

Tax Revenue Decentralisation and Corruption in the Context of Civil Liberties: A Cross-Country Study

Paweł Galinski ¹

¹ Faculty of Management, Department of Banking and Finance, University of Gdansk, Poland
ORCID: 0000-0002-9407-4515
e-mail: pawel.galinski@ug.edu.pl

Abstract

In studies on the functioning of the public sector there are surveys examining the determinants of corruption, including the level of fiscal decentralisation in the light of economic and social development. However, there is a dearth of survey data presenting the impact of the revenue side of this decentralisation in the context of civil liberties. Thus, the aim of the paper is to examine the influence of tax revenue decentralisation and civil liberties on corruption based on the OECD countries, taking into account the impacts of a country's size, scope of the public sector and public procurements, macroeconomic uncertainty, and interactions between tax revenue decentralisation and civil liberties on the phenomenon under study. The empirical study concerns 38 OECD countries in the period 2012–2022. Therefore, longitudinal data models were estimated, namely the fixed effects model and panel quantile regression with fixed effects using the method of moments. The survey showed that an increase in tax revenue decentralisation causes a decrease in corruption. In addition, civil liberties and their interaction with aforementioned decentralisation may determine corruption; however, this is heterogeneous throughout the distribution of corruption level. In addition, the scope of the public sector and macroeconomic uncertainty stimulate rent-seeking behaviour, which weakens the institutional foundations to counteract corruption. Thus, policymakers should be aware that the growing scope of the public sector, government fragmentation, and the functioning of bottlenecks in the performance of official duties at sub-national level might lead to a decrease in the efficiency of anti-corruption policy or programmes. Based on the findings, it is crucial to ensure price stability to reduce the analysed dysfunction.

Key words

corruption, decentralisation, tax revenue decentralisation, civil liberties, government size, public procurements.

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Introduction

The processes of fiscal decentralisation and corruption determine the quality of government (Kyrriacou & Roca-Sagalés, 2011). This quality can be perceived through the perspective of efficiency in the sphere of economy, finance, the proper functioning of democracy, human rights, or the rule of law (Rothstein & Teorell, 2008). Simultaneously, corruption interacts and coevolves along with governance (Kwilinski, 2023), economic, social, political (Kwilinski et al., 2022), and culture development (Gouvea et al., 2019; Valdovinos-Hernandez et al., 2019). Moreover, corruption is driven by market failures (Contreras, 2014), democratisation, or media freedom (Bhattacharyya & Hodler, 2015). These factors are grouped into certain broad categories, i.e. (1) economic and demographic; (2) political; (3) judicial and bureaucratic; and (4) geographical and cultural (Aidt, 2011). It is worth adding that civil liberties are elements of democracy and its indexes; thus, their effects on corruption might be conditional on economic and social factors (Oueghlissi & Derbali, 2023). In the group of corruption factors,

the impact of fiscal decentralisation is also examined, taking into consideration its revenue and expenditure side. These dimensions might affect corruption (Bojanic, 2023) and other issues of the local economy differently.

In the context of the complexity of corruption, Treisman (2000) indicates that this phenomenon is difficult to investigate empirically due to a number of probable determinants being interconnected in complex ways. This, in turn, requires in-depth analysis (Prabowo, 2019). Similarly, the fiscal autonomy of public institutions is affected by various quantitative and qualitative factors. Although there are numerous studies concerning fiscal decentralisation, it is crucial, according to Martinez-Vazquez et al. (2017), to apply more sophisticated econometric methods and pay more attention to replication analysis. This results from the fact that certain diverging findings are likely to be the result of inadequate estimation methods. Moreover, there are fewer studies dealing with corruption in relation to revenues rather than expenditure (Guillamón et al., 2021). Therefore, in this article, in-depth analysis in the sphere of the nexus between tax revenue decentralisation and corruption in the context of civil liberties was implemented. Longitudinal data models with the interaction term and the quantile panel regression were applied, which allows the estimation of relations that are heterogeneous throughout the distribution of the dependent variable.

