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A disaggregated analysis of the impact of corruption on tax revenue mobilization in developing countries : Evidence of a nonlinear relationship

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Abstract

Over the past two decades, increasing attention has been given to the mobilization of tax revenues in developing countries. Numerous empirical studies have investigated the impact of economic, structural, institutional, and social factors on public revenues, with a strong focus on corruption. This article contributes to the literature by distinguishing between various types of corruption and examining their nonlinear relationships with tax revenue. By utilizing disaggregated V-Dem indicators for corruption, and applying a dynamic GMM approach to address the endogeneity of corruption, the article also examines macroeconomic determinants of tax revenue mobilization in 122 middle- and low-income countries from 1990 to 2017. The findings demonstrate that corruption has a nonlinear relationship, shaped by both its scale and nature.

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1. Introduction

Empirical research has extensively explored how economic, structural, institutional, and social factors affect tax revenues, with a particular emphasis on corruption[1]. Systemic corruption undermines the state's ability to foster inclusive growth and reduce poverty by damaging the core of business operations and restricting economic potential. It erodes public trust in institutions, reduces the effectiveness and fairness of public policies, and diverts taxpayer money from social spending. This leads to tax revenue loss, facilitating tax evasion for some while increasing the tax burden for others, ultimately impairing the state's capacity for social investment (Tanzi, 1998; Bird et al., 2008).

To the best of our knowledge, previous studies examining the relationship between corruption and tax revenue have primarily relied on composite indicators such as the ICRG and WGI indices to measure corruption. While a few have explored potential nonlinearities in the corruption-revenue relationship (e.g., Méon and Sekkat 2005; Méon and Weill 2010; Bogetić and Naeher 2024a), these studies rely on aggregate measures of corruption and do not analyze the distinct effects of its various components within a nonlinear framework. The main novelty of our paper lies in the use of disaggregated indicators of corruption, which enables a more nuanced analysis of how various forms of corruption, such as judicial, administrative, and political, affect tax revenue mobilization. Additionally, we explicitly account for potential threshold effects, uncovering nonlinear dynamics that may vary by corruption type and tax category.[2]

Furthermore, we focus specifically on tax revenue and its composition (direct versus indirect taxes), rather than total government revenue, because tax collection is particularly sensitive to institutional quality, and the distortions introduced by corruption. Unlike many non-tax revenue resources, tax systems depend heavily on voluntary compliance, auditing, and formal enforcement mechanisms which are vulnerable to corruption. As noted by Besley and Persson (2013), effective tax systems are closely linked to state capacity, and institutions such as the judiciary, tax administration, and audit mechanisms play a critical role in tax collection.

Building on this, the primary contribution of this paper is the modeling of the impact of political corruption and its various components, as derived from the V-Dem database, on tax revenue in developing countries, while also examining the nonlinear relationship. V-Dem provides detailed indicators covering different forms of corruption, including political, executive, judicial, administrative, and public sector corruption, enabling a more precise analysis of corruption

[1]Corruption is described as "the abuse of public office for private gain". Transparency International and international organizations (IMF, World Bank, OECD, etc.) use this definition.

[2]Nur-tegin and Jakee (2020) used disaggregated corruption measures from the World Bank Enterprise Surveys to examine the effects on firm performance. Our study applies a distinct institutional disaggregation (executive, legislative, administrative, judicial corruption) to tax revenue mobilization at the macroeconomic level, addressing gaps in understanding corruption's role in fiscal capacity development.

rather than treating it as a uniform concept. This study contributes to the empirical literature by distinguishing between various types of corruption and by identifying nonlinearities in their effects on tax revenue mobilization. Relying on a dynamic GMM approach to address endogeneity concerns, the analysis draws on data from 122 middle- and low-income countries over the period 1990 to 2017. Based on the lubricating effect hypothesis of corruption (grease the wheels hypothesis), the findings reveal a nonlinear relationship between corruption and tax revenue.

The rest of the paper is structured as follows. Section 2 reviews the related literature on the effect of corruption on tax revenues. Section 3 presents the econometric methodology and provides a descriptive analysis of the data used. Section 4 outlines the empirical results and discusses their implications. Finally, Section 5 concludes with a summary of the findings and offers recommendations for policy and further research.

2. Related literature

Extensive empirical studies have explored the relationship between corruption and tax systems. This group of studies focuses on the macroeconomic consequences of corruption on taxation, often connecting corrupt activities by public officials with the various aspects of their fiscal and tax policies. Allowing tax auditors to accept bribe can decrease the amount of revenue collected. Corruption reduces governments' tax collection when it contributes to tax evasion, improper tax exemptions, or poor tax administration (Alm et al., 1991; Gupta, 2007; Gupta et al., 2001; Tanzi, 1998; Phuong, 2015; Epaphra and Massawe, 2017; Thornton, 2008; Baum et al., 2017; Attila et al., 2009).

