



# No Taxation Without Representation? An Empirical Examination of the Relationship Between Democratization and Tax Compliance

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## Abstract

The existing literature mostly assumes a positive relationship between democracy and tax compliance. Combining individual-level data from the World Value Survey and country-level data from the Polity IV Project and World Development Indicators, our empirical analysis provides an alternative finding: while tax compliance does increase with the degree of democratization, our heterogeneous effect analysis shows that this association is exclusively pronounced under well-established democratic regimes. By contrast, the democratic transition under autocracies or hybrid regimes substantially erodes tax compliance. We also find that tax compliance plays an important role in shaping tax structure, leading to a higher share of direct tax revenues. Our research therefore highlights the significance of better understanding of the determinants and consequences of tax compliance across various political regimes.

**Keywords** Democratization · Tax compliance · Direct tax · Political regime

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## 1 Introduction

It is more or less an emerging consensus that the political regime of a given country essentially influences almost all the policy decisions (Zanger 2000; Hegre 2001; Fearon and Laitin 2003; Vreeland 2008, among many others), and taxation governance is no exception (as surveyed by Acemoglu and Robinson 2000; Gould and Baker 2002; Acemoglu and Robinson 2005; Baskaran 2014). Previous literature largely holds that democratization can facilitate the establishment of a strong tax morale, and the resulting voluntary tax compliance will reduce administrative costs and promote tax efficiency (Pommerehne and Weck-Hannemann 1996; Torgler 2003; Feld and Frey 2007; Balamatsias 2018). In particular, the existing academic understanding of the relationship between democracy and taxation primarily considers taxes as a fiscal contract between taxpayers and the state, and therefore contends that direct democracy endorses the legitimacy of this fiscal contract, leading to more positive views toward taxation and more compliant tax attitudes.

Although this theory provides valuable insights in political science, it is actually inconsistent with some fundamental features of the international patterns of tax compliance and tax evasion. For example, many democratic countries such as the United States, France, and Spain still suffer from tax non-compliance and some of the highest costs of tax avoidance.<sup>1</sup> Moreover, a handful of previous studies have pointed out that countries experiencing democratic transitions are facing serious challenges to maintain tax morale and inhibit tax evasion (Hug and Spörri 2011). These inconsistencies between theory and reality make it very necessary to systematically investigate the relationship between democracy and tax compliance, and more generally, to better understand the driving forces of tax morale.

Based upon individual-level data from the World Value Survey and country-level data from the Polity IV Project and World Development Indicators, our study attempts to reexamine the relationship between tax compliance and democracy, especially focusing on the heterogeneous effects of the degree of democratization across different political regimes. Although our country-level empirical analysis based upon the entire sample suggests that tax compliance generally increases with democracy, in agreement with the existing academic understanding, our heterogeneous effect models furthermore prove that this positive effect prevails exclusively among countries with well-established democratic institutions. In contrast to the existing academic understanding, our empirical analysis further suggests that under autocratic or anocratic regimes, democratic transition actually diminishes tax compliance. These heterogeneous effects of democracy on tax compliance are supported by both the individual-level and country-level analyses and are insensitive to the inclusion of a series of confounding covariates, the different estimation methods, and various model specifications.

Our study adds to established literature that focuses on tax morale and its driving forces (as surveyed by Alm and Torgler 2004). In particular, our findings of the

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<sup>1</sup> This information is based upon the estimates from World Institute for Development Economics Research at United Nations University.

heterogeneous effects of democratization on tax compliance under various political regimes shed new light on the “slippery slope” framework that distinguishes two key driving forces of tax compliance—taxpayers’ trust toward political authorities and political authorities’ controlling power over taxpayers (Kirchler et al. 2008; Kirchler et al. 2008). While the positive relationship between the degree of democratization and tax compliance under well-established democratic institutions can largely be attributed to the effects of trust, the eroding impact of democratic transition under autocratic or hybrid regimes is likely due to the declining controlling power of tax authorities over taxpayers. Our research demonstrates that the enforced tax compliance is equally as important as the voluntary one (Muehlbacher et al. 2011)—the political instability and ineffectiveness associated with democratic transition under autocratic or anocratic regimes are plausibly the most important causes of the declining tax compliance (Hug and Spörri 2011). Our empirical results therefore echo some previous findings that democratic transition may produce bad economic and political outcomes, for example, political chaos, ethnic conflicts, weakening state capacity, corruption, and lawlessness (Rodrik and Wacziarg 2005).

In addition to the heterogeneous effects of democracy on tax compliance, our empirical analysis also provides some suggestive evidence for the association between compliant tax attitudes and taxation structure. In particular, our country-level analysis reports that there is a robust positive relationship between tax compliance and the share of direct tax among the total tax revenues. Therefore, our research bears important policy implications, since better understanding of the determinants of tax compliance is not only crucial to reducing administrative costs, but also essential to establishing an optimal and realistic tax structure. Our study takes only the first small step, and more future studies are necessary to examine the potential causes and outcomes of tax compliance.

The remainder of the paper proceeds as follows. The following section will describe the data we used, as well as the empirical strategy of how we constructed our variables. Section 3 will illustrate the descriptive patterns of the relationship between democracy and tax compliance, followed by the estimation results of our individual-level and country-level regressions. Section 5 offers brief concluding remarks and discussion.

