Testing "Grease the Wheels" Hypothesis for Corruption on Commonwealth of Independent States

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Abstract:

The Commonwealth of Independent States (CIS) is an intergovernmental organization of eleven sovereign states of the Former-Soviet Union. Countries in this group are low and middle-income economies and what is worse, there are many constraints on their economic growth. One of these constraints and common features of these countries is the high level of corruption. In the literature, it is mostly indicated that weak governance has detrimental effects or in other words, may "sand the wheels" economies. However, another approach which is called as "Grease the Wheels Hypothesis" claims that corruption may affect economic growth, investments, international trade, or other economic activities positively in countries that have weak governance. On the other side, as economies grow, households and firms may demand better institutions from governments. Therefore, the relationship in question may be bilateral. The aim of this study is to investigate the causal nexus between corruption and economic growth in CIS. In order to capture the effects of foreign direct investment, international trade, and government size in corruption-growth nexus, we estimate different multivariate models and employ the panel bootstrap Granger causality test. This methodology allows us to test the causality nexus for each individual panel member while considering cross-sectional dependency and heterogeneity among them. Our findings show that a positive one-way causality runs from corruption to economic growth for Belarus, Kyrgyz Republic, Moldova, and Turkmenistan, while it is negative for Azerbaijan. Moreover, it is detected that causality may also run from the opposite direction when considering different control variables.

Keywords: Institutions, economic growth, corruption, causality

JEL Codes: D7, O43, C33

1. Introduction

Corruption, as a concept that emerged with the existence of states and still exists today, can show its effect in many areas. This widespread effect can also manifest itself in many aspects of economies such as economic growth, investments, entrepreneurship, and financial markets. For this reason, corruption has been extensively discussed in the economics literature with these different regards. There are various definitions and perspectives for the economics of corruption. Even it is difficult to agree on a certain definition, there is a consensus on the World Bank's (1997) corruption definition that is the abuse of public office or transfers the public sources for private gains. Jain (2001) discoursed three types of corruption: grand corruption, bureaucratic corruption, and legislative corruption. These types differ across the source of misused power of decision makers. Also, Aidt (2011) summarized the three necessary conditions of arising or persisting of corruption: discretionary power, economic rents, and weak institutions.

In recent years, the literature on economics of corruption generally focuses on the institutional point of view. Most of the studies that stressed the strong ties between institutions and economic development emphasized the importance of corrupt behaviors of countries (e.g. Chong and Calderon, 2000; Hodgson and Jiang, 2007; Acemoglu et al., 2005). Besides these points of views, there is a broad empirical literature on the impacts of corruption on economies. Some of these studies directly test the "grease or sand the wheels" hypothesis for corruption (e.g. Meon and Weill, 2010; Meon and Sekkat, 2005; Arif et al., 2020; Huang, 2016). The grease the wheels hypothesis implies that corruption may foster the economic growth, financial development, investments, etc. and become the greases in the wheels of economic development (Meon and Weill, 2010; Song et al., 2021). Also, Mein and Weill (2010) stated that corruption may be beneficial where the bureaucratic inefficiency is high, and the institutions are deficient as the second-best solution. The empirical evidence (e.g. Shittu, 2018; Qureshi et al., 2021; Göktürk and Yalçınkaya, 2020) show that the validation of grease the wheels that corruption may foster the economic growth, especially for developing countries where the institutional environment is not sufficient. Because the booster impact of corruption may exist by finding a way around bureaucracy or regulation by reducing the transaction costs in an economy. This way composes of bribery, rent-seeking opportunity, discretionary behaviors, etc. (Rose-Ackerman, 1997).

On the other hand, corruption has detrimental impacts on economies through different channels as misallocation of resources, mismatching of entrepreneurs and funds, and damages the institutional environment (Meon and Weill, 2010; Aidt, 2011). It may also result in high costs

for economies and their imposition on society (Svensson, 2005). The literature also presents some empirical evidence on the validity of "sand the wheels" hypothesis (e.g. Hakimi and Hamdi, 2016; Song et al., 2021).

