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Can Tax Simplification Help Lower Tax Corruption?

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Abstract

This paper seeks to find empirical evidence of a link between tax simplification and corruption in tax administration. It attempts to do this by first defining "tax simplicity" as a measurable variable and exploring empirical relationships between simpler tax regimes and corruption in tax administration. Corruption in tax administration is calculated with data series from the World Bank's Enterprise Survey Database. The focus is on business taxes. The study includes 104 countries from different income groups and regions of the world. The time period is 2002–12. The empirical findings support the existence of a significant link between the measure of tax corruption and tax simplicity, so a less complex tax system is shown to be associated with lower corruption in tax administration. It is predicted that the combined effect of a 10 percent reduction in both the number of payments and the time to comply with tax requirements can lower tax corruption by 9.64 percent. Some interesting regional differences are observed in the results. Similarly, the income level of countries plays an important role in determining the impact of tax simplification on tax corruption; specifically, the link is stronger for lower-income level countries. The positive link between tax simplicity and lower tax corruption has useful policy implications.

This paper is a product of the Governance Global Practice Group. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at rawasthi@worldbank.org.

Can Tax Simplification Help Lower Tax Corruption? *

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1. Introduction

The tax administration of a country plays a central role in raising much needed revenues to finance government expenditures. No state can exist without taxes. In today's world taxes go beyond merely raising revenues; they signify the "fiscal contract" between society and its government, the so-called "price for civilization" (attributed to Oliver Wendell Holmes, Jr., 1904). The willingness for people of a country to pay tax relates very strongly with their identification with the state as citizens of the country they live in. This intrinsic willingness to pay tax – also referred to as tax morale – is higher where taxpayers have more confidence in the integrity of government, and more specifically, the integrity of the tax administration. Therefore, a corruption-free tax administration is the basis for establishing good governance, the foundation on which a strong fiscal contract can be built, and determines the extent to which people are happy to voluntarily comply with their tax duties.

Corruption in tax administration is as old as the system of collecting taxes itself. It finds reference in ancient treatises, for example, in the *Arth Shastra*, written by Kautilya in India as far back as the third century B.C. (see, for example, one translation, "Kautilya's Arthashastra", Kautilya, 1915). Chapter VIII of Book II of the book is entitled, "Detection of What Is Embezzled by Government Servants Out of State Revenue"**.** The chapter lists several ways in which revenues can be compromised by corrupt officials, and specifies penalties to be imposed. The chapter starts with the following statement, which underscores the importance of tax revenues and recognizing the possibility of corruption:

> "ALL undertakings depend upon finance. Hence foremost attention shall be paid to the treasury."

The interesting point is that as far back as the third century B.C., there was a realization that corruption in tax administration is a real risk.

Intuitively, there is an understanding that complexity of the tax system gives rise to corruption: the more complex a tax regime, the greater the opportunity for corruption. Complexity in tax law leads to opportunities for multiple interpretations of tax statutes, giving rise to incentives for choosing the lowest-tax options. Whether a tax official accepts the low-tax

interpretation or not is at their discretion. Given that significant monetary stakes could be involved, this provides rent seeking opportunities to tax officials. But, even at a more basic service-delivery level, tax corruption from complexity can arise. Complex declaration forms, high costs of compliance, and intricate compliance procedures may provide rent seeking opportunities to tax officials that "facilitate" tax compliance for a "fee." Both these types of complexity exist in varying degrees in tax administrations around the world, but typically in developing countries with low levels of "maturity" of tax administrations, complex tax administrations abound. And, consequently, corruption in tax administrations is seen as a serious problem in developing countries, with a detrimental impact on tax collections, and on tax morale.

This paper attempts to answer the question of whether or not there is empirical evidence that would link tax complexity and corruption in tax administrations. In the literature there are several studies, investigating the link between tax corruption and taxes[2] and also the link between tax complexity and taxes.[3] But, there are only a very limited number of empirical studies on the relationship between tax corruption and tax complexity which can be considered as an important component of the transmission mechanism between tax complexity and taxes. None of these studies on tax corruption and tax complexity involve a cross-country dimension. For example, Obwona and Muwonge (2002) and Kasimbazi (2003) find tax complexity and lack of transparency leads to tax corruption in Uganda, but focus only on one country in their analysis.

In this paper, tax corruption is measured directly by using firm-level data from 104 different countries. Given data availability, we focus only on business taxes (corporate taxes,

[2] For example, Tanzi and Davoodi (2002) studies corruption, growth, and public finances, Friedman, Johnson, Kaufmann, and Zoido-Lobaton (2000) studies determinants of unofficial activity in 69 countries, Crandall and Bodin (2005) and Imam and Jacobs (2007) focus on the effect of corruption on tax revenues; and Purohit (2007) studies corruption in tax administration.

[3] Some papers on the impact of complex tax systems on tax cost: Heyndels and Smolders (1995), Cuccia and Carnes (2001), Evans (2003), Dean (2005), Mulder, Verboon and De Cremer (2009), Saad (2009), Alm (1999), Paul (1997), Oliver and Bartley (2005), Quandt (1983), Alm, Jackson and Mckee (1992), Picciotto (2007). Some studies on how tax complexity may lead to lower taxes: Milliron (1985), Mills (1996), Spilker, Worsham and Prawitt (1999), Forest and Sheffrin (2002), Kirchler, Niemirowski and Wearing (2006), Richardson (2006), and Slemrod (2007). There are some controversial studies, indicating that tax complexity may lead to higher taxes: Scotchmer (1989), White, Curatola and Samson (1990).

value added tax, and labor taxes) and exclude personal income tax. The main data source is the World Bank's Enterprise Survey Database. The dataset covers the years from 2002 to 2012. Tax complexity is measured with two alternative variables: time to comply with tax requirements and the number of tax payments, both of which are from the World Bank's Doing Business database. In this paper we try to identify empirical determinants of tax corruption, including tax complexity indicators, through different regression analyses. In the benchmark regression specification, tax corruption is the dependent variable, while tax complexity indicators and control variables are included as independent variables. The control variables include political and institutional determinants of tax corruption, as well as judicial determinants. A GMM technique is applied to investigate the impact of these variables on tax corruption due to the possibility of an endogeneity problem.

The regression findings support the existence of a strong link between tax corruption and the indicators of tax complexity. After obtaining the estimated coefficients, different experiments are run to understand the economic significance of the tax simplification variables on tax corruption. The results show that while a 10 percent drop in the number of tax payments leads to an approximately 4 percent cut in tax corruption, the same amount of decrease in the hours to comply with tax requirements reduces tax corruption by 6 percent. The combined effects of the two tax simplification variables (10 percent cuts in both variables) are predicted to be even stronger, leading to a 9.6 percent cut in tax corruption. To check for robustness, regional differences and the income level of countries are controlled.

We find that tax corruption responds more to the changes in the tax simplification variables in the Latin America and Caribbean and Sub-Saharan African regions. Similarly, a stronger positive link is observed between tax corruption and tax simplification for lower-income countries. The empirical results, indicating that tax simplification has a strong impact on tax corruption, have important policy implications. Lowering corruption in tax administration is possible by simplifying the tax regime, often in various easy, non-controversial ways, many of which do not even need legislative changes. The paper attempts to provide a road map for tax

simplification; steps that can be taken both in tax laws and tax administration which would move a tax administration towards simplification, and hence on a path of lower tax corruption.

Section 2 gives information on the measurement of the tax corruption variable, as well as the indicators of tax complexity. Section 3 focuses on regression analyses and experiments. Section 4 presents some policy implications of the empirical results and includes suggestions on how to simplify taxes. Section 5 concludes.

2. Tax Simplification and Tax Corruption: Data Issues

2.1 Measuring Tax Simplicity

As the intuitive analysis tells us, a simpler tax system creates fewer chances for rent seeking and lowers the opportunity for corruption in the tax system. The question arises, how does one define "tax simplicity", particularly in a way that would allow comparisons on an international level and across a time period? The only viable option available is to use the Doing Business reports produced by the World Bank Group. The Doing Business reports measure the ease of doing business as reflected in 10 indicators, including one on complying with the tax system: Paying Taxes. 2 sub-indicators of the Paying Taxes indicator are: Time to Comply and Number of Payments. The premise is that the lower the time taken to comply with the tax system and the fewer the number of payments, the easier it is for businesses to comply with their tax paying obligations. Based on the definitions of the sub-indicators and the methodology of collecting data around them, it appears that for the purposes of this paper, the sub-indicators, Time to Comply (TAXTIME) and Number of Payments (TAXPAY), are the best suited measures of "tax simplicity". It may be noted that these two variables are also used to measure the complexity of tax systems by Lawless (2013). That paper investigates the impacts of changing tax complexity on foreign direct investment flows. The definitions and methodologies as set out in the Doing Business reports are provided in Appendix 1 (Doing Business Paying Taxes, 2013).

The TAXTIME indicator measures the time it takes to prepare and file tax returns for the three major taxes that impact an average medium-sized business, and the time taken to make the payments of these taxes. The preparation time includes the time taken to collect all

information and data needed to calculate the tax liability and to fill out the declaration forms. If the tax regime has complex provisions which impose requirements to provide information that may not be available to a business in the normal course of carrying on its business, or in its usual financial accounting, this adds to the time taken to comply. Finally, the time taken to actually complete declaration forms is also included, and so is the time taken to make the payments. If the declaration forms are complex, long, and tedious, that would result in a higher time to comply. And if payment procedures are inconvenient and not streamlined, time to comply increases. All of these raise compliance costs for taxpayers. This provides businesses with the incentives to accede to rent-seeking tax officials who may be able to help cut down on the time and cost of tax filing and payments in return for an appropriate rent. This represents one link between tax complexity and tax corruption.

Secondly, if the tax laws contain provisions that provide special tax concessions or exemptions based on a business fulfilling certain conditions, such as, maintaining special documentation or accounts to comply with the tax regime, and avail those concessions, the extra time that requires is also factored in. This not only increases the time to comply, but it can also lead to tax corruption in that the concessions are wrongly claimed, the provisions are deliberately misused, false claims are made, and incorrect documents submitted, in collusion with some corrupt officials. Thus, a complex regime has the potential to engender rent seeking behavior, and time to comply is a good proxy of the complexity or simplicity of the tax regime.

Similarly, TAXPAY is a good measure of the ease of payment procedures of taxes. In inefficient tax administrations, taxpayers often face onerous payment procedures, have limited options in terms of where the payments can be made, and may have to stand in long lines to submit their tax payments. The Doing Business methodology captures all this, and in addition, it factors in the benefits of electronic filing and payments. In fact, the Doing Business methodology assigns a higher weight to e-filing and e-payment systems: where these systems are widely prevalent, it assumes only one payment, even though businesses may make more frequent payments. Therefore, it implicitly assumes that e-filing and e-payment systems significantly reduce compliance burdens. Electronic tax systems thus get a disproportionately

high weight, and rightly so. It is seen around the world that successfully operating e-systems have been extremely useful to tax administrations in reducing tax compliance time and cost for tax payers and direct contact between taxpayers and tax officials. So, the Doing Business's paying taxes sub-indicator is also useful in judging a tax system's simplicity.

Based on this reasoning, the two sub-indicators chosen as proxies for a measure of tax simplicity are TAXTIME and TAXPAY. As the data analysis shows in the following sections, while each of these indicators by themselves have a positive relationship with tax corruption, jointly they further strengthen the relationship.

It should be noted that the Doing Business (DB) reports come out with a lag of two years. For example, a DB 2010 report reflects the measures of various indicators as were recorded for the year 2008. Accordingly, the year 2008 data points of all other variables used in the paper correspond to "DB year" 2010; care has been taken in ensuring that the data for the same years have been matched for each country.

The Doing Business indicators have been criticized as they are not considered the most robust of measures, especially in the case of the Paying Taxes indicators. The methodology and the presentation of the data collected have also been questioned. However, the point is, they are the *only* available set of data points that provide an objective, world-wide comparison of indicators of the complexity or simplicity of tax regimes.

The Doing Business report has recently been reviewed by an independent panel[4] constituted by the President of the World Bank. This panel has also relied, among others, on a study carried out by the International Tax Dialog (ITD) in 2008, which made various suggestions on improving the DB Paying Taxes indicator.[5]

In general, the recommendations conclude that "the Panel accepts the need for tax indicators as a measure of the ease of doing business for small and medium-sized enterprises. It

[4] Independent Panel Review of the Doing Business Report, June 2013, http://www.dbrpanel.org/sites/dbrpanel/files/doing-business-review-panel-report.pdf

[5] The International Tax Dialog brings together the Inter-American Center of Tax Administrations, European Commission, Inter-American Development Bank, IMF, OECD, United Nations, and the World Bank.

also notes that there have been examples of where the indicators have helped governments identify and implement best practices. For this reason, the Panel supports continuing the tax indicator in a modified form, either in the context of the present framework but with a different approach, or in the context of a new framework" (Independent Panel Report, 2013 page 40).

The panel did raise questions about the methodology for all the 10 indicators used in the Doing Business report, including Paying Taxes. Specifically, on the Paying Taxes, they have criticized most the Total Tax Rate (TTR) indicator, saying it is not indicative of the ease of doing business at all. We agree with this view and in this paper we do not use the TTR measure for tax simplicity.