## 2 Data and Variables

To substantiate the effect of democratic institutions on tax compliance, we constructed a data set that covers 324,036 individuals from 89 countries throughout 27 years scattering from 1981 to 2016.<sup>2</sup> Our dependent variable, tax compliance, was measured at the individual level using the data from the World Value Survey (WVS). As arguably one of the largest worldwide surveys that seeks to examine longitudinal changes in attitudes, values, and cultural orientations (Ariely and Davidov 2011), the WVS instruments inquired into taxpayers’ compliance in standard

<sup>2</sup> These years are: 1981–1982, 1984, 1989–1991, 1995–2015, and 2016.

questions across all six waves. In particular, the WVS asked the following question: “Generally speaking, would you say that cheating on tax is justifiable?”<sup>3</sup> Respondents were required to report their attitudes toward tax evasion from one, indicating “never justifiable”, to ten, denoting “always justifiable”. For the sake of interpretation, we reversed the scale of the responses on tax compliance, so that our measure runs from one to ten, presenting a spectrum from the lowest level of compliance to the highest. As the same round of WVS can be conducted in different years across countries, in total WVS inquired about tax compliance over a period of 27 years.

The unique feature of the WVS benefits our empirical strategy mainly in two respects. First, every round of the WVS consists of nationally representative samples for many countries, with basically large enough sample sizes. For instance, the country-specific sample sizes in the latest round (WVS 6) range from 841 in New Zealand to 4078 in India. Therefore, our measure of tax compliance was able to representatively capture taxpayers’ general attitudes in each country of our analytical sample, although it varied across individuals. Second, the survey instruments regarding tax evasion stay exactly consistent across years, enabling our measure to display the longitudinal changes in people’s attitudes toward taxation, especially after controlling for survey year-fixed effects. According to the estimates based upon WVS, tax compliance is the highest in Bangladesh in 2002, with 98% of its citizens holding that cheating on tax is never tolerable—the average compliance index was as high as 9.941. In contrast, compliance scores were the lowest in Haiti in 2016, with as many as 29% respondents reporting that cheating on tax is always justifiable, and the average compliance level was only 5.334. The patterns of tax compliance we observed using WVS data were generally consistent with the well-known picture shown in the existing literature, providing further confidence to the reliability of our estimation. Benefiting from these unique features, in addition to individual-level analysis, we also performed a series of country-level analyses to examine the relationship between democracy and tax compliance. Our country-level measure of tax compliance was aggregated from the individual responses in the WVS.

The main challenge to our empirical strategy lies in constructing the key explanatory variable that measures the strength and quality of democratic institutions. Following many previous exercises (Rowley and Smith 2009; Bjørnskov et al. 2010; Cingranelli and Filippov 2010), we exploited the Polity IV Project to construct our independent variable (Marshall et al. 2014). Covering all the independent countries with a total population of more than 500,000, the Polity IV Project offers information on regimes for 194 countries and regions since 1800. Based upon five comprehensive dimensions relevant to the quality of democratic institutions, namely, competitiveness of executive recruitment, openness of executive recruitment, constraints on the chief executive, regulation of participation, and competitiveness of participation, Polity IV estimated two aggregate indices of democracy and autocracy. Following conventional strategies (Marshall et al. 2014), we subtracted the autocracy index from the democracy index to construct our polity proxy. As both democracy

<sup>3</sup> The survey questionnaires are available from <http://www.worldvaluessurvey.org/wvs.jsp>, last retrieved on July 31 2019.

and autocracy indices are measured on an ordinal ten-point scale, the polity proxy we used ranged from – 10 to 10—indicating a highly autocratic regime to a highly democratic regime.

The effect of democracy on tax compliance could be confounded by many individual attributes and other overarching socioeconomic characteristics. According to the previous academic understanding of the determinants of tax compliance, it is crucial that we control for respondents' demographic characteristics, such as gender and age (Collins et al. 1992). We additionally controlled for respondents' marital status, including never married, married, and widowed or divorced, premised upon the reasoning that marriage may change people's financial considerations regarding tax paying and tax evasion. We also controlled for the years of schooling, given that the existing literature has demonstrated the role of education in shaping people's attitudes toward taxation. On the one hand, education may promote tax non-compliance, as it enhances people's degree of fiscal knowledge, especially the knowledge regarding tax evasion opportunities; on the other hand, education could improve tax compliance since many studies have shown that the more educated hold more positive perceptions about taxation (Wallschutzky 1984; Witte and Woodbury 1985). Moreover, we included the employment status into our equation, and further controlled for respondents' income, given that people's status in the labor market may shape their attitudes toward taxation, and therefore their tax compliance.

Some country-specific institutional or socioeconomic backgrounds may also affect tax compliance. The first notable case is the level of economic development, which we measured by GDP per capita, because the existing literature often viewed the economic prosperity as an important determinant of tax morale (Bird 1992; de Soto 2000; Picur and Riahi-Belkaoui 2006), which can be translated into high tax compliance in attitudes and even behaviors (Alm et al. 1992; Torgler 2003; Cummings et al. 2009). In agreement with many previous studies, we also included the inequality level of adjusted gross income, which is measured by the Gini coefficient, to capture the potential impact of wealth distribution on tax compliance (Bishop et al. 2000; Alm and Yunus 2009; Cummings et al. 2009; Johns and Slemrod 2010). We also controlled for foreign direct investment (FDI) to measure the economic openness of a specific country and its possible effects on tax compliance.