The aim of this study is to investigate the causal nexus between corruption and economic growth in the Commonwealth of Independent States (CIS). To capture the effects of foreign direct investment, international trade, and government size in corruption-growth nexus, we estimate different multivariate models and employ the panel bootstrap Granger causality test. The reason for investigating this sample is that the countries in the sample are at the bottom 10 percentile rank of the control of corruption index. As we highlighted in the literature, the positive impact of corruption on economic growth, investments, or financial development is often significant in countries where the corruption is high, and institutions are weak. When we examine the control of corruption index and World Governance Indicators, it is seen that the CIS countries selected in this study are at a lower level than the averages of Sub-Saharan Africa and Latin America, which are among the country groups with the lowest governance and control of corruption.

In the remaining part of the study, we present the literature on the impacts of corruption on economies. Section 3 describes the data. The methodology and findings are presented in section 4. Finally, we conclude the research in section 5.

2. A Brief Literature Review

The existing literature on the corruption and economic growth nexus is extensive and focuses on the detrimental or promoter effects of corruption on economic activities. The studies attempt to test the "grease or sand the wheels" hypothesis on the macro (e.g. Meon and Sekkat, 2005; Meon and Weill, 2010; Arif et al., 2020) or micro-level (Dreher and Gassebner, 2013; Mendoza et al., 2015). In micro-level studies, researchers investigate that corruption whether encourages or blocks the entrepreneurship or firm performance. The results indicate that the "grease the wheels" hypothesis is generally supported at the firm-level, especially in developing countries. Macro-level studies, which are the focus of this study, are more common in the literature. The main reason for this is that systematic corruption or corruption perception data is available at the macro level. The relationship between corruption and growth has been excessively investigated with different approaches. Most early studies employed the Generalized Method of Moments (GMM) and Ordinary Least Squares (OLS) regressions for developed and developing countries using macroeconomic indicators as foreign direct investments, GDP per capita, trade openness, etc. We can generalize the results of these studies as twofold: some

report that corruption harms the economy, while others report it positively effects the economy. However, mixed results may vary according to the institutional capacity or income groups of the countries. Meon and Weill (2010) analyzed both developed and developing countries and found an evidence on supporting the "grease the wheels" hypothesis for poorly governance countries. The recent studies Arif et al. (2020) and Marakbi et al. (2021) reported similar results with advanced panel regression methods. According to Arif et al. (2020), corruption impacts FDI positively in BRICS. Also, Marakbi et al. (2021) stressed that corruption supports economic growth and private investments if the countries' institutional quality is low.

In addition to these, some studies found mixed results on the negative effects of the corruption when the corruption level is considered. According to Meon and Sekkat (2005), corruption has a negative impact on economic growth. Sharma and Mitra (2019) analyzed different income groups and confirmed the "sand the wheels" hypothesis for lower and lower-middle income countries. Nevertheless, according to Okada and Samreth (2014) and Ahmad et al. (2012) claimed that the income group is unrelated to corruption-growth nexus because the corruption level revealed the relationship between corruption, FDI and economic growth. They stated that if the corruption is low, corruption hampers FDI and GDP. But it supports the economy where the corruption is severe.

Most recent studies that examining the effects of corruption on the economy employ cointegration and Granger causality methods. The following Table 1 summarizes these studies. As seen in Table 1, most of the studies reported that the causal relationships between economic growth and corruption. However, just a few considered the sign of causality (Nurudeen et al., 2014; Huang, 2016; Qureshi et al., 2021). Nurudeen et al. (2014) found that there is a positive unidirectional Granger causality from political instability and economic development to corruption in the long run. While a shock to corruption has a negative effect on economic development, a shock to economic development has a positive effect on corruption five-to-fifteen-year period. They suggest that the main determinant of high corruption and low GDP is the political instability for ECOWAS countries.

Table 1: The Summary of Related Literature Applying Cointegration and Causality Methodologies.

