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Corruption, political instability, and growth: Evidence from the Arab Spring

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Abstract

This paper empirically investigates the relationship between corruption, political instability, and economic growth. We first show how these variables interact by allowing for bidirectional causality between each two of the three variables for which we employ a panel VAR model on a dataset of 140 countries over the period of 1990-2017. Then, we exploit the incidence of the Arab Spring, as an exogenous shock, to measure the short-term effects of political shocks on corruption levels, political stability and economic growth using the difference-in-differences (DiD) framework.

Keywords: Corruption, Political Stability, Democratization, Arab Spring, Economic Growth, MENA Region, Panel VAR, Difference-in-Differences

JEL code: D72; D73; E02; O43; F43; O47

1. Introduction

Although there is ample evidence of its impacts, the economic effects of corruption, especially on growth, continue to be a debatable topic in the

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literature. In this regard, the literature has suggested two different hypotheses: sanding the wheels vs. greasing the wheels. While the former confirms such intuitive negative growth impacts, the latter suggests that corruption can have some positive impacts on the economy by circumventing cumbersome bureaucratic regulations. Many channels can explain the effects of corruption on growth, such as investment and government expenditures. For example, empirical evidence reported by Mauro [1998], Davoodi and Tanzi [2002] and Gupta et al. [2002] shows that corruption distorts government expenditures towards less productive activities. Cooray et al. [2017] finds that corruption has negative impacts on public debt. On the other hand, Egger and Winner [2005] find that corruption stimulates foreign direct investments, especially in low-income countries. Similarly, Mironov [2005] distinguishes between 'bad' and 'residual' corruption where the latter is found to have positive growth impacts in countries with institutions of poor quality.

Modeling corruption is not an easy task, and many of the existing research papers suffer severe limitations. For example, the relationship between corruption and economic growth is likely to exhibit a bidirectional type of causality and does not necessarily go only from corruption to growth [Lučić et al., 2016]. Moreover, nothing can guarantee that the relationship between both variables behaves in a linear fashion [Méndez and Sepúlveda, 2006]. Regardless of this, institutions, especially political settings in a given country, can be a fundamental determinant of corruption and the rate of growth. Such relationships are already well documented in the literature. For example, Méndez and Sepúlveda [2006] and Rock [2009] find that corruption levels are peculiarly different between democratic and non-democratic countries. Nevertheless, while the relationship between corruption and a country's political settings can also be bidirectional, most of the existing studies tend to overlook such intuition.

Unlike existing literature which tends to focus on growth impacts of either corruption or political settings separately, we show how the three variables interact together simultaneously allowing for bidirectional causality between every two variables. In other words, while existing literature focuses mainly on how corruption and political instability affect economic growth, in this study, we ask a different set of questions: Does corruption lead to political unrest? Would political instability lead to higher levels of corruption? Does growth lead to political stability and lower levels of corruption? What are the effects of the Arab Spring on levels of corruption, political stability, and economic growth in the MENA region? For the latter question, the Arab Spring offers a unique opportunity to quantify this relationship in a quasi-natural experiment environment. In fact, to the best of our knowledge, this is the first paper to exploit the incidence of the Arab Spring to measure the effects of political instability on economic growth and the level of corruption.

The remainder of this paper proceeds as follows. Section 2 reviews the existing literature on defining and measuring corruption as well as on the relationship between corruption, political stability, and economic growth. Section 3 presents the dataset and summarizes the empirical methodology. Our empirical results are summarized in section 4. Finally, section 5 concludes.

2. Literature Review

Corruption is a complex and multifaceted phenomenon that exhibits different forms and shapes. It is a complicated term to define, and there is no consensus on a single, comprehensive, universally accepted definition of what corruption could be. What is considered to be corrupt behavior in a given society might not be seen in the same way in another, and therefore various interpretations of corruption exist [Iyer and Samociuk, 2016]. For example, the most blatant act of corruption is bribery which is strictly prohibited and illegal in some countries while it might be still illegal but socially acceptable in other countries. Bribery in some societies turns to be a way of life as, due to abysmal economic performance and institutions, it becomes the only way to access public services. Even in most societies where bribery is condemned and unacceptable, it is meant to be invisible, and its victims are not easily identifiable. This unobservability adds an extra layer of complexity to any attempt in defining and measuring corruption.

