Michael Alexeev and Robert Conrad

Assessment of Tax Reform Results in Russia: Comparative Analysis[1]

by

1. Introduction

Our goal is to examine the effect of Russia's post-1999 tax reforms on tax collections and on investor perceptions. Macroeconomic and microeconomic survey data are used in an attempt to evaluate the tax reforms from different perspectives. Publicly available cross-country and firm-level data are used to compare Russia's performance with other CIS countries and East European economies in transition. More specifically, we perform a comparative analysis of the trends in tax effort, tax-related behavior of business taxpayers (such as the share of sales firms hide from tax inspectors), and perceptions of the tax system and of the tax administration in Russia during 1999-2005. While there have been empirical studies that focused on certain aspects of Russia's tax reforms (e.g., Ivanova et al., 2005 and Sinelnikov-Murylev et al., 2003 on personal income tax reform), as well as overall evaluations of the impact of tax reforms based on analysis of Russian data (e.g., Nazarov, 2008), we are not aware of any empirical studies of the effects of Russia's tax reforms on tax effort, VAT efficiency, or the perceptions of the tax system based on cross-country comparisons. Our aim is to begin to fill this gap in the literature. Based on our analysis, the results from using different methods (macroeconomic and microeconomic survey data) are broadly consistent: the tax reform has had only marginal effects on tax effort and perceptions.

2. The Data

A detailed description of our data and sources can be found in Table 1. We also provide a brief description of our most important variables as they are examined in the course of our discussion. A clarification is needed, however, with respect to the tax-to-GDP ratios.

Like other researchers, including Bird et. al. (2008), we use the data from the Government Finance Statistics (GFS) database compiled by the International Monetary Fund (IMF). Surprisingly, there are two inconsistent sets of relevant statistics available from the IMF. One dataset is contained in a CD-ROM that can be purchased from the IMF. Another dataset is available online (see IMF, 2008). This latter dataset is very similar to the data contained in the World Development Indicators (WDI) Online (2008). According to the Government Finance Statistics Manual (see http://dw.mof.go.th/foc/Document/finance_state/fpo/GFSM2001.pdf), "Tax revenue, … is composed of compulsory transfers to the general government sector. Certain compulsory transfers, such as fines, penalties, and most social security contributions, are excluded from tax revenue" (p. 47). The general government sector is defined as consisting of "entities that fulfill the functions of government as their primary activity." There are significant discrepancies, however, between GFS online data and the data from the GFS CD-ROM and from some other sources. In particular, the GFS online data differ significantly from the Russian Ministry of Finance data (all numbers are in percent of GDP and exclude social security contributions):[2]

Source	Tax revenue	2000	2001	2002	2003	2004	2005
Russia's Ministry of Finance	General government budget	28	27.7	23.9	22.9	22.2	24.3
	Federal budget	10.2	12.5	12.7	12.0	10.9	13.3
IMF GFS online database	General government budget	13.7	15.8	13.7	13.4	13.3	16.6
IMF GFS CD-ROM	General government budget	24.21	25.62	23.89	22.65	23.35	26.62

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[2] One note about Russian data used in this study should be emphasized. Russia's tax collections in 2005 include VAT assessments for the oil company YUKOS as a result of audits for earlier years. The additional collections constituted 0.64% of Russia's GDP (see Nazarov, 2008. p. 39). If this amount were to be excluded from 2005 data, Russia's tax effort and VAT efficiency results for 2005 would change significantly. At the same time, if we were to disregard these amounts for 2005, we would presumably need to include them in the earlier years. Most of the tax collections data we use, particularly for developed countries and for later years, are based on accruals. In the majority of the cases, both cash and accrual methods yield similar numbers, but this is not the case for Russia in 2005. None of the data we have, however, makes an adjustment for pre-2005 years based on YUKOS assessment. Were we to do this particular adjustment, we would need to investigate other countries with respect to unusual collections events there as well. In the end, we decided to present our data without adjusting for YUKOS assessment. That is, our 2005 number for Russia's VAT collections as a share of GDP is 6.8% instead of 6.2%, which it would have been had we excluded the YUKOS assessment. Correspondingly, the 2005 ratio of overall tax collections to GDP for Russia that we use below is 26.62% instead of 25.98%. Note that while these adjustments are important for evaluating Russia's tax effort and VAT efficiency for 2005 and some earlier years, they would have negligible effect on the values and statistical properties of regression coefficients that we obtain below.

Sources: Russia's Ministry of Finance data are from *Russian Economy in 2007: Trends and Outlooks*, Issue 29, Institute for the Economy in Transition, Moscow (http://www.iet.ru/en/russian-economy-in-2007-issue-29.html), Table 2, p. 97; IMF GFS online data are from IMF (2008). IMF GFS CD-ROM data are calculated based on tax collections in local currency units from GFS CD-ROM and GDP in local currency units from WDI Online (2008).

It appears that the discrepancy arises mostly because the GFS online data exclude a significant portion of regional tax revenues. The GFS CD-ROM data are much closer to those reported by Russia's Ministry of Finance.[3] For this reason we chose to use GFS CD-ROM data. In order to increase the number of available data points, we used other data sources when the GFS CD-ROM data are not available (e.g., Stepanyan, 2003 for several economies in transition). Also, for those countries where the discrepancy between GFS CD-ROM data and the GFS online dataset was not very large, we used the data from the latter to fill missing values in the former.

3. Tax Effort

Tax effort, defined as the ratio of tax revenue to GDP, is an important summary characteristic of the country's tax system. Developed countries on average exhibit significantly higher tax effort than developing countries. This outcome can be a reflection either of the greater ability of developed countries to collect statutorily defined taxes or the greater willingness of developed countries' populations to acquiesce to higher statutory tax burden, or both. Typically, the economic literature on tax effort has focused on the country's collections ability or the supply side of the tax effort.[4] Thus, a conventional approach to analyzing tax effort is to estimate the following regression:

$$\frac{\text{TR}}{\text{GDP}} = \beta_0 + \beta_1 \frac{\text{GDP}}{\text{POP}} + \beta_2 \frac{\text{AG}}{\text{GDP}} + \beta_3 \frac{\text{TRADE}}{\text{GDP}} \beta_4 \frac{\Delta\text{POP}}{\text{GDP}} + \varepsilon, \qquad (1)$$

where TR refers to total tax collections in a given year, GDP stands for gross domestic product in constant 2000 US dollars,[5] POP denotes population, AG is value added in agriculture, TRADE represents the sum of exports and imports, and ΔPOP is population growth. Per capita GDP can be viewed as a proxy for the quality of the country's government administration and the ability of its taxpayers to pay taxes. The role of trade in the economy, which we refer to in shorthand below as "openness," is important because trade taxes are usually easier to collect relative to other taxes such as income tax and domestic VAT. The agricultural sector, on the other hand, is usually more difficult to

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[3] GFS CD-ROM data represent tax revenue in local currency units. In order to convert these data into shares of GDP we used GDP in local currency units from WDI Online (2008).

[4] For a recent survey of tax effort literature, see Bird et al. (2008). A more comprehensive survey is presented in the working paper version, Bird et al. (2006).