Even though the independent panel report criticizes Time to Comply (TAXTIME) due to its subjectivity, they agree (as does the ITD) that this indicator is a good, useful measure of the compliance burden of a tax system.

On the third sub-indicator, the Panel has recommended that the Number of Payments (TAXPAY) measure be dropped or modified, as the number of times a firm needs to make payments may not represent simplicity or lower compliance burdens, in their view. They also question the validity of assuming one payment in case electronic filing and payment systems are being used. On this, our view is a bit different. As discussed above, we believe that the indicator is a useful measure of simplicity. Moreover, it gives a higher weight to electronic filing and payments systems, which help reduce opportunities for tax corruption. On both these counts, we see this indicator to be useful for this paper.

2.2 Measuring Tax Corruption

The World Bank's Enterprise Surveys (www.enterprisesurveys.org) offers an expansive array of economic data on 130,000 firms in 138 countries. An Enterprise Survey is a firm-level survey of a representative sample of an economy's private sector. The surveys cover a broad range of business environment topics including access to finance, corruption, infrastructure, crime, competition, and performance measures.

Firm-level surveys have been conducted since 2002 by the World Bank. The raw individual country datasets, aggregated datasets (across countries and years), panel datasets, and all relevant survey documentation are publicly available (see Appendix 2 for a description of the methodology). The Enterprise Surveys (ES) data used for this paper is for 138 countries which have a non-zero number for the measure of the tax corruption indicator. These surveys are conducted between the years 2002 and 2013.

In the questionnaire administered by the Enterprise Surveys, the following questions are asked about corruption in tax administration:

- "J3 question" from the survey: over the last 12 months, was this establishment visited or inspected by tax officials?
- "J5 question" from the survey: in any of these inspections or meetings was a gift or informal payment expected or requested?

Based on the response, the measure of percent of firms giving gifts to tax officials is computed. More specifically, for each country, the tax corruption indicator is defined as the ratio of the number of "yes" answers to "J5 question" to the total number of "yes" answers to "J3 question". This is a direct measure of corruption in tax administrations.

It is worth noting that while calculating the tax corruption ratios, we do not use any aggregate data from the Enterprise Surveys Database. The tax corruption ratio is constructed by using firm-level data from the database; and then we calculate country averages by using this series based on firm-level data. The detailed information on firms from each country is presented in Table A1 in the Annex. It can be seen in the table that the number of firms interviewed is large and it includes firms with different characteristics. Thus it can be concluded that firms included in the Enterprise Surveys Database represent the average position of countries because the database covers a broad range of firms. The response rates on tax corruption are reasonably large in many countries. The size characteristics of firms are well-distributed. Almost 53 percent of firms are small firms, which are defined as having fewer than

20 employees. About 31% of the firms are medium size (with between 20 and 99 employees), while the share of large firms is 16 percent (more than 99 employees). There are representative firms from each sector: 40 percent of the firms are from the manufacturing sector; 17 percent from the retail sector; 25 percent of firms are from the other service sectors; 2 percent of firms are from other sectors; and the remaining sectors are not identified.

One of the limitations of the ES database is that it does not cover all countries (about 60 less than the Doing Business for the years in consideration). Therefore, we do not get a worldwide dataset. Another limitation is that the ES does not do a survey in each country every year, the way the Doing Business is conducted. This fact requires using a technique to fill out missing data points for the missing years from the ES database.

Databases based on survey studies may have incomplete data points. Such missing information raises uncertainty associated with data aggregation and negatively affects the possibility of obtaining proper conclusions. Several techniques are suggested in the literature to estimate incomplete data points. In this paper the data imputation technique of expectation maximization is exploited (Dempster, Laird, and Rubin, 1977; Anderson, Basilevsky, and Hum, 1983; Rubin, 1987; Ruud, 1991; and Honaker and King, 2010). This technique estimates missing data points with the help of a predictive model that incorporates the available information, and any prior information on the data, as well as relationships between variables included in the process. The imputation technique is a two-stage iterative method. In the first stage, called the expectation stage, a log-likelihood function for missing data points is formed and their expectations are taken. In the second stage, which is named as the maximization stage, the expected log-likelihood from the first stage is maximized. Before the imputation is applied, all variables used in the process are standardized to enhance the distributional features of the series. If there are any negative numbers in the series, a constant number is added to data points to guarantee that the imputation of negative values can be realized.

The data imputation technique of expectation maximization requires including different related variables as predictors of series that needs to be completed. In this paper, because the tax corruption ratio is the variable with missing data points, the candidates of predictors must

be related to the tax corruption series. They must also be as complete as possible in terms of both time and cross-section dimensions. A general corruption index is picked as the predictor, because it is the most related to the tax corruption ratio and at the same time their numbers of observations are mostly complete. The general corruption index used in the imputation process is “Control of Corruption” from the World Bank Institute’s Worldwide Governance Indicators Database. It is defined as “measuring perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as ‘capture’ of the state by elites and private interests” (Thomas, 2010). After the imputation process, the tax corruption ratio has been transformed to its original scale.

While extending the tax corruption series by using the available information for predicted values of missing years, it should be noted that its statistical features have not been changed. The already available data points in the series are taken as is and the remaining data points are predicted. The descriptive statistics for the tax corruption series before and after data extension show that its average value was 23.1 before the extension and it is 22.1 after the extension. The median value of the tax corruption series was 18.7 before the extension of the series, and it becomes 18.1 after the extension. Similarly, the before-extension and after-extension standard deviations are very close as well: 19.1 and 18.8, respectively.

2.3 Sample Selection

The distribution of the tax corruption series among countries indicates that some cultural perception issues play an important role in how firms define bribery or corruption in their countries. As presented in Table 1, while most Latin American countries have an unexpectedly low tax corruption ratio, some high-income or upper middle-income countries face a relatively high tax corruption ratio. These findings of the Enterprise Surveys appear to be contrary to anecdotal and other observations in these countries. Such low ratios may possibly be explained by an observation that in some countries gift demands by tax inspectors may not be considered corruption. Another explanation could be that our definition of tax corruption calculated from the Enterprise Surveys, i.e., the ratio of the number of "yes" answers to the “J5 question” to the total number of "yes" answers to the “J3 question”, would not cover cases

such as, payments of bribes for obtaining a tax clearance certificate or a tax refund, or for preventing a tax audit from taking place.

In order to eliminate possible negative impacts of such cross-country differences, fixed country effects are introduced in regression analyses. In addition to this measure, some countries are eliminated if their tax corruption ratio is unexpectedly high or low. For this purpose, two country rankings are compared to each other: the ranking based on the tax corruption ratio calculated from the Enterprise Survey database as defined above and the ranking based on the bribery index from the Global Competitiveness Index Database. Because the series from the Enterprise Survey Database include subjective elements, it is helpful to compare country rankings by using the two variables on corruption to identify countries with "unexpected" data. The tax corruption ratio is between 0 and 100 where higher numbers indicate higher corruption. The bribery index, which is defined as irregular payments and bribes, is an index between 1 and 7, where lower numbers indicate higher corruption.[6] Each of the 138 countries from our initial dataset is ranked based on these two measures, and then these two rankings are compared to each other for each country. If the absolute value of the

[6] The definition in World Economic Forum (2013) is "average score across the five components. The question is: In your country, how common is it for firms to make undocumented extra payments or bribes connected with (a) imports and exports; (b) public utilities; (c) annual tax payments; (d) awarding of public contracts and licenses; (e) obtaining favorable judicial decisions." In each case, the answer ranges from 1 (very common) to 7 (never occurs).

Table 1 - County Averages: Tax Corruption and Tax Simplification (2002-2012)

	Tax corruption (demand for bribery % of total tax visits)	Tax Payments (number per year)	Tax Time (hours per year)		Tax corruption (demand for bribery % of total tax visits)	Tax Payments (number per year)	Tax Time (hours per year)
Albania	47.8	44	364	Lebanon	24.5	19	180
Angola	18.9	30	276	Lesotho	4.2	33	379
Armenia	33.6	40	527	Liberia	62.5	33	155
Azerbaijan	50.8	25	491	Lithuania	18.3	12	170
Bahamas	12.4	18	58	Macedonia, FYR	23.1	37	150
Bangladesh	59.6	20	335	Madagascar	9.9	24	241
Belarus	14.3	79	773	Malawi	12.7	25	247
Belize	6.2	37	147	Mali	25.7	55	270
Benin	19.1	56	270	Mauritania	43.1	37	696
Bhutan	3.3	19	274	Mauritius	1.2	8	160
Bosnia and Herzegovina	39.3	52	401	Mexico	6.8	15	454
Botswana	6.5	34	145	Moldova	39.7	48	224
Brazil	9.7	9		Mongolia	12.9	41	197
Bulgaria	26.7	18	567	Montenegro	6.4	67	359
Burkina Faso	17.8	45	270	Mozambique	10.6	37	230
Burundi	26.8	30	193	Namibia	2.7	37	333
Cambodia	72.1	41	157	Nepal	14.5	34	365
Cameroon	40.2	44	651	Niger	15.4	41	270
Cape Verde	5.3	38	186	Nigeria	26.8	38	1003
Central African Republic	20.9	56	499	Pakistan	56.0	47	562
Chad	19.6	54	732	Panama	4.7	53	486
Chile	2.3	8	310	Paraguay	24.3	34	345
China	19.1	17	533	Peru	5.0	9	372
Congo, Dem. Rep.	48.8	32	322	Philippines	23.9	46	195
Congo	20.7	60	606	Poland	24.4	33	362
Costa Rica	2.0	36	304	Romania	22.9	95	205
Côte d'Ivoire	19.6	64	270	Russia	34.4	8	342
Croatia	25.1	31	196	Rwanda	6.6	22	152
Czech Republic	29.4	12	670	Samoa	17.7	37	224
Dominica	13.9	37	127	Senegal	14.5	59	674
Ecuador	4.2	8	624	Serbia	20.1	66	279
Egypt	28.5	33	517	Sierra Leone	9.3	30	375
Gabon	13.4	26	488	Slovak Republic	26.2	29	273
Gambia, The	12.8	50	376	Slovenia	23.0	20	260
Ghana	21.5	33	251	South Africa	2.1	9	250
Greece	60.8	12	231	Sri Lanka	4.0	62	251
Guatemala	4.6	28	341	St. Lucia	5.15	32	82
Guinea	57.3	57	419	St. Vincent and the Grenadines	2.90	36	100
Guinea-Bissau	25.2	46	208	Swaziland	3.6	33	105
Honduras	4.2	47	291	Tanzania	19.7	48	172
Hungary	13.5	13	310	Timor-Leste	3.08	13	438
India	60.2	49	260	Togo	8.4	50	270
Indonesia	28.3	51	332	Trinidad and Tobago	7.8	40	210
Iraq	32.1	13	312	Turkey	19.0	11	231
Jamaica	4.6	64	404	Uganda	11.4	31	210
Jordan	0.5	26	141	Ukraine	41.4	118	1115
Kazakhstan	43.6	8	243	Uruguay	0.8	49	320
Kenya	37.0	41	389	Vanuatu	5.0	31	120
Kosovo	0.9	33	163	Vietnam	36.6	32	986
Kyrgyz Republic	63.4	64	205	Yemen	44.8	44	248
Lao PDR	28.8	34	487	Zambia	8.7	38	183
Latvia	21.1	9	288	Zimbabwe	10.6	50	242

Source: Authors' calculations based on series from the World Bank's Enterprise Survey and Doing Business Databases.

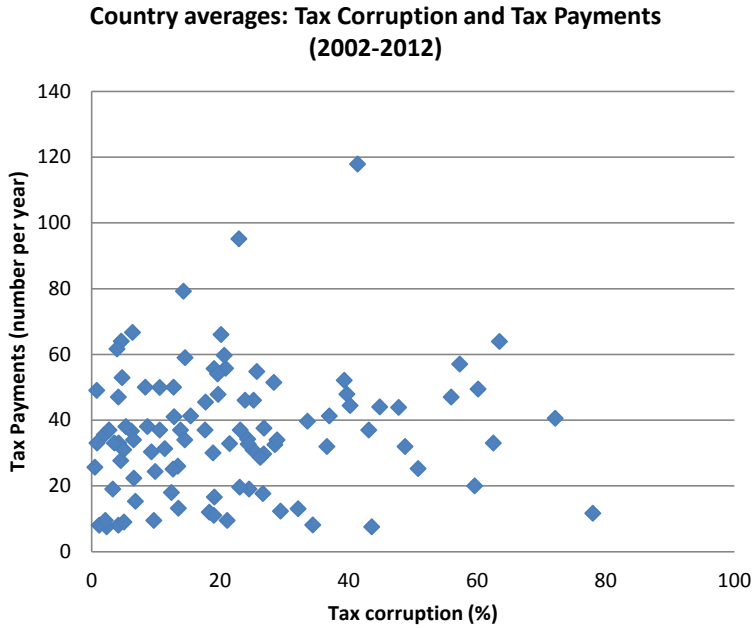
difference between the two rankings for any country is larger than 70, that country is excluded from the sample. After this elimination process, 104 countries are left in the dataset.