Author(s)	Variable(s)	Period	Sample	Methodology	Empirical findings
Wright and Craigwell (2012)	GDP and CPI	1998-2009	42 Developing Countries	DH	CPI→GDP (Bulgaria, Chile, Estonia, Hungary, Mexico, Poland, Romania, Turkey, Venezuela)
Grochova and Otahal (2013)	GDP and CPI	Fourteen years period*	11 Central and Eastern Europe Countries	Cointegration, GC	CPI ↔GDP
Nurudeen et al. (2014)	POLS, CPI, GDP	1996 – 2012	Economic Community of West African States	Multivariate Cointegration, GC	(+)GDP→CPI
Huang (2016)	CPI, GDP, EF	1997 – 2013	13 Asia-Pacific Countries	Multivariate Bootstrap Panel Granger	(-)CPI→GDP (South Korea) (-)GDP→CPI (China) *EF is the control variable
Hakimi and Hamdi (2016)	FDI, GDP, ICRG(COR)	1985 – 2013	15 MENA Countries	VECM and GC	COR (-) GDP and FDI COR →GDP COR ↔FDI
Arapovic et al. (2017)	CPI, GDP, GOVS	1995 – 2013	14 Transition Economies	DH	CPI ↔TO
Bota-Avram et al. (2018)	GDP, WGI (COC)	2006 – 2015	136 Countries	TY Causality	COC ↔ GDP
Shittu et al. (2018)	EXDEBT, GDP, ICRG (COR)	1990 – 2015	5 Sub-Saharan African Countries	FMOLS, DOLS, GC	COR (+) GDP GDP → COR
Verne and Verne (2020)	GDP, WGI(COC), POLS	2002 – 2017	162 Countries	DH	No causal relationship
Göktürk and Yalçınkaya (2020)	GDP, CPI	2008 – 2016	Balkan Countries	FMOLS, GC	CPI (+) GDP, FDI CPI → GDP CPI → FDI

Qureshi et al. (2021)	FDI, WGI (COC), GDP	1996 – 2018	54 Developing and Developed Countries	PVAR, GC	(+) COC↔GDP (Developing Countries) (-) COC→GDP (Developed countries)
Song et al. (2021)	GDP, CPI, FD	2002 – 2016	142 Developing and Developed Countries	FMOLS, VECM, GC	CPI (-) GDP (all sample) CPI→FD No causality for GDP-CPI

Notes: GDP represents the various type of economic growth and development variable as GDP per capita annual growth, GDP per capita PPP, etc. CPI is the abbreviation of corruption perception index of Transparency International Database. ICRG (COR) represents the corruption index of International Country Risk Guide database. WGI(COC) is the control of corruption index from the World Governance Indicator Dataset. POLS, EF, GOVS, FD, and EXDEBT represents political stability, economic freedom, government stability, financial development and external debt, respectively.

ECM: Error Correction Model, VECM: Vector Error Correction Model, GC: Granger Causality, TY: Toda-Yamamoto Causality, DH: Dimitrescu-Hurlin Panel Non-causality, FMOLS: Fully Modified Ordinary Least Squares, DOLS: Dynamic Least Squares, PVAR: Panel Vector Autoregression.

*This study presents the period of the study only with this expression.

Qureshi et al. (2021) applied a PVAR method and Granger Causality Wald test to investigate the positive or negative causal relationships between foreign direct investments, corruption, and economic growth. The results differ across countries. While the control of corruption has negative impact on inward foreign direct investments and economic growth for developing countries, inward FDI and economic growth are affected positively by control of corruption in developed countries. So, they clarified that higher corruption and weaker institutional quality boost investments and economic growth. Because the presence of strong institutions strengthens the effectiveness of regulations and weakens the corrupt behaviors. The causal relationships also support these results. They reported positive bidirectional causal linkages between corruption, economic growth, and FDI for developing countries. Moreover, there is a negative unidirectional causality from corruption to economic growth and FDI in developed countries.

Lastly, using the multivariate bootstrap panel causality method, which is also the focus of our study, Huang (2016) presented country-specific results for Asia-Pacific countries which have high corruption level. According to Huang (2016), the common perception that corruption is bad for economic growth and, but the results differ across countries. In South Korea, the negative causality runs from CPI to economic growth with economic freedom as a control variable, so the grease the wheels hypothesis is valid. However, there is a negative unidirectional causality from economic growth to CPI with economic freedom as a control variable in China. So, an increase in economic growth raises the corruption in China.

3. Data

The data set of our analysis comprises annual measures for the period 2002-2019 on 10 the Commonwealth of Independent States (CIS): Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyz Republic, Moldova, Russian Federation, Tajikistan, Turkmenistan and Uzbekistan. The selection of this sample of CIS was made due to availability of the data.[1] The variables used in estimations are as follows: Corruption (COR) is proxied by the percentile rank of the control of corruption. It captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption. Percentile rank indicates the country's

[1] Afghanistan could only be included in the panel model estimation where the FDI variable is defined as an auxiliary variable.

rank among all countries, with 0 corresponding to lowest rank, and 100 to highest rank. Economic growth (EG) is measured by real GDP per capita.