[5] Regression results using per capita GDP in purchasing power parity (PPP) terms are very similar to the results for per capita GDP in constant US dollars. We chose to use the latter because several other variables in the regressions are based on GDP in US dollars rather than on GDP in PPP terms.

tax relative to other economic activities. Finally, in countries with fast population growth, tax administrations may find it difficult to keep track of new taxpayers (Bahl, 2003). For these and some other reasons, it is expected that tax effort would positively depend on per capita GDP and the economy's openness to trade, and it would be negatively related to the share of agriculture and population growth in the country.

We stress that because of the focus on the supply side of tax effort, one has to be careful in interpreting the results of regression (1). In particular, greater tax effort, as reflected in a country's positive residuals relative to estimates obtained via (1), does not necessarily imply a more efficient tax system or even a more effective tax administration, because specification (1) does not include either a measure of statutory tax burden or a measure of welfare loss associated with tax collections. That is, a country with a very efficient tax system and tax administration might be characterized by low tax effort simply because its population prefers to have a relatively small public sector. Conversely, a country that exhibits high tax effort might be collecting taxes in an inefficient manner. Nonetheless, it has been shown that more developed countries generally exhibit greater tax effort and the determinants of this measure of tax effort have been extensively studied in the literature.

Typically, equation (1) is estimated using the conventional Ordinary Least Squares method (OLS). This approach may not be entirely adequate, particularly because of the potentially significant reverse causality between tax effort and per capita GDP. This problem is difficult to address, because appropriate instruments are not readily available. In addition, equation (1) might suffer from a missing variable bias. For example, both tax effort and per capita GDP could be influenced by the quality of institutions in a country. It is possible to add institutional quality measures to the right hand side of equation (1), but that approach creates another channel for reverse causality, because the quality of institutions may be in part determined by the country's ability to collect revenue to fund these institutions. We address this issue below.

Despite these difficulties, regressions similar to equation (1) have been commonly used in the literature and for now we will use them too, keeping in mind their limitations. In the present section of our paper, we use more recent and comprehensive data than have been used in tax effort literature to date and we focus on the performance of the economies in transition. We also add some variables to equation (1) that are clearly exogenous and significantly improve the statistical fit of our estimates. In addition, we estimate tax effort regressions for several different years, which allows for a comparison of Russia's tax effort to other countries before and after Russia's major tax reforms of 2000-2001.

Standard tax effort regressions do not exhibit a particularly good statistical fit. The signs of the coefficients, however, are mostly as expected (see Table 2). Looking at the residuals from these regressions (Table 3), we find that Russia's tax effort has been greater than the estimated average for all countries; i.e., Russia's residuals from these regressions are positive throughout the period. Note, however, that while Russia's tax effort increased during the tax reform years of 2000 and 2001, by 2005 it was only marginally higher than the 1999 level.

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One interesting issue is how Russia's tax effort differs from that of other economies in transition, and whether tax effort in the economies in transition has been systematically different from other countries. Among other factors, relatively low tax effort in the economies in transition might be due to a limited capacity of their tax administrations and an established tradition of tax evasion. In order to evaluate Russia's performance relative to the other economies in transition, we augment the standard regressions with a dummy variable for the economies in transition. In these augmented regressions, the coefficients of the transition economies' dummy variable are always negative but not statistically significant, except in the 1999 regression and the regression on the 1999-2005 mean values where it is significant at the 10% level (see Table 4). This implies that the tax effort in the economies in transition has been generally similar to or perhaps marginally lower than that for other countries. (A similar approach shows that tax effort in the CIS countries has not been significantly different from other economies in transition during the period under consideration.)

Russia's tax effort during the period was higher than in the other economies in transition, particularly in 2000 and 2001(see residual values presented in Table 5). In part, this might be a consequence of significant tax revenues from Russia's oil sector.[6] In general, tax reforms in Russia do not appear to have significantly increased tax effort.

The standard tax effort regressions described above account only for a small number of country characteristics that might affect tax effort. As mentioned above, country characteristics in the traditional tax effort regressions may proxy the factors that reflect the ability of the state to collect taxes; that is, these characteristics represent supply side "tax handles." In a recent paper, Bird et al. (2008) attempt to add some demand side variables to tax effort regressions. They use 1990-1999 cross-country data to estimate the effect of institutional quality on tax effort, arguing that the population would be willing to accept a higher tax burden only in countries with relatively good government institutions.[7] In particular, Bird et al. add "control of corruption" and "voice and accountability" measures developed by the World Bank to the usual set of regressors.[8] While they find a statistically significant positive effect of these institutional quality variables on tax effort, these results are subject to the possible endogeneity problem between institutional quality and tax effort. The instruments Bird et al. use to alleviate this problem (English legal origin and ethnic fractionalization) pass the standard tests in their regressions, but the same instruments are quite weak in our regressions. As is well-

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[6] Note, however, that the inclusion of a measure of oil output (either value of oil output per capita or the ratio of the value of oil output to GDP) on the right hand side of (1) does not result in a statistically significant coefficient. This might be due to the fact that different governments obtain oil revenue differently. Some countries rely, at least in part, on resource taxes, while other countries rely mostly on royalties that are not included in tax revenue. Russia collects most of its revenue from the oil sector via a tax on the extraction of mineral resources and an export duty. Both appear to be included in Russia's tax revenue.

[7] One can also argue that the quality of government institutions can affect the supply side of tax effort as well. For example, a country with corrupt tax inspectors may find it difficult to collect taxes.

[8] Bird et al. (2008) focus on tax effort in Latin American countries, and so they also add a dummy variable for Latin America.

known, weak instruments result in a potentially significant bias, particularly in small sample two-stage least-squares estimation (see, for example, Murray (2006)). (Note, however, that we are using the data for a different period than that used by Bird et al.) Moreover, when we use the same instrumental regressions with our data and include a dummy variable for the economies in transition and some additional explanatory variables (see next paragraph), the institutional quality coefficients become statistically insignificant.

Because the inclusion of institutional quality variables in the tax effort regressions is subject to potential endogeneity and finding appropriate instruments for these variables in tax effort regressions is problematic, we prefer a different approach. The question we ask is: what relatively immutable country characteristics affect tax effort? After trying a number of different variables, including those used by Bird et al. as instruments in their equations, we decided on two factors that appear to be particularly important statistically: absolute latitude of the country and the share of Protestant population. One advantage of using these variables as regressors is that they are clearly exogenous. While it might be difficult to interpret the coefficients of these variables, because they presumably affect both the demand and the supply side of tax effort, one can argue that the resulting regressions provide a better comparison of tax effort in different countries, because these regressions control for immutable country characteristics.

Tax effort regressions with these additional explanatory variables are presented in Table 6. Interestingly, the country's latitude and the share of Protestants are generally more statistically significant than the usual tax effort variables. The residuals from all of our tax effort regressions show that Russia's tax effort relative to other economies in transition peaked in 2001, but by 2005 it had returned to approximately the same level as was observed prior to tax reforms (Table 7). We conclude that tax reforms of 2000-2002 did not change Russia's tax effort in a systematic manner. One reason for this might have been that the implementation of tax reforms and rising oil prices among other factors resulted in budget surpluses and reduced the pressure on the government in general and tax service in particular to raise collections. Of course, another reason might have been an explicit decision by the government to reduce the overall tax burden on the economy.

