

Robustness test

Including the rural population, inflation and external debt leaves the results unchanged (in terms of the signs and significance). Populations in rural areas and inflation have an expected negative impact on tax ratio. The base variables remain robust, even after inclusion three interactive terms between manufacturing and GDP per capita and also agriculture and the openness variable and GDP per capita (equation 7). For the debt variable, the negative coefficient was also anticipated as according to Tanzi (1989) a high debt burden can create macroeconomic imbalances that may tend to reduce the tax level. That is, servicing of the foreign debt requires a trade account surplus, which in turn may require a reduction in imports.

Modified model: the role of institutional variables

We now turn to the cross section estimates which allowed us to include the institutional (demand) variables such governance indicators (*i.e.* government effectiveness, regulatory quality, corruption) and control for the size of shadow economy.¹⁶ They were not included into panel estimation regression as they do not reveal much variation over time. The explanatory variables follow those employed in the panel model (the basic regression corresponds to the equation 2 from the first table) as regression passed test of the omission variable (suggesting that the functional form is correct) and the test for homoskedasticity.

The empirical results, presented in Table 5 strongly suggest strongly that the conventional factors play a significant role in the determination of the tax ratio, while the institutions perform less well. Although in some cases (*i.e.* shadow economy, corruption index) coefficients took the right sign, often they were insignificant. The lack of significance of the institution variables may be caused by potential causality between the level of development, the shadow economy, and the governance variables. For example, more affluent countries have usually better quality institutions, and smaller shadow economy (the significantly positive coefficient on the shadow economy-GDP per capita interactive term seems to confirm that observation, EQ4). Moreover, causality may run from taxes to informal sector (high taxes tend to encourage informality). Although, we experimented with

¹⁶ The shadow variable reflects tax evasion.

Table 5

**Cross-section Results, Mean Values for Years 1995-2004 for 57 Countries
(in Which 26 ECA + 6 Comparators)**

	EQ1 Base	EQ2	EQ3	EQ4	EQ5	EQ6	EQ4
GDP per capita	.001* (.000)	.001* (.000)	.001* (.000)	.001** (.000)	.001* (.000)	.001 (.000)	.000 (.000)
Trade	.072* (.032)	.080* (.032)	.086* (.034)	.078* (.034)	.068* (.033)	.068* (.033)	.079* (.035)
Agriculture	-.118 (.014)	-.226** (.016)	-.169 (.143)	.016 (.163)	-.182 (.152)	-.168 (.143)	-.016 (.178)
Population growth	-2.281* (1.163)	-1.966* (1.152)	-2.188* (1.172)	-1.863* (1.176)	-2.311* (1.227)	-2.440* (1.167)	-1.869* (1.167)
Shadow economy			-.069 (.095)	-.169** (.103)			-0.126 (.113)
Shadow economy_1					-.019 (0.226)		
Corruption						2.740 (2.337)	1.706 (2.401)
GDP per capita*		.001* (.000)					.000 (.000)
Agriculture*							
GDP per capita*				.001* (.000)			.001* (.000)
Shadow							
Const.	20.39 (3.975)	16.21* (4.525)	22.63* (6.560)	19.62* (1.386)	21.23* (10.66)	22.85* (1.386)	20.24* (6.572)
No. of observ.	57	57	56	56	57	57	56
R-square	0.54	0.56	0.54	0.67	0.54	0.58	0.56

* significant at 5 per cent level, ** significant at 10 per cent level.
Standard errors reported in brackets.

instrumental variable approach¹⁷ it did not improved our estimates (EQ 5).

This suggests that considerable caution should be exercised in calculating effects of institution variables on tax performance; further work should seek to identify those magnitudes more reliably.

¹⁷ Following Davoodi (2006) we assumed that the shadow economy is driven mainly by tax burden; quality of institutions and GDP per capita.