Nevertheless, there are many attempts to put an acceptable definition of the term 'corruption.' A commonly used definition is one that focuses on the action of abusing public power, roles, or resources to make personal gains. This definition is adopted in many studies including the widely cited papers by Bardhan [1997] and Tanzi [1998]. Therefore, we adopt a similar definition as discussed in section 3.

In addition to the difficulty in defining and measuring corruption as discussed above, numerous studies attempt to identify the main causes and effects of corruption. A large list of antecedents of corruption includes political settings, governance systems, economic performance, and institutional quality. Inefficient and complex regulation systems, for instance, lead to higher chances of corrupt behavior by officials (see, Tanzi [1998]; Wei and Kaufmann [1999]; and Goel and Nelson [2010], among others). Only a few attempts have been made to investigate the causal links, if any, between economic growth and the spread of corruption. Ali and Isse [2002], for example, report no statistically significant causality from growth to corruption. Another study by Aidt et al. [2008] finds that higher growth rates reduce the incidence of corruption but only in the presence of 'strong' institutions. Similar results appear in Bai et al. [2013] where growth is found to reduce corruption if 'strong' land rights exist.

With the exception of a few studies, most of the literature on the growth-corruption nexus focuses on causality from corruption to economic growth (not the other way around). And the majority of this work confirms the distortionary growth impacts of corruption. For example, Pellegrini and Gerlagh [2004] find that corruption slows down economic growth mainly through its detrimental impacts on investment and trade. Similar findings are reported in Mo [2001]; Anoruo and Braha [2005]; Hodge et al. [2011];

Egunjobi [2013]; Anh et al. [2016] and dAgostino et al. [2016].

On the other hand, political (in)stability and the quality of institutions matter for corruption. An early attempt to investigate how political settings could be an essential determinant of corruption is Lederman et al. [2005] where they find political stability to be associated with lower levels of corruption. Asongu and Nwachukwu [2015] establish causal evidence of a positive nexus between political stability and corruption control. Moreover, the findings in Campante et al. [2009] support evidence of a U-shaped relationship between political instability and economic growth after controlling for the level of democracy.

Furthermore, there is also a group of studies that combine the three variables (i.e., corruption, political stability, and growth). Adefeso [2018] find no statistically significant relationship between political instability and economic development in African countries. Nurudeen et al. [2015] find a unidirectional causality from political instability to economic growth in the short-term while in the long-term causality runs from growth and political stability to corruption. Shabbir et al. [2016] find that corruption determines both economic growth and institutional quality.

Our contribution to this large and extensive body of literature is as follows. Unlike existing literature which tends to focus on growth impacts of either corruption or political settings separately, we show how the three variables interact together simultaneously allowing for bidirectional causality between every two variables. Besides, we exploit the Arab Spring incidence, and its associated political instability in the MENA region, to quantify this relationship in a quasi-natural experiment environment. To the best of our knowledge, this is the first study to employ the incidence of the Arab Spring to measure the effects of political instability on economic growth and the level of corruption.

3. Data and Methods

3.1. The dataset

As highlighted earlier (in sections 1 and 2), a major challenge facing research on corruption is how to define, and consequently measure, the term 'corruption'. It is no doubt a difficult task to measure what is illegal and meant to remain unseen. However, any empirical study has to be clear about what is being captured and measured, and research on corruption is no exception. As mentioned in section 2, this study adopts a broad and commonly used definition which identifies corrupt behavior based on the incidence of abusing public resources to achieve private benefits for officials. However, such a definition of corruption also sheds light on the important role that institutions play in determining or combating corruption. Good and strong institutions would impose appropriate checks and balances, which would, in turn, spur growth and limit corrupt behavior. This intuition confirms the importance of studying the three variables simultaneously allowing for bidirectional causality between each pair of variables in our dataset.

To address our research questions empirically, we collect a large dataset of annual data which covers 140 countries between 1990 and 2017. The main variables in our dataset include measures for corruption, institutional quality, and economic growth.

Following our definition of corruption, discussed earlier, we choose to employ a measure that captures perceptions of the corruption taking place by public officials. Therefore, we use the '*pubcorr*' index of the V-Dem database. The index, namely public sector corruption, builds on the view of a large number of experts to measure the perception of public officials corrupt behaviour in a given country at a certain point in time[1]. The *pubcorr* index takes values from zero to one, where a larger value denotes a higher level of corruption.