4. VAT Efficiency Estimates

Tax effort regressions presented above do not control for tax rates even though tax rates are obviously of major importance for estimating tax effort. Presumably tax rates represent mainly the demand side of tax effort.[9] Therefore, by controlling for tax rates in tax effort regressions we are able to focus more on the supply side of tax effort or, in other words, on the ability of the tax administration to collect taxes rather than on the willingness of the population to accept certain statutory tax rates. This ability to collect

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[9] Tax rates might also affect the supply side, because other things equal, the government might find it easier to collect a given tax if its rate is lower.

tax is usually referred to in the economic literature as tax efficiency (see the studies reviewed below).[10]

Most research on tax efficiency has been devoted to the analysis of VAT. Even with respect to VAT, however, there have been very few cross-country empirical studies of the determinants of VAT efficiency and VAT collections. One possible reason for this situation is the surprising difficulty to obtain reliable and consistent data, particularly with respect to collections. While several sources report collections of general consumption and turnover taxes, the only substantial database containing VAT revenues is available from IMF's Government Finance Statistics (GFS). Even that database is far from complete, however, and is often inconsistent with other estimates and even with the earlier GFS publications. In our analysis, we use GFS data whenever possible. If these data are not available, we average estimates from other sources (see Table 1 for data sources on VAT revenues and rates).

In one of the earliest papers on this issue, Bogetic and Hassan (1993) used cross-sectional data from a sample of 34 countries for 1988 to estimate factors determining VAT efficiency measured as the ratio of VAT revenue to GDP. They concluded that in addition to being positively related to the VAT rate, VAT collections were on average higher in countries that use a single VAT rate applied to a relatively broad base. This is not a particularly surprising result, but it is also unreliable, because the number of observations is much too small.

A cross-sectional approach is also used by Ebrill et al. (2001) to examine what was called VAT C-efficiency defined as (the natural logarithm of) VAT revenue as a percentage of private consumption.[11] Based on a sample of 40 to 89 countries, depending on specification, they obtained the following results. First, while VAT C-efficiency increased with the standard VAT rate, the elasticity of this relationship was statistically significantly less than unity (the point estimate was 0.7). This outcome might be due to higher VAT rates being associated with more narrow VAT bases or due to greater difficulties that tax administrations experience with collecting VAT as the standard rate increases. VAT efficiency was also higher in countries with a greater share of foreign trade in GDP, presumably because VAT on imports is easier to collect than at other stages in the VAT chain and, in addition, some countries delay VAT refunds on exports. It is also possible that the importance of trade is correlated with the quality of institutions in the country (as it is in our data, for example), and the quality of institutions affects the quality of the tax administration. If this is the case, however, then the inclusion of trade openness can result in an endogeneity problem in cross-sectional data, although presumably this problem would not be serious, because openness would be only weakly

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[10] Of course, higher than average tax collections may be accomplished in an inefficient manner. For example, a tax administration's unwillingness to pay VAT refunds to legitimate exporters may raise VAT collections, at least in the short term, but it would not be a feature of an efficient VAT system. Nonetheless, this is a widely accepted terminology.

[11] It is unclear, however, whether VAT revenues correspond to the same year as other variables in Ebrill et al. regressions (the authors note that they use "VAT revenue data … for most recent year available." p. 12).

correlated with the error term.[12] Ebrill et al. also found that VAT efficiency was positively related, albeit weakly, to the age of the VAT system in a country perhaps reflecting the experience of the tax administration as well as public acceptance. A significant negative determinant of VAT efficiency was the extent of illiteracy in the country. Illiteracy, however, could be endogenous with VAT revenue if VAT constitutes a significant portion of tax revenue in the country. Finally, regional dummy variables were not significant, except for a positive coefficient for a group of small island countries.

Unlike the above papers, Aizenman and Jinjarak (2005) use panel data estimation based on 44 countries over a period from 1970 to 1999 to estimate what determines VAT efficiency, defined either as $\dfrac{\text{VAT Collections}}{(\text{VAT rate} \cdot \text{Final Consumption})}$ or as $\dfrac{\text{VAT Collections}}{(\text{VAT rate} \cdot \text{GDP})}$. Their results are that VAT efficiency positively depends on GDP per capita, degree of urbanization, trade openness, and political stability. VAT efficiency is negatively related to the share of agriculture in the economy.

Unfortunately, these results are obtained based on highly questionable data and assumptions. In particular, the two key data series appear to be flawed. For instance, VAT revenues are taken from the University of Michigan database that aggregates VAT revenues with other general consumption tax revenues. Obviously, general consumption taxes may differ from VAT revenues.

Perhaps a more serious problem with this study is the assumption that the VAT rate in the countries in their sample remained the same as in 2003. This assumption obviously does not correspond to reality. In Russia alone the standard VAT rate has changed several times since the VAT was introduced in 1992, particularly if one takes into account the special tax that existed in 1994-1995. VAT rates have changed over the years in several more countries. Given that the VAT rate is obviously a key component of VAT efficiency, we cannot put much confidence in Aizenman and Jinjarak's results.

Similarly to Aizenman and Jinjarak, we use panel data to estimate VAT efficiency regressions. Unlike them, however, we use actual VAT rates collected from different sources. Our sample of countries is also 50% larger than theirs. In addition, we present OLS, fixed effects, and between effects estimates.

We use two different dependent variables in our regressions: (1) the ratio of VAT revenue to GDP and (2) the ratio of VAT revenue to final consumption multiplied by the standard VAT rate (we denote this variable as VAT_EFF). We use the following specifications for the two benchmark regressions:

$$\frac{\text{VAT}}{\text{GDP}} = \beta_0 + \beta_1 \cdot \text{VAT\_rate} + \beta_2 \cdot \left(\frac{\text{EXP} - \text{IMP}}{\text{GDP}} \right) + \beta_3 \cdot \frac{\text{AG}}{\text{GDP}} + \varepsilon, \qquad (2)$$

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[12] In our data, the correlation between openness and a measure of government effectiveness is only about 0.2.

$$\text{VAT\_EFF} = \gamma_0 + \gamma_1 \cdot \text{VAT\_rate} + \gamma_2 \cdot \text{OPENNESS} + \gamma_3 \cdot \frac{\text{AG}}{\text{GDP}} + \varepsilon , \qquad (3)$$

where (EXP – IMP) is the trade balance. This variable is expected to have a negative coefficient, because while export is a part of GDP and import is not, most countries impose VAT on imports and exempt exports. Following Ebrill et al., the specification for the second dependent variable includes a measure of the importance of trade in the economy, or openness (the ratio of exports plus imports to GDP). Openness is used instead of trade balance, because final consumption already represents the potential VAT base and there is no need to adjust it for trade balance.