On the other hand, some studies argue that corruption can reduce tax evasion and thereby increase tax revenue. When the expected gains from corruption, such as bribes, are high, tax collectors may be more motivated to monitor taxpayers closely. This increased monitoring raises the perceived cost of evasion, discouraging taxpayers from avoiding taxes and ultimately boosting revenue. In fact, this positive impact of corruption on tax revenue has been observed in developing countries (Chand and Moene, 1999; Mookherjee, 1998), however Fjeldstad and Tungodden (2003) argue that this effect is likely to be a short-lived phenomenon and tends to vanish over the long term. Indeed, although corruption may have systematically negative effects in countries with well-functioning institutions, it may increase productivity and entrepreneurship in highly regulated countries with ineffective public institutions and governance systems (Houston, 2007; Méon and Weill, 2010). However, while corruption can help counteract the effects of excessive regulation, it is not necessarily a factor that drives economic growth (Dreher and Gassebner 2013).

All these studies suggest that corruption can have both positive and negative effects on taxation, underscoring the ambiguous nature of this relationship and confirming its non-linearity. However, this raises the question of how much corruption can be tolerated before it becomes detrimental to the tax system. This concern arises because existing research has not investigated whether there is a specific level of corruption that enhances or undermines taxation. Additionally, no study has comprehensively identified the level of corruption that would optimize tax revenue.

3. Data and Methodology

This study covers a sample of 122 low and middle-income countries over the period 1990-2017. The data for total tax revenue, direct and indirect taxes, come from the Government Revenue Dataset (GRD) of the International Central for Tax and Development (ICTD). This database combines data from several international sources[3] For our variables of interest on corruption, data are collected from the V-Dem (Varieties of Democracy) database. The corruption index includes measures of six distinct types of corruption that cover both different areas and levels of the political sphere, distinguishing between executive, legislative[4] and judicial corruption. In the executive sphere, the measures also distinguish between corruption primarily related to bribes and corruption related to embezzlement. They also distinguish between corruption at the highest levels of the executive branch (at the level of leaders/government) on the one hand, and corruption in the general public sector on the other. The measures thus capture several types of corruption: 'petty' and 'grand' corruption; bribery and theft; corruption aimed at influencing the legislative process; and corruption related to implementation. The index is obtained by taking the average of (a) the public sector corruption index, (b) the executive corruption index, (c) the legislative corruption indicator and (d) the judicial corruption indicator. In other words, these four spheres of government are equally weighted in the index produced. Scores are given on a continuous scale from 0 (lowest level of corruption) to 1 (highest level of corruption).

This study applies the Generalized Method of Moments (GMM) developed for dynamic panel models by Holtz-Eakin et al. (1988), Arellano and Bond (1991) and Arellano and Bover (1995). The empirical model used is as follows:

$$TR_{it} = \alpha + \beta_1 Corr_{it} + \beta_2 Corr_{it}^2 + \beta' X_{it} + \eta_i + \lambda_t + \epsilon_{it} \quad (1)$$

where TR_{it} is the ratio of tax revenue excluding subsidies and social contributions to the coun-

[3] National government statistics agencies, World Bank, IMF, Academic and research institutions, National tax authorities and revenue departments and Surveys and data collections from countries and regions.

[4] As data on legislative corruption are missing for countries without legislatures, the authors of the database take the average of public sector corruption, executive corruption and judicial corruption to create the legislative corruption index (McMann et al., 2016).

try's GDP i at time t, $Corr$[5] is a measure of corruption that will alternatively take the form of political corruption[6] and then the sub-indices of corruption (executive, legislative, administrative, judicial and regime corruption[7]). $Corr^{2}$ is the quadratic form of corruption. α, β and β' are vectors of parameters to be estimated. X_{it} denotes a vector of control variables capturing key structural and macroeconomic determinants: real GDP per capita (level of economic development), agriculture share of GDP (composition of the economic structure), urbanization (tax base expansion), government expenditure (public sector size), trade openness (cross-border taxation), and inflation (macroeconomic stability). All data are sourced from the World Bank's World Development Indicators. η_i , λ_t denote country-specific and time-specific effects. ϵ_{it} represents the unobserved random error term.

Given the persistence of tax revenues, the potential for serial correlation is a concern; this is confirmed by the Wooldridge (2002) test for autocorrelation in panel data. To ensure the econometric analysis's robustness and avoid spurious regressions, we examine the time-series properties of the data. Specifically, we apply a Fisher-type panel unit root test based on augmented Dickey-Fuller (Choi, 2001) tests for each panel. The results indicate that the variables used in the analysis are stationary, thereby confirming the appropriateness of the data for dynamic panel estimation.[8] To address this, we use an estimator that fits panel regression models when the disturbance term follows a first-order autoregressive process. A concern may also arise about the endogeneity of corruption with fiscal performance. It can be argued that the relationship between corruption and tax revenue is unlikely to be unidirectional for two reasons. First, a higher level of taxes may be necessary to invest in and build institutions to combat corruption. Second, high taxation could encourage tax evasion, while low tax capacity could foster corrupt behavior. Estimating equation (1) is therefore challenging due to the potential reverse causality between corruption and taxation. To address this endogeneity problem, the literature has applied different instrumental variable approaches (Ghura, 1998; Hwang et al., 2002; Attila et al., 2009; Thornton, 2008; Baum et al., 2017).