### 3 Descriptive Statistics

We report details on the descriptive statistics of tax compliance, polity index, and other covariates in Table 1. Among our analytical sample of WVS, respondents' average compliance index is 8.560 with a standard deviation of 2.242, indicating that an overwhelming majority of our sample individuals consider tax cheating as unjustifiable and hold rather compliant attitudes toward taxation. In terms of demographic characteristics, our analytical sample consisted of roughly half women and half men, with an average age of 41. As it is challenging to compare real income across countries, in our empirical analysis we measured income by self-reported income groups on a 1–10 scale, with one indicating the lowest self-identified income group and ten the highest one. Averagely, WVS respondents

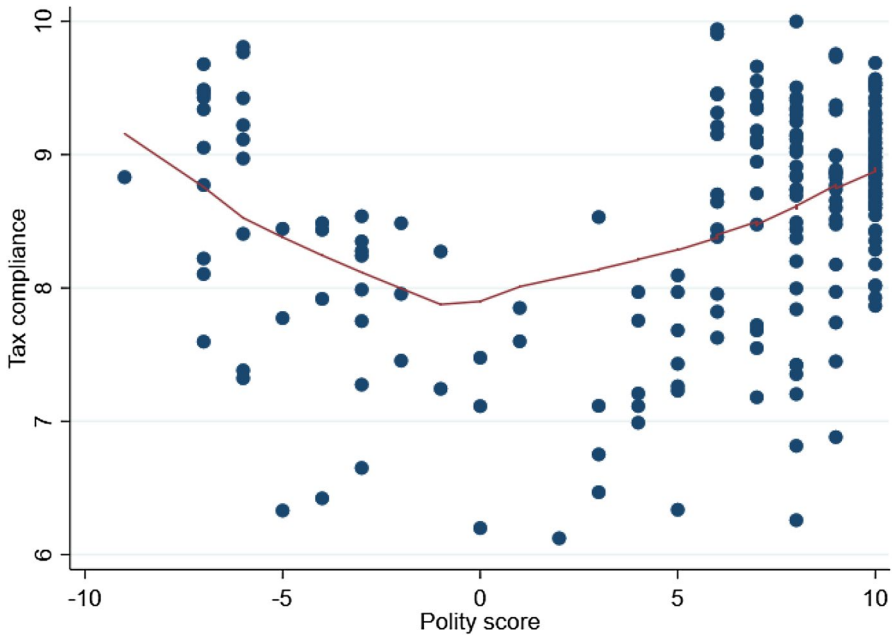
**Table 1** Descriptive statistics of selected variables in WVS data

Continuous variables	Mean	Standard deviation
Tax compliance	8.560	2.242
Age	40.881	16.035
Self-reported income group	4.674	2.309
Dummy variables		Percentage
<i>Gender</i>		
Male		48.76
Female		51.24
<i>Marital status</i>		
Never married		24.57
Currently married		64.26
Divorced or widowed		11.17
<i>Education</i>		
Illiterate		5.32
Primary		19.86
Secondary		51.74
Tertiary		23.08
<i>Employment status</i>		
Employed		45.43
Self-employed		11.92
Unemployed, retired, students, and housewives		42.65

No. of individuals is 234,036; no. of countries is 89; no. of years is 27

identified themselves as belonging to the lower middle level of the income distribution—the mean income level equal to 4.674. In terms of marital status, approximately 64% of our analytical sample is currently married while 25% are never married, and the other 11% are either divorced or widowed. As Table 1 shows, approximately 5% of the WVS respondents are illiterate, namely, they never received any formal education. Of the nearly 95% of the educated respondents, only 23% of them have attained tertiary education or higher, whereas more than half of them only attended secondary education. Approximately 12% of our individual observations are self-employed while the other 45% are students, housewives, retired, or unemployed.

Before identifying the relationship between democracy and tax compliance using multivariate analysis based upon individual-level data obtained from WVS, we first described the patterns of attitudes toward tax cheating across countries and over time in Fig. 1. As mentioned previously, we derived cross-country data on tax compliance from all six rounds of the WVS; in particular, we exploited the sample mean of the compliance index to measure citizens' general attitudes toward taxation in a specific country, given that the WVS consisted of large representative samples for the surveyed countries. While the horizontal axis of



**Fig. 1** The cross-country pattern of tax compliance and polity score, 1981–2016

Fig. 1 indicates the polity index of a specific country in a given year, the vertical axis measures its citizens' general level of tax compliance. The scattered dots in Fig. 1 therefore denote every country-year observation in our sample. In addition to the scatter plot, we also conducted locally weighted scatterplot smoothing (Lowess) to fit models based upon localized small subsets of the data and then described the fluctuations of the data point by point. Using this method, we can get a “smoothed” fitted line showing the relationship between tax compliance and polity score more vividly.

Figure 1 clearly reveals that among the countries where the WVS has conducted its surveys upon tax attitudes, the association between tax compliance and democracy basically follows a *U-shaped* pattern—tax compliance first decreases and then increases with democratic levels. According to Fig. 1, countries under anocratic regimes, namely, those countries incoherently mix democratic and autocratic traits in their political practices, feature the lowest tax compliance among their citizens. The *U-shaped* relationship between democracy and tax compliance shown in Fig. 1 suggestively implies the eroding effect of political instability and ineffectiveness under anocracy on tax governance.

**Table 2** The determinants of tax compliance: individual-level analysis based on WVS data

	Dependent variable: tax compliance index				
	(1)	(2)	(3)	(4)	(5)
Male		- 0.189*** (0.009)	- 0.194*** (0.009)	- 0.201*** (0.009)	- 0.195*** (0.009)
Age		0.013*** (0.000)	0.013*** (0.000)	0.014*** (0.000)	0.014*** (0.000)
<i>Marital status</i>					
Never married					
Currently married			0.048*** (0.012)	0.054*** (0.012)	0.068*** (0.012)
Divorced or widowed			- 0.046** (0.018)	- 0.037** (0.018)	- 0.047** (0.019)
<i>Education</i>					
Illiterate					
Primary				0.178*** (0.023)	0.183*** (0.023)
Secondary				0.225*** (0.022)	0.257*** (0.022)
Tertiary				0.251*** (0.024)	0.311*** (0.024)
<i>Employment status</i>					
Employed					
Self-employed					- 0.082*** (0.015)
Unemployed					0.009 (0.010)
Self-reported income group					- 0.030*** (0.002)
Country-fixed effects	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Constant	8.203*** (0.100)	7.764*** (0.100)	7.735*** (0.101)	7.506*** (0.103)	7.629*** (0.103)
Observations	234,036	234,036	234,036	234,036	234,036
R-squared	0.110	0.120	0.120	0.120	0.121

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$



## 4 Empirical Results

### 4.1 Individual-Level Analysis

We began our empirical analysis by first examining the individual level determinants of tax compliance based upon WVS data, using OLS regression models. Table 2 presents the estimated coefficients from a series of additive OLS regressions. Our estimation is based upon 234,036 individual observations that had no missing values on all of our individual-level covariates. As mentioned above, they come from 89 countries, and they were surveyed over 27 years scattering from 1981 to 2016.