**ANNEX 2
ADDITIONAL FIGURES**

Figure 16

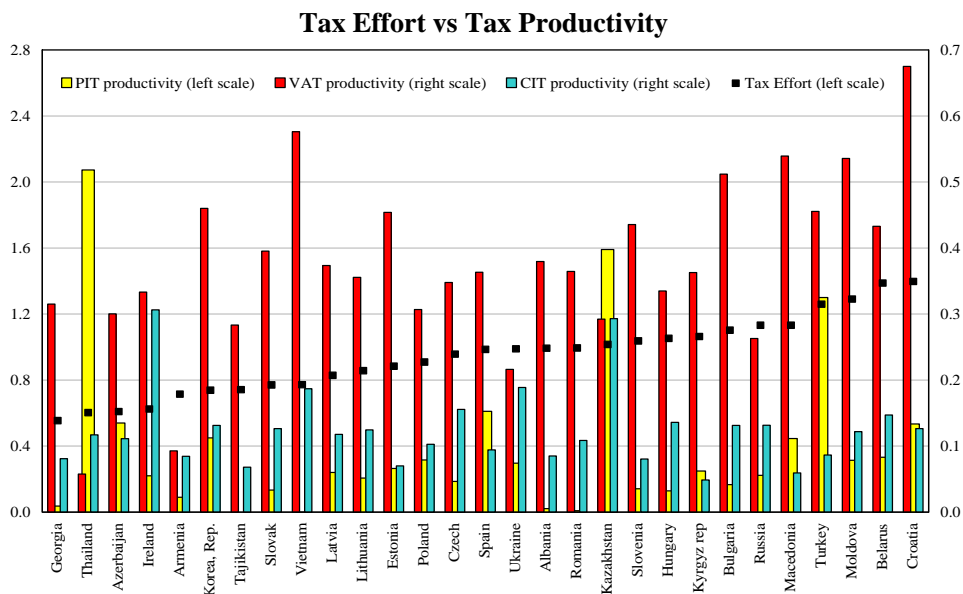


Figure 17

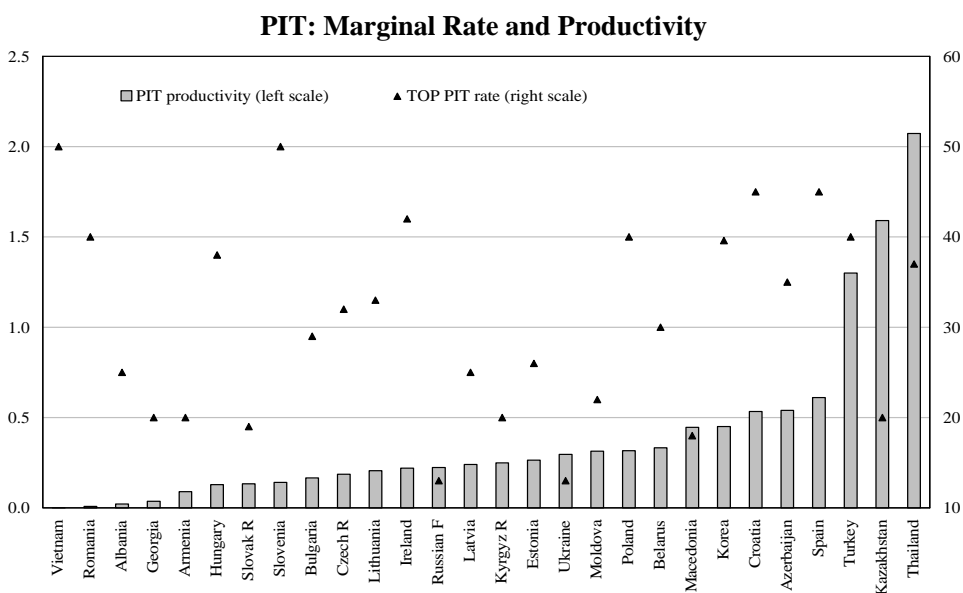
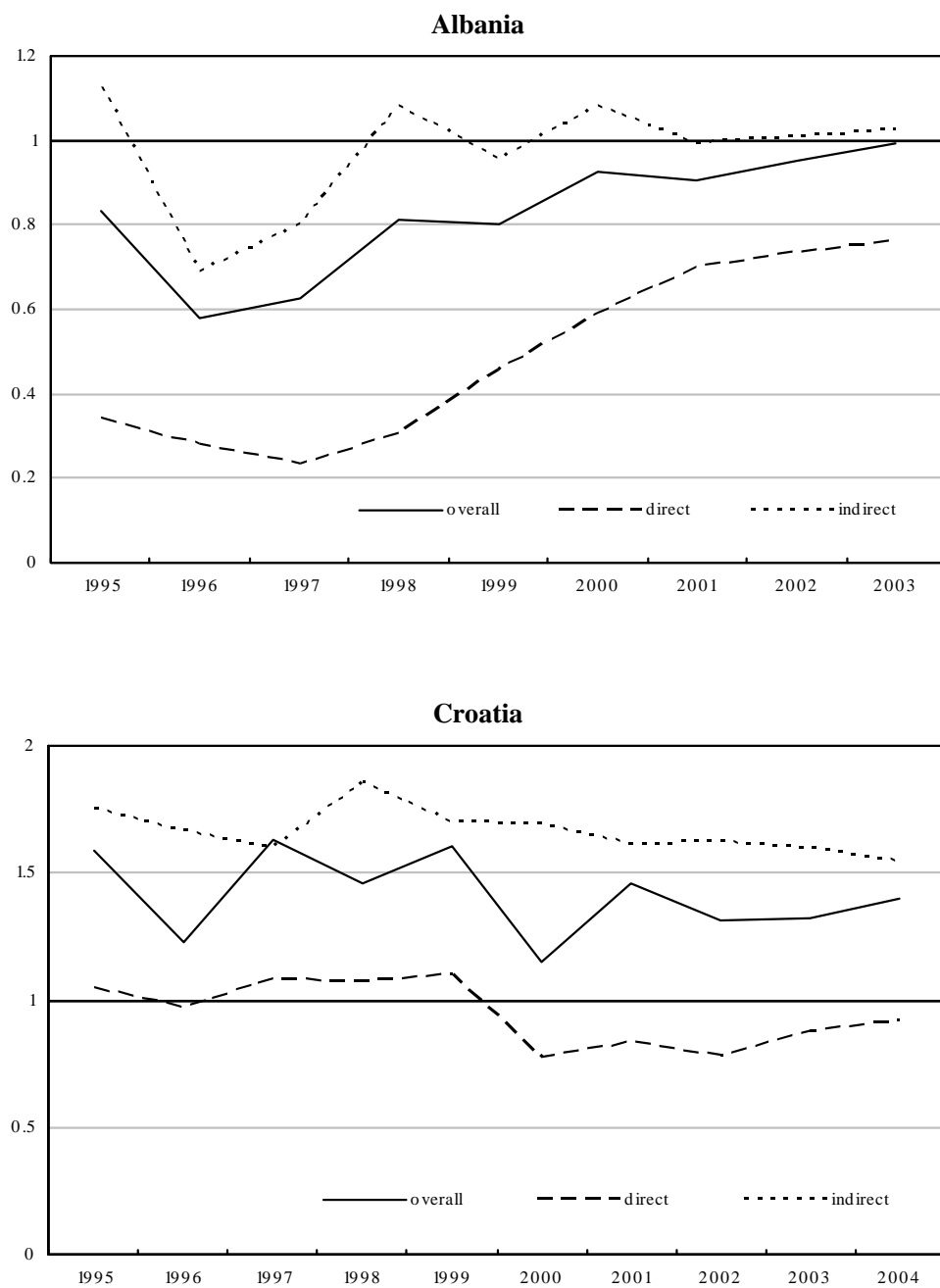


Figure 18

Trends in Tax Effort Indices for Selected ECA and Non-ECA Countries

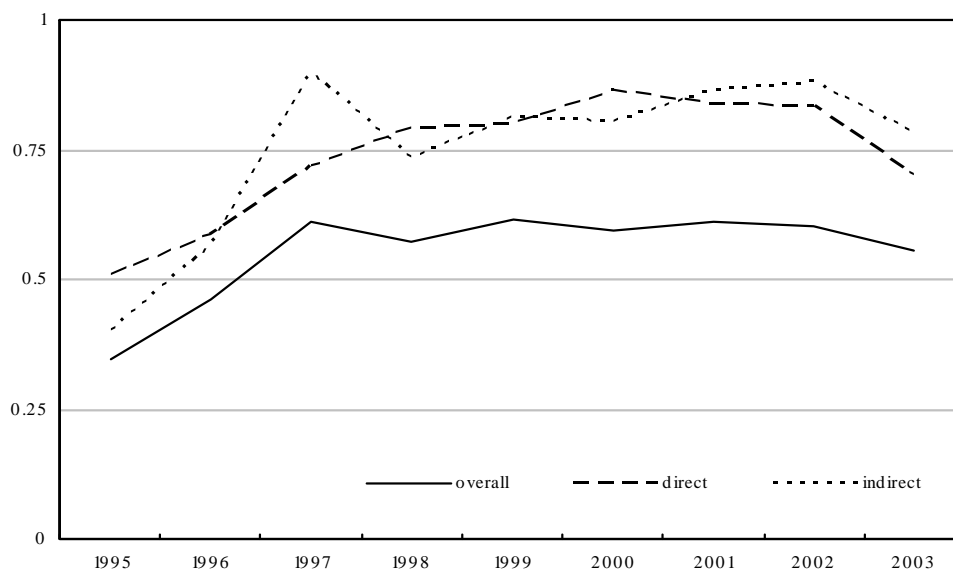


Source: staff calculations.