Omitted variables bias in studies of corruption and tax revenue mobilization is addressed using dynamic Generalized Method of Moments (GMM) estimation, specifically the Arellano and Bond (1991) methodology. Fixed effects models, while useful for controlling country-specific factors, can obscure key heterogeneity in corruption and instrumental variables, leading to weak results. The GMM approach corrects for endogeneity and fixed effects by using

[5] In order to facilitate comparisons, all six indices are rescaled to have values between 0 for less corruption and 10 for high corruption.

[6] V2x_corr: political, v2jucorrd: judicial, v2x_execo: executive, v2x_pubco: public or administrative, v2lgcrrpt: legislative, and v2x_np_reg: regime corruption, with values between $[-3, 3]$ where -3 indicates more corruption and 3 indicates less corruption for legislative and judicial corruption, and $[0, 1]$ where 0 indicates less corruption and 1 indicates more corruption for executive, public, and political corruption.

[7] Regime corruption index is another global index which is composed by three sub indices : Executive corruption index, Legislature corrupt activities and Judicial corruption decision

[8] These results are not reported here for brevity but are available from the authors upon request.

lagged values of endogenous variables and lagged values of weakly exogenous variables as instruments. However, this method does not handle time-invariant factors effectively. To address this, the system GMM approach, combining difference and level equations, is used for better efficiency. To further refine results and handle finite sample issues, the two-step estimation method (Windmeijer, 2005) is applied. The Hansen (1982) test is employed to check instrument validity, addressing issues of autocorrelation and heteroscedasticity, and a second-order autocorrelation test is performed to verify the non-correlation of error terms.

4. Results and Discussion

Linear models may oversimplify the complex relationship between corruption and tax revenue, as corruption's impact can vary across levels. To better capture these dynamics, the study uses a more comprehensive empirical approach. The analysis unfolds in four stages: First, fractional polynomial graphs are used to identify complex, non-linear associations. Second, local polynomial smoothing graphs reveal nuanced local patterns. Third, a quadratic estimation using the Generalized Method of Moments (GMM) rigorously tests the relationship and identifies thresholds or turning points. Finally, corruption indices are split into values below and above the identified threshold. Patterns shown in Figures 1, and 2 align with a quadratic specification, confirming a nonlinear relationship.

The results of the estimation are reported in tables I, II and III which show that the model is well-specified and robust. The Arellano-Bond test for AR(2) shows p-values above 0.05, indicating that there is no significant second-order serial correlation in the differenced residuals. This supports the validity of the model's specification. Additionally, the Hansen test p-values also exceed 0.05, suggesting that the instruments used are valid and exogenous. Overall, these results imply that the GMM model is appropriate, with no major issues of autocorrelation or instrument validity. The results show that both β_1 and β_2 are statistically significant with almost corruption indices. The coefficient on the linear term of political corruption index is equal to 0.754 while the one on the rescaled squared term is -0.078. In sum, the quadratic regression suggests that corruption is associated positively with tax revenue before certain thresholds[9] These thresholds will be used in next GMM estimation to evaluate the effect of corruption levels under and above thresholds. Table I and III report these results. Results of these tables confirm the nonlinear relationship between corruption and tax revenues. Coefficients are positive below the thresholds and turn negative once the thresholds are exceeded.

Our findings are align with the theoretical insights of Fjeldstad and Tungodden (2003) and Chand and Moene (1999). These papers indicate that when senior bureaucrats are non-corrupt,

[9]The thresholds (Turning points) were obtained from the estimated model using the formula for the turning point of a quadratic function: *Corr** = $-\beta_1/2\beta_2$, where *Corr** is the turning point level of corruption, and β_1 and β_2 are the coefficients of linear and quadratic term of corruption, respectively.