To proxy for a country's political settings we use the '*poltiy*' index from the Polity IV database Marshall et al. [2014]. The '*poltiy*' index is available for a large number of countries over a long period, which perhaps explains why it has been widely used in the literature. This index is based on sub-scores for constraints on the chief executive, the competitiveness of political participation, and the openness and competitiveness of executive recruitment. The '*poltiy*' score ranges from -10 to +10 with higher values denoting more democratic institutions. The Polity Codebook de-

[1] Arguably, whatever definition one considers, focusing only upon one aspect of corruption (e.g. bribery) overlooks its breadth and complexity and therefore might limit our understanding to such complex phenomenon. However, any empirical study has to be specific on what is being measured. Our measure here reflects our definition of corruption.

fines a polity within the range [6,10] as a coherent democracy, one in the range [-10,-6] as a coherent autocracy, and one in the range [-5,5] as an incoherent regime. In our application, we rescale the '*poltiy*' index to range from 0 to 10 with larger values denoting a better quality institutional set-up.

Finally, we measure economic growth in a given country by its per capita real income. Although it has been widely criticized for not being a 'good' measure of the standard of living, the GDP is the most commonly used measure to reflect economic growth. Table 1 shows the descriptive statistics for the three variables described above.

Table 1: Descriptive Statistics

Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
pubcorr	4153	0.5049285	0.3028824	0.0043169	0.9794533
polity	4153	6.674929	3.266204	0	10
gdp	4153	8.268439	1.555429	4.751814	11.62597

3.2. Empirical Methodology

Since our dataset composes a panel data of 140 countries over the period of 1990-2017, we begin our estimation by following the conventional fixed effects (FE) and random effects (RE) estimations for static panel data models as well as the popular generalized method of moments (GMM) of Arellano and Bond [1991] for dynamic panel data models.

In addition to our baseline estimations (static and dynamic panels), we employ a *panel VAR* modeling approach to examine how corruption, growth and a country's political settings interact allowing for bidirectional causality between each pair of variables. A distinctive advantage of the VAR alike models is that all variables are sought to be endogenous and interdependent. Thus, we have a three-equation system, and each equation has one of our three variables as the dependent variable while the other two variables appear on the right-hand side (in a lagged form) as the explanatory variables. Our *panel VAR* model can be formally presented as follows.

$$Y_{it} = \mathbf{A}_{0i}(t) + \mathbf{A}_i(l)Y_{t-1} + \epsilon_{it} \tag{1}$$

where $Y_{it} = (y'_{1t}, y'_{2t}, \ldots, y'_{Nt})'$ is a $G \times 1$ vector of endogenous variables, $i = 1, \ldots, N \quad \& \quad t = 1, \ldots, T$ denoting country and time dimension respectively, and $u_{it} = G \times 1$ is a vector of random disturbances where $\epsilon_{it} \sim iid(0, \Sigma_\epsilon)$. By estimating the above model and running relevant diagnostic tests, we shall then produce a set of impulse response functions (IRFs) which explain how each variable responds to shocks to the other two variables in the system.

Furthermore, we investigate how political instability affects both the levels of corruption and economic growth in a quasi-natural experiment environment. More specifically, the Arab Spring offers a unique opportunity which we exploit to quantify the effects of political shocks on the three variables of interest. For this purpose, we employ the Differences-in-Differences (DiD) estimation to compare MENA countries (treatment group) with other countries (control group). A DiD regression-based estimator can be obtained by estimating the following equation.

$$y_{it} = \beta_0 + \beta_1 MENA_i + \beta_2 shock_t + \beta_3 MENA_i.shock_t + \phi X_i + \epsilon_{it} \tag{2}$$

Where y_{it} is the outcome variable; $MENA_i$ is a dummy variable that takes the value of one for the treatment group and zero otherwise; $shock_t$ is a dummy that takes the value of one for $year \geq 2011$ (post-treatment) and zero for $year < 2011$ (pre-treatment). The DiD estimator is the OLS estimator of β_3, the coefficient of the interaction term between $MENA_i$ and $Shock_t$. X_{it} can be a series of control variables.