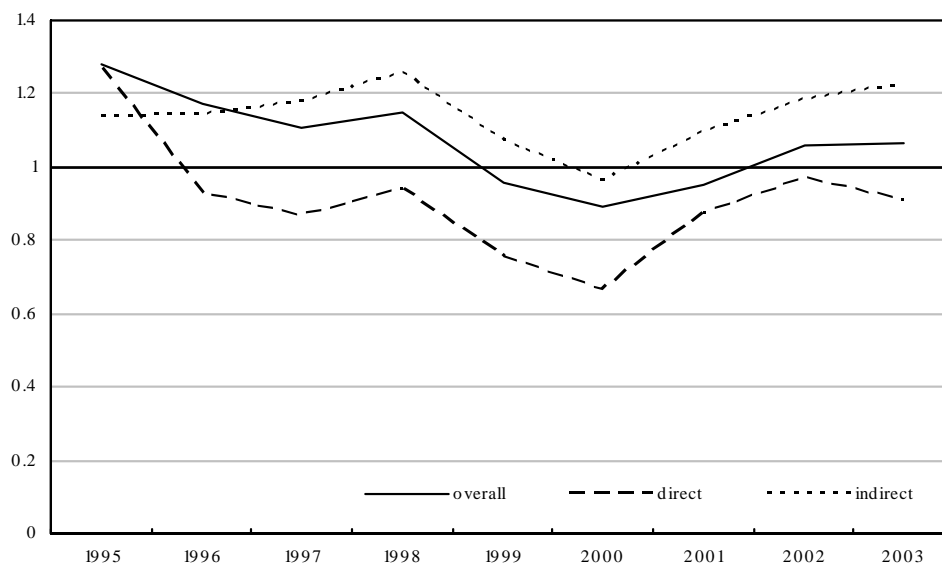
Figure 18 (continued)

Trends in Tax Effort Indices for Selected ECA and Non-ECA Countries

Georgia



Kyrgyz Republic

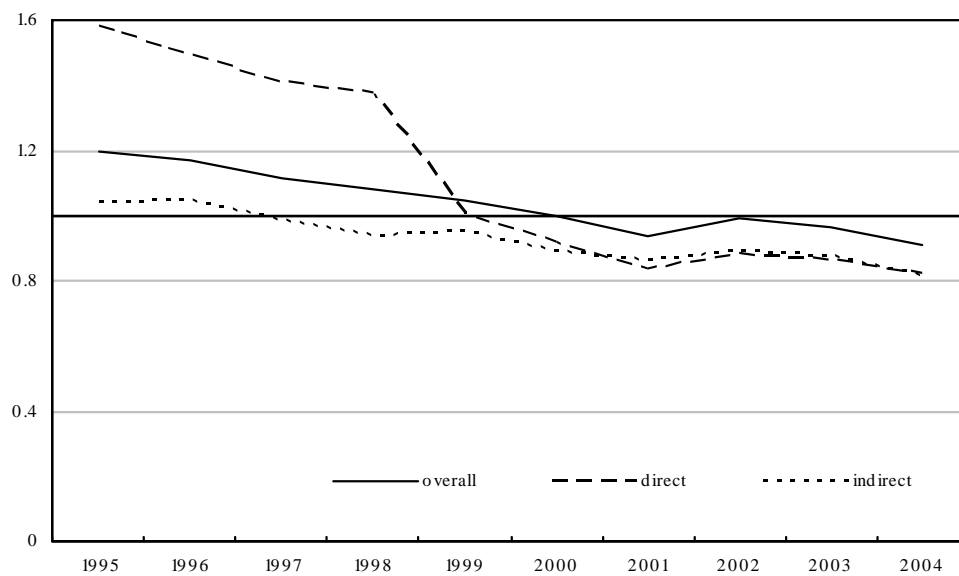


Source: staff calculations.

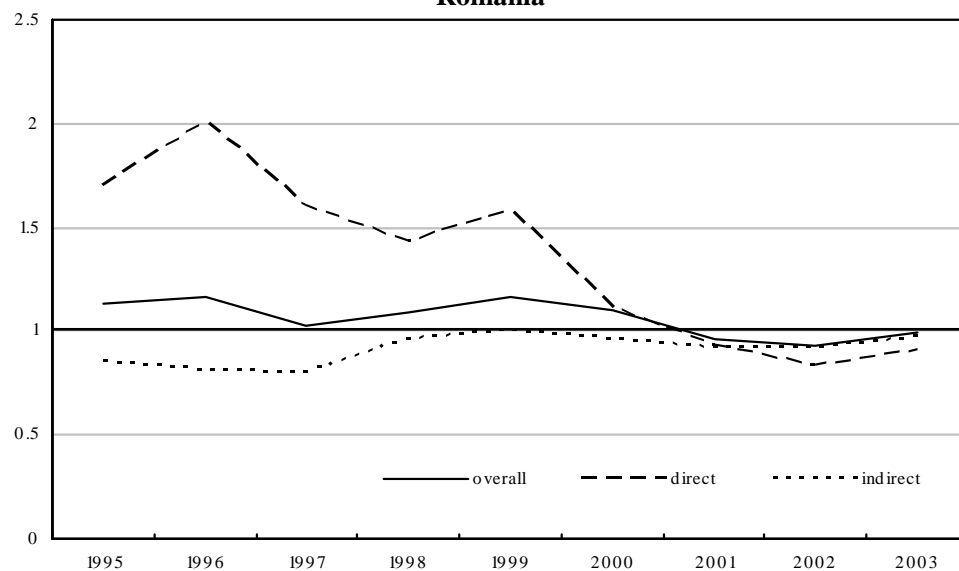
Figure 18 (continued)