As a consequence, the aim of the paper is to examine the influence of tax revenue decentralisation and civil liberties on corruption based on the OECD countries, taking into account the impacts of a country's size, scope of the public sector and public procurements, macroeconomic uncertainty, and interactions between tax revenue decentralisation and civil liberties on the phenomenon under study. To attain the purpose of the research study, the following hypotheses were formulated:

Hypothesis 1 (H1): An increase in tax revenue decentralisation causes a decrease in the level of corruption.

Hypothesis 2 (H2): Higher civil liberties affect the degree of corruption; however, this is heterogeneous throughout the distribution of corruption level.

Hypothesis 3 (H3): There is a statistically significant interaction between tax revenue decentralisation and civil liberties in terms of the impact on corruption.

Hypothesis 4 (H4): Both the size of government and the scope of public procurements affect corruption, especially in highly corrupt countries.

Identification of the potential relationships between tax revenue decentralization, civil liberties, and corruption may contribute to the formulation of policy assumptions for tax power devolution in the country to increase efficacy of the actions. There is a view in the research literature that in countries with low levels of corruption, implementing further measures to reduce corruption may have no effect, despite the involvement of significant funds (Pluskota, 2020).

The novelty of this study is the examination of the impact of an interaction between tax revenue decentralization and civil liberties on corruption, as well as including the aspects of the size of the government, scope of public procurements and macroeconomic uncertainty, proxied by inflation rate (Gründler, 2017; Bouis, 2019; Ahmed & Islam, 2010), which affects fiscal health of local governments by altering the economic conditions, the fiscal structure and the interactions between these issues (Martell, 2024). The empirical estimation tries to reveal the potential influence of the civil liberties on the impact of deepening fiscal decentralization on corruption and the impact of different dimensions of the public sector and economic condition on the studied phenomenon. The literature

review and the empirical research also show the complexity of the relationships between the studied variables, and their potential ambiguity.

The originality of the article is also the application of the panel quantile regression, which allows for the estimation of relationships across the distribution of the level of corruption in OECD countries. This enables the formulation of more precise anti-corruption policies in individual countries in the light of tax revenues devolution, or fiscal, social and macroeconomic situation.

1. Literature review

In the subject literature scientists indicate that both corruption and decentralization are multi-dimensional issues (Choudhury, 2015; Pal, 2013). Thus, it is difficult to clearly identify their level and determinants. In the case of fiscal decentralization, on the one hand, it can be assumed as an explained variable (Bojanic, 2020). On the other hand, this is considered as a predictor of various issues, e.g. local government indebtedness (Galinski, 2023b) or debt risk (Ouyang & Li, 2021), environmental federalism (Galiński, 2023a), access to education and health, school quality, life satisfaction, natural disaster death rates, citizens' trust in government, party system nationalization or infant mortality rate (Martinez-Vazquez et al., 2017). In the second type of research, scholars also examine the nexus between fiscal decentralization and corruption. Choudhury (2015) emphasizes that examining an influence of decentralization on direct corruption experiences has become crucial, whereas empirical estimations have been unable to credibly verify the causal relation between decentralization and corruption experiences.