The baseline model presented in Column (1) only controls for country and year fixed effects. The coefficient of determination for Model (1) is 0.110, showing that the cross-country and over time differences account for approximately 11% of the total variations in terms of tax compliance. Model (2) additionally controlled for gender and age, finding that while males were significantly less compliant compared to females in taxation, the tolerant attitudes toward tax cheating decrease profoundly with the increase of age. In particular, the estimated results in Model (2) suggested that the compliance index for males was less than females by 0.189. To gauge the magnitude of this implied effect of gender on tax attitudes, recall that the standard deviation of tax compliance index was approximately 2.242. Therefore, the estimated gender difference in terms of tax compliance can be translated into approximately 8% of the standard deviation, according to Model (2). Moreover, Model (2) shows that after controlling for year and country fixed effects, one additional year of age increased the compliance index by 0.013. Therefore, the compliance score of taxpayers at the retiring age (60) was larger than their younger counterparts at age 18 by 0.546, implying that age is one of the important determinants of tax attitudes.

In Model (3) we further included marital status into our regression, premised upon the reasoning that marriage may change people's perception about taxation and attitudes toward tax cheating. According to Model (3), married couples are significantly more compliant in taxation compared with their single counterparts; however, the widowed and the divorced are less compliant than never-married people. Model (4) furthermore incorporates the highest education levels that respondents have obtained. The estimated results showed that tax compliance increased with education, in a steady manner. In terms of effect sizes, the compliance index for individuals who attended primary school was larger than the compliance index for the illiterate by 0.178, while for respondents with secondary and tertiary education, the differences were 0.225 and 0.251, respectively. Model (4) suggests that education improves tax compliance, probably because the educated citizens generally hold more positive views toward taxation (Wallschutzky 1984; Witte and Woodbury 1985). The potential causal mechanism that education diminishes tax compliance through its enhancing effect on tax evasion knowledge and skills does not hold true.

Model (5) additionally controls for the socioeconomic status in the labor market, namely, the employment status and income. We found that the self-employed

were significantly less compliant in taxation, compared with employees. Model (5) seems to provide little empirical evidence to reject the null hypothesis that there is no significant difference in tax compliance between the employed and the unemployed, including the jobless people, the retired, students, and housewives. The self-identified income group was found to negatively correlate with tax compliance—the higher the income group one thinks he or she belongs to, the lower his or her compliance index was. This is plausibly because the rich find tax cheating more necessary than the poor, and they might possess more relevant knowledge in terms of tax evasion.

The coefficients of determination barely increased from Model (2) to Model (5), suggesting that compared with year- and country-fixed effects, individual characteristics were not as important in shaping people's compliant attitudes toward taxation. Rather, we should explore country-specific institutional backgrounds to better understand the determinants of tax attitudes. Therefore, we replaced the country-fixed effects with the polity index in Model (5) of Table 2, to investigate the relationship between democracy and tax compliance. The results are reported in Table 3.

Column (1) displays the baseline estimates using the entire analytical sample. The estimated results largely confirm the findings from Model (5) in Table 2, except that the effects of primary and secondary education became insignificant, and the unemployed turned out to be significantly less compliant than the employed. Unexpectedly, there was insufficient evidence in Column (1) to reject the null hypothesis of no effect of democracy on tax compliance—the estimated coefficient of polity index was not only statistically insignificant, but also very small in magnitude. The coefficient of determination for Model (1) is also small—only approximately 4% of the total variation in tax compliance was explained by individual characteristics, year-fixed effects, and polity index.

In light of the patterns shown in Fig. 1, we conjectured that this unexpected result was probably due to the heterogeneous effects of democracy on tax attitudes under different regimes. Therefore, following the conventional strategy suggested by the manual of the Polity IV Project, we further disaggregated our sample countries into different types of regimes based upon their polity index, and then re-estimated the effect of democracy on tax compliance based upon different subsamples. In particular, we converted the polity scores into three regime categories, including autocracies, anocracies, and democracies, for which the polity score ranges from  $-10$  to  $-6$ ,  $-5$  to  $5$ , and  $6$  to  $10$ , respectively. For individual observations under these different regime types, we re-estimated the equation predicting tax compliance in Column (1) and report the results in Columns (2)–(4). Moreover, because the main independent variable in the models of Table 3—polity score—only varied at the country level, but did not differ across individuals, we adjusted for the potential within-country correlation of the residuals, to correctly estimate the standard errors. For the estimated coefficients for polity index across all models in Table 3, we therefore report the standard errors adjusted for the clustering effect of observations of the same country.