In addition to the benchmark regressions (2) and (3), we also estimate regressions with institutional quality variables (either rule of law or control of corruption) added on the right-hand side of the fixed effects regressions.[13]

Results of the benchmark OLS, fixed effects (both with intra-group correlation adjustment and time dummy variables), and between effects estimation of regressions (2) and (3) are presented in Table 8. Russia's residuals for these regressions are found in Table 9.

In addition, the results of OLS regressions and between effects regressions with the same time-invariant country characteristics as in tax effort regressions (i.e., absolute latitude and share of Protestants) are presented in Table 10. The results of fixed effects regressions with institutional quality variables are presented in Table 12. The residuals from these regressions are shown in Tables 11 and 13, respectively.

The results show that after the 1998 financial crisis, Russia has been collecting more VAT revenue than the averages suggested by our regressions, although VAT efficiency dropped below average in three specifications in 2004 and in one specification in 2005. Another important point to make is that similarly to tax effort, Russia's VAT efficiency peaked in 2001 and declined afterwards, suggesting that tax reforms did not have a lasting impact. (VAT efficiency also was high in 2005 for some regression specifications, but that was presumably due mostly to the additional assessments on YUKOS – see footnote 1 in Section 2.)

Other results are noted in summary fashion.

OLS regressions:

1.1. The VAT rate is strongly and positively related to the VAT-to-GDP ratio in regressions (2) but the elasticity (at the average value of the VAT rate) is less than one.

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[13] The potential endogeneity of institutional quality measures with VAT revenue is unlikely to present a problem in fixed effects regressions, because the base value of institutional quality would be part of the fixed effect. At the same time, year-to-year variations in institutional quality presumably would not be significantly affected by year-to-year fluctuations in VAT revenues.

This is also evidenced in VAT efficiency regressions (3) where the VAT rate has a significant negative coefficient.[14]

1.2. The share of agriculture in GDP is negatively related to VAT efficiency.

1.3. The ratio of trade balance to GDP has a negative coefficient in regressions (1). Openness has a positive coefficient in regressions (2).

1.4. Protestants share in the population and absolute latitude are positively related to VAT efficiency, although latitude is not always statistically significant.

1.5. If the share of Protestants and absolute latitude are included in the regressions, neither institutional quality nor CIS or transition dummies are statistically significant.

Results 1.1-1.4 are, of course, as expected. Result 1.5 indicates that latitude and Protestant share are sufficiently correlated with institutional quality to make the latter statistically insignificant. For example, in 2000, the coefficient of correlation between the control of corruption measure and latitude is 0.47 and between the control of corruption and Protestant share is 0.49.

Fixed effects:

2.1. The VAT rate is no longer statistically significant in regressions (3) although it still has a negative coefficient. This might be the case, however, because VAT variability for a given country is not sufficient to tease out this relationship in a fixed effects estimation. (Note that this coefficient measures the second order effect of the VAT rate. The first order effect is reflected in the definition of VAT efficiency.)

2.2. As before, the share of agriculture in GDP is negatively related to VAT efficiency.

2.3. Openness is no longer statistically significant in the benchmark equation, but becomes significant when institutional quality is added to the regressions.

2.4. Institutional quality becomes (weakly) significant (note that we cannot use latitude and Protestants share in fixed effects regressions) and has expected signs.

The between effects estimation results are broadly similar to OLS results.

5. Micro Evidence of the Effects of Tax Reforms on Business Taxpayers

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[14] If VAT were perfectly structured and administered as a uniform consumption tax, the dependent variable in regressions (3) would always be unity and would not be affected by the VAT rate as an explanatory variable. The fact that the VAT rate has a negative coefficient in regressions (3) suggests that VAT efficiency declines as the VAT rate increases. This result is similar to lower than unitary elasticity of VAT revenue with respect to the VAT rate in regressions (2).

The previous sections used macroeconomic data to evaluate Russia's tax collection performance relative to other economies in transition. In this section we calculate indicators of the tax environment facing firms in Russia, CIS, and East European countries based on the World Business Environment Survey (WBES) conducted at the firm level in 1999-2000, 2002-2003, and 2005. We compare the extent to which tax rates and tax administration are perceived to be a problem, the share of sales that firms hide from tax authorities, payments to tax inspectors, and the share of sales paid in bribes. The data for WBES 2000 on the one hand, and for 2002-2003 and 2005 on the other hand, are not completely comparable, because survey questions changed somewhat between year 2000 and 2002. The changes were relatively minor in our judgment, however, so that we can have reasonable confidence in the intertemporary comparisons. Also, we can compare Russia to other economies in transition for each of these years to see whether Russia's tax reforms have changed its relative standing with respect to these indicators.

A description of the WBES 2000 questions that produced the relevant variables is presented in Table 14. Variables in the 2002-2003 and 2005 surveys are essentially the same as in WBES 2000. However, *Problem: High taxes* and *Problem: tax regulations & administration* variables have the range of 0 to 4 instead of 1 to 4. Also, in WBES 2005 *Bribe tax* is a specific number rather than an interval, instead of sales hidden from tax authorities, the survey asks about sales reported to the tax authorities, and *Payments to deal with taxes* is a 0/1 response to the question "Was Gift or Informal Payment Ever Expected/Requested (to/by tax inspector)?"

Tables 15, 16, and 17 contain the means and standard deviations of responses for the entire survey and subsamples for Russia, CIS, and East European economies in transition. In addition, we present results of the test (p-values) for the statistical significance of the difference between corresponding sample means for Russia and firms from other countries. As all survey data related to corruption, the answers to the last three questions in the table above should be treated with considerable caution, because it is hard to ascertain the relative willingness of respondents from different countries to answer truthfully.

Russian firms' perceptions of high taxes as a problem experienced the most striking change relative to perceptions in other countries. While prior to tax reforms Russia's firms viewed high tax rates as a more serious problem than did firms in other countries, including the CIS and Eastern Europe subsamples, the situation changed dramatically in the post-reform surveys. Both in WBES 2002-2003 and WBES 2005 Russia's firms perceived high taxes to be significantly less of a problem than the firms elsewhere.

The changes were much less dramatic with respect to regulations and tax administration. As with high taxes, Russia's firms ranked this problem as more serious than did firms elsewhere. In the 2002-2003 survey, perceptions of this problem in Russia became similar to those in the CIS but not as sanguine as in Eastern Europe. By 2005, however, things appear to have returned to their pre-reform state. Regulations and tax administration are again a greater problem for firms in Russia than elsewhere.

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Given the apparent improvement in the tax environment but continuing problems with regulations and tax administration, the trends in the extent of corruption are unlikely to be clear. Indeed, this is the case in our data. With respect to the share of the firms' sales that go to pay bribes (so-called bribe tax), Russia's ranking did not change much between WBES 2000 and WBES 2005, with a slight improvement between 2002-2003. If anything, the difference between bribe tax in Russia and in Eastern Europe became more statistically significant by 2005 than it was in 2000, although the average bribe tax declined rather dramatically everywhere.