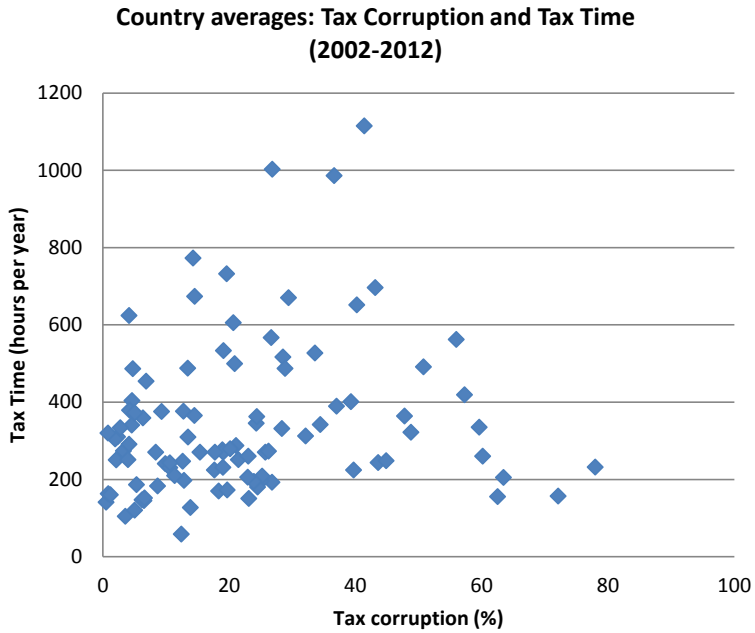
2.4 Tax Simplification and Tax Corruption: Country Averages

Table 1 presents the average values of the two tax simplification variables and the tax corruption indicator for 104 countries included in the dataset over the period of 2002 to 2012. It can be seen that the tax corruption ratio changes significantly across countries and its range is large. Liberia has the highest ratio at 62.5%, while Jordan has the lowest tax corruption ratio, which is equal to 0.5%. The dataset includes countries from different regions of the world. Representatives of each income group are also present in the dataset. The maximum average number of tax payments per year is 118, and it belongs to Ukraine. Chile has the minimum number of tax payments; 8 times. The country with the highest average value of tax hours per year is Uruguay (1,115 hours), while the country with the lowest tax hours is the Bahamas (58 hours). It should be noted that Brazil's time to comply taxes is excluded in the study because of its obvious outlier value at 2,600 hours.

It is interesting to first view the data in the form of scatter plots – the tax corruption ratio plotted against tax payments (TAXPAY) or tax time (TAXTIME). In Figure 1, a specific linear trend cannot be immediately observed. But as time to comply and tax payments increase, there is a tendency that the tax corruption ratio increases. So there is a positive correlation between the two. The correlation coefficient between time to comply and tax corruption is 0.13, while the correlation coefficient between tax payments and tax corruption is 0.17. These correlations are low, but statistically significant at the 1 percent level, given the large number of observations included in the study (close to 1000 data points). One important point is that the correlation between the tax simplification indicators and tax corruption can appear to be low, but it should be noted that country specific features are not considered in these correlation measures. As noted above, each country, based on their cultural values, can have a different perception of corruption concept. This fact may prevent us from seeing the actual link between tax simplification and tax corruption which can be more obvious when country differences are controlled. Thus regression analysis gives a better idea of the link between tax simplification

Figure 1- Country Averages: Tax Corruption and Tax Simplification (2002-2012)





Source: Authors' calculations based on series from the World Bank's Enterprise Survey and Doing Business Databases.

and tax corruption, because it allows us to introduce fixed country effects to control for observed country differences. It can be also added that when the time dimension is taken into account instead of using only country averages, the correlation between the tax corruption ratio and tax simplification is much higher at the country level.

2.5 Dual Causality Tests between Tax Simplification and Tax Corruption

Dual granger causality tests are run between the tax corruption ratio and the two alternative definitions of tax simplification by using panel data. The test results are presented in Table 2. The upper panel is for time to comply taxes and the lower panel is for the number of tax payments as two indicators of tax simplification. In the upper panel, the first null hypothesis is time to comply (TAXTIME) does not cause tax corruption, while the second one states tax corruption does not cause time to comply. 5 different lag values are applied for each test. The first test results for TAXTIME indicates that TAXTIME causes tax corruption with the lag numbers 2 or higher. As the tax time to comply changes, it causes changes in the tax corruption variable, and the impact lasts a couple of years. Any causality from tax corruption to TAXTIME cannot be identified as presented in the table. It means that any changes in tax corruption do not cause changes in tax time to comply. The test result is robust to the different number of lags. This last result confirms that there is no dual causality between two variables, and the direction of causality is only from TAXTIME to tax corruption.

The same set of tests is repeated for the number of tax payments (TAXPAY). The results are shown in Table 2 in the lower panel. As can be seen in the results, TAXPAY is not as successful as TAXTIME in causing tax corruption. When the numbers of lags are 2 and 3, the null hypothesis of TAXPAY not causing tax corruption is rejected. It indicates causality moving from TAXPAY to tax corruption. This causality is not observed when the number of lags is equal to 1, 4, or 5. Similar to the TAXTIME tests, no causality in the direction of tax corruption to TAXPAY is detected. The test results show that there is no dual causality between TAXPAY and tax corruption. The absence of dual causality is important for regression analyses, which are presented in the following section.

Table 2 – Panel Data: Dual Granger Causality Tests

Panel Data: Dual Granger Causality Tests between Tax Time (hours per year) and Tax Corruption

		H_0: TAXTIME does not Granger Cause CORRUPTION			***H_0: CORRUPTION does not Granger Cause TAXTIME***		
Number of lags	Number of observations	F-Statistic	Prob.	Result	F-Statistic	Prob.	Result
LAG 1	903	0.014	0.905	Fail to reject H_0	0.177	0.674	Fail to reject H_0
LAG 2	745	2.468	0.085	Reject H_0	0.656	0.471	Fail to reject H_0
LAG 3	588	2.921	0.043	Reject H_0	0.598	0.616	Fail to reject H_0
LAG 4	431	2.310	0.057	Reject H_0	1.122	0.346	Fail to reject H_0
LAG 5	312	3.678	0.003	Reject H_0	0.976	0.322	Fail to reject H_0

Panel Data: Dual Granger Causality Tests between Tax Payments (number per year) and Tax Corruption

		H_0: TAXPAY does not Granger Cause CORRUPTION			***H_0: CORRUPTION does not Granger Cause TAXPAY***		
Number of lags	Number of observations	F-Statistic	Prob.	Result	F-Statistic	Prob.	Result
LAG 1	911	0.288	0.592	Fail to reject H_0	0.126	0.722	Fail to reject H_0
LAG 2	752	2.658	0.072	Reject H_0	1.641	0.194	Fail to reject H_0
LAG 3	594	2.722	0.063	Reject H_0	2.056	0.105	Fail to reject H_0
LAG 4	436	0.486	0.746	Fail to reject H_0	0.838	0.480	Fail to reject H_0
LAG 5	316	1.470	0.199	Fail to reject H_0	1.044	0.271	Fail to reject H_0

Source: Authors' calculations.

3. Tax Simplification and Tax Corruption: Regression Results

In the paper, the starting point of regression analyses is an initial regression specification which regresses the tax corruption ratio on the tax simplification variables (TAXTIME and/or TAXPAY) and on different sets of control variables, consisting of variables which are thought to be affecting tax corruption.

Dos Santos (1995), Tanzi (1998), and Keen (2003) investigate possible causes of tax corruption. In addition to behavioral and cultural determinants of tax corruption, they also list factors related to the tax system and tax Administration: 1) Complex tax systems: Tax auditors can collect bribes from taxpayers by taking advantage of complex rules or unclear laws, regulations, and procedures. The taxpayer, who wants to evade taxes, can choose to bribe the tax auditor. 2) Time-consuming and costly dispute resolution: the taxpayer might choose to bribe to get things done. 3) Complex declaration forms, high costs of compliance, and intricate

compliance procedures. 4) High tax rates may lead to more corruption by increasing the incentive for taxpayers to evade them; however, there is no clear evidence to either validate or refute this (there is no clear support in the literature; for example, Ivanova, Keen, and Klemm, 2005). 5) Lack of sanctions is another important factor stimulating corruption. In the regression specification, tax simplification variables are included to capture Factors 1 and 2. Judicial determinants are included for Factor 5. We try to capture possible behavioral and cultural factors with political, economic and geographical determinants.

Based on the literature on corruption, the regression specification is defined as:

$$Tax\ corruption_{it} = \alpha_0 + \alpha_1.\log(tax\ simplification)_{it} + \alpha_2.\ economic\ determinants_{it} + \alpha_3.political\ determinants_{it} + \alpha_4.judicial\ determinants_{it} + \alpha_5.geograhical\ \ determinants_{it} + \in_{it}$$

In the regression specification for each set of determinants, different control variables are tried to see which ones can explain tax corruption best. Most of these control variables have already been introduced in the literature as possible determinants of general corruption in different countries. . Some papers investigating determinants of general corruption are listed below, while explaining control variables used in the regression analyses.[7]

As possible ***economic determinants of corruption***, the following variables are introduced in our regression analyses: index for wastefulness of government spending and global competitiveness index, both of which are from Global Competitiveness Index Database; real GDP per capita, real GDP growth rate, and the share of taxes in GDP, all of which are from the World Bank's World Development Indicators. There are several empirical studies supporting the negative link between general corruption and market competitiveness.[8] Similarly, in the literature the negative link between the level of income and general corruption has been

[7] Seldadyo and de Haan (2006) present a good literature review of empirical studies on corruption.
[8] See, for example, Iwasakia and Suzukib (2012), Shabbir and Anwar (2007), Park (2003), Kunicova and Ackerman (2005), Gurgur and Shah (2005), and Graeff and Mehlkop (2003).

studied extensively.[9] Other studies find a negative link between economic growth and corruption,[10] while some find a negative link between the share of tax revenue in GDP and corruption.[11]

In our regression analyses with tax corruption, even though the estimated coefficients of the economic determinants present the expected negative sign, no statistically significant coefficient is observed for this set of variables. The only exception to this is the share of taxes in GDP which has a significant coefficient with the expected negative sign. Unfortunately, this series has many missing data points which lower the total number observations by more than half. Since the real GDP per capita series fails the unit root test and, thus, is non-stationary, it is not included in the specification. Given that the estimated coefficients of tax simplification variables are robust to the regression specifications with or without the economic variables, we excluded them in the final benchmark regression specification. The results with omitted economic variables are presented in Table A2 in Annex.[12] Column (1) presents the estimation results of one of the regression specifications of the benchmark empirical model. In columns (2)-(5) the results with the variables which are omitted from the benchmark specification are presented. It is worth noting that political determinants are highly correlated with macroeconomic indicators. As a result, the inclusion of political determinants of tax corruption in the regression specification partially captures the effects of economic determinants on tax corruption anyway. In addition to that the inclusion of country fixed effects is also helpful to control for omitted economic determinants of tax corruption.

In the second set of control variables, different ***political and institutional determinants of corruption*** are introduced and their statistical significance in determining tax corruption is determined. The variables in this group are:

[9] Some examples are Serra (2006), Shabbir and Anwar (2007) Treisman (2000), Kunicova and Ackerman (2005), Braun and di Tella (2004), Alt and Lassen (2003), Graeff and Mehlkop (2003), Persson and Tabellini (2003), Tavares (2003), Fisman and Gatti (2002), Paldam (2002), Abed and Davoodi (2000), and Rauch and Evan (2000).
[10] Evrensel (2010) and Isse and Ali (2003).
[11] Goel and Nelson (2010).
[12] It should be noted that many different specifications are estimated with these omitted variables. Only selected results are presented in Table A2 because of space limitation. The complete results are available upon request.

- From International Country Risk Guide Database: bureaucracy quality; civil disorder; democratic accountability; political risk rating.
- From the World Bank Institute's Worldwide Governance Indicators Database: voice and accountability; political stability and absence of violence/terrorism; government effectiveness; regulatory quality.
- From Global Competitiveness Index Database: transparency of government policy making; burden of government regulation.