Column (2) suggests that under autocratic regimes, tax compliance decreases with the polity score. When the regime improves from the most autocratic one (polity score equals  $-10$ ) to the marginally autocratic one (polity score equals  $-6$ ),

**Table 3** The effect of polity score on tax compliance: individual-level analysis based on WVS data

Polity score intervals	Dependent variable: tax compliance index					
	(1) [-10, 10]	(2) [-10, -6]	(3) [-5, 5]	(4) [6, 10]	(5) [-10, 0]	(6) [1, 10]
Polity score	0.017 (0.001) [0.014]	-0.093** (0.021) [0.042]	-0.109** (0.004) [0.041]	0.002 (0.004) [0.050]	-0.238*** (0.006) [0.027]	0.176*** (0.003) [0.032]
Male	-0.171*** (0.010)	-0.109*** (0.025)	-0.151*** (0.021)	-0.198*** (0.011)	-0.085*** (0.019)	-0.190*** (0.011)
Age	0.013*** (0.000)	0.010*** (0.001)	0.013*** (0.001)	0.011*** (0.000)	0.008*** (0.001)	0.010*** (0.000)
<i>Marital status</i>						
Never married						
Currently married	0.099*** (0.012)	0.023 (0.034)	0.081*** (0.027)	0.045*** (0.015)	0.032 (0.024)	0.095*** (0.014)
Divorced or widowed	-0.137*** (0.019)	-0.056 (0.056)	-0.082* (0.044)	-0.125*** (0.023)	-0.079* (0.041)	-0.125*** (0.021)
<i>Education</i>						
Illiterate						
Primary	0.030 (0.023)	-0.037 (0.049)	0.053 (0.042)	0.203*** (0.032)	-0.100*** (0.033)	0.142*** (0.030)
Secondary	-0.033 (0.022)	-0.053 (0.047)	0.136*** (0.040)	0.152*** (0.031)	-0.153*** (0.032)	0.080*** (0.029)
Tertiary	0.050** (0.024)	-0.056 (0.052)	0.061 (0.045)	0.245*** (0.033)	-0.142*** (0.037)	0.197*** (0.031)
<i>Employment status</i>						
Employed						
Self-employed	-0.050*** (0.015)	-0.049 (0.042)	-0.141*** (0.030)	0.051*** (0.019)	-0.162*** (0.029)	0.069*** (0.018)
Unemployed	-0.026** (0.010)	-0.052* (0.027)	-0.083*** (0.024)	-0.040*** (0.012)	-0.083*** (0.020)	-0.064*** (0.012)
Self-reported income group	-0.019*** (0.002)	-0.030*** (0.006)	-0.030*** (0.005)	-0.018*** (0.002)	-0.020*** (0.005)	-0.026*** (0.002)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	7.992*** (0.074)	8.647*** (0.148)	7.442*** (0.065)	8.061*** (0.087)	6.656*** (0.085)	6.442*** (0.080)
Observations	234,036	30,195	44,899	158,942	51,702	182,334
R-squared	0.038	0.121	0.058	0.042	0.116	0.061

Reported in parentheses are standard errors without adjustment; reported in square brackets are standard errors adjusted for individuals clustering within countries. The stars of the polity score are marked based upon adjusted standard errors

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$

citizens' tax compliance averagely decreased by approximately 0.372. Column (3) reports similar results on the estimated effect of polity score for anocracies as for autocracies. The estimated coefficient for polity score was negative and statistically significant, meaning that under anocracies while institutions become more democratic, people are likely to be more tolerant of tax cheating. The estimated coefficient for polity score in Column (4) was positive as we expected; however, it was statistically insignificant. This is plausibly due to the lack of variance in polity index under democratic regimes—the standard deviation is only 1.343 in this subsample.

To address these concerns, we performed an alternative exercise to disaggregate our sample countries into the following two regimes based upon polity index: democracies with polity scores ranging from 1 to 10 and autocracies with polity indices ranging from  $-10$  to 0. We estimated the same equation as in Models (1) through (4), for these two subsamples, respectively, and displayed the estimated results in Models (5) and (6). Our empirical results in Models (5) and (6) vividly confirm the previous findings in Fig. 1, that the impact of democracy on tax compliance features a *U*-shaped pattern. In particular, under autocratic regimes people's compliant level in taxation decreased with the polity score; while in contrast, the tax compliance increased with the polity index under democratic regimes.

The coefficients for polity score were statistically significant across Models (5) and (6), and they become larger in magnitude. For example, because the standard deviations of polity score and compliance index were 2.311 and 1.295, respectively, under autocracies, our estimates of Model (5) imply that when the polity index increases by one standard deviation under the autocratic regime, its tax compliance would by contrast decrease by 0.425 standard deviations. To some extent, the inhibiting effect of polity score on tax compliance under autocratic regimes is not only statistically significant, but also economically meaningful. Democratic institutions are especially important in shaping tax compliance under autocratic regimes, which is manifested in the relatively large coefficients of determination for Model (2) and Model (5). By contrast, the explanatory power of polity score on tax compliance is less satisfying under democratic regimes.

## 4.2 Country-Level Analysis

Because the WVS provided large enough representative samples for each country, we were able to measure the general tax attitudes at the country level, and therefore constructed a data set containing tax compliance indices for each country in a given year. In a more ideal research setting, it would benefit our analysis substantially if we could obtain a panel data set of country-level tax compliance and polity scores. However, as the WVS inquired into tax attitudes in different countries across years, our constructed panel was overwhelmingly unbalanced. We therefore treated our country-level data set as repeated cross-sectional, to examine the relationship between tax compliance and polity score after controlling for year-fixed effects. The assumption underlying this exercise was that after including year-fixed effects, the tax compliance measured at different years would be comparable with each other.