Trends in Tax Effort Indices for Selected ECA and Non-ECA Countries

Poland



Romania

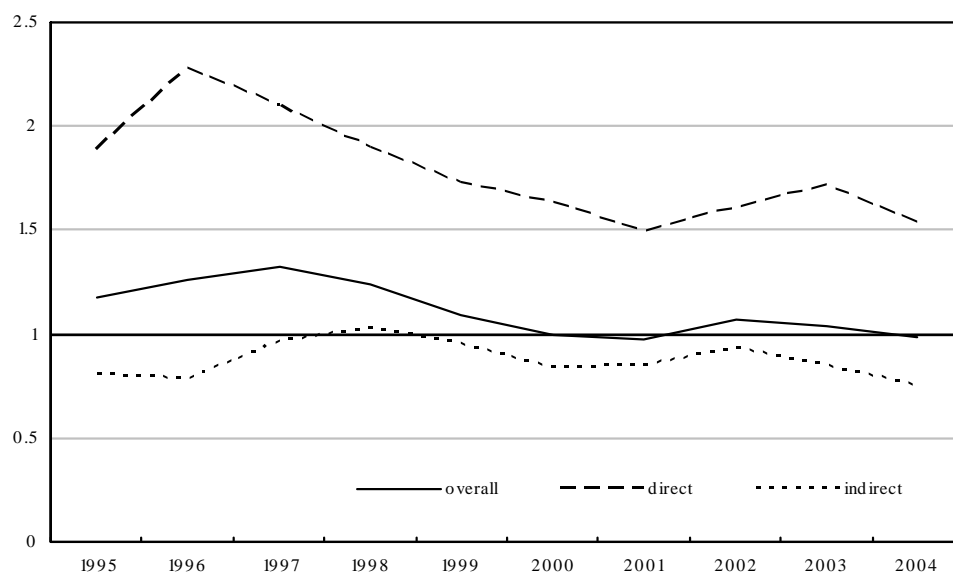


Source: staff calculations.

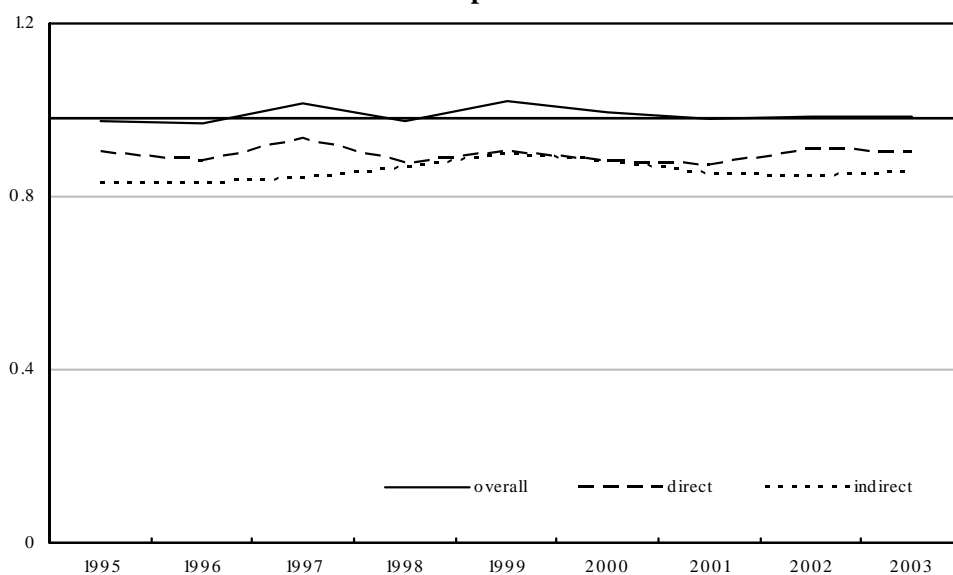
Figure 18 (continued)

Trends in Tax Effort Indices for Selected ECA and Non-ECA Countries

Ukraine



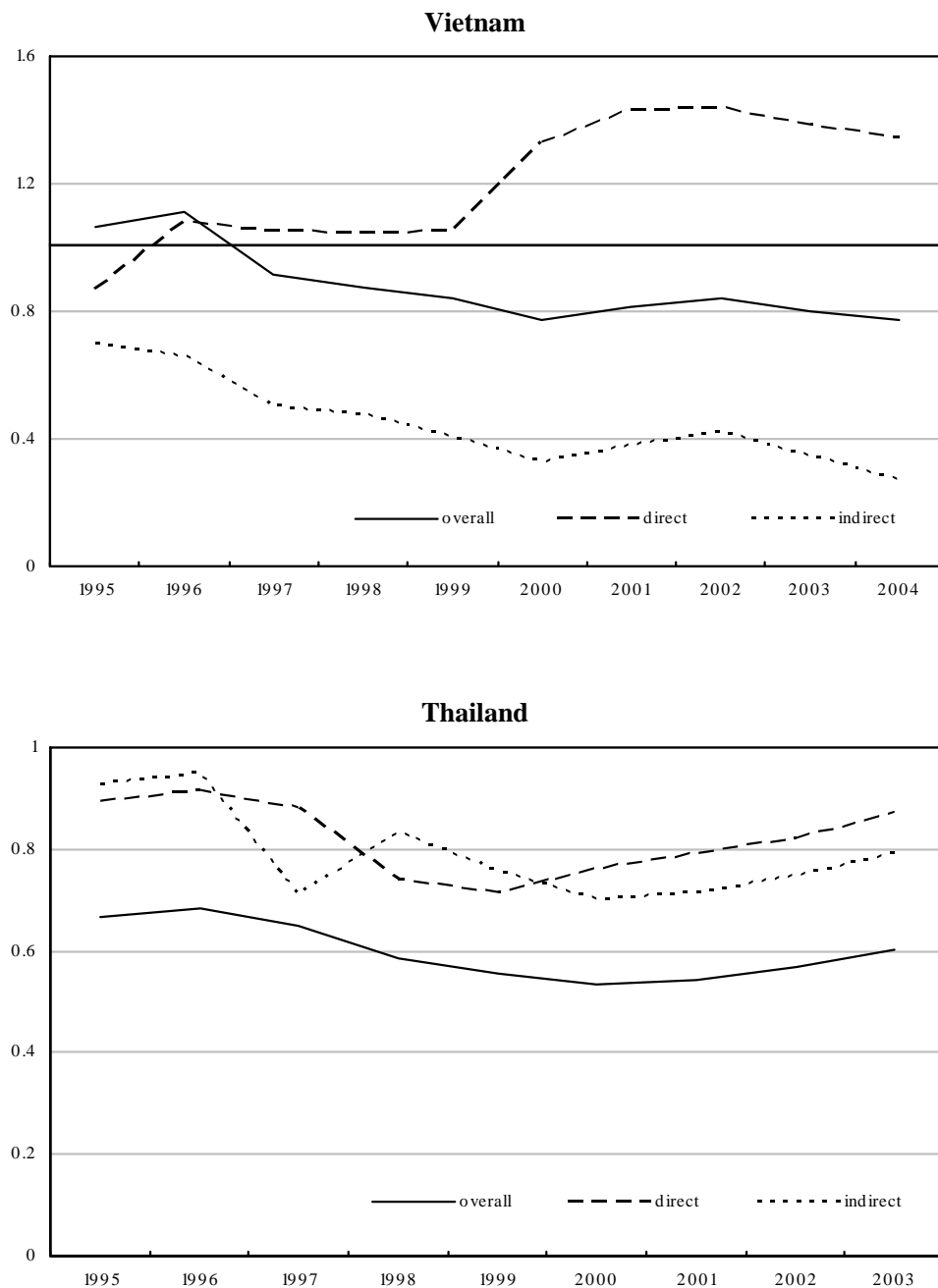
Spain



Source: staff calculations.