In the literature there are many studies focusing on the link between general corruption and its political and institutional determinants. Several studies find a negative link between corruption and bureaucracy quality,[13] while democratization has been identified as one of the main factors determining corruption.[14] The link is found to be negative. According to several empirical studies the link between corruption and political stability is also negative.[15] According to Tanzi (1998), higher transparency of government lowers corruption. Voice and accountability are significant determinants of corruption and as voice and accountability improve, corruption declines.[16]

Since all these indexes indicate improvements with higher values, in our regression specifications the expected sign of all these variables' estimated coefficients is negative as is the case in the literature. The regression results indicate that only bureaucracy quality, democratic accountability, government effectiveness, and burden of government regulation are statistically significant determinants of tax corruption. In columns (6)-(11) of Table A2 in Annex, the results with the omitted political and institutional variables are reported. It can be seen that the estimated coefficients of the tax simplification variables, which are the main interests of our paper, is robust to the presence or absence of the insignificant determinants. Thus, only

[13] For example, Tanzi (1998), Gurgur and Shah (2005), Brunetti and Weder (2003), and van Rijckeghem-Weder (1997).
[14] Iwasakia and Suzukib (2012), Revier and Elbahnasawy (2012) Shabbir and Anwar (2007), Treisman (2000), Tanzi (1998), Kunicova and Ackerman (2005), Braun and di Tella (2004), Knack and Azfar (2003), Paldam (2002), Swamy, Knack, Lee, and Azfar (2001), Wei (2000), and Goldsmith (1999).
[15] Serra (2006), Evrensel (2010), and Park (2003).
[16] Revier and Elbahnasawy (2012), Shabbir and Anwar (2007), Lederman, Loayza, and Soares (2005), and Brunetti and Weder (2003).

bureaucracy quality, democratic accountability, government effectiveness, and burden of government regulation are included in the final benchmark regression specification. Due to the presence of high correlation among variables, government effectiveness and burden of government regulation are included alone in regression specifications.

Two variables are included to control ***judicial determinants of corruption*** in our regression analyses: "law and order" from International Country Risk Guide Database and "rule of law" from the World Bank Institute's Worldwide Governance Indicators Database. In the literature, several studies find a negative link between corruption and judicial determinants.[17] Since these variables are close substitutes, they are included one at a time in the initial regression specification. In our regression outcomes, given that higher values of these indexes indicate an improvement, both variables have the expected negative sign. But only the "rule of law" index has a statistically significant coefficient. Given that these two variables are close substitutes, only "rule of law" is included in the benchmark specification.

In the last set of control variables, ***geographical determinants of tax corruption*** are considered. In our regression analysis the variable included in this group is total natural resources rents (% of GDP) from The World Bank's World Development Indicators. The link between corruption and natural resources has not been extensively researched. In one example, Leite and Weidmann (1997) present a negative relationship between corruption and the share of natural resources in GDP. In our regression results, the variable has an expected positive sign but its estimated coefficient is not statistically significant. Because the estimated coefficients of the tax simplification variables are robust to the inclusion or exclusion of the variable which captures natural resources rents, they are excluded in the benchmark regression specifications. The estimated coefficients are reported in column (12) of Table A2 in Annex.

As pointed out in the previous section, the value of tax corruption changes significantly across countries, even if they take place in the same income groups. Thus, country fixed effects

[17] Iwasakia and Suzukib (2012), Revier and Elbahnasawy (2012), Evrensel (2010), Tanzi (1998), Damania, Fredriksson, and Mani (2004), Herzfeld and Weiss (2003), Broadman and Recanatini (2000), and Ades and di Tella (1997).

are introduced to control for country differences. Similarly, time dummies are included in the regression analyses to control for time effects on tax corruption.

After dropping the insignificant control variables, which do not affect the robustness of the estimated coefficients, the final benchmark regression specification becomes:

$$Tax\ corruption_{it} = \beta_0 + \beta_1.\log(tax\ simplification_{it}) + \beta_2.\ bureaucracy\ quality_{it} + \beta_3.democratic\ accountability_{it} + \beta_4.government\ effectiveness_{it} + \beta_5.burden\ of\ government_{it} + \beta_6.rule\ of\ law_{it} + country\ fixed\ effects + time\ fixed\ effects + \varepsilon_{it} \quad (1)$$

The tax corruption ratio and the two tax simplification variables are defined in the previous section. TAXTIME and TAXPAY are included one by one as well as together in the regression analyses. In the regression specification regional dummies are also included in some regression analyses.

Bureaucracy quality (BUREAUC) is taken from the International Country Risk Guide Database and it is defined as: "Institutional strength and quality of the bureaucracy is a shock absorber that tends to minimize revisions of policy when governments change." It is an index number between 1 and 6, where 6 corresponds to the highest quality. Thus the expected sign of the estimated coefficient is negative.

Democratic Accountability (DEMOC) is also from the International Country Risk Guide Database. The database defines the series as: "A measure of, not just whether there are free and fair elections, but how responsive government is to its people. The less responsive it is, the more likely it will fall. Even democratically elected governments can delude themselves into thinking they know what is best for the people, regardless of clear indications to the contrary from the people." The series consists of index numbers taking a value between 1 and 6. 6 represents the highest democratic accountability. Its sign is expected to be negative.

Government effectiveness (EFFECTIVE) and ***rule of law*** (RULE) are from the World Bank Institute's Worldwide Governance Indicators Database. Government effectiveness is "measuring 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" (Thomas, 2010). Rule of law captures "perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police and the courts, as well as the likelihood of crime and violence" (Thomas, 2010). The measure of both variables for each country is a point in the range of -2.5 (lowest effectiveness or rule of law) to 2.5 (highest effectiveness or rule of law). As a result, the expected sign of both variables is negative.

Burden of government regulation (BURDEN) is from Global Competitiveness Database and it measures "how burdensome is it for businesses in your country to comply with governmental administrative requirements (e.g., permits, regulations, reporting)? [1 = extremely burdensome; 7 = not burdensome at all]" (World Economic Forum, 2013). Similar to other control variables the expected sign is negative.

Table 3 –Descriptive Statistics

	BURDEN	*BUREAUC*	*DEMOC*	*EFFECTIVE*	*RULE*	*TAX CORRUP*	*TAXPAY*	*TAXTIME*
Mean	3.218	1.981	4.079	-0.350	-0.399	22.047	36	344
Median	3.195	2.000	4.000	-0.443	-0.470	18.172	35	274
Standard Deviation	0.579	0.988	1.494	0.662	0.704	18.741	21	119
Minimum	1.847	0.000	0.000	-1.877	-1.924	0.398	6	58
Maximum	5.297	4.000	6.000	1.263	1.367	81.667	147	1585
Count	839	1230	1230	1064	1069	1107	882	873

Source: Authors' calculations.

Table 4 –Correlation Matrix

	BURDEN	*BUREAUC*	*DEMOC*	*EFFECTIVE*	*RULE*	*TAX CORRUP*	*TAXPAY*	*TAXTIME*
BURDEN	1.000							
BUREAUC	0.654	1.000						
DEMOC	0.587	0.310	1.000					
EFFECTIVE	0.517	0.638	0.561	1.000				
RULE	0.101	0.244	0.314	0.408	1.000			
TAX CORRUP	-0.141	-0.164	-0.218	-0.259	-0.306	1.000		
TAXPAY	0.070	-0.165	-0.082	-0.324	-0.286	0.132	1.000	
TAXTIME	-0.090	-0.101	-0.233	-0.189	-0.253	0.172	0.315	1.000

Source: Authors' calculations.

The descriptive statistics of the variables used in the regression analysis are summarized in Table 3. The pairwise correlation matrix is given in Table 4. All correlation coefficients are significant at least at a 5 percent significance level. The correlations present the expected signs. Since the correlation of BURDEN and EFFECTIVE with other independent variables is high, these two variables are introduced alone in the regression specifications.

Before running regression analyses, panel unit root tests have been conducted. The test results infer that the null hypothesis of unit root non-stationarity is rejected at the 1 percent level of significance for each variable used in the regression analyses.

Hausman endogeneity tests are run to understand whether any statistically significant endogeneity problem is observed. Such a problem may lead to inconsistencies in estimated coefficients if a panel least squared technique is used for regression analyses. The null hypothesis of exogeneity is rejected, indicating a presence of an endogeneity problem which is

most probably caused by omitted variables. For consistent estimation coefficients, that problem has to be corrected. The Generalized Method of Moments is one of the most commonly used regression techniques to handle endogeneity problems (Arellano and Bond, 1991; Arellano and Bover, 1995; and Blundell and Bond, 1998). This methodology requires introduction of instrumental variables. In the regression analyses below, instrumental variables are defined as the first lagged values of the right-hand-side variables of the benchmark regression specification.

3.1 Panel Regression Results: Determinants of Tax Corruption

The benchmark regression specification of the results presented in Table 5 is Equation (1). In the specifications, the tax simplification variables are used one by one, as well as together. Since the tax simplification variables are in levels while the rest of the variables are in percent or index numbers, TAXPAY and TAXTIME are expressed in log terms in the equations.

The results in columns (1), (2), (4) and (6) include the specifications with only TAXPAY or only TAXTIME. In the rest of the specifications they are introduced together. In each specification either no control variables are included or different sets of control variables are involved. The control variable sets are determined based on their statistical significance and the correlation coefficients between them. Bureaucracy quality can match with democratic accountability and rule of law variables, since the correlation coefficients among these variables are relatively low as presented in Table 4. On the other hand, the government effectiveness and burden of government regulation variables are introduced one by one due to the presence of a collinearity problem. In each specification, country and time fixed effects are introduced to control for country and time effects, successively.

Table 5 - Panel Regression: Determinants of Tax Corruption (Sample 2002-2012)

Dependent variable: Tax corruption	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Constant term	12.409	-12.125	-16.988	22.675	10.644	10.676	4.082	2.97	-3.136	2.287	8.205
	(3.698)***	(-1.797)*	(-2.368)**	(5.663)***	(1.418)	(1.323)	(0.506)	(0.323)	(-0.421)	(0.307)	(1.077)
Tax simplification											
log(Tax payments)	2.819		1.937	2.451		2.611	2.535	2.967	2.362	2.243	
	(2.918)***		(1.97)**	(2.444)***		(2.011)**	(2.555)***	(1.922)**	(2.337)***	(2.236)***	
log(Tax time)		6.023	5.712		2.316	5.317	4.866	5.206	4.239	3.102	4.702
		(5.101)***	(4.803)***		(1.876)*	(1.872)*	(3.137)***	(3.865)***	(3.56)***	(2.582)***	(3.352)***
Political and Political Institution Determinants of Corruption											
Bureaucracy Quality (higher better quality)				-0.772	-0.556	-0.555	-0.599				-0.772
				(-1.881)*	(-1.703)*	(-1.799)*	(-1.964)**				(-1.995)**
Democratic Accountability (higher better)				-1.543	-1.298	-1.298	-1.92				-1.891
				(-2.937)***	(-2.429)**	(-2.418)**	(-3.603)***				(-3.548)***
Government Effectiveness (higher better)									-6.508		
									(-6.244)***		
Burden of government regulation, 1-7 (best)								-4.558			
								(-3.605)***			
Judicial and Bureaucratic Determinants of Corruption											
Rule of Law (higher better)				-6.775	-6.492	-6.495				-7.434	
				(-6.449)***	(-6.296)***	(-6.041)***				(-7.73)***	
No. of observations	881	872	872	856	847	847	860	634	859	859	860
J-statistics	2.897	2.939	3.193	3.131	2.527	3.261	3.316	3.168	2.781	2.795	3.233
Arellano-Bond serial correlation test AR(1)	0.182	0.186	0.187	0.224	0.229	0.231	0.228	0.232	0.250	0.221	0.245
Arellano-Bond serial correlation test AR(2)	0.871	0.890	0.950	0.832	0.851	0.891	0.884	0.849	0.838	0.994	1.041
Jarque-Bera normality test	1.452	1.550	1.350	1.421	1.419	1.487	1.473	1.415	1.397	1.406	1.422

Note: The estimation method is a panel - GMM. Annual data are used. t-statistics are given in parenthesis. * indicates 10% significance level, ** indicates 5% significance level, and *** indicates 1% significance level. These significance levels are equal to one minus the probability of rejecting the null hypothesis of zero coefficients. J-test is for overidentification problem where H0: there is no overidentification problem. For serial correlation z-tests, H0 is "there is no serial correlation"; and for normality test, H0 is "normal distribution".

When the estimated coefficients are checked in Table 5, it can be seen that the signs associated with the coefficients of both measures of tax simplification, TAXTIME and TAXPAY, are consistent with the hypothesis that there exists a positive relationship between the tax corruption measure and tax simplification. Furthermore, the t-statistics of the estimated coefficients indicate the statistical significance of the relationship. TAXTIME and TAXPAY are significant at the 1 percent level in most specifications. So the results indicate that there exists a positive link between the percent of firms expected to provide gifts during tax inspections and the number of tax payments and hours to comply. This result is robust to the inclusion of different sets of control variables. The magnitudes of the estimated coefficients are large as well. The experiments presented below indicate that the tax corruption ratio drops by around 0.3 percent with a 1 percent improvement in the number of tax payments and around 0.5 percent with a 1 percent lower time to comply with tax requirements.

When the estimated coefficients of the control variables are investigated in Table 5, it can be seen that all variables have negative coefficients and are statistically significant at least at the 10 percent level. Given that an increase in any of these control variables indicates improvement conditions, the negative link between the tax corruption ratio and the control variables is the expected result. This is especially true for the index for democratic accountability and rule of law which are highly significant determinants of tax corruption. The results indicate that as democratic accountability increases and the law is enforced more strictly, tax corruption declines as a response to these improvements. Conversely, as countries' democratic accountability and rule of law indicators decrease, they start facing larger tax corruption issues. The index measuring bureaucracy quality also has an important negative impact on tax corruption. As expected, the higher the quality, the lower is tax corruption. The burden of government regulation is an index measure with higher values indicating lower government burdens. Thus the negative estimated coefficient of this variable produces the expected result. As the government's burden declines, tax corruption incidents tend to decline with it. The effectiveness of government is another variable significantly determining tax corruption. As the government effectiveness indicator improves, tax corruption issues lessen.