Dell'Anno and Teobaldelli (2015) revealed that decentralization is significantly associated with lower corruption, both theoretically and empirically. Decentralization may be conducive to reduce corruption due to enhanced accountability and competition among local governments or higher levels of information and transparency at the sub-national level (Martinez-Vazquez et al., 2017). Similarly, Arikan (2004) displayed that corruption may be lower in countries with higher extent of fiscal decentralization due to bureaucrats in a fiscally decentralized economy are less able to engage in rent-seeking behaviour. Hence, corruption and rent-seeking are state system failures indicating institutional weaknesses, determining negative economic effects (Dincă et al., 2021), causing redistribution of resources and malfeasance (Ali & Hodan, 2003) since the rent-seeking is unproductive, destroys value by wasting valuable resources (Tollison, 2012) and is associated with the inflation processes in the economy (Åslund, 1999). High inflation, in turn, leads to uncertainty (Atkinson, 1998), which is conducive to corruption (OECD, 2015). Therefore, in some surveys rent-seeking is perceived through the level of the corruption (Fofana, 2022), as the rent-seeking activities can take the form of corruption (Starosta de Waldemar, 2010; Svensson, 2000). Thus, corruption affects quality of institutions (Lyulyov et al., 2023). In addition, a low revenue collection in the region in relation to others might partly result from this dysfunction (Yohou, 2023). Government officials are empowered to create bottlenecks in performance of their duties, which might be encountered in greater government fragmentation (Goel & Nelson, 2011). According to the survey of Gurgul and Shah (2014) the lack of service orientation in the public sector, weak democratic institutions, economic isolation, colonial past, internal bureaucratic controls, and centralized decision-making are perceived as the major drivers of corruption. As a results, local politicians have incentives to behave honestly exercising power, lest they would not be elected (Shrestha et al., 2023). Kuhn and Pardos-Prado (2021) add that central-level corruption

directly affects decentralization, and indirectly enhances support for decentralization and self-determination through dissatisfaction towards the national government.

However, Prud'homme (1995) indicates that local tier favours corruption more than the central level, since local politicians and bureaucrats are likely to be more subject to pressing demands from local interest groups, e.g. in the field of taxation. In turn, monitoring and auditing aspects are usually better developed at the national than sub-national level. Hence, decentralization may counteract corruption in countries with high degrees of press freedom, whereas countries without effective monitoring institutions suffer from decentralization (Lessmann & Markwardt, 2010). Therefore, there are findings which show that decentralization can contribute to corruption due to a lack of coordination resulted from greater dispersion of government decision-making powers or higher number of public officials increases potential for bribery (Shrestha et al., 2023). Furthermore, corrupt bureaucrats may support processes of decentralization since it is more conducive to extract gain (rent) during an interaction with the society at the local level (Choudhury, 2015). Campbell and Saha (2013) show that a democratic transformation: (a) initially affects a decrease of corruption, (b) at intermediate stages of democracy increases corruption, (c) at mature levels of democracy, substantially reduces corruption. Thus, in the economy the relationship between democracy and corruption does not have to be monotonic.

As far as potential relationships between corruption and human rights (including the civil liberties and rights (Lewczuk, 2021) are concerned, they are analysed by Ngugi (2010). Corruption decreases the ability of the government to respect, protect, and fulfil its human rights obligations. Therefore, higher levels of corruption are strongly associated with breaches of civil liberties (Transparency International, 2022). Corruption affects a decrease of revenues available to the government and the capacity of the government to fund basic services or to meet adequate standards of living and counteract social exclusion. Thus, corruption exacerbates other human rights violations, and finally is an obstacle to development (Spyromitros & Panagiotidis, 2022). The findings of Lewczuk (2021) show the importance of civil liberties for the economic development and the existence of various channels of interrelationship between these categories. Similarly, Pritchett and Kaufmann (1998) argue that civil liberties are conducive to improving a country's economic performance and designing the mechanisms for delivering public services.

On the other side, decentralization infuses more resources to the local community and thereby made available more venues and broader infrastructure for human capital development. However, decentralization also introduces possibilities of larger disparities amongst municipalities, and may affect social exclusion (Thede, 2009). Nevertheless, an increase of expenditure side of fiscal decentralization improved the governance in regions, which should be accompanied by the promotion of citizen participation through civil society organizations in local development, including their participation in planning, execution and supervision of actions and policies (de Mello & Barenstein, 2001). Thus, fiscal decentralization can become a driver for greater political and civil liberties (Bojanic, 2018a), which, in addition, may foster economic growth (Bojanic, 2018b).