To account for possible bias in the DiD estimator due to dealing with a large and quite heterogeneous group of countries, we apply the propensity score matching (PSM) technique to estimate the average treatment effect of the treated (ATT). The propensity score, in this context, can be defined as the conditional probability of the incidence of a political shock given pretreatment characteristics as follows.

$$p(X) \equiv Pr(D = 1|X) = E(D|X) \tag{3}$$

where $D = \{0, 1\}$ is the indicator of exposure to a political shock and X is the multidimensional vector of pretreatment country-specific characteristics.

4. Empirical results

4.1. Baseline Estimation: FE, RE and GMM

Our first step in the estimation strategy is to apply the traditional panel data estimation techniques before applying our three-equation system estimated within a panel VAR framework. Since we acknowledge the fact that causality between each pair of variables in our model may be bidirectional, we maintain the principle of the three-equation system throughout. However, it is worth noting that in contrast to our panel VAR estimation, the results reported in the current subsection are obtained for each equation separately.

Table 2 reports our fixed and random effects estimations for three separate equations of GDP, *polity* and corruption indices. More specifically, while models (1), (3) and (5) employ fixed effects (FE) estimations, models (2), (4), and (6) are random effects estimations. For the GDP equation, both estimations FE and RE estimations, confirm that while political settings have a positive growth impact, corruption levels have negative effects on economic growth. Both effects are statistically significant at 1% level. The second equation, of *polity* index as the dependent variable, shows that while corruption contributes negatively to political settings, economic growth would have a positive impact on political institutions. The third equation, of the corruption index as the explained variable, shows that both better political institutions and higher levels of economic growth would be useful in combating corruption. These findings are in line with our *priori* on the relationship between corruption, political institutions, and economic growth.

Table 2: Fixed and Random Effects Estimations

Dep. Var.	GDP		*polity*		Corruption	
	(1)	(2)	(3)	(4)	(5)	(6)
	FE	RE	FE	RE	FE	RE
polity	0.037***	0.038***			-0.004***	-0.005***
	(0.003)	(0.003)			(0.001)	(0.001)
Corruption	-0.301***	-0.390***	-0.891***	-1.153***		
	(0.052)	(0.052)	(0.243)	(0.233)		
GDP			0.806***	0.757***	-0.028***	-0.047***
			(0.073)	(0.065)	(0.005)	(0.004)
Cons.	8.170***	8.199***	0.511	1.034*	0.753***	0.918***
	(0.036)	(0.096)	(-0.626)	(0.606)	(0.039)	(-0.039)
N	4153	4153	4153	4153	4153	4153

However, since the above specifications (1-6) are estimated for each equation separately, exogeneity is presumed, and causality is expected to run only in one direction and towards the dependent variable. Therefore, the obtained estimations are likely to be biased if causality runs in both directions or even if it is unidirectional but in the opposite direction. In fact, empirical research discussed in section 2 shows that this is likely to be the case. Perhaps, this is why many studies on corruption and institutional quality which use panel data models tend to employ a dynamic specification in which lagged values of the dependent variable appear among the regressors. In such cases, there is an endogeneity bias because the country fixed effect term is likely to be correlated with the lagged dependent variable. Therefore, these sort of dynamic models is usually estimated using the generalized method of moments (GMM) of Arellano and Bond [1991].

Table 3: Arellano and Bond (1991) Two-Way Two Step GMM Estimations

Dep. Var.	(7) GDP	(8) *polity*	(9) Corruption
L5.GDP	0.915***	0.261***	-0.118***
	(0.002)	(0.018)	(0.001)
L5.*polity*	0.005***	0.285***	-0.022***
	(0.001)	(0.007)	(0.001)
L5.Corruption	-0.179***	-1.596***	
	(0.012)	(0.132)	
Cons.	0.871***	3.638***	1.614***
	(0.021)	(0.213)	(0.003)
Wald test	3402	3402	3402
Sargan OIR test	0.000	0.000	0.000
A-B AR1 FD test	0.000	0.000	0.000
A-B AR2 FD test	0.265	0.930	0.533
N	3402	3402	3402

Table 3 reports our GMM estimation for the three equations separately. In this estimation, the fifth lag of the dependent variable appears as one of the independent variables. Yet, even after addressing the endogeneity issue, our previous findings remain the same. More specifically, our GMM estimation shows that while good political institutions have positive impacts on economic growth, higher corruption levels would be detrimental to economic growth. Similarly, our previous results hold for both political institutions and corruption.