While a bribe tax reflects general corruption, *Hidden sales* and *Payments to deal with taxes* are more closely related to tax reforms. Here also some improvement seems to have taken place in 2002-2003, but by 2005 Russia regained its earlier low-ranking position, although the absolute share of Russia's firms' sales hidden from taxation declined somewhat relative to WBES 2000. *Payments to deal with taxes* present perhaps the most surprising results in terms of Russia's relative position, particularly with respect to Eastern Europe. Both before and especially after tax reforms, Russia's firms reported lower frequency of such payments than did East European firms. Also, perhaps as a result of lowered tax rates, firms in Russia went from paying more (in dealing with taxes) than their CIS counterparts in WBES 2000 to paying slightly less than CIS firms in WBES 2005.

6. Conclusions

Our investigation has shown that tax reforms in Russia did not significantly change its position relative to other countries with respect to tax effort. Russia's relative tax effort and VAT efficiency peaked in 2001 but later returned to essentially pre-reform levels. We note, however, that both tax effort and VAT efficiency are relatively poor indicators of economic efficiency and welfare. As noted, tax effort might be low due to the country's unwillingness to tax itself and VAT efficiency might be high because exporters are not given VAT refunds in a timely manner or are not allowed to use legitimate VAT credits. In this sense, microdata from the WBES survey might be a better indicator of the success of tax reforms. These data present a somewhat mixed picture. On the one hand, high taxes and tax administration are no longer perceived by Russia's business taxpayers to represent serious problems and both the bribe tax and sales hidden from tax authorities declined as a percentage of total sales between 2000 and 2005. On the other hand, according to most of these indicators the tax environment in Russia remains worse than in Eastern European economies.

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Table 1. Description and sources of macroeconomic data

Variable	Description and sources
VAT revenue as a share of GDP	VAT revenue as percentage of GDP. Most of the values were calculated using VAT revenue in local currency units (LCUs) from IMF's GFS database (see IMF, 2008) and GDP in LCUs from World Bank's WDI Online (2008) database. When GFS data were not available, VAT revenue shares in GDP were calculated averaging the data from the following sources: (1) Bird and Gendron (2006); (2) Mertens and Tesche (2002); (3) OECD (2007); (4) Stepanyan (2003); and (5) Summers and Sunley (1995).
VAT rate	Standard VAT rate (in percentage terms) in the given year or greatest part of the year. Sources: (1) Bird and Gendron (2006); (2) Deloitte (2006); (3) European Commission (2008); (4) Stepanyan (2003); and (5) Summers and Sunley (1995).
Tax revenue as a share of GDP	Tax revenue as a percentage of GDP. Sources: IMF's GFS database and World Bank's WDI Online database.
Agriculture as a share of GDP	Value added in agriculture as a percentage of GDP. Source: WDI Online database.
Per capita GDP	Per capita GDP in constant 2000 US dollars. Source: WDI Online database.
Population growth	Population growth rate. Source: WDI Online database.
Openness	Ratio of exports plus imports to GDP. Source WDI Online database.
Final consumption as a share of GDP	Final consumption as a percentage of GDP. Source: WDI Online database.
Protestants	Share of Protestants in population. Source: La Porta, et al. (1999). The number for Lithuania is from Iwaskiw (1995).
Control of corruption	Index of control of corruption. The range is from 1 (most corrupt) to 6 (least corrupt). Source: ICRG (2006).
Law and order	Index of the strength and impartiality of the legal system and of popular observance of the law. The range is from 1 (least law and order) to 6 (most law and order). Source: ICRG (2006).
Latitude	Absolute latitude of the country scaled between 0 and 1. Source: Ayyagari et al. (2006).

Table 2. Standard Tax Effort Regressions, 1999 – 2005
(Dependent variable: Tax revenue/GDP ratio)

Variable name	1999	2000	2001	2003	2005	1999-2005 means
	(1)	(2)	(3)	(4)	(5)	(6)
Agriculture/ GDP	-.075 (.061)	-.049 (.070)	-.086 (.062)	-.059 (.088)	-.199* (.112)	-.071 (.058)
Per capita GDP ($1000's USD)	.262** (.101)	.402*** (.090)	.328*** (.086)	.241*** (.080)	.267*** (.097)	.242*** (.079)
Population growth	-2.328*** (.684)	-1.774*** (.660)	-1.389** (.573)	-2.792*** (.808)	-1.960* (.990)	-2.679*** (.491)
Ratio of exports and imports to GDP	.018 (.015)	.018 (.015)	.013 (.015)	-.008 (.017)	-.021 (.014)	.000 (.015)
Observations	105	98	104	102	78	130
Adj. R-squared	.359	.432	.400	.367	.410	.397

Notes: Significance levels for coefficient estimates: *** - 1%; ** - 5%; * - 10%;
Robust standard errors are in parentheses

Table 3. Residuals from Standard Tax Effort Regressions in Table 2
(Economies in Transition, 1999-2205)

Country	1999	2000	2001	2003	2005	1999-2005 means
Albania	-	-	-	-1.475	-.747	-1.892
Armenia	-	-	-	-6.946	-5.864	-6.666
Azerbaijan	-2.648	-2.403	-2.058	-	-	-3.557
Belarus	3.957	18.012	17.955	12.131	13.255	9.340
Bulgaria	.304	-1.286	-.562	-.013	2.470	-1.160
Cambodia	-	-	-	-6.927	-2.938	-5.063
China	-10.556	-9.757	-9.142	-9.995	-12.458	-10.732
Croatia	8.805	3.797	2.609	5.590	3.594	4.371
Czech R.	-6.218	-2.102	-2.879	-1.140	-1.868	-2.953
Estonia	-7.199	-2.690	-1.982	-1.824	-2.263	-3.316
Georgia	-6.964	-5.664	-4.382	-11.174	-4.518	-9.230
Hungary	1.506	3.867	4.365	.795	2.032	2.526
Kazakhstan	-7.014	.635	.738	-.250	5.820	-.471
Kyrgyz R.	-2.473	-3.864	-2.266	-	-	-3.810
Latvia	-7.489	-7.458	-6.986	-4.022	-4.147	-6.441
Lithuania	-	-1.206	-.480	-2.851	-3.303	-3.005
FYR of Macedonia	-	-	-	-	-	-
Moldova	2.003	3.226	4.470	.472	4.236	1.045
Mongolia	-5.575	-2.307	-.056	8.324	-	1.655
Poland	-2.870	-4.364	-1.876	-1.888	-2.850	-3.283
Romania	-3.782	-5.597	-9.271	-3.966	-4.435	-6.181
Russia	1.159	5.043	6.805	1.308	2.152	1.931
Serbia	-	-	-	-	-	-1.589
Slovakia	-2.861	-1.685	-3.398	-3.031	-3.588	-3.376
Slovenia	.044	.900	1.894	1.561	-.031	.662
Tajikistan	-3.526	-3.134	-7.881	-3.182	-	-4.170
Turkmenistan	3.436	8.309	-	-	-	7.775
Ukraine	-8.728	-6.815	-.071	-2.030	.391	-4.353
Uzbekistan	13.595	11.478	8.926	-	-	10.042
Vietnam	.289	.256	2.934	4.452	-	2.509