2. Methodology

The starting point of the empirical research was the survey of: (1) Fisman and Gatti (2002), and (2) Karlström (2015). In the first study the authors proposed the basic specification of the regression (Fisman & Gatti, 2002), in which corruption (corruption index) was determined by: (a) decentralization

(total expenditure of subnational, i.e. state and local governments over total spending by all levels, i.e. state, local, and central); (b) GDP per capita (natural logarithm); (c) civil liberties (Gastil index of civil liberties); (d) population (natural logarithm); (e) government size (total government expenditure in relation to GDP). In contrast, Karlström (2015) specified a basic equation for the model, which examined the influence of: (a) democracy (democracy index); (b) decentralization; (c) interaction term by multiplying democracy with decentralization (its various forms, i.e. fiscal and administrative, political) on corruption (perceived through Transparency International's Corruption Perception Index). In Karlström's estimation, fiscal decentralization was measured as revenue share of sub-central governments (local and state) in total (local, state, and central) public revenues.

Taking into consideration the aforementioned studies and the application of panel data this article examines an influence of tax revenue decentralization, civil liberties, interaction between tax revenue decentralization and civil liberties and other factors on corruption, using the data of 38 OECD countries for the period 2012-2022.

In the survey, both panel data models with fixed effects (FE) and random effects (RE), were initially considered. However, the outcomes of the Wald test, the Breusch-Pagan test, and the Hausman test resulted in the final estimation of FE models (Gruszczynski, 2020), which take a form (Brooks 2019):

$$Y_{it} = \alpha + X'_{it}\beta + u_i + v_{it}, \quad (1)$$

where Y_{it} is the dependent variable (corruption) for i country in t period; α represents the intercept term; X'_{it} is a $k \times 1$ vector of independent variables, i.e. tax revenue decentralization, civil liberties, interaction between tax revenue decentralization and civil liberties, government size, GDP per capita, population, population per region, inflation, public procurements observed for i country in t period; β is a $k \times 1$ vector of the parameters to be measured on the independent variables; u_i is an individual specific effect, and v_{it} , is the 'remainder disturbance'.

Due to the detected presence of the heteroscedasticity (verified by means of the Modified Wald test for groupwise heteroskedasticity) and the autocorrelation (verified by means of the Bias-corrected Born and Breitung Q(p)-test) the clustered standard errors were applied (Hill et al., 2018; Wursten, 2018). In addition, for FE models 'Within R2' and 'R2' were presented as a goodness of fit measures and outcomes of F test.

To deepen the research on the nexus between corruption, tax revenue decentralization, civil liberties and the aforementioned interaction term, as well as to verify the stability of the results (robustness check), a panel quantile regression with fixed effects using the method of moments, i.e., method of moments-quantile regression (MM-QR) (Machado & Santos Silva 2019), was estimated. The use of the MM-QR approach was to check the statistical significance of the variables, considering the distribution of the dependent variable, i.e. corruption (CPI). In this regression, it is estimated the conditional τ -th quantiles $Q_Y(\tau|X)$ for location-scale model, which takes a form (Machado & Santos Silva, 2019):

$$Y_{it} = \alpha_i + X'_{it}\beta + (\delta_i + Z'_{it}\zeta)U_{it}, \quad (2)$$

with $P\{\delta_i + Z'_{it}\zeta > 0\} = 1$. In the MM-QR model the parameters (α_i, δ_i) , $i = 1, \dots, n$, capture the individual i fixed effects; U is an unobserved random variable; and Z is a $k \times 1$ vector of known

differentiable (with probability 1) transformations of the components of X with element l given by $Z_l = Z_l(X)$, $l = 1, \dots, k$; ζ is a $k \times 1$ vector of other parameters. For MM-QR models there was presented the Wald test to show the overall significance of the regression (Fuinhas et al. 2021).