**Table 4** The effect of polity score on tax compliance: country-level analysis

Polity score intervals	Dependent variable: tax compliance index								
	(1) [- 10, 10]	(2) [- 10, 0]	(3) [1, 10]	(4) [- 10, 0]	(5) [1, 10]	(7) [1, 10]	(8) [- 10, 0]	(9) [1, 10]	
Polity score	0.037*** (0.012)	- 0.274*** (0.052)	0.180*** (0.029)	- 0.274*** (0.052)	0.175*** (0.035)	0.197*** (0.058)	- 0.284*** (0.056)	0.175*** (0.030)	
GDP per capita				- 0.000 (0.000)	0.000 (0.000)				
Gini coefficient						0.016 (0.011)			
Foreign direct investment							0.006 (0.025)	- 0.005 (0.009)	
Constant	8.174*** (0.350)	5.828*** (0.640)	7.030*** (0.433)	5.861*** (0.648)	7.066*** (0.455)	5.438*** (0.994)	5.790*** (0.664)	7.075*** (0.439)	
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Observations	207	44	163	44	163	75	43	161	
R-squared	0.183	0.740	0.344	0.745	0.333	0.410	0.734	0.327	

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$

In total, we had 207 country–year observations, which consisted of measures for 89 countries in 27 different years. The results are reported in Table 4.

Model (1) presents our baseline country-level estimates. The positive coefficient for polity score suggests that, consistent with findings from previous literature, there is a positive relationship between democracy and tax compliance. Measured at the country level, the sample mean compliance index was 8.573 with a standard deviation of 0.874, whereas the sample mean polity score was 5.401 with a standard deviation of 5.639. Therefore, the estimated results of Model (1) imply that while holding year-fixed effects constant, a one standard deviation increase in polity score would promote tax compliance level by 0.239 standard deviations. However, our subsequent analysis reported in Columns (2) and (3) provides strong evidence that the assumption of homogeneous effects of democracy does not hold true. In particular, we tested the effect of democracy on tax compliance under different regimes, again based upon the classification of polity scores.

Because our sample size for the country-level analysis was relatively small, to maintain the statistical power of regressions based upon subsamples, we divided the sample countries into only two regimes: autocracies of which the polity scores range from  $-10$  to  $0$  and democracies of which the polity scores range from  $1$  to  $10$ . The heterogeneous effects of democracy on tax compliance were estimated in Models (2) and (3), respectively. Taken together, the empirical results displayed in Column (2) and (3) show that democracy plays different roles in shaping tax compliance under different regimes.

The estimated coefficient for polity score was negative among 44 autocratic country-year observations; however, in stark contrast, the estimated coefficient was positive among 163 democratic country-year observations. Moreover, both of the coefficients were statistically significant, and they were substantially larger than the baseline estimate in terms of magnitude, showing that the effect of democracy on tax compliance was strongly contingent upon regime types. The coefficients of determination for Models (2) and (3) were substantially higher than Model (1), providing further evidence that the impact of democracy on tax compliance is heterogeneous by regime types. The sample mean of the polity score was  $-4.614$  under the autocratic regime, and the standard deviation was 2.325, whereas the sample mean of the polity score was 8.104 under the democratic regime, and the standard deviation was 2.098. Furthermore, the sample mean of compliance index was 8.272 under the autocratic regime, and the standard deviation was 0.965; while the sample mean of compliance index was 8.609 under the democratic regime, and the standard deviation was 0.811. Based upon these estimates, we were able to gauge the magnitudes of the heterogeneous effects of polity score on tax compliance under autocratic and democratic regimes: a one standard deviation increase of polity score would decrease tax compliance by 0.660 standard deviations under autocracies; whereas under democracies, it would by contrast promote tax compliance by 0.466 standard deviations. Therefore, the effects of democratic institutions on tax compliance were not only statistically significant, but also economically meaningful.

As discussed previously, the impact of democratic institutions might be confounded by other overarching socioeconomic backgrounds. As our sample size for the country-year observations was relatively small, and moreover, these observations

span a relatively long period of time, it was challenging for us to gather all information for a long list of control variables. To maintain the sample size and statistical power, we separately controlled for different confounding covariates and checked the robustness of our previous finding across Models (4) through (8).

Models (4) and (5) report the estimates of regressions based upon autocratic and democratic country–year observations after controlling for GDP per capita. This exercise was premised upon the reasoning that economic prosperity may correlate with democratic institutions on one hand (as surveyed by Robinson 2006) and influence people’s tax attitudes on the other. Our measure of GDP per capita comes from the World Development Indicators provided by World Bank. The results of Models (4) and (5) showed that the inclusion of GDP per capita did not change our estimates on the effect of polity score qualitatively, and it did not significantly improve the coefficients of determination. Therefore, the heterogeneous effects of democratic institutions on tax compliance were not sensitive to the control of economic prosperity.

Alternatively, Model (6) incorporated the Gini coefficient into the regression as a proxy for income inequality in different countries across years. The measure of this covariate was also obtained from the World Development Indicators by World Bank. Unfortunately, for the 44 autocratic country–year observations, there were too many missing values for the Gini coefficient, so we could only estimate the effect of polity score on tax compliance for 75 democratic country–year observations. Despite this limitation, our estimates in Model (6) confirmed our previous finding that under a democratic regime, the polity index was positively associated with tax compliance. Compared with the estimated coefficient in Model (3), the effect of democracy was even larger in magnitude after controlling for the Gini coefficient. This again showed the validity of our empirical results.

Finally, we controlled for foreign direct investment in Models (7) and (8) to roughly capture the effect of economic openness. This information was again obtained from the World Development Indicators provided by World Bank. The estimated coefficients did not change either qualitatively in statistical significance or in magnitude, confirming our argument on the heterogeneous effects of democracy on tax compliance. Taken together, Table 4 demonstrates that polity score correlates with tax compliance positively under democracies while negatively under autocracies, and its effects were robust to the inclusion of a series of socioeconomic backgrounds.