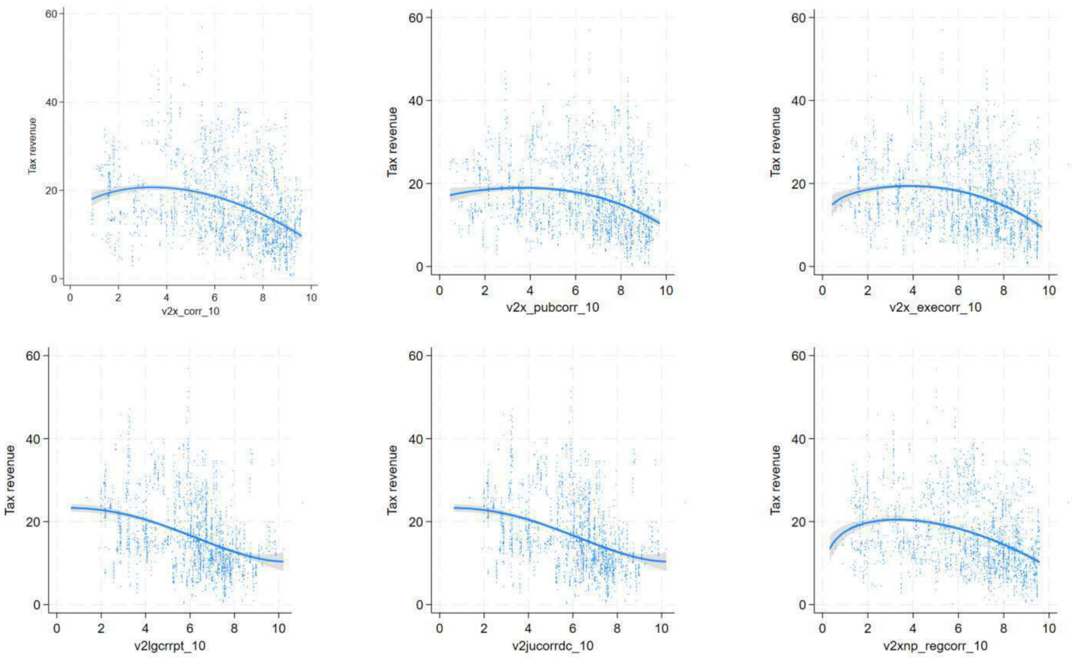

Figure 1: Fractional polynomial:The scatter plot is corruption versus Tax revenue. The line is the best fit quadratic function.

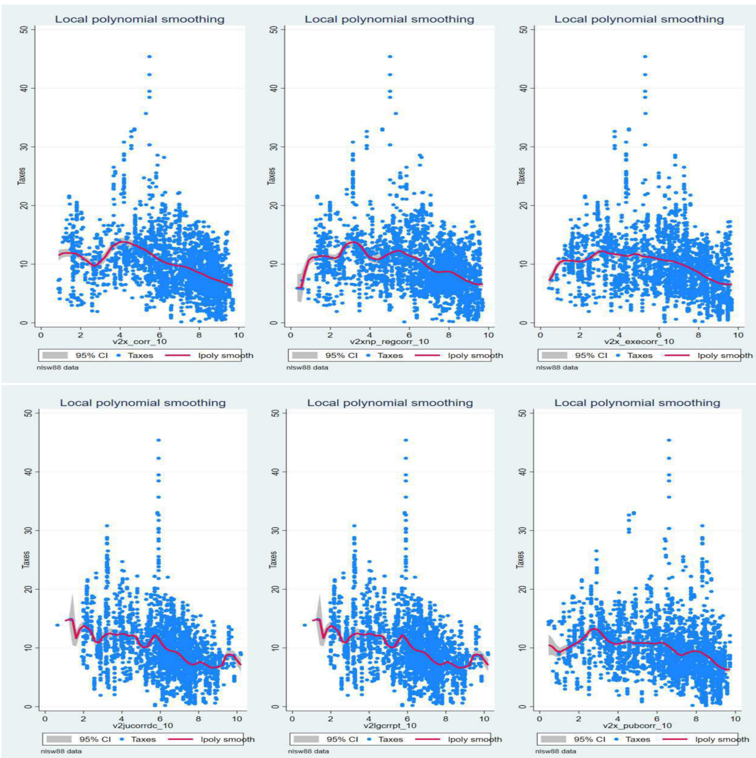

Figure 2: Scatter plots fitted with local polynomial smoothing

a bonus system can motivate tax collectors to work harder and report accurately, increasing tax revenues, as they benefit directly from bonuses. However, Fjeldstad and Tungodden (2003) highlights that when higher-level officials are corrupt, the effectiveness of such bonus systems diminishes. In such environments, corrupt tax collectors might leverage their enhanced bargaining power to extract higher bribes or continue engaging in corrupt practices, rather than focusing on improving tax collection. This dynamic helps explain why, once corruption exceeds a certain threshold, its initially positive effects on tax revenue may reverse, resulting in decreased overall revenue and increased corruption, thus reinforcing our study's findings. Moreover, according to Liu and Mikesell (2019), corrupt officials often create more complex tax systems, leading to higher collections due to reduced transparency. They tend to favor indirect taxes over direct taxes, which can be less fair and increase total revenue. While this complexity burdens taxpayers, it can result in greater state revenues. Control variables mostly follow theoretical expectations. Real GDP per capita and trade openness are strongly linked to higher tax revenue, though the effect of trade weakens with high corruption. A larger agricultural sector is associated with lower revenue but becomes insignificant with corruption thresholds. Government spending is mildly positive, suggesting a larger public sector may help mobilize taxes. Inflation is consistently positive, possibly reflecting higher nominal collections in moderate inflation environments.

We assess the robustness of our results by adding governance indicators and new control variables and removing previously used ones. To account for other potential factors affecting the relationship between corruption and tax revenue, we re-estimate the basic model, gradually incorporating these additional variables. In Table A.2, from column (1) to column (7), we include FDI, education, unemployment, labor force participation, and dummy variables for low-income, lower-middle-income, and upper-middle-income countries and from column (8) to column (14), we include governance indicators.[10] Then, we sequentially drop the control variables used in the baseline estimation in Table A.3. The results indicate that our findings remain robust.[11] Finally, we conducted another robustness test by separating taxes into direct and indirect categories. The results remained robust, but it was evident that indirect taxes are more affected by corruption than direct taxes. When examining the coefficients related to corruption, we observed that the coefficients for indirect taxes were higher. This aligns with studies by Thornton (2008), Imam and Jacobs (2014), and Tanzi (1998), which suggest that the pronounced effect on indirect taxes is due to their frequent interactions between tax authorities

[10] Data for Governance are obtained from the the World Governance Indicators Database. The other variables are sourced from World Development Database. Except for the "Control of Corruption" indicator, we included the remaining five governance indicators in our analysis. In addition,we incorporate Polity2 index sourced from Polity IV as a measure of the level of democracy. To complement the analysis, we constructed a mean governance indicator (Mean Governance) and a composite index based on the five selected governance indicators using principal component analysis method (PCA).