Our aim is to test for Granger causality between COR and EG within a trivariate framework and estimate models by using three different auxiliary variables, which are stated to have a possible effect on the COR-EG relationship in the literature. Trade openness (TO) is captured by trade as a percentage of GDP, Government spending (GOV) is proxied by general government final consumption expenditure as a percentage of GDP. Lastly, foreign direct investment (FDI) is measured by net FDI inflows as a percentage of GDP. The sources of the data are the World Governance Indicators (WGI) and World Development Indicators (WDI) of the World Bank and Heritage Foundation's data set. All variables are used in natural logarithms.

4. Methodology and Findings

In order to understand the causal linkages between COR and EG in the CIS countries, we utilize panel data methodology and start with testing cross-sectional dependency and heterogeneity across the panel members. A set of four tests are employed to check cross-sectional dependency: LM test of Breusch and Pagan (1980), CD_{LM} and CD tests of Pesaran (2004) and Bias-adjusted CD test of Pesaran et al. (2008). Then, the slope homogeneity is tested using the methods of Swamy (1970) and Pesaran and Yamagata (2008). Table 2 reports the results for testing cross-sectional dependency and slope homogeneity. All the findings indicate that both the null hypothesis of no cross-sectional dependence and the null hypothesis of slope homogeneity are strongly rejected for all models.

Table 2: Results of cross-sectional dependence and homogeneity tests

Model	I COR-EG (Auxiliary variable: TO)	II COR-EG (Auxiliary variable: GOV)	III COR-EG (Auxiliary variable: FDI)
LM	134.554***	115.304***	132.318***
CD_{LM}	9.440***	7.411***	7.372***
CD	4.731***	8.252***	6.064***
$LM_{Adj.}$	7.727***	6.070***	8.095***
$\tilde{\Delta}$	4.968***	5.675***	4.442***
$\tilde{\Delta}_{adj}$	5.591***	6.387***	4.999***

Note: *** indicates significance at the 0.01 level.

The existence of cross-sectional dependency and heterogeneity across the panel members indicates that using the Bootstrap Panel Granger Causality framework of Kónya (2006) is the most appropriate methodology since it deals with both issues. This procedure is based on seemingly unrelated regression (SUR) systems and provides Wald tests results with country specific bootstrap critical values. Moreover, it does not require any pretesting for panel unit root and cointegration properties of the data.

The SUR system form of trivariate model is formulated as follows:

$$y_{1,t} = \alpha_{1,1} + \sum_{l=1}^{mly_1} \beta_{1,1,l} y_{1,t-l} + \sum_{l=1}^{mlx_1} \delta_{1,1,l} x_{1,t-l} + \sum_{l=1}^{mlz_1} \theta_{1,1,l} z_{1,t-l} + \varepsilon_{1,1,t}$$

$$\vdots \qquad (1)$$

$$y_{N,t} = \alpha_{1,N} + \sum_{l=1}^{mly_1} \beta_{1,N,l} y_{N,t-l} + \sum_{l=1}^{mlx_1} \delta_{1,N,l} x_{N,t-l} + \sum_{l=1}^{mlz_1} \theta_{1,N,l} z_{N,t-l} + \varepsilon_{1,N,t}$$

$$x_{1,t} = \alpha_{2,1} + \sum_{l=1}^{mly_2} \beta_{2,1,l} y_{1,t-l} + \sum_{l=1}^{mlx_2} \delta_{2,1,l} x_{1,t-l} + \sum_{l=1}^{mlz_2} \theta_{2,1,l} z_{1,t-l} + \varepsilon_{2,1,t}$$

$$\vdots \qquad (2)$$

$$x_{N,t} = \alpha_{2,N} + \sum_{l=1}^{mly_2} \beta_{2,N,l} y_{N,t-l} + \sum_{l=1}^{mlx_2} \delta_{2,N,l} x_{N,t-l} + \sum_{l=1}^{mlz_2} \theta_{2,N,l} z_{N,t-l} + \varepsilon_{2,N,t}$$