Figure 18 (continued)

Trends in Tax Effort Indices for Selected ECA and Non-ECA Countries



Source: staff calculations.

ANNEX 3
SUMMARY OF THE RESULTS

Table 6

Tax Effort Index – ECA and Selected Non-ECA Countries
(average values in the period 1995-2004)

Countries	Tax/GDP	Tax Effort		
		Overall	Direct	Indirect
Albania	18.4	0.8	0.5	1.0
Armenia	16.5	0.7	0.8	0.7
Azerbaijan	14.6	0.8	1.0	0.7
Belarus	40.8	1.4	1.4	1.5
Bosnia and Herzegovina	40.4	1.7	n.a.	1.8
Bulgaria	31.7	1.1	1.0	1.1
Chile	18.9	0.7	0.0	1.0
Croatia	42.9	1.4	0.9	1.7
Czech Republic	34.2	1.0	0.8	0.9
Estonia	32.7	0.9	1.0	0.8
Georgia	11.2	0.6	0.7	0.7
Hungary	39.0	1.1	1.0	1.1
Ireland	31.4	0.8	0.9	1.0
Kazakhstan	19.6	0.8	1.2	0.6
Korea	22.3	0.7	0.8	0.7
Kyrgyz Republic	17.3	1.1	0.9	1.1
Latvia	29.6	0.9	1.1	0.8
Lithuania	29.0	0.9	1.1	0.9
Macedonia, FYR	32.0	1.2	0.8	1.2
Moldova	26.8	1.2	1.2	1.5
Poland	31.3	1.0	1.1	0.9
Romania	28.4	1.1	1.3	0.9
Russian Federation	25.9	1.1	0.9	1.3
Slovak Republic	33.0	1.0	0.8	0.8
Slovenia	39.1	1.1	0.6	1.9
Spain	34.4	1.0	0.9	0.9
Tajikistan	13.5	0.6	0.6	0.8
Thailand	16.4	0.6	0.8	0.8
Turkey	26.7	1.2	1.5	1.1
Ukraine	31.1	1.1	1.8	0.9
Uzbekistan	33.9	2.3	n.a.	n.a.
Vietnam	16.3	0.9	1.2	0.4
ECA (26)	28.5	1.1	1.0	1.1
-CIS (11)	22.8	1.1	1.1	1.0
-EU8 (8)	33.5	1.0	0.9	1.0
-Rest (7)	31.5	1.2	1.0	1.3

Table 7

Intertemporal Comparison of Tax Effort Indices: ECA and Non-ECA Countries

Country	Tax/GDP	Tax/GDP	Tax		Direct		Indirect	
	1995	2004	1995*	2004**	1995*	2004**	1995*	2004**
Albania	17.7	22.0	0.8	1.0	0.3	0.8	1.1	1.0
Armenia	13.0	17.0	0.5	0.7	1.3	0.7	0.4	0.6
Azerbaijan	12.3	15.4	0.6	0.6	1.2	1.2	0.4	0.6
Belarus	37.3	42.9	1.4	1.4	1.8	1.3	1.3	1.5
Bulgaria	31.6	33.6	1.2	1.1	1.3	0.8	1.1	1.2
Croatia	44.4	40.9	1.6	1.4	1.0	0.9	1.8	1.5
Czech Republic	34.9	35.0	1.0	1.0	0.9	0.9	0.9	0.8
Estonia	33.9	32.6	1.0	0.9	1.2	0.9	0.9	0.8
Georgia	5.8	15.4	0.3	0.6	0.5	0.7	0.4	0.8
Hungary	42.0	37.0	1.3	1.1	1.0	1.0	1.4	1.0
<i>Ireland</i>	32.8	30.0	0.9	0.6	1.1	0.6	1.0	0.9
Kazakhstan	15.8	23.3	0.7	1.0	1.0	1.6	0.7	0.5
<i>Korea</i>	19.4	25.5	0.7	0.7	0.9	0.9	0.7	0.7
Kyrgyz Republic	20.1	18.4	1.3	1.1	1.3	0.9	1.1	1.2
Latvia	30.0	28.0	1.0	0.8	1.1	1.0	0.8	0.7
Lithuania	28.1	29.0	0.9	0.9	1.1	1.0	0.9	0.8
Macedonia, FYR	34.9	30.8	1.4	1.1	1.1	0.6	1.4	1.2
Moldova	24.8	29.8	1.1	1.3	1.3	1.4	1.8	1.5
Poland	33.3	29.6	1.2	0.9	1.6	0.8	1.0	0.8
Romania	28.8	27.9	1.1	1.0	1.7	0.9	0.9	0.9
Russian Federation	31.1	27.3	1.4	1.1	1.2	0.9	1.4	1.5
Slovak Republic	38.4	28.7	1.2	0.8	1.1	0.5	1.1	0.7
Slovenia	36.2	40.4	1.1	1.0	0.5	0.8	2.1	1.1
<i>Spain</i>	32.8	35.8	1.0	1.0	0.9	0.9	0.8	0.9
Tajikistan	9.9	15.2	0.3	0.7	0.3	0.6	0.0	1.1
<i>Thailand</i>	17.8	17.4	0.7	0.6	0.9	0.9	0.9	0.8
Turkey	19.7	30.4	0.9	1.3	1.2	1.4	0.8	1.4
Ukraine	32.6	29.2	1.2	1.0	1.9	1.5	0.8	0.8
Uzbekistan	33.5	30.9	2.1	2.0	n.a.	n.a.	n.a.	n.a.
<i>Vietnam</i>	17.2	16.7	1.1	0.8	0.9	1.3	0.7	0.3
ECA (26)	28.1	28.8	1.1	1.0	1.1	1.0	1.1	1.0
-CIS (11)	21.5	24.1	1.0	1.0	1.2	1.1	0.8	1.0
-EU8 (8)	34.6	32.5	1.1	0.9	1.1	0.9	1.1	0.8
-rest (7)	31.1	32.1	1.3	1.2	1.1	0.9	1.3	1.3
Non-ECA Countries (31)	29.6	30.9	0.9	0.9	0.9	1.1	1.0	0.9
High income (30)	35.8	35.4	1.0	1.0	1.0	1.0	1.1	0.9
Upper mid income (17)	24.1	25.7	1.0	1.0	1.0	0.9	1.0	1.0
Low mid income (10)	16.5	21.0	1.0	1.1	0.9	1.4	0.9	1.1

* last available data (1995 or 96), with exception of Russian Federation, Moldova (1997), and Bulgaria, Bosnia (1998).