[11] As governance data are available only from 1996 onward, all regressions are restricted to the period 1996-2017

and individuals, making them more susceptible to corruption. Results of this test are presented in table A.4.

5. Conclusion

The main objective of this paper is to analyze the effect of disaggregated corruption on tax revenue using GMM estimations for a panel of 122 developing countries over the period 1990–2017. The findings reveal a nonlinear relationship between corruption and tax revenue. While previous studies have explored this nonlinearity, they typically use aggregate corruption indicators and assume a uniform effect across all types and levels of corruption. In contrast, this paper contributes by employing disaggregated corruption measures to examine how their effects on tax revenue vary nonlinearly with corruption intensity. The analysis shows that a linear model oversimplifies this relationship. To address this, the empirical strategy uses a non-linear (quadratic) framework to better capture the varying impacts of corruption based on its type and level.

Results confirm a nonlinear (hump-shaped) relationship, indicating that corruption's effect on tax revenue mobilization depends on its intensity: revenue tends to increase at low levels of corruption but declines once corruption exceeds a certain threshold. The nonlinear analysis shows that while limited corruption may ease bureaucratic delays, higher levels promote tax evasion and erode public trust. This supports the conditional "grease the wheels" hypothesis: in weak institutional settings, minor corruption might temporarily aid tax collection by reducing red tape. As corruption increases, its harmful effects such as rent seeking, tax evasion, and institutional erosion begin to outweigh any short-term benefits, ultimately reducing tax revenue.

When breaking corruption down into its various dimensions using V-Dem data, a similar hump-shaped relationship emerges. Judicial and legislative corruption show a negative impact on revenue, while their quadratic terms are positive but not statistically significant. In contrast, administrative, executive, and regime corruption display a positive linear effect, but their quadratic terms are negative, suggesting diminishing returns at higher levels. At low levels, these forms of corruption may ease bureaucratic inefficiencies and support revenue collection. However, beyond a certain threshold, rising corruption reduces compliance and trust in tax institutions.

While our findings suggest a nonlinear relationship between corruption and tax revenue, these results should be interpreted with caution due to potential endogeneity. To strengthen causal inference, future work should explicitly incorporate governance indicators to test whether institutional quality systematically moderates the effect of disaggregated corruption on revenue mobilization. As highlighted by Méon and Sekkat (2005) and Bogetić and Naeher (2024b), such analysis would clarify whether the "grease the wheels" effect persists only in near-failed states (Houston, 2007) or reverses at intermediate governance levels.

Table I: Quadratic Estimation and Threshold Analysis of Corruption (V-DEM) on Total Tax Revenue

	(1)	(3)	(4)
L.Taxes	0.921***	0.937***	0.938***
	(0.001)	(0.007)	(0.009)
Gdp capita	0.059***	0.051***	0.062***
	(0.002)	(0.006)	(0.006)
Infl	0.002***	0.002***	0.003***
	(0.000)	(0.000)	(0.000)
Trade	0.002***	0.004***	-0.000
	(0.000)	(0.001)	(0.001)
Urb	0.000	0.000	0.003
	(0.000)	(0.002)	(0.004)
Agr	-0.005***	0.006***	0.007
	(0.001)	(0.000)	(0.005)
Exp	0.000*	0.000	-0.001*
	(0.000)	(0.230)	(0.001)
Constant	1.735***	0.669***	7.243***
	(0.286)	(0.230)	(1.054)
Corruption	0.754**		
	(0.196)		
Corruption×Corruption	-0.078***		
	(0.018)		
<Threshold		0.138***	
		(0.026)	
>Threshold			-0.868***
			(0.116)
Observations	1678	1678	1678
Instruments	66	66	62
Groups	95	82	95
AR(2)	0.111	0.140	0.104
Hansen	0.287	0.408	0.560

Note: Pr. AR(2) and Pr. Hansen denote the p-values of Arellano and Bond's (1991) test for second-order autocorrelation in first-differenced residuals and Hansen's (1982) test for the over-identification of instruments, respectively. Significance Codes: *** : 0.01; ** : 0.05; * : 0.1.