and,

$$z_{1,t} = \alpha_{3,1} + \sum_{l=1}^{mly_3} \beta_{3,1,l} y_{1,t-l} + \sum_{l=1}^{mlx_3} \delta_{3,1,l} x_{1,t-l} + \sum_{l=1}^{mlz_3} \theta_{3,1,l} z_{1,t-l} + \varepsilon_{3,1,t}$$

$$\vdots \qquad (3)$$

$$z_{N,t} = \alpha_{3,N} + \sum_{l=1}^{mly_3} \beta_{3,N,l} y_{N,t-l} + \sum_{l=1}^{mlx_3} \delta_{3,N,l} x_{N,t-l} + \sum_{l=1}^{mlz_3} \theta_{3,N,l} z_{N,t-l} + \varepsilon_{3,N,t}$$

where $y = [y_{1t}, y_{2t}, \dots, y_{Nt}]'$ and $x = [x_{1t}, x_{2t}, \dots, x_{Nt}]'$ denote the COR and EG, respectively. $z = [z_{1t}, z_{2t}, \dots, z_{Nt}]'$ denote the auxiliary variable TO, GOV or FDI. l represents the lag length, N is the cross-section dimension and t is the time period. Following Kónya (2006), to determine the optimal lag structure the system is estimated by using 1-4 lags and then choosing the combinations which minimize the Schwarz Bayesian information criterion.

In these trivariate systems, we focus on the relationship between COR and EG. Table 3 presents the results for our first trivariate model, where TO is considered as the auxiliary variable in the model. For Belarus and Turkmenistan, there exists negative causality from COR to EG which means that an increase in control of corruption (decrease in corruption) leads to a decrease in economic growth. Therefore, the "grease the wheels" hypothesis is supported for Belarus and Turkmenistan. On the other hand, the result for the Kyrgyz Republic support evidence on "sand the wheels" hypothesis which implies that control of corruption induces economic growth. The hypothesis that EG does not Granger-cause COR is rejected only in Russia. Strikingly, we find that EG is negatively associated with COR, indicating corruption is increased following an increase in economic growth in Russia.

Table 3: Panel causality between corruption and economic growth
(TO is treated as an auxiliary variable)

	COR does not cause EG					EG does not cause EG				
Countries	Coefficient	Statistic	10%	5%	1%	Coefficient	Statistic	10%	5%	1%
Armenia	-0.046	0.337	14.67	22.45	46.57	0.248	11.453	27.16	37.34	64.85
Azerbaijan	-0.008	0.078	10.98	16.55	34.81	-0.212	0.991	11.62	17.65	37.09
Belarus	-0.084**	23.255	9.55	14.55	29.33	0.435	11.789	18.43	26.97	58.52
Kazakhstan	0.027	1.394	13.58	21.60	49.05	0.100	0.056	24.79	34.63	62.10
Kyrgyz Rep.	0.058*	12.187	12.07	19.06	36.85	1.493	14.831	16.19	22.91	43.87
Moldova	-0.051	10.805	13.06	19.91	40.10	-0.269	0.409	10.14	15.10	28.89
Russia	-0.282	0.016	13.16	19.98	42.93	-1.238*	9.335	9.33	14.85	31.19
Tajikistan	0.002	0.178	13.82	21.52	42.69	-0.749	1.819	11.73	17.42	31.58
Turkmenistan	-0.045***	48.410	11.04	16.63	33.83	0.285	1.235	11.03	16.55	31.68
Uzbekistan	-0.007	2.176	10.86	16.21	32.99	-0.112	0.130	15.35	22.30	44.14

Note: ***, ** and * indicate significance at the 0.01, 0.05 and 0.1 levels, respectively.

As regards our second trivariate model, where GOV is used as an auxiliary variable, the results given in Table 4 demonstrate that "grease the wheels" hypothesis is supported for Moldova and Turkmenistan while "sand the wheels" hypothesis is supported for Azerbaijan. Meanwhile, economic growth leads to increase corruption only in Azerbaijan in this model specification. For the remaining countries, there is no causality running in any direction between COR and EG.