In the study, the specification of the applied variables is follows:

Dependent variable: ‘Corruption’, measured using the Transparency International’s Corruption Perceptions Index (CPI) from Transparency International (2024), which ranges from 0 to 100, with higher values indicating less corruption. This index might be applied to proxy the rent-seeking behaviour (Wong et al., 2022).

Independent variables:

- ‘Tax Revenues Decentralization’ (TRD), as sub-national tax revenues to total general government tax revenues $\times 100$ (Afonso et al., 2023), natural logarithm, extracted from OECD (2023).
- ‘Civil Liberties’ (CL), measured using Civil Liberties Index (ranges from 0 - low to 10 - high), which indicates the extent to which citizens enjoy civil liberties. Index extracted from ‘Our World in Data’ (2023). Introduction of this kind of variable also enables to control the level of economic development (Fisman & Gatti, 2002).
- ‘Tax Revenues Decentralization $\times$ Civil Liberties Index’ (TRD $\times$ CL), as an interaction term. Kyriacou and Roca-Sagalés (2011) introduced interaction between democratic maturity and fiscal decentralization in the study on government quality, whereas Karlström (2015) verified the significance of an interaction between fiscal decentralization and democracy. Obeng (2021) underlines that the aim of every decentralization is an increase of direct participation of citizens and civil society.
- ‘Government Size’ (GS), as general government expenditures to GDP (%). Ali and Isse (2003) found that an increase of the size of government is associated with an increase in the level of corruption. Fisman and Gatti (2002) indicate that introduction of this ratio could also control for the fact that larger countries might adopt more decentralized fiscal systems to better fulfil the diverse preferences of the society together with the appearance of the economies of scale in the process of counteracting corruption. Variable extracted from OECD (2024) and Turkish Statistical Institute (2023, for TUR for 2021 and 2022).
- ‘Gross Domestic Product (GDP) per capita’ (GDP per capita, US dollars, constant prices, constant PPPs, reference year 2015) extracted from OECD (2024), which is perceived as a ‘standard’ determinant of corruption (Aidt, 2011).
- ‘Population’, natural logarithm, using the World Bank (2023), as a control variable (Fisman & Gatti, 2002; Karlström, 2015) of the country’s size, which is applied in surveys on corruption (Aidt, 2011). According to the economies of scale larger countries have more efficient bureaucracy and regulations along with their implementation, an adequate quality of public institutions that reduce corrupt among politicians and bureaucrats. Opposite views suggest that small countries need to be better managed to maintain sound finances and economic competitiveness, which result in less corruption in these states (Amin & Soh, 2019). Knack and Azfar (2003) argue that population-corruption relationship is an artifact of sample selection bias.
- ‘Population per region’, natural logarithm, using the World Bank (2023) and the number of regions (first-tier subnational governments) based on OECD (2021, 3) and Lecuna (2012). Total population divided by total number of regional governments (first-tier subnational unit) was used by

Lecuna (2012), who found that countries with more population per regional government had better corruption ratings (higher CPI).

- ‘Inflation’, measured as consumer prices (annual %) using World Bank (2023). Oueghlissi and Derbali (2023) applied inflation rate as control variable for macroeconomic uncertainty. They emphasize that an increase of inflation signals real wage deterioration which is positively correlated with the development of rent-seeking behaviours.
- ‘Public Procurement’, measured as general government procurement spendings to total general government expenditures (%), extracted from OECD (2024), not available data for CHL. Well-managed public procurements can play a major role in strengthening public sector performance, enhancing citizen confidence (OECD, 2015), and an increase of the spending efficiency due to competition on the market (Borowiec et al., 2017).

Tu sum up, this study examines tax revenue decentralization, civil liberties, interaction between tax revenue decentralization and civil liberties as potential causes of corruption, also taking into account the scope of the public sector (government) and the control of the size and development of countries (regions), which is consistent with the observation of Aidt (2011) as well as the aspects of macroeconomic uncertainty and procurement spendings.