Table II: Quadratic estimation of disaggregated corruption (V-DEM) on total tax revenue

	(1)	(2)	(3)	(4)	(5)	(6)
L.Taxes	0.914***	0.924***	0.907***	0.992***	0.921***	0.926***
	(0.010)	(0.008)	(0.004)	(0.008)	(0.001)	(0.008)
Gdp capita	0.057***	0.067***	0.056***	0.065***	0.059***	0.051***
	(0.006)	(0.007)	(0.004)	(0.007)	(0.002)	(0.007)
Infl	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Trade	0.004***	0.005***	0.007***	-0.000	0.002***	0.004***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Urb	0.004	0.003	0.000	-0.005*	0.000	0.002
	(0.002)	(0.002)	(0.001)	(0.001)	(0.000)	(0.002)
Agr	-0.002	0.003	-0.003	-0.011*	-0.005***	-0.001
	(0.005)	(0.004)	(0.002)	(0.005)	(0.001)	(0.005)
Exp	0.000	-0.000	-0.001**	-0.000*	0.000*	0.004*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
Judcorr	-0.649*					
	(0.355)					
Judcorr²	0.037					
	(0.030)					
Regcorr		0.535**				
		(0.174)				
Regcorr²		-0.070***				
		(0.016)				
Execorr			2.601***			
			(0.221)			
Execorr²			-0.257***			
			(0.020)			
Pubcorr				1.300**		
				(0.326)		
Pubcorr²				-0.103***		
				(0.025)		
Polcorr					0.754**	
					(0.196)	
Polcorr²					-0.078***	
					(0.018)	
Legcorr						-0.727**
						(0.352)
Legcorr²						0.039
						(0.183)
Constant	3.647**	0.431	0.023	-1.639**	1.735***	1.301***
	(1.109)	(0.497)	(0.118)	(0.766)	(0.286)	(0.355)
Observations	1678	1678	1678	1678	1678	1678
Instruments	63	66	89	63	66	63
Groups	99	95	95	95	95	99
AR(2)	0.105	0.114	0.110	0.105	0.111	0.105
Hansen	0.437	0.367	0.413	0.109	0.287	0.437

Note: Pr. AR(2) and Pr. Hansen denote the p-values of Arellano and Bond's (1991) test for second-order autocorrelation in first-differenced residuals and Hansen's (1982) test for the over-identification of instruments, respectively. Significance Codes: *** : 0.01; ** : 0.05; * : 0.1.

Table III: Threshold Analysis of Disaggregated Corruption (V-DEM) on Total Tax Revenue

	(1)		(2)		(3)	
	Threshold=3.821		Threshold=5.060		Threshold=6.310	
	<	>	<	>	<	>
L.Taxes	0.904***	0.862***	0.865***	0.867***	0.863***	0.863***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Gdp capita	0.120***	0.093***	0.097***	0.096***	0.090***	0.088***
	(0.016)	(0.014)	(0.015)	(0.015)	(0.014)	(0.015)
Infl	0.008***	0.005***	0.005***	0.005***	0.005***	0.005***
	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Trade	0.024***	0.037***	0.038***	0.039***	0.039***	0.039***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)
Urb	0.007**	0.008**	0.003	0.006*	0.004	0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
Agr	-0.001	0.000	-0.006	-0.000***	-0.005	-0.003
	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)
Exp	0.000**	0.001***	0.001***	0.001**	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.727*	0.174	-0.663	-0.219	-0.675**	0.289
	(0.407)	(0.461)	(0.478)	(0.483)	(0.230)	(1.054)
Regcorr	0.187**	-0.146***				
	(0.090)	(0.041)				
Execorr			0.190***	-0.116***		
			(0.040)	(0.025)		
Pubcorr					0.076***	-0.053**
					(0.027)	(0.027)
Observations	1678	1678	1678	1678	1678	1678
Instruments	57	60	60	60	60	60
Groups	95	95	95	95	95	95
AR(2)	0.121	0.126	0.136	0.134	0.127	0.129
Hansen	0.337	0.247	0.257	0.259	0.284	0.291

Note: Pr. AR(2) and Pr. Hansen denote the p-values of Arellano and Bond's (1991) test for second-order autocorrelation in first-differenced residuals and Hansen's (1982) test for the over-identification of instruments, respectively. Significance Codes: *** : 0.01; ** : 0.05; * : 0.1.

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Appendices

A Appendix

A.1 Descriptive statistics

	Obs	Mean	Std. dev.	Min	Max
Total tax revenue	2436	16.434	8.524	0.298	56.916
Direct taxes	2566	4.455	2.980	0.018	24.136
Indirect taxes	2806	9.714	4.819	0.152	45.403
GDP per capita	3188	4.038	7.439	-64.047	149.973
Agriculture	3098	18.670	12.649	0.892	79.042
Trade	3199	58.413	30.758	4.101	243.048
Inflation	2857	41.892	511.061	-18.108	23773.13
Urbanization	3378	45.650	19.851	5.416	91.749
Government Expenditures	2840	33.600	68.080	2.147	1311.695
Political Corruption	3373	6.729	2.120	0.88	9.74
Judicial corruption	3384	6.201	1.793	0.643	10
Executive corruption	3373	6.441	2.215	0.43	9.68
Administrative corruption	3373	6.484	2.201	0.46	9.75
Legislative corruption	3384	6.201	1.793	0.643	10