### 4.3 Additional Results

Our empirical results so far provide compelling evidence for the argument that democratic institutions increase compliant attitudes toward taxation only under democratic regimes; however, they can by contrast hinder tax compliance under autocracies. Our results therefore expanded the academic understanding of the determinants of tax morale and tax compliance. We then provided some additional results, turning to an empirical analysis of the importance of tax compliance in shaping different tax practices across countries. In particular, we focused on the role tax compliance plays

in determining tax structure, especially the proportion of direct tax among total tax revenues.

Our measures of the different sources of tax revenues across country over time came from the Government Revenue Dataset compiled by the World Institute for Development Economics Research at the United Nations University. Direct tax is defined as the tax revenues that individuals paid directly to the government, including income tax, personal property tax, and taxes on assets. Direct tax is the opposite of indirect tax, in which the tax burden can be passed off from the *de jure* taxpayer to another economic entity or individual. In other words, indirect taxes are levied on one entity but actually paid by another. For example, sales tax, service tax, custom duty, and value added tax are all indirect tax.

Researchers and policy makers have long been seeking the optimal combination of direct and indirect taxation, and many previous studies have pointed out the importance of compliance to the farming of taxes (Boadway et al. 1994; Hudson and Godwin 2000; McCaffery and Slemrod 2006; Watrin and Ullmann 2008). Moreover, a longstanding consensus is that as direct taxes may be more possible to evade than indirect taxes (Boadway et al. 1994), the quality of administration of direct taxes is more reliant on people's compliant attitudes than indirect taxes. Based upon this reasoning, we conjecture that in the countries where citizens hold more a positive view on taxation and therefore more compliant tax attitudes, the proportion of direct tax among the total tax revenue might be higher, since it requires fewer enforcement costs to achieve the fiscal administration on direct taxes.

We exploited the Government Revenue Dataset to calculate the share of direct tax in the total tax revenues, and then tested the assumption of the positive relationship between tax compliance and the share of direct taxes. The results are reported in Table 5. Model (1) shows the baseline estimates, for which tax compliance measured at the country level was the independent variable, and the share of direct taxes in total tax revenue was the dependent variable. After controlling for year-fixed effects, the estimated coefficient for tax compliance was positive and statistically significant, supporting our conjecture that citizens' compliant attitudes toward taxation may facilitate fiscal administration and promote the share of direct taxes among the entire tax frame.

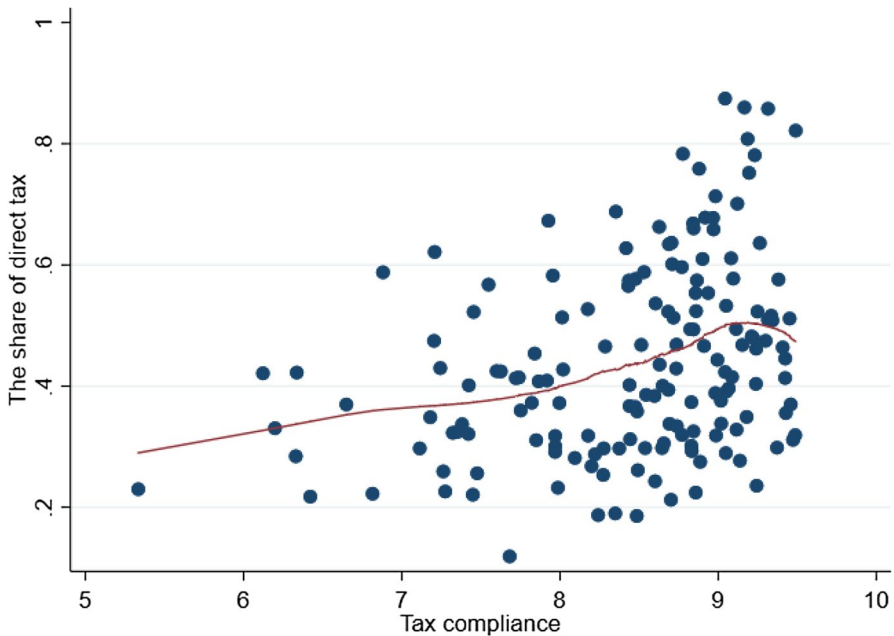
Models (2) through (4) additionally controlled for GDP per capita, the Gini coefficient, and foreign direct investment, respectively, to check the sensitivity of our previous results to the inclusion of other confounding covariates. The coefficients for compliance index stayed primarily unchanged across Models (2) through (4), both in terms of statistical significance and effect size, providing further evidence for our previous finding of the positive association between tax compliance and the share of direct taxes. Note that although the sample size was reduced to 67 in Model (3), the effect of tax compliance was still statistically significant at the one percent significance level. This, as a side note, further showed the robustness of this positive association. Models (2) through (4) also suggest that while the share of direct tax positively correlated with GDP per capita, it was negatively related to income inequality. However, according to Model (4), there was little empirical evidence to reject the null hypothesis of no effect of foreign direct investments on the share of direct taxes.