Table 4. Tax Effort Regressions with CIS and Economies in Transition Dummy Variables, 1999 – 2005
(Dependent variable: Tax revenue/GDP ratio)

Variable name	1999	2000	2001	2003	2005	1999-2005 means
	(1)	(2)	(3)	(4)	(5)	(6)
Agriculture/GDP	-.056 (.063)	-.043 (.075)	-.084 (.067)	-.031 (.096)	-.174 (.128)	-.051 (.062)
Per capita GDP ($1000's USD)	.201* (.107)	.392*** (.099)	.325*** (.094)	.216*** (.081)	.238** (.111)	.204** (.082)
Population growth	-3.253*** (.764)	-1.993* (1.044)	-1.450* (.857)	-3.487*** (1.137)	-2.664 (1.744)	-3.385*** (.623)
Ratio of exports and imports to GDP	.029 (.018)	-.019 (.017)	-.014 (.017)	-.006 (.018)	-.018 (.017)	.005 (.017)
Economy in transition	-4.382* (2.318)	-.712 (2.604)	-.268 (2.341)	-2.576 (2.225)	-2.139 (3.333)	-3.223* (1.857)
Observations	105	98	104	102	78	130
Adj. R-squared	.386	.432	.400	.379	.416	.412

Notes: Significance levels for coefficient estimates: *** - 1%; ** - 5%; * - 10%;
        Robust standard errors are in parentheses

Table 5. Residuals from Tax Effort Regressions with CIS and Economies in Transition Dummy Variables
(Economies in Transition, 1999-2205)

Country	1999	2000	2001	2003	2005	1999-2005 means
Albania	-	-	-	-.296	.218	-.366
Armenia	-	-	-	-6.447	-5.487	-5.742
Azerbaijan	.032	-2.014	-1.892	-	-	-1.599
Belarus	4.453	18.182	18.039	12.874	13.625	10.284
Bulgaria	1.438	-1.498	-.566	.671	2.786	-.477
Cambodia	-	-	-	-5.475	-1.378	-2.790
China	-7.519	-9.308	-8.954	-8.301	-11.659	-8.644
Croatia	11.843	3.835	2.659	6.881	4.545	5.851
Czech R.	-4.251	-1.828	-2.802	.282	-.910	-1.442
Estonia	-6.485	-2.598	-1.889	-.739	-1.566	-2.206
Georgia	-6.130	-5.715	-4.338	-1.038	-4.591	-8.652
Hungary	2.283	4.097	4.491	1.488	2.955	3.859
Kazakhstan	-6.325	.866	.866	.972	7.150	1.049
Kyrgyz R.	-.006	-3.579	-2.138	-	-	-2.146
Latvia	-6.182	-7.321	-6.875	-3.003	-3.539	-5.226
Lithuania	-	*1.183	-.378	-1.837	-2.843	-1.830
FYR of Macedonia	-	-	-	-	-	-
Moldova	2.841	3.214	4.528	.981	4.471	1.809
Mongolia	-3.951	-2.129	.066	9.869	-	3.291
Poland	-.347	-4.125	-1.745	-.440	-1.768	-1.557
Romania	-1.682	-5.436	-9.226	-3.160	-3.902	-5.051
Russia	2.681	5.348	6.954	2.680	2.698	3.405
Serbia	-	-	-	-	-	-2.587
Slovakia	-1.077	-1.475	-3.289	-1.720	-2.707	-1.947
Slovenia	2.518	1.280	2.064	3.193	1.234	2.610
Tajikistan	-1.350	-2.870	-7.743	-1.860	-	-2.453
Turkmenistan	5.524	8.614	-	-	-	9.747
Ukraine	-7.873	-6.887	-.28	-1.543	.668	-3.666
Uzbekistan	16.707	11.884	9.094	-	-	12.076
Vietnam	2.859	.646	3.102	5.968	-	4.399

Table 6. Tax Effort Regressions with Additional Explanatory Variables, 1999 – 2005
(Dependent variable: Tax revenue/GDP ratio)

Variable name	1999	2000	2001	2003	2005	1999-2005 means
	(1)	(2)	(3)	(4)	(5)	(6)
Agriculture/ GDP	-.048	-.043	-.046	-.045	-.118	.033
	(.058)	(.064)	(.056)	(.083)	(.111)	(.060)
Per capita GDP ($1000's USD)	-.073	.075	-.022	-.027	-.005	-.058
	(.123)	(.110)	(.092)	(.084)	(.135)	(.078)
Population growth	-2.249***	-.597	-.928*	-1.402	-1.198	-2.223***
	(.715)	(.935)	(.525)	(1.062)	(1.479)	(.642)
Ratio of exports and imports to GDP	.030*	.025*	.027**	.011	-.001	.017
	(.017)	(.013)	(.012)	(.014)	(.017)	(.012)
Economy in transition	-6.223**	-3.613	-4.665*	-3.740	-4.340	-5.550**
	(2.731)	(2.770)	(2.613)	(2.544)	(3.548)	(2.137)
Latitude	13.754**	19.557***	18.534***	16.457***	17.261**	17.261***
	(5.446)	(5.813)	(5.055)	(4.923)	(6.945)	(4.247)
Protestants	.115***	.098***	.109***	.118***	.102**	.121***
	(.042)	(.032)	(.031)	(.031)	(.044)	(.030)
Observations	101	95	101	98	76	124
Adj. R-squared	.512	.566	.573	.541	.553	.577

Notes: Significance levels for coefficient estimates: *** - 1%; ** - 5%; * - 10%;
Robust standard errors are in parentheses

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Table 7. Residuals from Tax Effort Regressions with Additional Explanatory Variables
(Economies in Transition, 1999-2205)

Country	1999	2000	2001	2003	2005	1999-2005 means
Albania	-	-	-	.491	.458	.628
Armenia	-	-	-	-3.917	-3.688	-3.954
Azerbaijan	.198	-1.781	-.832	-	-	-1.463
Belarus	4.718	16.731	16.525	12.279	13.017	9.275
Bulgaria	2.864	1.831	1.091	2.412	3.915	1.137
Cambodia	-	-	-	-2.774	-.296	.265
China	-6.333	-7.612	-6.163	-6.987	-8.886	-6.674
Croatia	11.973	6.547	4.819	7.936	5.982	7.226
Czech R.	-3.743	-1.652	-2.011	-.144	-.848	-1.375
Estonia	-14.203	-10.574	-10.895	-9.988	-9.876	-11.701
Georgia	-4.243	-3.039	-2.667	-7.500	-2.544	-6.490
Hungary	1.921	2.782	2.995	1.415	1.608	2.228
Kazakhstan	-5.144	.392	.786	.744	6.183	.747
Kyrgyz R.	-.739	-3.985	-2.098	-	-	-2.794
Latvia	-7.686	-9.138	-8.996	-4.722	-5.012	-7.258
Lithuania	-	-1.355	-1.172	-2.241	-3.033	-2.379
FYR of Macedonia	-	-	-	-	-	-
Moldova	2.986	3.215	3.687	.869	3.596	1.271
Mongolia	-4.984	-3.597	-1.653	6.515	-	.961
Poland	.036	-3.284	-.581	-.081	-1.003	-.914
Romania	-1.845	-4.894	-8.455	-2.114	-2.950	-4.488
Russia	1.784	2.848	5.304	1.137	2.549	2.083
Serbia	-	-	-	-	-	-
Slovakia	-1.376	-1.905	-3.933	-3.358	-3.802	-2.998
Slovenia	5.051	3.822	5.059	5.107	3.558	4.930
Tajikistan	-1.608	-3.548	-7.996	-3.315	-	-3.337
Turkmenistan	5.252	7.685	-	-	-	8.584
Ukraine	-7.335	-6.246	-.263	-.523	1.073	-3.389
Uzbekistan	16.305	11.553	9.377	-	-	11.719
Vietnam	6.151	5.207	8.072	8.758	-	8.161