** the most recent data (2004 or 03), with exception of Hungary, Ireland, Slovakia and Uzbekistan (2002).

Table 8

Tax Effort Index – Full Sample
(average value in the period 1995-2004)

Country	Tax/GDP	Tax Effort		
		Overall	Direct	Indirect
Sweden	51.3	1.3	1.5	1.1
Denmark	49.8	1.2	1.8	1.4
Finland	46.4	1.2	1.3	1.2
Belgium	45.6	1.0	0.9	0.8
France	45.0	1.2	0.9	1.0
Austria	43.7	1.0	0.9	1.0
Croatia	42.9	1.4	0.9	1.7
Italy	42.9	1.1	1.1	1.0
Norway	42.6	1.1	0.9	1.7
Belarus	40.8	1.4	1.4	1.5
Netherlands	40.7	1.0	0.7	0.9
Bosnia and Herzegovina	40.4	1.7	n.a.	1.8
Slovenia	39.1	1.1	0.6	1.9
Hungary	39.0	1.1	1.0	1.1
Germany	37.1	0.9	0.7	0.9
Greece	36.2	1.1	1.0	1.1
UK	36.0	0.9	1.1	1.0
Portugal	34.9	1.0	0.9	1.1
Spain	34.4	1.0	0.9	0.9
Czech Republic	34.2	1.0	0.8	0.9
Uzbekistan	33.9	2.3	n.a.	n.a.
Slovak Republic	33.0	1.0	0.8	0.8
Estonia	32.7	0.9	1.0	0.8
Macedonia, FYR	32.0	1.2	0.8	1.2
Bulgaria	31.7	1.1	1.0	1.1
Ireland	31.4	0.8	0.9	1.0
Poland	31.3	1.0	1.1	0.9
Ukraine	31.1	1.1	1.8	0.9
Australia	30.7	0.9	1.3	0.8
Latvia	29.6	0.9	1.1	0.8
Lithuania	29.0	0.9	1.1	0.9
Romania	28.4	1.1	1.3	0.9
United States	28.2	0.7	0.9	0.5
Uruguay	27.4	1.0	0.6	1.0
Moldova	26.8	1.2	1.2	1.5
Turkey	26.7	1.2	1.5	1.1
South Africa	26.4	1.0	2.1	0.7

Table 8 (continued)

Tax Effort Index – Full Sample
(average values in the period 1995-2004)

Country	Tax/GDP	Tax Effort		
		Overall	Direct	Indirect
Russian Federation	25.9	1.1	0.9	1.3
Japan	25.8	0.7	0.8	0.5
Mongolia	22.9	1.1	1.3	1.2
Korea	22.3	0.7	0.8	0.7
Argentina	21.7	0.8	0.4	1.1
Kazakhstan	19.6	0.8	1.2	0.6
Chile	18.9	0.7	0.0	1.0
Albania	18.4	0.8	0.5	1.0
Bolivia	17.8	1.1	0.9	1.2
Mexico	17.7	0.7	0.7	0.8
Kyrgyz Republic	17.3	1.1	0.9	1.1
Armenia	16.5	0.7	0.8	0.7
Thailand	16.4	0.6	0.8	0.8
Vietnam	16.3	0.9	1.2	0.4
Peru	14.7	0.7	0.8	0.8
Azerbaijan	14.6	0.8	1.0	0.7
India	14.6	1.0	0.9	1.4
Tajikistan	13.5	0.6	0.6	0.8
Georgia	11.2	0.6	0.7	0.7
Nigeria	10.9	1.0	1.5	0.7
Regions				
ECA (26)	28.5	1.1	1.0	1.1
-CIS (11)	22.8	1.1	1.1	1.0
-EU8 (8)	33.5	1.0	0.9	1.0
-rest (7)	31.5	1.2	1.0	1.3
LAT (6)	19.7	0.8	0.6	1.0
MENA (1)	26.7	1.2	1.5	1.1
South Asia (1)	14.6	1.0	0.9	1.4
EAP (4)	19.5	0.8	1.0	0.8
AFR (2)	18.7	1.0	1.8	0.7
Income				
High income (30)	36.0	1.0	1.0	1.0
-EU 8	33.5	1.0	0.9	1.0
-ECA (9)	34.5	1.0	0.9	1.1
Upper mid income (17)	24.8	1.0	1.0	1.0
-ECA (12)	27.2	1.1	1.1	1.1
Low mid income (10)	18.5	1.1	1.0	1.0
-ECA (5)	20.5	1.1	0.9	1.0