A.2 Robustness Check: Adding Control Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
L.Taxes	0.922***	0.917***	0.932***	0.932***	0.930***	0.922***	0.969***	0.893***	0.952***	0.934***	0.936***	0.897***	0.914***	0.896***
	(0.002)	(0.002)	(0.003)	(0.004)	(0.002)	(0.001)	(0.009)	(0.010)	(0.016)	(0.010)	(0.017)	(0.017)	(0.009)	(0.009)
Growth	0.058***	0.061***	0.060***	0.064***	0.060***	0.058***	0.069***	0.050***	0.049***	0.057***	0.046***	0.053***	0.049***	0.054***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.002)	(0.003)	(0.007)	(0.010)	(0.012)	(0.007)	(0.013)	(0.013)	(0.009)	(0.008)
Infl	0.002***	0.007***	0.003***	0.003***	0.002***	0.002***	0.003***	0.003***	0.002***	0.003***	0.002***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0003)	(0.0002)	(0.001)	(0.0003)	(0.0002)	(0.0002)	(0.0002)
Trade	0.001***	0.001***	0.004***	0.003***	0.002***	0.002***	0.000	0.003	0.004	0.006	0.005	0.013**	0.003	0.005**
	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.003)	(0.005)	(0.002)	(0.004)	(0.005)	(0.003)	(0.002)
Urb	0.000	0.002*	-0.000	0.001	0.001	0.002*	0.003	0.002	0.001	-0.001	0.000	0.001	0.002	0.001
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.004)	(0.005)	(0.007)	(0.004)	(0.008)	(0.008)	(0.005)	(0.005)
Agr	-0.003**	0.001	-0.008	-0.006	-0.006***	-0.002*	-0.008	0.029**	0.001	-0.013	0.006	-0.006	0.029**	0.021**
	(0.001)	(0.002)	(0.005)	(0.005)	(0.001)	(0.001)	(0.007)	(0.013)	(0.014)	(0.008)	(0.016)	(0.016)	(0.013)	(0.010)
Exp	0.000	-0.001	-0.000	-0.000	0.000	0.000	-0.001*	-0.001	-0.002	-0.001*	-0.002	-0.002	-0.001	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	-0.363	-4.356***	-2.974***	-4.717***	0.892**	1.465***	-5.634	-1.001	-3.746***	-3.619***	-3.336**	-3.751**	-1.001	-1.101
	(0.331)	(0.358)	(0.380)	(0.614)	(0.343)	(0.356)	(1.112)	(1.226)	(1.253)	(0.856)	(1.430)	(1.484)	(1.226)	(1.024)
FDI	0.031***													
	(0.001)													
Education		0.017***												
		(0.000)												
Unemployment			-0.004											
			(0.004)											
Labor force				0.013***										
				(0.004)										
Dummy LIC					0.340***									
					(0.087)									
Dummy LMC						0.132**								
						(0.055)								
Dummy UMC							-0.196							
							(0.180)							
Mean Governance								2.086***						
								(0.461)						
PCA									0.371*					
									(0.210)					
Polity2										0.108***				
										(0.013)				
Political Stability											0.542**			
											(0.208)			
Voice and Accountability												1.036***		
												(0.345)		
Government Effectiveness													1.073***	
													(0.277)	
Regulatory Quality														1.270***
														(0.261)
Corruption	1.060***	1.973***	0.464***	2.353***	0.277**	2.605***	0.445***	1.751***	2.180***	1.761***	2.144***	2.264***	1.751***	1.594***
	(0.106)	(0.103)	(0.114)	(0.155)	(0.138)	(0.426)	(0.096)	(0.436)	(0.428)	(0.339)	(0.524)	(0.536)	(0.436)	(0.338)
Corruption*Corruption	-0.116***	-0.195***	-0.064***	-0.223***	-0.048***	-0.227***	-0.057***	-0.176***	-0.204***	-0.152***	-0.199***	-0.197***	-0.176***	-0.167***
	(0.009)	(0.009)	(0.010)	(0.014)	(0.012)	(0.036)	(0.008)	(0.039)	(0.039)	(0.032)	(0.048)	(0.048)	(0.039)	(0.031)
Observations	1565	1354	1678	1678	1678	1678	1678	1254	1254	1477	1258	1258	1254	1254
Instruments	91	90	87	87	90	90	65	65	50	66	50	50	65	65
Groups	94	91	95	95	95	95	95	95	95	89	95	95	95	95
AR(2)	0.094	0.208	0.115	0.118	0.113	0.111	0.115	0.133	0.128	0.118	0.128	0.124	0.133	0.126
Hansen	0.403	0.586	0.434	0.385	0.412	0.424	0.288	0.358	0.521	0.406	0.396	0.419	0.358	0.361

Note: Pr. AR(2) and Pr. Hansen denote the p-values of Arellano and Bond's (1991) test for second-order autocorrelation in first-differenced residuals and Hansen's (1982) test for the over-identification of instruments, respectively. Significance codes: *** : 0.01; ** : 0.05; * : 0.1.