**Table 5** The Association between Tax Compliance and the Share of Direct Tax

	Dependent variable: the share of direct tax					
	(1)	(2)	(3)	(4)	(5)	(6)
Tax compliance	0.061*** (0.109)	0.056*** (0.108)	0.077*** (0.160)	0.059*** (0.109)	0.075*** (0.160)	0.077*** (0.131)
GDP per capita		0.000** (0.000)			- 0.000 (0.000)	- 0.000* (0.000)
Gini coefficient			- 0.004** (0.002)		- 0.004** (0.002)	- 0.004** (0.002)
Foreign direct investment				- 0.002 (0.002)	- 0.001 (0.002)	- 0.001 (0.001)
Constant	0.116 (0.158)	0.154 (0.158)	0.199 (0.233)	0.135 (0.159)	0.211 (0.238)	0.197 (0.196)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	207	207	66	207	66	66
R-squared	0.265	0.286	0.521	0.270	0.550	

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$



**Fig. 2** The cross-country pattern of the share of direct tax and tax compliance, 1981–2016

Model (5) simultaneously controlled for GDP per capita, the Gini coefficient, and foreign direct investment to further check the robustness of the positive relationship between compliant attitudes and the share of direct taxes. The coefficient for compliance index was 0.075, and it was statistically significant at the one percent significance level, indicating that when compliance score increases by one, the share of direct taxes would on average increase by 7.5 percentage points. Given that the sample mean of the share of direct taxes was 0.440, with a standard deviation of 0.159, a one standard deviation increase in tax compliance would promote the share of direct taxes by 0.412 standard deviations. To sum up, there was a strong relationship between tax compliance and the share of direct taxes, not only in terms of statistical significance, but also in terms of the association size. To account for the truncation of our dependent variable between 0 and 1, as it is the share of direct tax, we further checked the robustness of our previous results in Model (6), using the *Tobit* model instead of OLS to estimate the equation. The coefficient for tax compliance stayed qualitatively unchanged, confirming the robustness of our results to the estimation methods.

We further plotted this association in Fig. 2, in which the horizontal axis denotes the compliance index for a given country–year observation, and the vertical axis indicates the share of direct taxes. Therefore, every dot in Fig. 2 represents a country–year observation, and its location implies the relationship between tax compliance and the share of direct taxes. Similar to the strategy we described previously, we again conducted the Lowess method to obtain a relatively smooth fitted line. It is evident in Fig. 2 that the share of direct taxes increased with the rise of tax

compliance. The generally upward trend of the Lowess smoothing line further demonstrates this positive relationship; in the countries where the citizens were more compliant in tax attitudes, direct taxes account for a larger share of the total tax revenue.

The additional empirical results we present in Table 5 and Fig. 2 further strengthen the important policy implications of our research. Since people's tax attitudes profoundly influence the share of direct taxes, estimating the determinants of tax compliance under different regimes is therefore crucial for academic and policy debates on optimal tax structure and its impact on the tax governance, as well as state's redistributive power.

## 5 Conclusion and Discussion

Combining the data from the WVS and the Polity IV project, our research examined the relationship between democratic institutions and tax compliance. Based upon both individual-level and country-level analysis, our empirical results provide compelling evidence that the effect of democracy varies substantially across different regimes. While under autocracies and anocracies, tax compliance decreases with the democratic process; under a democratic regime tax compliance by contrast increases with the polity score. Taken together, tax compliance was the lowest under anocratic countries, probably due to the political instability and the government ineffectiveness. Our empirical findings essentially challenge the existing wisdom about the effect of democratization on tax compliance that democracy would enhance the positive views toward taxation and promote tax compliance unconditionally.

This research on the determinants of tax compliance bears important policy implications. The existing theories pertinent to tax governance largely focus on the economic efficiency of tax policies, for example, previous studies have spent tremendous efforts on examining the impact of taxation on labor supply and labor mobility (Feldstein and Wrobel 1998; Day and Winer 2006; Liebig et al. 2007; Cohen et al. 2011; Young and Varner 2011; Young et al. 2016). However, a considerable amount of recent literature has pointed out that we should also take the administrative costs of tax governance into consideration when we try to determine the optimal tax system (Boadway et al. 1994; Hudson and Godwin 2000; McCaffery and Slemrod 2006; Watrin and Ullmann 2008). The positive relationship between tax compliance and the share of direct tax we find in empirical analysis implies that tax compliance plays an important role in reducing the governance costs in taxation. Therefore, our studies suggest that to build up an optimal tax system and enhance tax governance, policy measures should be designed and implemented to improve citizens' tax compliance. Moreover, our findings demonstrate that estimating the determinants of tax compliance is very crucial for policy debates on not only the optimal tax formulas, but also the optimal tax frames.

This study has potential limitations. As we discussed in the section of empirical results, our data are not ideal for examining the causality between democracy and tax compliance. We are fully aware of the possibility that the relationship between democracy and tax compliance we observed in this study might be due to

endogenous problems. For example, the fact that democratization reduces tax compliance under anocracies is probably due to political instability and governance inefficiency. Likewise, it is plausible that polity score negatively correlates with tax compliance under autocracies because of weak state capacity. Our estimation cannot rule out the possibility of omitted variable problems. However, our empirical findings are still valuable, given that existing studies largely neglect the possibility of heterogeneous effects, and take the positive relationship between democracy and tax compliance for granted.

Our research could be a good starting point, suggesting several important avenues for future research. First, future studies could carefully document the important driving forces that promote tax compliance, since compliance is crucial to reducing governance costs and facilitating an optimal tax formula and structure. Second, since we have found that the share of direct tax among the total tax revenues relates to tax attitudes, future research could explore other potential outcomes that are closely associated with people's tax compliance. Such exercises might be necessary to comprehensively determine effective methods of tax governance under different institutional conditions. Finally, it is essential for us to better understand the mechanisms through which democratization affects tax compliance. Future research efforts should be invested in collecting and analyzing finer-grained, longitudinal data that are more helpful for causal identification. Our study takes only a small pioneering step toward the ambitious aim of understanding the determinants and consequences of tax compliance. More much academic attention is needed on this topic to enhance tax governance and improve tax efficiency.

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## Compliance with Ethical Standards

**Conflict of interest** On behalf of all authors, the corresponding author states that there is no conflict of interest.

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