All of these results related to the control variables support previous empirical findings in the literature as explained in the prior subsection.

Different tests are included with each regression result. Given that the use of the GMM regression technique in the regression analysis requires introducing instruments, it is important to test the validity of these instruments. J-statistics reported with the regression results are the test statistics for the overidentification test of all instruments used in the regression specifications. The null hypothesis is "overidentification problem does not exist." We fail to reject the null hypothesis for every signal regression specification. The first and second order Arellano-bond correlation tests (AR(1) and AR(2)) are also calculated for each regression specification. They are z-tests and the null hypothesis for each test is "serial correlation does not exist." Similar to the J-test results, the null hypothesis is failed to reject, indicating that no serial correction problem is observed. The last test statistic reported in the regression results is Jarque-Bera normality test. The null hypothesis is defined as "series have normal distributions." We fail to reject the null hypothesis in each case. So the test results support the validity of the regression analysis.

3.2 Experiments

The empirical specification given in Equation (1) is a powerful predictor of significant gains in reducing tax corruption through tax simplification. This can be confirmed with different experiments measuring the economic significance of tax simplification for tax corruption. In the experiments it is asked how much tax corruption is expected to drop if the complexity of tax systems is reduced, corresponding to the lower values of TAXPAY and TAXTIME. For the experiments, the predicted values of the tax corruption ratio are computed for different values of the tax simplification variables, as well as the control variables. While calculating the predicted values of tax corruption, the estimated coefficients of tax simplification variables and the control variables are taken from different empirical specifications of Table 5. The predicted values of improvements in the tax simplification variables are also computed using the same estimated coefficients from the regression outcomes presented in Table 5, keeping the values of all other variables in the specifications constant.

Table 6 - Experiments: Impact of Tax Simplification on Tax Corruption (in percentage terms)

	10% drop in tax payments	10% drop in tax time	10% drop in tax payments and tax time
Equation (4) from Table 5	-3.883	..	..
Equation (11) from Table 5	..	-5.866	..
Equation (7) from Table 5	-3.303	-6.341	-9.644

Source: Authors' calculation.

The experiments are based on three different equations: TAXTIME individually; TAXPAY individually; both together. The decision on picking up the regression specifications is determined by the significance level of the tax simplification variables and the control variables. Columns (4) and (7) from Table 5 are used for TAXPAY experiments, while TAXTIME experiments are based on the specifications presented in columns (11) and (7). The experiments for the combined effect of the two simplification measures are based on the estimated coefficients of column (7). The experiment outcomes are presented in Table 6. A 10 percent drop in the number of tax payments leads to a 3.8 percent cut in tax corruption according to the estimated coefficients given in column (4) of Table5. The drop in tax corruption is 3.3 percent if using the estimated coefficients of column (7) of Table 5. Instead if we reduce the hours to comply with tax requirements by 10 percent, the model predicts a reduction of 5.87 percent in the level of administrative corruption according to column (11) of Table 5 and a reduction of 6.34 percent with the parameters of column (7) of the same table. When these two individual effects are compared to each other, it can be concluded that a cut in TAXTIME has a stonger positive impact on tax corruption. As expected, the combined effect of TAXPAY and TAXTIME is even stronger. The model presented in column (7) of Table 5 predicts a 9.64 percent drop in tax corruption with the combined effect of 10 percent drops in both TAXPAY and TAXTIME at the same time.

The fact that the impact of an improvement in TAXTIME has a stronger impact on reducing tax corruption is in line with intuitive thinking. Time to comply with taxes is a true representative of the complexity of a tax system; a more complex tax law will need more time and effort to understand the provisions to be able to compute the accurate tax liability and prepare and file the tax return. Consequently, complexity can provide incentives to taxpayers to seek to bribe their way into reducing the compliance burdens caused by it. Again, if, as is often the case, complexity arises due to a plethora of tax incentives in the law, it provides opportunities to reduce the tax liability by claiming these incentives, sometimes through corrupt means.

Table 7 - BRIC countries: Impact of Tax Simplification on Tax Corruption (in percentage terms)

	10% drop in tax payments	10% drop in tax time
Brazil	-3.251	..
China	-3.009	-4.424
India	-2.662	-4.902
Russia	-3.325	-4.698

Source: Authors' calculation.
Note: The results in the first column are based on Column (4) in Table 5, while the ones in the second column are from Table 5 Column (11).

Similar experiments are run for selected countries to show how the reductions in tax complexity would affect their tax corruption. The BRIC economies are used as examples. The results are presented in Table 7. The experiment results based on TAXPAY are from column (4) of Table 5, while the results for TAXTIME are from column (11). The responses of tax corruption to a 10 percent cut in TAXTIME or TAXPAY are mostly similar across countries, but some differences are observed. In India a 10 percent cut in TAXPAY leads to a 2.66 percent cut in tax corruption, while the same amount of cut can result in a 3.32 percent decline in Russia. The

effects of cuts to the number of tax payments on tax corruption are similar in China and Brazil. The response of tax corruption to cuts in TAXTIME is strongest in India, where a 10 percent decline in TAXTIME lowers tax corruption by 4.90 percent. In China the same experiment produces a 4.4 percent cut in tax corruption, while it is 4.7 percent in Russia.

It should be noted that since only business taxes are included in this study, the magnitude of the impacts of tax simplification on tax corruption, as calculated above, can be considered partial. In a study where personal income taxes are taken into account as well, the overall impact of tax simplification on tax corruption is expected to be stronger.

3.3 Importance of Regional Differences in Determining Tax Corruption

As presented in section 2 of the paper, significant differences in the tax corruption measure are observed across regions. For example, while Latin American and South Asia countries tend to report lower measures of tax corruption, countries from Eastern Europe and Central Asia present much higher tax corruption ratios. These results are not entirely in line with observed instances of tax corruption. For example, it is generally expected that tax corruption is higher in South Asia than ECA. Our surmise is that two factors may be responsible for the slightly unexpected results: first, the cultural factors which may have an influence on the responses to the Enterprise Survey questions on tax corruption, and, second, the fact that tax corruption data are not collected from all countries. Nevertheless, there is value in exploring regional dimensions to gain some understanding of the dynamics of tax simplification and corruption in a region.

In order to understand the impact of regional differences on the link between tax simplification and tax corruption, the benchmark regression specification is run separately for each region. The regions included in the study are: Europe and Central Asia (ECA), Sub-Saharan Africa (SSA), Latin America and Caribbean (LAC), South Asia (SASIA), East Asia and Pacific (EAP), and the Middle Eastern and North Africa region (MENA). Due to data limitations, some regions are combined. Countries from SASIA and EAP are pooled together. Similarly, MENA and ECA countries form one group.

Table 8 presents the regression results for different regions. When the results in Table 5 and Table 8 are compared to each other, it can be seen that the results are consistent and robust, but still some regional differences are observed. The estimated coefficients of the two tax simplification variables are statistically significant and have the expected positive sign. The control variables also have the expected sign and are statically significant determinants of tax

Table 8 –Regional Differences in Tax Corruption (2002-2012)

Dependent variable: Tax corruption	(1)	(2)	(3)	(4)
	SSA	EAP and SASIA	LAC	MENA and ECA
Constant term	-21.308	46.893	53.717	13.975
	(-2.342)**	(1.384)	(7.391)***	(0.845)
Tax simplification				
log(Tax payments)	4.574	2.855	6.357	3.254
	(3.222)***	(1.624)	(6.165)***	(2.065)**
log(Tax time)	3.802	2.106	4.857	2.017
	(2.674)***	(1.747)*	(1.85)*	(1.837)*
Political and Political Institution Determinants of Corruption				
Bureaucracy Quality (higher better quality)	-0.846	-3.101	-0.338	-1.411
	(-1.707)*	(-1.682)*	(-1.524)	(-0.733)
Democratic Accountability (higher better)	-1.45	-1.2	-2.023	-1.157
	(-1.733)*	(-1.816)*	(-3.807)***	(-1.754)*
Judicial and Bureaucratic Determinants of Corruption	-11.184	-20.703	-1.864	-9.483
Rule of Law (higher better)	(-8.511)***	(-5.619)***	(-2.509)**	(-3.929)***
No. of observations	340	126	124	257
J-statistics	2.485	2.556	2.649	2.487
Arellano-Bond serial correlation test AR(1)	0.460	0.414	0.474	0.461
Arellano-Bond serial correlation test AR(2)	0.888	0.908	0.878	0.889
Jarque-Bera normality test	1.264	1.297	1.246	1.267

Note: The estimation method is a panel - GMM. Annual data are used. t-statistics are given in parenthesis. * indicates 10% significance level, ** indicates 5% significance level, and *** indicates 1% significance level. These significance levels are equal to one minus the probability of rejecting the null hypothesis of zero coefficients. J-test is for overidentification problem where H0: there is no overidentification problem. For serial correlation z-tests, H0 is "there is no serial correlation"; and for normality test, H0 is "normal distribution".

corruption. The exception is the SASIA and EAP region. The statistical significance level of the

estimated coefficients of this region is lower (see column (2)). In column (1) only SSA countries are included. The estimated coefficients of both TAXTIME and TAXPAY are highly significant. The magnitude of the coefficients of the tax complexity indicators is high as well. LAC countries present a similar result. As can be seen in column (3) the estimated coefficients of both TAXTIME and TAXPAY are significant and their size is large. Column (4) combines the MENA and ECA countries in our dataset. The size of estimated coefficients is low, but statistically significant.

Table 9 - Regions: Impact of Tax Simplification on Tax Corruption (in percentage terms)

	10% drop in tax payments	10% drop in tax time	10% drop in tax payments and tax time
ECA+MENA	-2.817	-1.746	-4.563
SSA	-5.362	-4.457	-9.819
LAC	-6.224	-4.756	-10.980
EAP+SASIA	-1.480	-1.092	-2.572

Source: Authors' calculation.
Note: The outcomes are calculated using the estimated coefficients reported in Table 8.

The economic significance of the estimated coefficients can be better understood with the help of experiments run with hypothetically changing values of the tax complexity variables. Experiment outcomes are presented in Table 9. The predicted changes are generated using the regression specifications given in Table 8's corresponding columns, based on which region is analyzed in the experiments. For each region three experiments are run. First the impact of a 10 percent drop in TAXPAY on tax corruption is investigated. Then the effect of a 10 percent drop in TAXTIME is studied. The combined effects of 10 percent cuts in TAXPAY and TAXTIME are reported in the last column of Table 9. A 10 percent decrease in TAXPAY or TAXTIME has the highest impact on tax corruption in the LAC region, where the cut in tax corruption is predicted to be 6.2 percent for TAXPAY and 4.7 percent for TAXTIME. When two effects are combined, 10 percent declines in TAXTIME and TAXPAY lead to almost 11 percent decline in tax

corruption. SSA countries follow LAC countries in terms of the economic significance of tax simplification on tax corruption. In the SSA region, a 10 percent drop in TAXPAY and TAXTIME causes a 5.4 percent and 4.5 percent decline in tax corruption, successively. The combined effect of two cuts on tax corruption is close to -10 percent. The impact of tax simplification on tax corruption is more limited in the ECA and MENA regions. While a 10 percent cut in TAXPAY leads to a 2.8 percent drop in tax corruption, the same amount of cut in TAXTIME leads to only a 1.8 percent cut. When two effects are combined, the total impact on tax corruption is predicted to be -4.6 percent for these countries. The weakest economic significance is observed in the SASIA and EAP regions. Even the combined effects of 10 percent cuts in TAXPAY and TAXTIME lead to only a 2.6 percent decline in tax corruption.

3.4 Importance of Development Levels of Countries in Determining Tax Corruption

In order to understand the importance of the development level of countries in determining tax corruption, the countries included in the study are split into two groups. In the first group, low-income and lower middle-income countries are included. While identifying the countries' income group, the World Bank's classifications are taken into account. 56 countries of the dataset belong to the first set. The second group consists of upper middle-income and high-income countries; there are 48 countries in this group. The descriptive statistics associated with these two groups are presented in Table 10. The lower-income group has larger tax corruption ratios on average and their tax systems are more complex, which is measured by the time to comply with tax requirements and the number of tax payments.

Table 10 – Income Groups: Descriptive Statistics

LOW-INCOME AND LOWER MIDDLE-INCOME COUNTRIES								
	BURDEN	*BUREAUC*	*DEMOC*	*EFFECTIVE*	*RULE*	*TAX CORRUP*	*TAXPAY*	*TAXTIME*
Mean	3.302	1.732	3.795	-0.670	-0.674	24.620	42	358
Median	3.316	2.000	4.000	-0.655	-0.685	19.595	41	270
Standard Deviation	0.577	1.045	1.446	0.451	0.545	19.182	17	145
Minimum	2.129	0.000	0.000	-1.769	-1.855	0.398	7	104
Maximum	5.297	4.000	6.000	0.733	1.083	96.667	147	1585
Count	450	684	684	612	615	629	499	499

UPPER MIDDLE-INCOME AND HIGH-INCOME COUNTRIES								
	BURDEN	*BUREAUC*	*DEMOC*	*EFFECTIVE*	*RULE*	*TAX CORRUP*	*TAXPAY*	*TAXTIME*
Mean	3.121	2.294	4.435	0.082	-0.025	18.661	29	325
Median	3.069	2.000	5.000	0.127	-0.074	14.757	22	292
Standard Deviation	0.567	0.811	1.479	0.656	0.724	17.600	24	102
Minimum	1.847	0.000	0.000	-1.877	-1.924	0.410	6	58
Maximum	4.408	4.000	6.000	1.263	1.367	95.276	125	1000
Count	389	546	546	452	454	478	383	374

Source: Authors' calculation.