A.3 Robustness Check: Dropping Control Variables

	(1)	(2)	(3)	(4)	(5)	(6)
L.Taxes	0.906***	0.938***	0.952***	0.938***	0.952***	0.927***
	(0.001)	(0.005)	(0.002)	(0.004)	(0.004)	(0.005)
Gdp capita		0.059***	0.068***	0.062***	0.031***	0.062***
		(0.004)	(0.004)	(0.005)	(0.002)	(0.004)
Infl	0.002***		0.003***	0.003***	0.003***	0.000***
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
Trade	0.004***	0.005***		0.002***	0.001	0.004***
	(0.000)	(0.001)		(0.002)	(0.001)	(0.001)
Urb	-0.001	0.002	-0.001		-0.001	-0.000
	(0.001)	(0.001)	(0.003)		(0.002)	(0.003)
Agr	-0.006***	-0.005	-0.000	-0.002		-0.006
	(0.002)	(0.005)	(0.006)	(0.004)		(0.004)
Exp	0.003*	-0.000	-0.000	-0.000	-0.000	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Constant	0.980***	-1.034***	-3.554***	-3.357***	-2.716***	-2.075***
	(0.303)	(0.642)	(0.444)	(0.398)	(0.606)	(0.509)
Corruption	1.588***	0.591***	2.275***	2.171***	1.947***	1.726***
	(0.204)	(0.122)	(0.163)	(0.149)	(0.221)	(0.145)
Corruption*Corruption	-0.171***	-0.074***	-0.219***	-0.210***	-0.192***	-0.172***
	(0.018)	(0.018)	(0.015)	(0.013)	(0.020)	(0.013)
Observations	1606	1766	1678	1678	1632	1731
Instruments	89	89	85	85	85	85
Groups	100	100	95	95	95	95
AR(2)	0.144	0.144	0.117	0.116	0.103	0.142
Hansen	0.357	0.357	0.406	0.403	0.490	0.297

Note: Pr. AR(2) and Pr. Hansen denote the p-values of Arellano and Bond's (1991) test for second-order autocorrelation in first-differenced residuals and Hansen's (1982) test for the over-identification of instruments, respectively. Significance codes: *** : 0.01; ** : 0.05; * : 0.1.

A.4 Impact of disaggregated corruption (V-DEM) on direct and indirect taxes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Indirect Taxes						Direct Taxes					
L.Taxes	0.928***	0.937***	0.862***	0.844***	0.874***	0.842***	0.943***	0.954***	0.923***	0.905***	0.905***	0.928***
	(0.008)	(0.002)	(0.007)	(0.007)	(0.007)	(0.007)	(0.011)	(0.004)	(0.004)	(0.021)	(0.021)	(0.003)
Gdp capita	0.042***	0.037***	0.043***	0.035***	0.044***	0.036***	0.000	0.001	0.004**	-0.000	-0.000	0.003**
	(0.005)	(0.002)	(0.005)	(0.005)	(0.004)	(0.005)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)	(0.001)
Infl	0.000	0.000	0.000***	-0.000***	0.000***	-0.000***	0.000**	0.000	0.000***	-0.000	-0.000	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Trade	0.000	0.001***	0.012***	0.001	0.006***	0.001	0.001***	0.001***	0.002***	0.000	0.000	0.001***
	(0.002)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Urb	-0.003	-0.005***	0.002	0.000	0.002	0.000	0.001	-0.000**	0.000*	0.003*	0.003*	0.000
	(0.003)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)
Agr	0.002	0.002*	0.014***	0.000	0.006	0.000	0.000	-0.001	-0.001	0.004*	0.004*	-0.001***
	(0.006)	(0.001)	(0.005)	(0.004)	(0.004)	(0.004)	(0.001)	(0.000)	(0.001)	(0.002)	(0.002)	(0.000)
Expend	-0.000	0.000***	-0.000*	0.001***	-0.000	0.001***	0.000*	0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.171)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Corruption	1.154***						0.125*					
	(0.198)						(0.065)					
Corruption²	-0.121***						-0.016*					
	(0.018)						(0.006)					
Pubcorr		0.238***						0.125***				
		(0.061)						(0.017)				
Pubcorr²		-0.041***						-0.014***				
		(0.006)						(0.001)				
Execorr			2.493***						0.411***			
			(0.189)						(0.028)			
Execorr²			-0.257***						-0.041***			
			(0.016)						(0.002)			
Judcorr				-0.333*						-0.314**		
				(0.181)						(0.124)		
Judcorr²				0.001						0.016		
				(0.015)						(0.010)		
Legcorr					-0.412**						-0.314**	
					(0.194)						(0.124)	
Legcorr²					0.007						0.016	
					(0.016)						(0.010)	
Regcorr						1.758***						0.208***
						(0.109)						(0.026)
Regcorr²						-0.189***						-0.023***
						(0.010)						(0.002)
Observations	1862	1862	1862	1957	1957	1862	1701	1701	1701	1773	1773	1701
Groups	102	102	102	102	106	102	98	98	98	102	102	98
Instruments	66	92	89	65	89	63	66	92	89	53	53	89
AR(2)	0.140	0.144	0.149	0.139	0.146	0.139	0.792	0.824	0.806	0.802	0.802	0.809
Hansen	0.231	0.286	0.501	0.308	0.405	0.260	0.615	0.358	0.588	0.649	0.649	0.615

Note: Pr. AR(2) and Pr. Hansen denote the p-values of Arellano and Bond's (1991) test for second-order autocorrelation in first-differenced residuals and Hansen's (1982) test for the over-identification of instruments, respectively. Significance codes: *** : 0.01; ** : 0.05; * : 0.1.