3. Research results

The descriptive statistics show that in the OECD countries there are differences in the field of tax revenue decentralization, and the Corruption Perceptions Index or Civil Liberties Index (Table 1). These countries also differ in the field of the size of government, and economic development, population of the state and per first tier sub-national government. There are also disparate shares of procurement spendings in the national budgets and the level of price stability.

Table 1. Descriptive statistics and the codes for the analysed OECD countries

Variable	Nº	Mean	Sd.	Min	Max
Corruption Perceptions Index	418	66.8971	15.4613	28.0000	92.0000
Tax Revenue Decentralization	416	14.3890	12.2003	0.6225	50.0953
Government Size	413	43.1487	8.1421	21.2500	63.2300
Civil Liberties Index	418	8.7171	1.3571	2.0600	10.0000
GDP per capita (natural logarithm)	418	10.5544	0.4026	9.4423	11.6331
Population (natural logarithm)	418	16.3897	1.5139	12.6783	19.6245
Population per region (natural logarithm)	418	14.2350	0.9547	12.5405	16.9228
Inflation	418	2.6606	4.6744	-1.7359	72.3088
Public Procurement	401	29.7884	6.6029	14.8800	46.9800
Country codes					
AUS, AUT, BEL, CAN, CHL, COL, CRI, CZE, DNK, EST, FIN, FRA, DEU, GRC, HUN, ISL, IRL, ITA, ISR, JPN, KOR, LVA, LTU, LUX, MEX, NLD, NZL, NOR, POL, PRT, SVK, SVN, ESP, SWE, CHE, TUR, GBR, USA					

Sources: developed by the author.

The outcomes of the estimated FE models show that an increase of the tax revenue decentralization affected a growth of the Corruption Perceptions Index (lower corruption) (Table 2). This extends the study of Fisman and Gatti (2002, 332) who found that countries with more decentralized expenditure had better corruption ratings. However, the larger size of government resulted in increased corruption. Thus, the expansion of the public sector leads to greater corruption, what was also found by Ali and Isse (2003, 460). Hence, the state’s active involvement in production of economic goods, forces public

institutions to resolve claims between various interests (Gerring & Thacker, 2005), which encourages the larger corruption. In addition, the MM-QR models (Table 3) indicate that an impact of tax revenue decentralization and size of government is greater the higher level of corruption in the country. Against the background of these results, it is worth adding the findings of Qiao, Ding, and Liu (2019) that fiscal decentralization is negatively associated with government size, supporting decentralization as an instrument to promote local competition, especially within mobile tax bases, thus constraining expansion of public sector growth.

Table 2. Estimation results for FE models characterizing factors affecting corruption in the OECD countries in the period 2012-2022

Variable	Model 1	Model 2	Model 3	Model 4
Tax Revenue Decentralization	16.0048*** (5.6095)	6.0201*** (2.1212)	15.3152** (5.7232)	4.4469** (1.8785)
Civil Liberties	1.3109 (1.7560)	-	1.5584 (1.6783)	-
TRD×CL	-1.0447* (0.5949)	-	-1.0314* (0.5901)	-
Government Size	-0.1446** (0.0704)	-0.1741** (0.0666)	-	-
GDP per capita	2.7324 (5.3564)	-	3.9577 (5.4229)	-
Population	-	29.0423*** (7.6767)	-	-
Population per region	-	-	-	24.5775*** (8.0730)
Inflation	-	-	-	-0.1502* (0.0825)
Public Procurement	-	-	-	0.2112 (0.1353)
Intercept	17.7356 (67.7269)	-414.5563*** (126.4493)	-2.4457 (67.5464)	-298.8539** (113.3898)
Obs	412	412	416	400
Within R^2	0.1226	0.1785	0.0941	0.1642
R^2	0.9768	0.9783	0.9760	0.9790
F test	[<0.01]	[<0.01]	[<0.01]	[<0.01]

Note: 1) ***, ** and * denotes statistical significance at 1%, 5% and 10% levels respectively; 2) cluster standard errors in parentheses (...); 3) p-value in brackets [...]