Table 8. Benchmark VAT Efficiency Regressions

Variable name	VAT/GDP	VAT_EFF	VAT/GDP	VAT_EFF	VAT/GDP	VAT_EFF
Estimation technique	OLS		Fixed Effects		Between Effects	
	(1)	(2)	(3)	(4)	(5)	(6)
VAT rate	.284***	-.983***	.260***	-.286	.252***	-1.332***
	(.033)	(.260)	(.061)	(.541)	(.050)	(.307)
Export-Import	-.061***	-	-.036	-	-.118***	-
	(.018)		(.027)		(.024)	
Openness	-	.074***	-	.004	-	.139***
		(.022)		(.050)		(.033)
Agriculture/GDP	-.100***	-.628***	-.137***	-.583***	-.134***	-.668***
	(.017)	(.111)	(.018)	(.208)	(.027)	(.140)
Observations	493	492	493	492	493	492
Countries	66	65	66	65	66	65
R-squared	.435	.417	.338	.193	.438	.504

Notes: OLS and fixed effects regressions include year dummies and adjust for intra-group (intra-country) correlation and heteroscedasticity (robust standard errors);
Standard errors are in parentheses; constants and year dummy variable coefficients are not shown;
Significance levels for coefficient estimates: *** - 1%; ** - 5%; * - 10%.

Table 9. Residuals Corresponding to VAT Efficiency Regressions in Table 8 (Russia)

Year	(1)	(2)	(3)	(4)	(5)	(6)
1992	2.464	30.576	1.971	26.955	3.822	39.300
1993	.480	9.123	-.173	5.760	1.409	13.951
1994	-1.351	-1.925	-1.875	-8.183	-1.044	1.514
1995	-1.054	-1.801	-1.356	-5.790	-1.209	-1.202
1996	.169	5.030	-.311	.465	-.006	4.675
1997	-.236	1.643	-.523	-2.431	-.343	1.986
1998	-.816	-6.176	-1.322	-9.943	-.825	-6.935
1999	.623	4.830	.068	1.784	1.280	2.688
2000	.658	8.194	.019	5.675	1.525	7.691
2001	.989	12.044	.510	8.710	1.266	9.950
2002	.294	5.184	.053	3.160	.726	5.145
2003	.657	8.223	.392	8.056	1.050	7.324
2004	-.009	3.040	-.168	3.407	.710	4.789
2005	.071	6.006	.002	5.325	1.437	10.537

Table 10. VAT Efficiency OLS and Between Effects Regressions with Additional Variables

Variable name	VAT/GDP	VAT_EFF	VAT/GDP	VAT_EFF
Estimation method	OLS		Between Effects	
	(1)	(2)	(3)	(4)
VAT rate	.223***	-1.387***	.221***	-1.627***
	(.035)	(.254)	(.051)	(.348)
Export-Import	-.059***	-	-.079***	-
	(.018)		(.023)	
Openness	-	.067***	-	.089**
		(.018)		(.037)
Agriculture/GDP	-.076***	-4.73***	-.085***	-.498***
	(.017)	(.117)	(.026)	(.143)
Protestants	.009**	.089***	.010	.078
	(.004)	(.032)	(.008)	(.058)
Latitude	2.87**	14.381	1.463	14.203
	(1.21)	(9.782)	(1.423)	(10.584)
Observations	492	491	492	491
Countries	65	64	65	64
R-squared	.491	.467	.471	.493

Notes: All regressions include year dummies and adjust for intra-group (intra-country) correlation and heteroscedasticity (robust standard errors);
Standard errors are in parentheses;
Constants and year dummy variable coefficients are not shown;
Significance levels for coefficient estimates: *** - 1%; ** - 5%; * - 10%.

Table 11. Residuals Corresponding to VAT Efficiency Regressions in Table 10 (Russia)

Year	(1)	(2)	(3)	(4)
1992	2.843	44.877	3.517	42.404
1993	.363	48.864	1.065	12.435
1994	-1.172	40.268	-1.091	.276
1995	-.932	39.222	-1.266	-2.612
1996	.132	41.169	-.157	2.308
1997	-.269	42.357	-.379	-.289
1998	-.859	42.891	-.997	-8.642
1999	.532	42.429	.617	1.377
2000	.552	44.472	.787	6.464
2001	.868	42.055	.810	8.346
2002	.199	44.382	.387	3.614
2003	.202	48.332	.644	5.229
2004	-.369	50.411	.285	2.626
2005	-.207	52.619	.935	8.293

Table 12. VAT Efficiency Fixed Effects Regressions with Institutional Quality Variables

Variable name	VAT/GDP	VAT_EFF	VAT/GDP	VAT_EFF
	(1)	(2)	(3)	(4)
VAT rate	.215*** (.053)	-.504* (.272)	.226*** (.058)	-.421 (.270)
Export-Import	-.044* (.023)	-	-.048** (.022)	-
Openness	-	.105*** (.024)	-	.103*** (.024)
Agriculture/GDP	-.168*** (.045)	-1.070*** (.204)	-.154*** (.046)	-.985*** (.201)
Corruption control	.136** (.068)	.915* (.482)	-	-
Law and order	-	-	.109 (.071)	1.168** (.574)
Observations	410	409	410	409
Countries	58	57	58	57
R-squared	.361	.286	.357	.287

Notes: Fixed effects regressions include year dummies and adjust for intra-group (intra-country) correlation and heteroscedasticity (robust standard errors);
Standard errors are in parentheses; constants and dummy variable coefficients are not shown;
Significance levels for coefficient estimates: *** - 1%; ** - 5%; * - 10%;
R-squared is "within" for fixed effects and "between" for between effects.