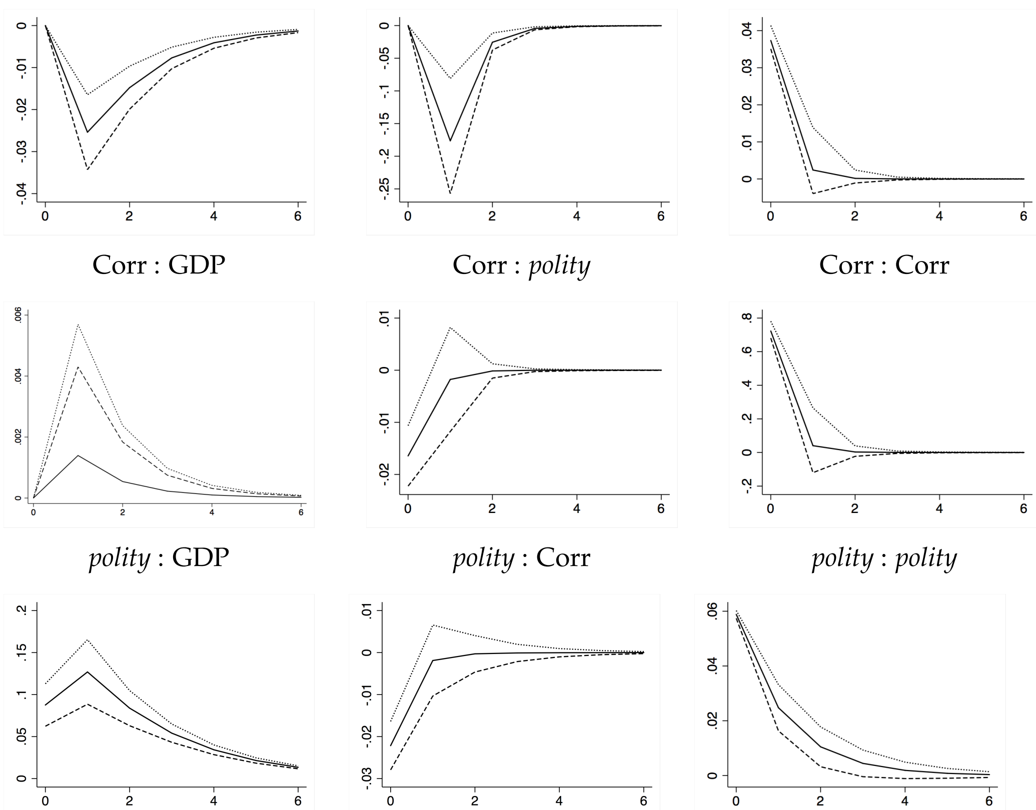
4.2. Panel VAR Estimation: IRFs

To estimate our panel VAR model, Eq. 1, we follow the estimation routine suggested in Abrigo et al. [2015], who build on the generalized method of moments (GMM) framework. The authors apply forward orthogonal deviation proposed by Arellano and Bover [1995] to remedy for the weaknesses of the first-difference transformation when estimating dynamic panel models. We use information criteria to select the optimal lag order (i.e., in both panel VAR specification and moment condition). Based on the model selection criteria, first-order panel VAR is the preferred model, since it has the smallest value for the information criteria. Therefore, we fit a first-order panel VAR model using the GMM estimator.

Since that panel VAR estimates are seldom interpreted independently, we proceed to estimate the IRFs as we are interested in examining the relationship between corruption, political settings, and economic growth within our system of equations. Although the simple IRFs have no causal interpretation, a shock on one variable is likely to be accompanied by shocks in other variables, as well, since the innovations ϵ_{it} are correlated contemporaneously. Fig. 1 presents the IRFs from our panel VAR model for all variables in the system along with its confidence bands. The IRF confidence intervals are estimated using Gaussian approximation based on 500 Monte Carlo draws from the estimated panel VAR model.