The regression results for these two groups of countries are presented in Table 11. The outcomes in the first 6 columns are for the lower-income group, while the estimated coefficients obtained from the higher-income group are presented in columns (7)-(12). When the findings are compared to each other, it can be seen that significant differences are observed between two income groups. Tax corruption is more responsive to changes in the level of tax complexity of lower-income countries. The estimated coefficients of both TAXTIME and TAXPAY are highly significant and the coefficients' economic significance is higher for this group. The regression results obtained from the combined panel set (Table 5) indicate that the economic significance associated with TAXTIME is higher than the significance of TAXPAY. But in Table 11 TAXPAY presents higher estimated coefficients for the lower-income group than TAXTIME. Given that it is relatively easier to reduce the number of tax payments than cutting TAXTIME, it is an encouraging result for policy makers of lower-income countries, where tax corruption issues tend to be more severe. The findings indicate that the control variables are statistically significant and have the expected negative signs for the lower-income group.

The estimated coefficients for the higher-income group show that the impact of tax simplification on tax corruption is more limited. The coefficients of TAXPAY and TAXTIME are

lower and at the same time their statistical significance is around the 10 percent level. For this group of countries the control variables have the expected negative signs and are statistically significant.

Overall the estimated coefficients are higher for tax simplification variables in the lower-income group. This difference between the two groups is reflected in experiments. Table 12 presents the economic significance of the estimated coefficients of the tax simplification variables. The economic significance of both indicators of tax complexity is higher for the lower-income set. In lower-income countries, the effect of reducing the number of tax payments by 10 percent is expected to lower tax corruption by 11 percent, a higher effect than reducing tax time. Reducing the time taken to comply for taxes by 10 percent is expected to cut tax corruption by 8 percent. In a regression specification where the two measures of tax simplification are included together, a 10 percent drop in TAXPAY leads to a 8.4 percent cut in tax

Table 11 - Panel Regression with two country groups: Determinants of Tax Corruption (Sample 2002-2012)

	LOW-INCOME AND LOWER MIDDLE-INCOME COUNTRIES						UPPER MIDDLE-INCOME AND HIGH-INCOME COUNTRIES					
Dependent variable: Tax corruption	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Constant term	-11.728	-20.793	-40.215	-0.516	-2.582	-22.449	24.095	5.872	12.14	32.289	22.159	28.686
	(-1.295)	(-2.326)**	(-3.6)***	(-0.056)	(-0.258)	(-1.9)*	(6.595)***	(0.583)	(1.15)	(6.91)***	(1.784)*	(2.241)**
Tax simplification												
log(Tax payments)	9.923		7.15	9.69		7.729	1.854		2.254	1.984		2.359
	(4.049)***		(2.863)***	(4.002)***		(3.097)***	(1.702)*		(1.906)*	(1.708)*		(1.981)**
log(Tax time)		7.97	6.765		6.301	4.892		2.255	2.374		1.67	1.786
		(5.122)***	(4.226)***		(3.854)***	(2.907)***		(1.771)*	(1.742)*		(1.349)	(1.411)
Political and Political Institution Determinants of Corruption												
Bureaucracy Quality (higher better quality)				-0.378	-0.444	-0.556				-0.913	-0.828	-1.08
				(-2.098)**	(-1.768)*	(-2.163)***				(-1.755)*	(-1.757)*	(-1.743)*
Democratic Accountability (higher better)				-2.826	-2.025	-2.295				-1.275	-1.213	-1.072
				(-4.037)***	(-2.816)***	(-3.196)***				(-1.629)*	(-1.713)*	(-1.838)*
No. of observations	499	499	499	490	490	490	382	373	373	379	370	370
J-statistics	2.912	2.706	2.014	3.010	3.190	2.897	2.857	2.637	3.362	3.454	2.663	2.561
Arellano-Bond serial correlation test AR(1)	0.816	0.716	0.819	0.712	0.912	0.882	1.010	1.299	1.302	1.208	0.995	1.098
Arellano-Bond serial correlation test AR(2)	0.877	0.815	0.774	0.974	0.975	1.073	0.861	0.963	0.663	0.716	0.564	0.964
Jarque-Bera normality test	1.462	1.258	1.157	1.557	1.278	1.416	1.435	1.339	1.139	1.477	1.344	1.440

Note: The estimation method is a panel - GMM. Annual data are used. t-statistics are given in parenthesis. * indicates 10% significance level, ** indicates 5% significance level, and *** indicates 1% significance level. These significance levels are equal to one minus the probability of rejecting the null hypothesis of zero coefficients. J-test is for overidentification problem where H0: there is no overidentification problem. For serial correlation z-tests, H0 is "there is no serial correlation"; and for normality test, H0 is "normal distribution".

corruption, while the same amount of decline in TAXTIME is expected to lower tax corruption by 6 percent. The second panel of Table 12 reports the results for the higher-income group. A 10 percent reduction in either TAXTIME or TAXPAY cuts the tax corruption ratio by 1.9 percent and 2.3 percent, respectively, but the effects are limited for this group of countries.

Table 12 – Income groups: Impact of Tax Simplification on Tax Corruption (in percentage terms)

	10% drop in tax payments	10% drop in tax time	10% drop in tax payments and tax time
LOW-INCOME AND LOWER MIDDLE-INCOME COUNTRIES			
Equation (4) from Table 11	-11.155	..	..
Equation (5) from Table 11	..	-7.976	..
Equation (6) from Table 11	-8.486	-6.031	-14.516
UPPER MIDDLE-INCOME AND HIGH-INCOME COUNTRIES			
Equation (10) from Table 11	-1.984	..	..
Equation (11) from Table 11	..	-2.350	..
Equation (12) from Table 11	-1.882	-1.600	-3.482

Source: Authors' calculations.

These results are encouraging. Most of World Bank Group client countries belong in the first group – the lower and lower-middle income countries. The model predicts that working on tax reforms that will reduce complexity of tax systems is highly beneficial in terms of an impact on reducing tax corruption.

4. Simplifying Tax Regimes to Lower Tax Corruption – Policy Implications and Specific Measures

It is interesting that the results obtained in the above analysis are similar to the findings of several other studies, for example, Fisman and Gatti (2006). They used data from the World Business Environment Survey, also a firm level survey carried out in 1999 and 2000 across 61 countries, with about 100 firms interviewed in each country. They modeled time spent with

bureaucrats against bribes paid, and further included in the regression a variable that measures the extent to which firms know in advance how much these irregular payments will be, and interact it with bribes. The estimated relationship between time and corruption is positive in their study as well. So, the more time it takes to comply with various regulations – in their study "time" is a variable which respresents senior management time spent with government officials in general, not just tax officials – the more the amount of irregular payments made. In our analysis presented above, the findings are on the same lines, are robust, are specific to corruption related to tax administration, and provide a clear policy prescription – if you want to reduce tax administration related corruption, simplify the tax regime.

A sizeable body of research on the economics of corruption has come to similar conclusions, that regulatory complexity in general, and tax complexity in particular, engenders corruption and rent-seeking behavior. Lambsdorff (2006) lists "regulatory quality" as one of the main causes of corruption. He recommends that reform should "avoid complicated rules and those that are difficult to administer, and should design individual incentives to promote honest decision making." Clearly, he is in favor of simple laws and regulations that are easier to comply with. Obwona and Muwonge (2002) pointed out how in the case of Uganda, despite changes in the tax regime, "the tax system is still complicated and non-transparent." These conditions prevented the reduction of corruption in the Uganda Revenue Authority. In another study of Uganda, Kasimbazi (2003) refers to unclear tax legislation which led to random and partly ad hoc collection procedures which gave wide discretionary powers to taxpayers and tax inspectors interpret tax laws. He recommends that the income tax laws should be simplified.

As our model above shows, lowering tax corruption is linked to tax simplification. We defined our "simplicity" variables as time to comply and number of payments. The model therefore, guides us to look for ways to reduce the time it takes to comply with the tax regime and reduce the number of payments taxpayers need to make. A set of such measures is outlined here.

It is important to note that there is a large literature on corruption in tax administrations and strategies to tackle it. This section does not attempt to summarize all of those efforts.

Rather, the emphasis here is to highlight those actions that can be taken which specifically help in improving "tax simplicity" as defined in this paper, i.e. measures that help to reduce the time to comply and the number of payments.

A distinction needs to be made between tackling the motives for corruption and tackling the opportunities for corruption.[18] Measures focused on improving tax simplicity generally would help reduce opportunities for corruption in tax administrations. According to Das-Gupta, Engelschalk, and Mayville (1999), "tax simplification is perhaps the most important method of limiting opportunity, and can also increase economic efficiency…" They list a set of measures, inter alia, which would help address opportunity for corruption. The measures that also impact favorably the time to comply and number of payments variables are listed below:

- Low and few rates and limited exemptions;
- Withholding and presumptive taxes, particularly for small businesses;
- Nondiscretionary penalties;
- Limited contact between taxpayers and tax officials;
- Computerization and automation.

In addition to the above, *A Handbook for Tax Simplification,* prepared by the Investment Climate Advisory Services (2009), provides a list of good practices to be followed by tax administrations to help reduce corruption. These include the following points which are specifically related to tax simplification:

- the tax administration, as far as possible, limits direct contact with taxpayers;
- where concessions or any type of clearances need to be granted, they must be granted by means of "transparent, nondiscretionary, and auditable written rules and procedures;"

[18] See for example, Das-Gupta, Engelschalk, and Mayville (1999).

- specific provisions such as levy of interest, penalties, or collection of delinquent taxes should be nondiscretionary and implemented via transparent rules and procedures;
- presumptions that reduce computation and record keeping needs are helpful in simplifying tax provisions.

One of the key measures that helps reduce tax complexity is computerization. Most modern tax administrations rely heavily on computer systems – for the purposes of their own internal data collection and analysis, and also in their interactions with taxpayers. In mature tax systems taxpayers are almost entirely able to interact with the tax authority electronically – to file returns, make payments, obtain refunds, etc. These systems reduce human interaction, thereby significantly reducing the opportunities for corruption. Investment Climate Advisory Services (2009) highlights the role of technology in reducing corruption and describes various ways in which it helps. IT technology can automatically record the receipt of different documents and requests for service. This reduces the scope for "out of turn" favors and makes service delays conspicuous and easy to monitor. IT systems also make it possible to set up nondiscretionary and standardized procedures for various activities such as creating tax demands, issuing notices, and processing refunds. In the case of audit procedures, using IT driven risk based audit systems can eliminate discretion in selection of cases for audit. All of these measures help reduce corruption. In terms of the variables of tax simplicity in our model here, IT systems help reduce the number of payments, especially as for the purpose of the Doing Business computation, if e-payments exist for the majority of taxpayers, the number of payments is taken as "1", even if there are more tax payments. So, in the measure of the number of tax payments, an extra weightage is provided for e-systems. This variable succeeds in capturing the IT-related tax simplification measures which also impact corruption.

Two other measures can help to reduce the time to comply:

- time limitations on provision of taxpayer services; and
- a well-oiled tax dispute resolution institution.

Setting time limitations on provision of specific taxpayer services help to ensure that the time to comply with the tax regime is kept within limits. It also helps keep tax corruption in check as delays in taxpayer services – such as, taxpayer registration, or issuance of tax refunds – can be monitored and corrupt practices identified and checked. An effective and efficient tax dispute resolution mechanism increases taxpayer confidence in the objectivity of the tax system and helps reduce the time to comply with the tax system by resolving disputes quickly.

Some of the measures described above need legislative amendments, changes in tax laws, but most of them are in the nature of improvements in the administration of the tax regime, and hence are easier to carry out. Experience shows that changes in tax laws, especially those aimed at reducing tax rates and getting rid of tax exemptions, are difficult and time consuming to make as they may negatively impact the economic interests of some taxpayers. On the contrary, several of the measures described above are in the nature of "win-win" propositions that improve the efficiency of the tax administration and impact positively all taxpayers. These measures do not need long drawn out legislative procedures. They are relatively simple ways to simplify tax regimes and reduce tax corruption.