Table 13. Residuals Corresponding to VAT Efficiency Regressions in Table 12 (Russia)

Year	(1)	(2)	(3)	(4)
1992	2.798	28.480	2.789	28.735
1993	.853	11.912	.855	12.600
1994	-1.379	-4.771	-1.387	-4.0374
1995	-.733	-1.211	-.731	-.334
1996	.296	5.720	.159	5.266
1997	.117	3.397	-.059	2.602
1998	-.621	-4.802	-.736	-5.148
1999	.651	5.473	.516	4.983
2000	.710	10.662	.557	9.910
2001	1.170	14.592	1.004	13.892
2002	.632	8.446	.470	7.619
2003	.844	12.528	.673	11.374
2004	.172	7.668	.116	7.313
2005	.479	11.301	.407	10.801

Table 14. Description of Microeconomic Variables in WBES 2000 and WBES 2002-2005

WBES 2000	
Variable name	**Survey question and possible answers**
Problem: High taxes	Please judge on a four point scale how problematic are these different regulatory areas for the operation and growth of your business (Please do not select more than 4 obstacles as the "major" (4)): High taxes 1 2 3 4
Problem: tax regulations & administration	Same as above Tax regulation/administration 1 2 3 4
Bribe tax	On average, what percent of revenues do firms like yours typically pay per annum in unofficial payments to public officials? 1 (0%), 2 (less than 1%), 3 (1~1.99%), 4 (2~9.99%), 5 (10~12%), 6 (12.01~25%) or 7 (more than 25%). (Midpoints of intervals are assumed for calculating averages. The last number is assumed to be 30%.)
Hidden sales	Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical firm in your area of activity keeps "off the books"? a) None at all 1 b) 1-10% 2 c) 11-20% 3 d) 21-30% 4 e) 31-40% 5 f) 41-50% 6 g) More than 50% (specify ___ %) 7 (Midpoints of intervals are assumed for calculating averages. The last number is assumed to be 55.5%.)
Payments to deal with taxes	Do firms like yours typically need to make extra, unofficial payments to public officials for any of the following: – to deal with taxes and tax collection? 1 – Always; 2 – Mostly; 3 – Frequently;

	4 – Sometimes; 5 – Seldom; 6 – Never.

<table>
<tr><td colspan="2" align="center">WBES 2002-2005</td></tr>
<tr><td>Variable name</td><td>Survey question and possible answers</td></tr>
<tr>
<td>Problem: Tax rates</td>
<td>Please tell us if any of the following issues are a problem for the operation and growth of your business. If an issue poses a problem, please judge its severity as an obstacle on a four-point scale where:
0 = No obstacle 1 = Minor obstacle
2 = Moderate obstacle 3 = Major obstacle
4 = Very Severe Obstacle

         No problem   Degree of obstacle
Tax rates   0   1 2 3 4</td>
</tr>
<tr>
<td>Problem: tax administration</td>
<td>Same as above

         No problem   Degree of obstacle
Tax
Admin   0   1 2 3 4</td>
</tr>
<tr>
<td>Bribe tax</td>
<td>We've heard that establishments are sometimes required to make gifts or informal payments to public officials to "get things done" with regard to customs, taxes, licenses, regulations, services etc. On average, what percent of annual sales value would such expenses cost a typical firm like yours? ____%</td>
</tr>
<tr>
<td>Hidden sales (1 – the answer to the survey question on the right)</td>
<td>Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical establishment in your area of activity reports for tax purposes? ____ %</td>
</tr>
<tr>
<td>Payments to deal with taxes (see sub-question on the right)</td>
<td>Overall question: On average, how many days last year were spent in inspections and mandatory meetings with officials of each of the following agencies in the context of regulation of your business? And what were the costs associated with these interactions?

- Tax inspectorate

Sub-question: Was Gift or Informal Payment Ever Expected/Requested? Yes=1 No=2</td>
</tr>
</table>

Table 15. Comparison of means from WBES 2000 survey (1999-2000 years)

	All countries, except Russia		Russia		CIS, except Russia		Eastern Europe	
	Mean/ p-value	SD/ Obs.	Mean	SD/ Obs.	Mean/ p-value	SD/ Obs.	Mean/ p-value	SD/ Obs.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Problem: High taxes (1 – 4)	3.22 (.000)	1.01 9192	3.71 -	.70 521	3.58 (.001)	.83 1229	3.33 (.000)	.93 1507
Problem: tax regs. & admin. (1 – 4)	2.73 (.000)	1.05 8978	3.22 -	.97 519	3.06 (.002)	1.06 1228	2.79 (.000)	1.04 1517
Bribe tax (% sales)	2.88 (.006)	5.34 4993	3.82 -	5.25 253	5.93 (.000)	7.17 657	3.26 (.132)	4.43 693
Hidden sales (% sales)	14.93 (.000)	19.06 7654	19.78 -	19.20 481	15.01 (.000)	18.88 1088	14.61 (.000)	18.42 1071
Payments to deal with taxes 1 (always) – 6 (never))	4.66 (.000)	1.63 4917	5.25 -	1.18 506	4.79 (.000)	1.47 1139	5.36 (.079)	1.12 1345

Table 16. Comparison of means from WBES 2002-2005 survey (2002-2003 years)

	All countries, except Russia		Russia		CIS, except Russia		Eastern Europe	
	Mean/ p-value	SD/ Obs.	Mean	SD/ Obs.	Mean/ p-value	SD/ Obs.	Mean/ p-value	SD/ Obs.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Problem: tax rates (0 – 4)	1.97 (.000)	1.36 22424	1.57 -	1.10 500	1.73 (.004)	1.12 2616	1.85 (.000)	1.10 3027
Problem: tax administration (0 – 4)	1.72 (.846)	1.37 22271	1.71 -	1.13 497	1.73 (.769)	1.11 2561	1.40 (.000)	1.14 2968
Bribe tax (% of sales)	1.98 (.000)	5.23 14945	1.43 -	2.50 471	2.02 (.000)	3.81 2497	1.26 (.178)	2.50 471
Hidden sales (% of sales)	24.77 (.000)	31.40 15527	18.04 -	24.55 427	18.38 (.799)	26.35 2457	14.29 (.003)	21.71 2672
Payments to deal with taxes (1=yes, 0=no)	.64 (.000)	.48 1351	.46 -	.50 495	.46 (.77)	.50 2472	.65 (.000)	.48 2755

Table 17. Comparison of means from WBES 2002-2005 survey (year 2005)

	All countries, except Russia		Russia		CIS, except Russia		Eastern Europe	
	Mean/ p-value	SD/ Obs.	Mean	SD/ Obs.	Mean/ p-value	SD/ Obs.	Mean/ p-value	SD/ Obs.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Problem: tax rates (0 – 4)	1.72 (.000)	1.25 16729	1.55 -	1.05 587	1.69 (.002)	1.09 3409	1.83 (.000)	1.13 4465
Problem: tax administration (0 – 4)	1.44 (.000)	1.21 16661	1.65 -	1.04 585	1.45 (.000)	1.11 3370	1.48 (.000)	1.15 4454
Bribe tax (% of sales)	.881 (.013)	3.46 15083	1.07 -	1.67 556	1.43 (.000)	2.92 3162	.77 (.000)	2.21 4081
Hidden sales (% of sales)	12.90 (.008)	22.10 16091	15.55 -	23.45 569	8.80 (.000)	17.79 3334	10.47 (.000)	17.9 4283
Payments to deal with taxes (1=yes, 0=no)	.64 (.000)	.48 14194	.42 -	.49 541	.46 (.114)	.50 3204	.70 (.000)	.46 (4013)