Table 9

Intertemporal Comparison of Tax Effort Indices: Full Sample

Country	Tax/GDP	Tax/GDP	Overall		Direct		Indirect	
	1995	2004	1995	2004	1995	2004	1995	2004
Albania	17.7	22.0	0.8	1.0	0.3	0.8	1.1	1.0
Argentina	20.9	26.0	0.8	0.8	0.3	0.5	1.1	1.2
Armenia	13.0	17.0	0.5	0.7	1.3	0.7	0.4	0.6
Australia	29.6	31.5	0.9	0.8	1.3	1.3	0.8	0.8
Austria	41.6	43.0	1.0	1.0	0.9	0.9	1.0	1.0
Azerbaijan	12.3	15.4	0.6	0.6	1.2	1.2	0.4	0.6
Belarus	37.3	42.9	1.4	1.4	1.8	1.3	1.3	1.5
Belgium	44.8	45.8	1.0	1.0	0.9	0.9	0.9	0.8
Bolivia	13.6	19.3	0.9	1.1	0.6	1.5	0.9	1.3
Bosnia and Herzegovina	41.0	39.2	2.0	1.4	n.a	n.a.	1.8	1.8
Bulgaria	31.6	33.6	1.2	1.1	1.3	0.8	1.1	1.2
Croatia	44.4	40.9	1.6	1.4	1.0	0.9	1.8	1.5
Czech Republic	34.9	35.0	1.0	1.0	0.9	0.9	0.9	0.8
Denmark	49.4	49.0	1.3	1.2	1.9	1.7	1.4	1.3
Estonia	33.9	32.6	1.0	0.9	1.2	0.9	0.9	0.8
Finland	46.0	44.9	1.3	1.1	1.2	1.1	1.2	1.2
France	44.2	44.2	1.2	1.1	0.8	0.9	1.0	0.9
Georgia	5.8	15.4	0.3	0.6	0.5	0.7	0.4	0.8
Germany	38.2	36.2	1.0	0.9	0.8	0.7	0.9	0.9
Greece	32.4	35.9	1.1	1.1	0.8	0.9	1.2	1.1
Hungary	42.0	37.0	1.3	1.1	1.0	1.0	1.4	1.0
India	14.7	15.7	1.1	1.0	0.7	1.3	1.6	1.3
Ireland	32.8	30.0	0.9	0.6	1.1	0.6	1.0	0.9
Italy	41.2	43.4	1.1	1.1	1.1	1.1	1.0	0.9
Japan	27.8	15.3	0.8	0.7	0.9	0.7	0.4	0.5
Kazakhstan	15.8	23.3	0.7	1.0	1.0	1.6	0.7	0.5
Korea	19.4	25.5	0.7	0.7	0.9	0.9	0.7	0.7
Kyrgyz Republic	20.1	18.4	1.3	1.1	1.3	0.9	1.1	1.2
Latvia	30.0	28.0	1.0	0.8	1.1	1.0	0.8	0.7
Lithuania	28.1	29.0	0.9	0.9	1.1	1.0	0.9	0.8
Macedonia, FYR	34.9	30.8	1.4	1.1	1.1	0.6	1.4	1.2
Mexico	16.7	19.5	0.7	0.7	0.6	0.8	0.8	0.8
Moldova	24.8	29.8	1.1	1.3	1.3	1.4	1.8	1.5
Mongolia	19.2	32.5	1.0	1.5	1.6	2.6	0.8	1.6

Table 9 (continued)

Intertemporal Comparison of Tax Effort Indices: Full sample

Country	Tax/GDP	Tax/GDP	Overall		Direct		Indirect	
	1995	2004	1995	2004	1995	2004	1995	2004
Netherlands	42.0	38.8	1.0	0.9	0.8	0.7	0.9	0.9
Nigeria	6.4	16.0	0.4	1.2	0.6	2.5	0.5	0.7
Norway	41.1	43.9	1.1	1.1	0.8	1.0	1.8	1.5
Peru	15.4	14.9	0.7	0.7	0.7	0.8	0.9	0.8
Poland	33.3	29.6	1.2	0.9	1.6	0.8	1.0	0.8
Portugal	33.6	33.9	1.0	1.0	0.9	0.9	1.1	1.0
Romania	28.8	27.9	1.1	1.0	1.7	0.9	0.9	0.9
Russian Federation	31.1	27.3	1.4	1.1	1.2	0.9	1.4	1.5
Slovak Republic	38.4	28.7	1.2	0.8	1.1	0.5	1.1	0.7
Slovenia	36.2	40.4	1.1	1.0	0.5	0.8	2.1	1.1
South Africa	25.0	26.8	1.0	0.9	1.9	2.1	0.8	0.7
Spain	32.8	35.8	1.0	1.0	0.9	0.9	0.8	0.9
Sweden	48.5	50.8	1.3	1.2	1.4	1.4	1.1	1.1
Tajikistan	9.9	15.2	0.3	0.7	0.3	0.6	0.0	1.1
Thailand	17.8	17.4	0.7	0.6	0.9	0.9	0.9	0.8
Turkey	19.7	30.4	0.9	1.3	1.2	1.4	0.8	1.4
UK	35.0	35.3	0.9	0.9	1.1	1.0	1.1	1.0
Ukraine	32.6	29.2	1.2	1.0	1.9	1.5	0.8	0.8
Uruguay	26.1	26.3	1.0	1.0	0.5	0.7	1.0	1.0
Uzbekistan	33.5	30.9	2.1	2.0	n.a.	n.a.	n.a.	n.a.
Vietnam	17.2	16.7	1.1	0.8	0.9	1.3	0.7	0.3
Regions								
ECA (26)	28.1	28.8	1.1	1.0	1.1	1.0	1.1	1.0
-CIS (11)	21.5	24.1	1.0	1.0	1.2	1.1	0.8	1.0
-EU8 (8)	34.6	32.5	1.1	0.9	1.1	0.9	1.1	0.8
-rest (7)	31.1	32.1	1.3	1.2	1.1	0.9	1.3	1.3
Non-ECA Countries (31)	29.6	30.9	0.9	0.9	0.9	1.1	1.0	0.9
Income								
High income (30)	35.8	35.4	1.0	1.0	1.0	1.0	1.1	0.9
Upper mid income (17)	24.1	25.7	1.0	1.0	1.0	0.9	1.0	1.0
Low mid income (10)	16.5	21.0	1.0	1.1	0.9	1.4	0.9	1.1

ANNEX 4 SELECTION OF THE FOCUSED COUNTRIES

(Source: Concept note of Public Finance and Economic Growth in Europe and Central Asia, November 2005, The World Bank).

ECA countries

Regional study “Public Finance and Economic Growth in Europe and Central Asia” proposes to focus much of the analysis on a subset of ECA and fast-growing non-ECA countries to facilitate more in-depth and cross-cutting analysis of comparisons and trade-offs within and among countries. The question is what criteria should be used for country selection given the wide diversity in the ECA region and outside. Several factors create pressures on public finance systems, and it would be hard to establish a typology of countries based on a comprehensive analysis of tensions and risks. However, a few key factors deserve special attention, as they are either cross cutting or affect key functions of modern welfare states where expenditure pressures are typically being felt:

- *The quality of public sector governance* is an overarching factor affecting the efficiency of management, targeting, and financing of public expenditure programs. Poor governance is likely both to reduce the efficiency of public spending and to raise the economic costs of taxation. Weak public sector governance also affects the capacity of governments to formulate and maintain a sound fiscal framework over time, thus increasing the risk of implementing unsustainable expenditure programs leading to cycles of booms and busts. The quality of governance is partially correlated with the level of per capita income, as low-income countries have fewer resources to spend in support of public administration and government accountability. Thus there is likely to be a strong need for public spending for education, infrastructure, and other public services even where governance is weak, making the question of the appropriate size of the public sector particularly problematic.
- *Demographics* affect public expenditures for both pensions and health care of senior citizens. Although the financial situation of pension and public health care systems greatly depends on their relative coverage, generosity, targeting, and efficiency of management, expenditure pressures are generally expected to increase in tandem with population aging.
- *The size of the school-aged population and the existing level of educational attainment* may affect public expenditure on education. As countries compete more intensely in global markets, it becomes more important to fill educational gaps in order to maintain international competitiveness. The larger the school-aged population in proportion to total population, the stronger the expected pressures on public expenditures to ensure adequate school enrolment ratios and bridge potential gaps in educational attainment. Although poor educational outcomes may, to some extent, reflect inefficient use of available resources,

bridging large gaps in education usually calls for additional expenditures – either directly through the provision of services by the public sector, or indirectly, for example, through the financing of educational voucher programs.

- The availability of large sources of *non-tax revenue*, usually in the form of hydrocarbon revenues, raises specific challenges for public finance management, but also creates much needed fiscal room for expenditure financing. Oil-rich countries are able to finance priority expenditure programs while keeping taxes at a relatively low level, which is usually reflected into a large non hydrocarbon budget deficit.¹⁸

Based on the above considerations, a few simple criteria have been combined with a view to grouping ECA countries according to potential tensions being faced by their public finance systems.

- Country Policy and Institutional Assessment (CPIA) ratings on public sector management and institutions, combined with an indicator of “bribe frequency”, were used as a measure of the quality of public sector governance.¹⁹
- The old age dependency ratio (population over 65 years as percent of working-age population) was used as a measure of potential tensions on pay-as-you go pension systems and health care systems.
- The size of school-aged population (population aged 6 to 18 years in percent of total) was used as an indicator of possible expenditure pressures in the future.
- The share of fuel exports in total export revenues was used to identify countries that benefit from significant hydrocarbon fiscal resources.

Combining (as a simple average) the old-age dependency and the size of school-aged population provides an approximate sense of potential tensions on social spending. Of course, actual social spending tensions may be much higher than suggested by demographics owing to unreformed pay-as-you-go pension systems and depending on existing inefficiencies in public health care and education systems. When this indicator is further combined with the public sector governance indicator, a classification of ECA countries into four groups can be established (Table 10 – detailed country rankings by indicator, including per capita PPP GDP are provided in Annex 1).

¹⁸ Although the availability of hydrocarbon revenues may affect the level and structure of taxation, the decisions concerning the level of public expenditure should not be directly related to the presence of hydrocarbon windfalls. Sound public finance would call for public expenditure programs to be driven by the marginal productivity and cost of public resources. Although the presence of hydrocarbon windfalls could temporarily lower the cost of public expenditure financing, eventually the decisions whether the return to expenditure programs outweighs the cost is independent of hydrocarbon wealth and should be better taken in the context of medium-term expenditure planning.

¹⁹ The following ratings on public sector management and institutions, closely related to public finance management, were used from CPIA: (i) Quality of Budget and Financial Management; (ii) Efficiency of Revenue Mobilization; and, (iii) Quality of Public Administration. The “Bribe frequency” indicator was extracted from the 2005 version of Business Environment and Enterprise Performance Survey (BEEPS). A single index of the quality of public sector governance was compiled by combining these four indicators.

Table 10**Potential Tensions on Public Finance Systems – ECA Country Groupings⁽¹⁾**

	Social spending tensions below average (Pensions, Health, Education, combined)	Social spending tensions above average (Pensions, Health, Education, combined)
Quality of Public sector Governance above average ⁽²⁾	Hungary Slovakia Czech Republic Poland Turkey	Estonia Latvia Lithuania Bulgaria Croatia Armenia
Quality of Public sector Governance below average ⁽²⁾	Kazakhstan* Bosnia Macedonia FYR Azerbaijan* Romania Russia* Belarus Albania Moldova	Georgia Serbia and Montenegro Ukraine Uzbekistan Tajikistan Kyrgyz Republic Turkmenistan*

* Countries with significant hydrocarbon export revenue earnings.

⁽¹⁾ Proposed set of case studies is bolded and highlighted.

⁽²⁾ Countries in each group are ranked by decreasing order in terms of their quality of public sector governance. Ranking of Turkmenistan is based only on the three selected CPIA governance indicators, as BEEPS is not available for this country.

According to the simple typology in Table 10, weak public sector governance and potentially high social spending tensions could pose risks in public finance systems. Shaded areas in the table highlight country groups likely to face higher tensions in their public finance systems – with the group most at risk being the one where weak public sector governance is combined with high potential tensions on social spending. This group includes a mix of countries that may face social spending tensions for diverse reasons – either reflecting pressures from aging populations, or because they will need to cater to the education needs of large young populations.

The proposed selection of case studies is intended to cover all four country groups highlighted above, so as to draw comparative lessons from countries facing diverse public finance challenges in the functional expenditure areas to be analyzed in Part 2 of the study. Relatively more emphasis will be placed on countries with quality of public sector governance below the average for the region as a whole (6 out of proposed 10). Availability of high quality data and up-to-date information

is also important, and a Public Expenditure Review is either available or under preparation in almost all of the countries proposed. Countries with substantial hydrocarbon earnings have not been included as their situation may not be as directly comparable to those without such economic “rents”.

As noted earlier, the proposed set includes the following 10 ECA countries: Albania, Croatia, Georgia, Kyrgyz Republic, Poland, Romania, Serbia, Slovakia, Turkey, and Ukraine.

Non-ECA Comparators

The selection of comparator countries outside of ECA emphasizes successful growth performance. The goal is to compare the fiscal policies and resulting public revenue and expenditure patterns of a set of high-growth countries at roughly similar levels of per capita income to our ECA focus countries. We propose to select the following six countries: Chile, Ireland, Korea, Spain, Thailand, and Vietnam.

All six have experienced average per capita growth rates of over 2.5 percent for the past ten years, and their range of per capita incomes (particularly at the start of the last decade’s high growth period) and population size are roughly similar to the range in our ECA focus countries. Several other non-ECA countries have similar 10-year growth rates but are considered less appropriate because either their economies are less diversified or otherwise less comparable to ECA (Costa Rica, Dominican Republic, Malaysia, and Uganda), their growth experience has been affected by conflict (Sri Lanka) or other distortions and special factors (Greece), or fiscal data at the general government level are unlikely to be readily available (Tunisia).

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