5. Conclusion

This study tries to construct an empirical link between tax simplification and tax corruption in tax administrations. The measure of tax corruption and the two alternative measures of tax complexity (the time to comply with tax requirements and the number of tax payments) are calculated using the World Bank's databases. The study includes 104 countries from different regions and income groups and covers the period of 2002-2012. After identifying the statistically significant determinants of tax corruption, experiments are run to understand the economic significance of tax simplification in this process. The regression findings support the existence of a strong link between tax corruption and the indicators of tax complexity. The link is both statistically and economically significant. The tax complexity indicators are robust to the inclusion of a different set of country-level variables. It is predicted that a 10 percent drop in TAXTIME leads to an approximately 4 percent decline in tax corruption, while the same about

of decline in TAXPAY leads to a roughly 6 percent improvement in tax corruption. The results indicate some differences across regions, as well as income groups. The combined effect of 10 percent declines in TAXTIME and TAXPAY is a 9.6 percent cut in tax corruption.

These empirical findings have important policy implications. There are different ways of reducing tax complexity and simplification of tax systems is useful in the process of fighting tax corruption.

It is worth noting that, in order to draw country-specific, detailed recommendations regarding tax simplification issues, the findings of our cross-country study should be followed by additional country-specific empirical studies, which should consider country specific characteristics that would affect tax corruption and tax simplification at the country level. Our study is not a substitute for such detailed country-level analysis. Each country has different features and it may require country specific analysis to have more detailed conclusions. Unfortunately such country-level studies focusing on the link between tax corruption and tax simplification are very limited, mainly, due to lack of data information on tax corruption. As far as we know, even though it is not perfect, the Enterprise Surveys Database is the only database which includes some data information on tax corruption. Thus, we believe that our panel-data analysis presents useful information on the link between tax corruption and simplification, which has been rarely investigated empirically in the literature.

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Appendix 1

Time to comply (TAXTIME): Time is recorded in hours per year. The indicator measures the time taken to prepare, file and pay three major types of taxes and contributions: the corporate income tax, value added or sales tax, and labor taxes, including payroll taxes and social contributions. Preparation time includes the time to collect all information necessary to compute the tax payable and to calculate the amount payable. If separate accounting books must be kept for tax purposes - or separate calculations made - the time associated with these processes is included. This extra time is included only if the regular accounting work is not enough to fulfill the tax accounting requirements. Filing time includes the time to complete all necessary tax return forms and file the returns at the tax authority. Payment time considers the hours needed to make the payment online or at the tax authorities. Where taxes and contributions are paid in person, the time includes delays while waiting.

Number of payments (TAXPAY): The tax payments indicator reflects the total number of taxes and contributions paid, the method of payment, the frequency of payment, the frequency of filing, and the number of agencies involved for this standardized case study company during the second year of operation. It includes taxes withheld by the company, such as sales tax, value added tax and employee-borne labor taxes. These taxes are traditionally collected by the company from the consumer or employee on behalf of the tax agencies. Although they do not affect the income statements of the company, they add to the administrative burden of complying with the tax system and so are included in the tax payments measure. The number of payments takes into account electronic filing. Where full electronic filing and payment is allowed and it is used by the majority of medium-size businesses, the tax is counted as paid once a year even if filings and payments are more frequent (emphasis added). For payments made through third parties, such as tax on interest paid by a financial institution, or fuel tax paid by a fuel distributor, only one payment is included even if payments are more frequent.

Appendix 2

The current survey instruments and manuals are available on the website: www.enterprisesurveys.org.

Firm-level surveys have been conducted since 2002 by different units within the World Bank. Since 2005-06, most data collection efforts have been centralized within the Enterprise Analysis Unit. Earlier data from differing survey instruments have been matched to an older standard instrument for dissemination on the website. The raw individual country datasets, aggregated datasets (across countries and years), panel datasets, and all relevant survey documentation are publicly available. All surveys have country-specific questions; therefore the aggregated dataset across countries does not include these country-specific questions.

Surveys implemented by the Enterprise Analysis Unit follow the Global Methodology, which is outlined on this page. Note that data users should exercise caution when comparing raw data and point estimates between surveys that did and did not adhere to the Enterprise Surveys Global Methodology.

Who conducts the surveys:

Private contractors conduct the Enterprise Surveys* on behalf of the World Bank. Due to sensitive survey questions addressing business-government relations and bribery-related topics, private contractors, rather than any government agency or an organization/institution associated with government, are hired by the World Bank to collect the data.

Confidentiality of the survey respondents and the sensitive information they provide is necessary to ensure the greatest degree of survey participation, integrity and confidence in the quality of the data. Surveys are usually carried out in cooperation with business organizations and government agencies promoting job creation and economic growth, but confidentiality is never compromised.

Who is surveyed:

The Enterprise Survey is answered by business owners and top managers. Sometimes the survey respondent calls company accountants and human resource managers into the interview to answer questions in the sales and labor sections of the survey. Typically 1200-1800 interviews are conducted in larger economies, 360 interviews are conducted in medium-sized economies, and for smaller economies, 150 interviews take place. The Sampling Note provides the rationale for these sample sizes.

The manufacturing and services sectors are the primary business sectors of interest. This corresponds to firms classified with ISIC codes 15-37, 45, 50-52, 55, 60-64, and 72 (ISIC Rev.3.1). Formal (registered) companies with 5 or more employees are targeted for interview. Services firms include construction, retail, wholesale, hotels, restaurants, transport, storage, communications, and IT. Firms with 100% government/state ownership are not eligible to participate in an Enterprise Survey. Occasionally, for a few surveyed countries, other sectors are included in the companies surveyed such as education or health-related businesses. In each country, businesses in the cities/regions of major economic activity are interviewed.

In some countries, other surveys, which depart from the usual Enterprise Survey methodology, are conducted. Examples include 1) Informal Surveys- surveys of informal (unregistered) enterprises, 2) Micro Surveys- surveys fielded to registered firms with less than five employees, and 3) Financial Crisis Assessment Surveys- short surveys administered by telephone to assess the effects of the global financial crisis of 2008-09.

Structure of the surveys:

The Enterprise Surveys Unit uses two instruments: the Manufacturing Questionnaire and the Services Questionnaire. Although many questions overlap, some are only applicable to one type of business. For example, retail firms are not asked about production and nonproduction workers.

The standard Enterprise Survey topics include firm characteristics, gender participation, access to finance, annual sales, costs of inputs/labor, workforce composition, bribery, licensing, infrastructure, trade, crime, competition, capacity utilization, land and permits, taxation, informality, business-government relations, innovation and technology, and performance measures.

Over 90% of the questions objectively ascertain characteristics of a country's business environment. The remaining questions assess the survey respondents' opinions on what are the obstacles to firm growth and performance. The mode of data collection is face-to-face interviews.

Sampling and weights:

The sampling methodology for Enterprise Surveys is stratified random sampling. In a simple random sample, all members of the population have the same probability of being selected and no weighting of the observations is necessary. In a stratified random sample, all population units are grouped within homogeneous groups and simple random samples are selected within each group. This method allows computing estimates for each of the strata with a specified level of precision while population estimates can also be estimated by properly weighting individual observations. The sampling weights take care of the varying probabilities of selection across different strata. Under certain conditions, estimates' precision under stratified random sampling will be higher than under simple random sampling (lower standard errors may result from the estimation procedure).

The strata for Enterprise Surveys are firm size, business sector, and geographic region within a country. Firm size levels are 5-19 (small), 20-99 (medium), and 100+ employees (large-sized firms). Since in most economies, the majority of firms are small and medium-sized, Enterprise Surveys oversample large firms since larger firms tend to be engines of job creation. Sector breakdown is usually manufacturing, retail, and other services. For larger economies, specific manufacturing sub-sectors are selected as additional strata on the basis of employment, value-added, and total number of establishments figures. Geographic regions within a country are selected based on which cities/regions collectively contain the majority of economic activity.

Ideally the survey sample frame is derived from the universe of eligible firms obtained from the country's statistical office. Sometimes the master list of firms is obtained from other government

agencies such as tax or business licensing authorities. In some cases, the list of firms is obtained from business associations or marketing databases. In a few cases, the sample frame is created via block enumeration, where the World Bank "manually" constructs a list of eligible firms after 1) partitioning a country's cities of major economic activity into clusters and blocks, 2) randomly selecting a subset of blocks which will then be enumerated. In surveys conducted since 2005-06, survey documentation which explains the source of the sample frame and any special circumstances encountered during survey fieldwork are included with the collected datasets.

Obtaining panel data, i.e. interviews with the same firms across multiple years, is a priority in current Enterprise Surveys. When conducting a new Enterprise Survey in a country where data was previously collected, maximal effort is expended to re-interview as many firms (from the prior survey) as possible. For these panel firms, sampling weights can be adjusted to take into account the resulting altered probabilities of inclusion in the sample frame.

Table A1 - Firm Characteristics from Enterprise Surveys

	Tax corruption (demand for bribery % of total tax visits)	Total number of firms interviewed	Total number of firms which answer "yes" to visits of tax officials	Total number of firms answering "yes" to whether any bribery is demanded during the visits	Size			Sector				
					% small	% medium	% large	% Manufacturing	% Retail	% Other Services	% Others	%Sector information unavailable
Albania	47.8	678	603	288	53.52	36.23	10.25	12.17	8.22	12.94	0.00	66.67
Angola	18.9	785	534	101	67.32	25.72	6.96	39.78	20.83	28.64	4.17	6.59
Armenia	33.6	896	682	229	48.93	33.77	17.30	10.07	10.96	12.30	0.00	66.67
Azerbaijan	50.8	900	684	347	45.78	36.68	17.54	10.53	10.53	12.28	0.00	66.67
Bahamas	12.4	150	24	3	46.67	36.67	16.67	28.00	18.00	53.33	0.67	0.00
Bangladesh	59.6	2505	1857	1107	29.19	30.59	40.23	85.90	2.79	6.72	4.59	0.00
Belarus	14.3	958	570	82	42.44	34.49	23.06	23.53	22.96	20.18	0.00	33.33
Belize	6.2	150	122	8	52.67	40.67	6.67	48.00	16.00	36.00	0.00	0.00
Benin	19.1	347	258	49	70.00	23.33	6.67	48.00	12.00	36.67	3.33	0.00
Bhutan	3.3	250	188	6	48.40	37.60	14.00	37.60	12.00	49.60	0.80	0.00
Bosnia and Herz.	39.3	743	466	183	41.35	31.68	26.69	11.63	9.42	12.19	0.09	66.67
Botswana	6.5	610	293	19	54.94	30.67	14.39	32.52	32.23	30.71	0.00	4.53
Brazil	9.7	3444	988	96	27.80	47.79	24.23	90.75	2.33	6.52	0.09	0.30
Bulgaria	26.7	2401	1607	429	44.94	33.40	21.40	19.26	8.99	11.75	0.00	60.00
Burkina Faso	17.8	533	391	69	66.81	23.42	9.77	30.40	46.12	23.48	0.00	0.00
Burundi	26.8	270	230	62	81.11	15.56	3.33	37.78	28.15	20.37	0.00	13.70
Cambodia	72.1	503	142	102	40.44	30.48	29.08	26.89	10.16	48.01	14.94	0.00
Cameroon	40.2	535	500	201	46.30	33.45	20.24	48.61	32.09	18.87	0.43	0.00
Cape Verde	5.3	254	152	8	61.03	30.44	8.52	44.24	35.96	19.29	0.51	0.00
Central African Rep.	20.9	150	135	28	66.00	26.67	7.33	24.67	27.33	48.00	0.00	0.00
Chad	19.6	150	137	27	51.33	36.00	12.67	40.00	20.67	38.67	0.67	0.00
Chile	2.3	2998	1890	44	30.35	40.60	29.05	71.43	11.52	16.41	0.10	0.54
China	19.1	6648	5052	966	21.96	40.04	38.00	62.63	5.37	31.89	0.11	0.00
Congo, Dem. Rep.	48.8	699	630	307	72.62	19.91	7.47	39.74	22.78	30.88	0.28	6.32
Congo	20.7	151	127	26	55.63	33.77	10.60	20.53	11.92	62.91	4.64	0.00
Costa Rica	2.0	881	247	5	50.13	32.61	17.26	29.93	9.29	10.78	0.00	50.00
Côte d'Ivoire	19.6	526	296	58	71.67	19.58	8.75	39.73	18.44	41.83	0.00	0.00
Croatia	25.1	1056	444	111	47.41	27.25	25.07	21.64	6.27	5.42	0.00	66.67
Czech Republic	29.4	861	448	132	39.78	34.81	25.41	29.33	15.47	21.87	0.00	33.33
Dominica	13.9	150	93	13	68.67	28.67	2.67	18.67	15.33	66.00	0.00	0.00
Ecuador	4.2	1477	598	25	39.14	38.29	22.57	47.08	24.56	28.29	0.00	0.08
Egypt	28.5	977	907	259	36.14	33.66	30.20	74.84	0.52	23.99	0.13	0.52
Gabon	13.4	179	143	19	63.69	25.70	10.61	13.97	12.85	66.48	6.70	0.00
Gambia, The	12.8	174	137	17	69.54	26.44	4.02	18.97	27.01	35.06	0.00	18.97
Ghana	21.5	494	465	100	74.49	19.03	6.48	59.11	20.85	20.04	0.00	0.00
Greece	60.8	546	397	241	73.99	14.84	11.17	0.00	0.00	0.00	0.00	100.00
Guatemala	4.6	1567	836	38	38.84	34.55	26.61	60.53	16.42	22.00	1.05	0.00
Guinea	57.3	223	185	106	88.34	8.52	3.14	60.54	21.97	16.59	0.00	0.90
Guinea-Bissau	25.2	159	136	34	85.53	13.21	1.26	31.45	33.96	15.09	0.00	19.50
Honduras	4.2	796	507	21	48.90	30.32	20.77	56.55	16.18	27.27	0.00	0.00
Hungary	13.5	1151	633	85	36.98	35.41	27.22	13.29	6.99	12.94	0.11	66.67
India	60.2	4113	1748	1051	69.63	18.40	8.57	52.55	46.01	0.00	0.83	0.61
Indonesia	28.3	2157	527	149	56.09	24.24	19.67	82.20	7.83	9.76	0.00	0.21
Iraq	32.1	756	389	125	78.31	20.77	0.93	62.83	5.56	31.61	0.00	0.00
Jamaica	4.6	470	156	7	37.23	44.95	17.82	32.18	33.51	34.31	0.00	0.00
Jordan	0.5	503	410	2	35.19	39.76	25.05	32.80	0.00	13.12	37.18	16.90
Kazakhstan	43.6	1379	923	402	34.04	40.98	24.97	11.27	10.17	11.89	0.00	66.67
Kenya	37.0	941	720	266	46.88	33.18	19.94	60.27	19.18	15.22	0.00	5.33
Kosovo	0.9	270	241	2	70.00	24.81	5.19	38.15	23.33	38.52	0.00	0.00
Kyrgyz Republic	63.4	712	638	405	37.80	39.35	22.85	9.89	5.64	9.36	0.11	75.00
Lao PDR	28.8	839	680	196	50.04	34.38	15.58	38.13	24.17	37.51	0.18	0.00
Latvia	21.1	652	379	80	48.49	24.89	26.63	11.32	11.07	10.95	0.00	66.67