Sources: developed by the author.

Regarding civil liberties (CL) and the interaction between civil liberties and tax revenue decentralization (TRD×CL), the FE models did not show the statistical significance of CL. However, Model 5 (MM-QR) displayed that an impact of civil liberties on corruption is not significant in the countries with low level of corruption. Thus, promoting civil liberties as a part of anti-corruption policies might be effective in the economies, where corruption is perceived as a real problem. The regressions (Table 2, Table 3) also revealed a statistically significant impact of the interaction between civil liberties and tax revenue decentralization on the level of corruption. In consequence, an increase in tax revenue decentralization reduces corruption, but this impact is smaller the greater the civil liberties in the country. An influence of this interaction might not be evident in states with low levels of corruption, probably due to properly functioning civil liberties.

Table 3. Estimation results for MM-QR models characterizing factors affecting corruption in the OECD countries in the period 2012-2022

Variable/Test	Model 5 Quantiles			Model 6 Quantiles		
	25 th	50 th	75 th	25 th	50 th	75 th
Tax Revenue De-centralization	19.4288*** (4.5463)	15.6474** (3.4261)	11.1286 (4.6877)	7.8700*** (1.7801)	5.9006*** (1.3216)	3.9967** (1.6758)
Civil Liberties	2.4784** (1.2652)	1.6327* (0.9500)	0.6220 (1.3043)	-	-	-
TRD×CL	-1.3173*** (0.4973)	-1.0545*** (0.3722)	-0.7404 (0.5126)	-	-	-
Government Size	-	-	-	-0.2084*** (0.0626)	-0.1719*** (0.0458)	-0.1367** (0.0590)
GDP per capita	4.2847 (3.4050)	3.9841 (2.5361)	3.6249 (3.5088)	-	-	-
Population	-	-	-	26.8640*** (4.8193)	29.1830*** (3.5155)	31.4250*** (4.5436)
Obs	416	416	416	412	412	412
Wald test	[<0.01]	[<0.01]	[<0.01]	[<0.01]	[<0.01]	[<0.01]
Variable/Test	Model 7 Quantiles			Model 8 Quantiles		
	25 th	50 th	75 th	25 th	50 th	75 th
Tax Revenue De-centralization	7.1377*** (1.7332)	5.1150*** (1.2338)	3.3432** (1.5599)	5.2468*** (1.5781)	4.4016*** (1.3047)	3.6678* (1.9668)
Population	21.4177*** (5.1209)	22.6153*** (3.6054)	23.6644*** (4.6196)	24.7376*** (5.6254)	24.5684*** (4.6413)	24.4216*** (7.0137)
Inflation	-	-	-	-0.2613** (0.1020)	-0.1439* (0.0852)	-0.0420 (0.1269)
Public Procurement	0.2375* (0.1280)	0.2072** (0.0902)	0.1807 (0.1155)	0.2184* (0.1327)	0.2108* (0.1094)	0.2042 (0.1654)
Obs	400	400	400	400	400	400
Wald test	[<0.01]	[<0.01]	[<0.01]	[<0.01]	[<0.01]	[<0.01]

Note: 1) ***, ** and * denotes statistical significance at 1%, 5% and 10% levels respectively; 2) standard errors in parentheses (...); 3) p-value in brackets [...]

Sources: developed by the author.