Table 4: Panel causality between corruption and economic growth
(GOV is treated as an auxiliary variable)

	COR does not cause EG					EG does not cause EG				
Countries	Coefficient	Statistic	10%	5%	1%	Coefficient	Statistic	10%	5%	1%
Armenia	0.148	5.647	13.49	20.11	43.05	0.068	0.622	26.65	36.66	69.34
Azerbaijan	0.132*	19.472	12.84	20.03	39.98	-0.582**	28.693	18.15	27.06	51.93
Belarus	-0.065	6.787	11.00	16.63	37.02	0.382	8.917	19.48	28.83	58.14
Kazakhstan	0.020	0.829	14.94	23.85	56.37	0.416	2.130	25.09	34.97	65.97
Kyrgyz Rep.	0.013	0.556	11.16	17.58	38.93	0.556	1.730	11.45	17.81	35.61
Moldova	-0.064*	14.787	12.89	19.52	39.59	-0.211	0.464	10.22	15.22	29.89
Russia	-0.006	0.070	13.36	20.11	42.70	-0.625	6.826	11.51	17.06	34.31
Tajikistan	0.010	4.514	15.17	23.74	46.57	-0.473	0.599	12.12	18.23	35.94
Turkmenistan	-0.039***	40.704	10.37	15.68	32.09	0.721	4.730	9.94	15.03	29.34
Uzbekistan	-0.006	1.952	9.60	14.61	28.70	0.090	0.138	14.37	22.16	45.93

Note: ***, ** and * indicate significance at the 0.01, 0.05 and 0.1 levels, respectively.

In Table 5, we report the results from panel causality between COR and EG, where FDI is treated as an auxiliary variable. For only Turkmenistan, there is significant and negative causality from COR to GDP, indicating that an increase in control of corruption in Turkmenistan reduced economic growth.

Table 5: Panel causality between corruption and economic growth
(FDI is treated as an auxiliary variable)

	COR does not cause EG					EG does not cause EG				
Countries	Coefficient	Statistic	10%	5%	1%	Coefficient	Statistic	10%	5%	1%
Afghanistan	-0.030	7.729	10.70	16.56	32.74	-1.018	2.457	13.08	20.05	39.41
Armenia	0.047	0.441	19.50	29.09	62.01	0.045	0.211	31.87	44.08	77.24
Azerbaijan	0.031	0.825	15.21	22.76	45.24	-0.017	0.004	15.02	22.65	49.35
Belarus	-0.069	8.905	12.52	19.17	37.66	0.281	4.604	20.83	32.62	73.63
Kazakhstan	0.002	0.004	17.17	26.27	54.64	0.724	8.934	28.85	39.74	76.11
Kyrgyz Rep.	0.018	1.471	11.49	17.21	36.65	1.178	10.783	12.87	19.38	37.32
Moldova	-0.002	1.528	18.41	28.49	66.03	0.169	0.332	9.19	13.55	27.34
Russia	0.011	0.310	17.73	26.92	52.47	-0.564	9.944	11.78	17.52	34.54
Tajikistan	0.010	3.784	20.97	32.46	70.22	-0.345	1.446	9.23	13.84	27.33
Turkmenistan	-0.043**	39.038	15.16	24.07	50.82	0.237	0.818	11.68	17.07	36.11
Uzbekistan	-0.007	2.307	13.54	20.22	43.92	0.164	0.468	16.86	25.23	50.13

Note: ***, ** and * indicate significance at the 0.01, 0.05 and 0.1 levels, respectively.

5. Conclusion

This study analyzed the causal nexus between corruption and economic growth for 10 CIS countries for the period 2002-2019. In literature, trade openness, government size and foreign direct investments are generally associated with both corruption in an economy and economic growth. To take into account, the effects of those variables on corruption-growth nexus, we set trivariate models and applied the trivariate bootstrap panel Granger causality methodology of Kónya (2006). Empirical findings indicate that "grease the wheels" hypothesis is supported for all the models only in Turkmenistan. Among the CIS countries, Turkmenistan has the lowest level of "control of corruption" and it is also at the bottom of the list in the world ranking. However, its GDP per capita increased steadily from $2500 in the beginning of the 2000s to $8000 in 2019. Therefore, it seems that corruption does not pose an obstacle to economic growth in a country with a high level of governance deficiency like Turkmenistan. On the other hand, it is found that there is a positive causality from control of corruption to economic growth for two countries, Azerbaijan and Kyrgyzstan. Since these two countries have very low GDP per capita and very high level of corruption, the policy makers in these countries should pay attention and develop policies accordingly for controlling corruption which may positively contribute to the economic growth.

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