Table A1 - Firm Characteristics from Enterprise Surveys (continued)

	Tax corruption (demand for bribery % of total tax visits)	Total number of firms interviewed	Total number of firms which answer "yes" to visits of tax officials	Total number of firms answering "yes" to whether any bribery is demanded during the visits	Size			Sector				
					% small	% medium	% large	% Manufacturing	% Retail	% Other Services	% Others	%Sector information unavailable
Lebanon	24.5	354	211	52	48.43	36.65	13.09	44.76	7.07	29.06	17.80	1.31
Lesotho	4.2	226	152	6	50.33	29.14	20.53	35.10	23.84	34.44	6.62	0.00
Liberia	62.5	150	138	86	78.67	14.67	6.67	14.00	10.00	41.33	34.67	0.00
Lithuania	18.3	920	482	88	37.97	38.70	23.22	9.15	6.52	9.15	0.18	75.00
Macedonia, FYR	23.1	736	482	111	46.38	31.14	22.19	11.66	8.47	12.93	0.27	66.67
Madagascar	9.9	738	377	37	38.20	44.72	17.08	45.84	17.98	36.18	0.00	0.00
Malawi	12.7	310	268	34	30.00	36.00	34.00	47.33	15.33	32.67	4.67	0.00
Mali	25.7	1005	696	179	76.35	21.26	2.38	53.21	20.33	26.46	0.00	0.00
Mauritania	43.1	237	213	92	78.90	18.99	2.11	33.76	19.41	26.58	0.00	20.25
Mauritius	1.2	610	179	2	52.26	33.17	14.57	55.28	21.11	22.86	0.75	0.00
Mexico	6.8	2960	1119	77	41.89	31.08	27.03	77.64	7.87	13.21	0.03	1.25
Moldova	39.7	990	767	305	37.93	36.08	25.99	7.44	9.23	8.33	0.00	75.00
Mongolia	12.9	557	415	53	39.50	40.88	19.61	35.91	23.48	40.61	0.00	0.00
Montenegro	6.4	216	106	7	51.72	34.48	13.79	32.76	35.34	31.03	0.86	0.00
Mozambique	10.6	479	354	38	63.88	29.65	6.47	71.19	22.13	6.68	0.00	0.00
Namibia	2.7	329	76	2	69.60	24.92	5.47	32.22	33.43	20.36	0.00	13.98
Nepal	14.5	850	617	89	55.58	34.68	9.74	43.72	26.43	29.72	0.14	0.00
Niger	15.4	275	197	30	63.40	31.33	5.27	31.47	7.80	23.33	1.00	36.40
Nigeria	26.8	1891	1527	409	77.26	20.41	2.33	50.13	20.89	21.68	0.00	7.30
Pakistan	56.0	1900	714	400	60.75	23.53	15.72	83.85	6.31	9.84	0.00	0.00
Panama	4.7	969	401	19	46.40	37.12	16.48	36.42	26.84	30.87	0.00	5.88
Paraguay	24.3	1587	580	141	45.86	41.20	12.94	58.55	17.89	18.48	0.18	4.89
Peru	5.0	2208	927	47	36.79	38.81	24.41	66.56	14.93	18.51	0.00	0.00
Philippines	23.9	2042	1532	366	31.60	42.99	25.41	74.21	12.82	12.82	0.15	0.00
Poland	24.4	2038	924	225	46.17	31.85	21.89	8.02	6.76	9.78	0.44	75.00
Romania	22.9	1396	963	221	34.18	36.57	29.25	11.83	9.37	12.14	0.00	66.67
Russia	34.4	6331	3486	1201	38.75	36.31	24.86	25.76	5.52	18.39	0.32	50.00
Rwanda	6.6	453	328	22	57.38	31.17	11.45	30.72	17.85	49.31	0.00	2.12
Samoa	17.7	109	56	10	63.30	32.11	4.59	24.77	22.94	44.95	0.92	6.42
Senegal	14.5	768	556	81	80.83	14.82	4.35	51.19	20.55	28.26	0.00	0.00
Serbia	20.1	1346	812	164	42.86	25.26	31.68	11.60	8.51	13.23	0.00	66.67
Sierra Leone	9.3	150	137	13	74.00	18.00	8.00	32.00	17.33	37.33	13.33	0.00
Slovak Republic	26.2	665	343	90	41.88	29.61	28.14	10.67	8.97	13.33	0.36	66.67
Slovenia	23.0	687	189	44	49.81	24.06	26.12	12.80	6.52	13.89	0.12	66.67
South Africa	2.1	1540	753	16	38.53	40.13	21.34	72.57	15.05	12.38	0.00	0.00
Sri Lanka	4.0	1062	529	21	51.97	29.18	18.85	59.34	19.84	20.82	0.00	0.00
St. Lucia	5.15	150	97	5	52.67	36.67	10.67	42.00	24.67	33.33	0.00	0.00
St. Vincent and the Gre.	2.90	154	69	2	71.43	24.68	3.90	31.82	29.87	38.31	0.00	0.00
Swaziland	3.6	307	237	8	69.71	18.89	11.40	22.80	40.07	25.41	0.00	11.73
Tanzania	19.7	1114	972	191	62.29	26.97	10.74	65.16	15.51	16.23	0.00	3.10
Timor-Leste	3.08	150	65	2	65.33	28.67	6.00	42.00	8.00	48.00	2.00	0.00
Togo	8.4	155	99	8	58.71	29.03	12.26	22.58	12.26	57.42	3.23	4.52
Trinidad and Tobago	7.8	370	166	13	44.86	27.84	27.30	32.70	31.89	34.86	0.54	0.00
Turkey	19.0	3546	1679	319	35.87	37.29	26.22	19.90	2.02	3.02	0.07	75.00
Uganda	11.4	863	712	81	65.90	27.53	6.57	54.53	21.67	19.01	0.00	4.80
Ukraine	41.4	1908	1216	503	42.29	34.90	22.81	22.68	4.78	5.84	0.04	66.67
Uruguay	0.8	1228	499	4	43.93	35.97	20.09	61.26	17.97	18.68	0.08	2.01
Vanuatu	5.0	128	96	5	63.28	35.16	1.56	11.72	36.72	51.56	0.00	0.00
Vietnam	36.6	2203	1589	582	21.84	40.93	37.23	73.98	8.64	16.43	0.95	0.00
Yemen	44.8	477	389	174	62.05	27.04	10.90	52.62	18.03	29.35	0.00	0.00
Zambia	8.7	690	551	48	55.17	31.61	13.22	62.81	23.97	13.22	0.00	0.00
Zimbabwe	10.6	600	506	54	38.73	36.89	24.37	62.77	14.86	22.37	0.00	0.00

Table A2 - Panel Regression with omitted variables for robustness check: Determinants of Tax Corruption

Dependent variable: Tax corruption	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant term	10.676	11.13	13.781	10.004	13.96	13.029	8.701	12.783	14.903	12.006	13.215	10.983
	(1.323)	(2.801)***	(1.593)	(1.239)	(2.733)***	(1.548)	(1.109)	(1.59)	(2.787)***	(1.466)	(3.645)***	(1.293)
Tax simplification												
log(Tax payments)	2.611	2.852	2.328	2.802	1.949	3.112	2.954	2.746	2.724	3.106	3.149	3.197
	(2.011)**	(2.762)***	(2.985)***	(1.913)**	(1.755)*	(2.507)***	(1.835)*	(2.706)***	(2.232)**	(2.101)**	(2.033)**	(1.944)**
log(Tax time)	5.317	5.297	4.961	5.142	3.207	4.928	5.644	4.736	4.471	5.418	5.488	4.611
	(1.872)*	(1.892)*	(2.426)**	(1.716)*	(2.210)**	(1.841)*	(1.948)*	(1.698)*	(2.009)**	(1.873)*	(1.939)*	(2.527)**
Economic Determinants of Corruption												
Wastefulness of government spending, 1-7 (best)		3.249										
		(0.878)										
Global Competitiveness Index, 1-7 (best)			-1.137									
			(-0.647)									
GDP per capita growth (annual %)				-0.225								
				(-1.372)								
Tax revenue (% of GDP)					-0.567							
					(-3.896)***							
Political and Political Institution Determinants of Corruption												
Bureaucracy Quality (higher better quality)	-0.555	-0.396	-0.454	-0.673	-0.208	-0.536	-0.225	-0.669	-0.389	-0.695	-0.526	-0.549
	(-1.799)*	(-1.821)*	(-2.168)**	(-1.844)*	(-1.995)*	(-2.203)**	(-2.291)**	(-1.847)*	(-2.544)**	(-1.861)*	(-2.261)**	(-2.111)**
Civil Disorder (higher low disrder)						-1.174						
						(-0.981)						
Political Stability and Absence of Violence/Terrorism (higher better)							-6.909					
							(-1.002)					
Democratic Accountability (higher better)	-1.298	-1.387	-1.211	-1.311	-0.707	-1.241	-1.354	-1.785	-0.995	-1.634	-1.587	-1.526
	(-2.418)**	(-2.132)**	(-1.639)*	(-2.438)**	(-2.016)**	(-2.299)**	(-2.596)***	(-3.233)***	(-1.842)*	(-2.538)**	(-2.446)**	(-2.68)***
Regulatory Quality (higher better)								-6.135				
								(-1.406)				
Political Risk Rating (higher value, lower risk)									-0.325			
									(-1.492)			
Voice and Accountability (higher better)										1.504		
										(0.946)		
Transparency of government policymaking, 1-7 (best)											-5.566	
											(-0.863)	
Judicial and Bureaucratic Determinants of Corruption												
Rule of Law (higher better)	-6.495	-4.82	-5.68	-6.557	-7.424	-6.362	-5.491	-5.081	-4.979	-7.634	-3.883	-5.943
	(-6.041)***	(-3.83)***	(-4.258)***	(-6.096)***	(-4.057)***	(-5.871)***	(-5.341)***	(-6.447)***	(-4.337)***	(-4.73)***	(-2.977)***	(-4.841)***
Cultural and Geographical Determinants of Corruption												
Total natural resources rents (% of GDP)												0.05
												(1.075)
No. of observations	847	613	613	840	473	847	846	847	847	847	613	749
J-statistics	3.261	4.104	3.104	3.427	2.802	3.409	3.415	2.229	3.909	2.409	3.404	3.392
Arellano-Bond serial correlation test AR(1)	0.231	0.242	0.355	0.875	0.981	0.879	0.381	0.766	0.752	0.879	0.148	0.868
Arellano-Bond serial correlation test AR(2)	0.891	0.803	0.803	0.887	1.015	0.883	0.453	0.673	0.883	0.863	1.103	0.989
Jarque-Bera normality test	1.487	1.004	1.204	1.146	1.358	1.138	1.438	1.238	1.238	1.108	1.004	1.348

Note: The estimation method is a panel - GMM. Annual data are used. t-statistics are given in parenthesis. * indicates 10% significance level, ** indicates 5% significance level, and *** indicates 1% significance level. These significance levels are equal to one minus the probability of rejecting the null hypothesis of zero coefficients. J-test is for overidentification problem where H0: there is no overidentification problem. For serial correlation z-tests, H0 is "there is no serial correlation"; and for normality test, H0 is "normal distribution". Column (1) presents the estimation results of the benchmark regression specification. In the remaining columns the results with the variables omitted from the benchmark model are presented.