The estimated models did not confirm the impact of the country's level of GDP per capita on corruption, whereas this nexus might be included in the other factor, i.e. civil liberties, as it was mentioned by Fisman and Gatti (2002). Nevertheless, an increase of inflation affects an increase of corruption (lower CPI), especially in the countries with low CPI (Model 8), which are vulnerable for rent-seeking behaviour. Hence, a deterioration of macroeconomic uncertainty results in a growth of corruption. This extends the findings of Valdovinos et al. (2019) that uncertainty avoidance (extent to which a society relies on social norms, and legal procedures to mitigate the unpredictability of future events) is a predictor of corruption levels. In addition, the regressions show that an increase of population or population per region affected a decrease of corruption (higher CPI). In the second case (i.e. population per region), this coincides with the findings of Lecuna (2012), who also identified that countries with more first-tier subnational governments relative to their population are more corrupt. Thus, an increase in corruption with greater government fragmentation may result from more rent-seeking opportunities (Goel & Nelson, 2011). Therefore, the public procurements should be promoted as a method of public spendings, including strengthening the quality of the procurement system.

According to the study of Ghossein et al. (2018) there is an inverse relationship between good procurement and corruption faced by the business sector. According to the estimation of Fazekas et al. (2016) there are certain dysfunctional techniques leading to higher corruption risk (rent-seeking opportunities) within public procurement, e.g.: not publishing the call for tenders officially, non-open procedure type, short submission period, expensive tender documents, annulling and re-launching procedures, increasing contract length and its modification. In addition, the MM-QR models (Table 3) show that an increase in general government procurement spendings as a share of total general government expenditures results in a decrease of corruption (lower CPI) in the states with the low corruption perceptions index.

Conclusions

In the research literature, there are examined numerous factors determining corruption. In certain studies, the findings lead to different conclusions, especially in the field of the impact of population as a proxy of unit's size. Distinct research outcomes result from the use of various variables to the phenomenon under study, different samples, and research methods. In addition, in most of the surveys the expenditure side of this decentralization is considered, since the spending autonomy leads to greater accountability and transparency. This study confirms that also an increase of tax revenue decentralization results in a decrease of corruption in the country. Thus, the hypothesis 1 (H1) was positively verified. However, this impact is lower whether the country is at the lower level of corruption. Nevertheless, the growing scope of the public sector or a government fragmentation and the functioning of the bottlenecks in the performance of official duties at sub-national level might hamper the efficiency of the anti-corruption policy and actions. The remedy for these phenomena should be regulations consisting in strengthening and promoting of public procurements as a method of government spendings, especially in the states, where corruption is rampant. The findings proved that both the size of government and the scope of public procurements affect corruption, especially in the highly corrupt countries. Then, the hypothesis 4 (H4) was positively verified. Strengthening regulations and standards within public procurement should be aimed at decreasing rent-seeking opportunities and increasing savings in public expenditures.

Regarding the impact of civil liberties on corruption, this is not homogeneous throughout the distribution of corruption level. An increase of the civil liberties reduces corruption in countries with higher levels of corruption, whereas in countries with low corruption this relationship is not statistically significant. Hence, this confirms the hypothesis 2 (H2). Simultaneously, the level of civil liberties may be affected by the fiscal decentralization, determine the economic development, and mechanisms of public service delivery. Corruption, in contrast, affects a lower capacity of public institutions to promote civil liberties. Therefore, in the scientific research, it is important to take into account inter-relationship relating to the spheres of corruption, fiscal decentralization, and civil liberties.

The study also shows that an increase of civil liberties decreases an impact of an increase of tax revenue decentralization on corruption, which leads to the positive verification of hypothesis 3 (H3). This interaction is not statistically significant in the countries with low levels of corruption. In these type of states civil liberties are not abridged in practice. In consequence, the implementation of monitoring and auditing instruments as part of ongoing fiscal decentralization and promotion of civil liberties should be adjusted to the level of corruption in the country, and potential interactions between these issues. Highly corrupt countries should also avoid increasing inflation, which determines greater

macroeconomic uncertainty and rent-seeking behaviour as a dysfunctional practice in the public sector. This relates to the findings of scholars that uncertainty avoidance affects corruption.

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