The IRFs graphs shown in Fig. 1 correspond to our three-system equation of endogenous variables estimated using the GMM method. The first row in Fig. 1 shows the responses from one standard deviation (SD) shock to the corruption index. The resulting IRFs show that increased levels of corruption would have statistically significant negative impacts on both GDP and the quality of institutions the second row in Fig. 1, which shows the IRFs from a 1SD shock to *Polity* index, provides evidence that stronger institutions would increase GDP growth and decrease corruption levels. Finally, the third row in the same graph presents the IRFs from a 1SD shock to GDP growth rate. These IRFs show that higher economic growth rates are accompanied by better quality institutions and lower levels of corruption.

Figure 1: Impulse response functions (IRFs) - Shock : Response



Corr : GDP | Corr : *polity* | Corr : Corr

polity : GDP | *polity* : Corr | *polity* : *polity*

GDP : *polity* | GDP : Corr | GDP : GDP

4.3. Quasi-Natural Experiment

The second objective of this paper is to estimate the short-term effects of the Arab Spring on our three variables (i.e., corruption, institutional quality, growth) using the DiD framework (Eq. 2). Table 4 presents the simple DiD estimation with no additional controls as well as the DiD estimation for each equation after controlling for the other two variables. The MENA coefficient provides an estimate of the difference in mean for the outcome variable between the treated group (MENA countries) and the control group (non-MENA countries). The Arab Spring coefficient, which corresponds to a dummy variable that is equal to one for the year 2011 and onwards, presents the difference in mean for the outcome variable between post-treatment and prior treatment. The DiD coefficient presents our differences-in-differences estimation.

The DiD estimation for the GDP equation (models 10 and 11 in Table 4) shows that the growth rate of per capita GDP has fallen in MENA countries (treated group) in response to the political instability in the region. However, this drop in economic growth does not seem to be statistically significant. Moving to the DiD estimation for the *Polity* index, it seems that there has been some improvement in the index as a result of the demands for political reforms in the region. Our estimation appears to be significant (at ten percent level) only when we control for economic growth rate and the level of corruption (model 13). Considering the third equation of corruption (models 14 & 15), the DiD estimation shows that there is a slight drop in the level of corruption in MENA countries as a result of the Arab

Table 4: Diff-in-Diff Estimations - No matching

	GDP		*polity*		Corruption	
Dep. Var.	(10)	(11)	(12)	(13)	(14)	(15)
MENA	0.336***	1.035***	-3.963***	-3.503***	0.143***	0.0840***
	(0.0794)	(0.0605)	(0.152)	(0.135)	(0.0153)	(0.0115)
Arab Spring	0.351***	0.278***	0.469***	0.309**	-0.0141	0.0379***
	(0.0597)	(0.0422)	(0.114)	(0.0985)	(0.0115)	(0.00781)
DiD	-0.114	-0.155	0.589	0.614*	-0.00241	-0.00104
	(0.161)	(0.114)	(0.308)	(0.264)	(0.0310)	(0.0210)
polity		0.0548***				-0.0247***
		(0.00662)				(0.00117)
Corruption		-3.374***		-3.912***		
		(0.0657)		(0.186)		
GDP				0.297***		-0.115***
				(0.0358)		(0.00224)
Cons.	8.138***	9.372***	7.155***	6.626***	0.482***	1.596***
	(0.0299)	(0.0721)	(0.0572)	(0.364)	(0.00576)	(0.0169)
N	4153	4153	4153	4153	4153	4153

Spring. However, the estimated coefficients are not statistically different from zero. Other estimated coefficients (for *polity*, corruption, and GDP) do not deviate from our results reported earlier in this paper (FE, RE, GMM, and Panel VAR).

Given the heterogeneity existing among countries in both groups (control and treatment), the DiD estimations reported in Table 4 are likely to be biased. To account for this bias, we employ the propensity score matching (PSM), thereby maximizing the observable similarity between treatment and control groups. As an alternative to linear regression, the PSM analysis allows us to create the two groups that have similar characteristics so that a comparison can be made within these matched groups. The implementation of the PSM methodology follows the two-step procedure whereby, in the first step, each country's probability (propensity score) of receiving a political shock is assessed conditional to a set of explanatory variables. For each equation, while one of our three variables of interest appears in the left-hand side, we include the other two variables as controls within the first stage of the model to ensure that the two groups are matched on similar characteristics (i.e., the level of corruption, institutional quality and economic development process). Consequently, the treatment and control group countries are matched on the basis of their propensity scores. We present the results in Table 5 based on the kernel matching method. The procedure involves taking each treated country (MENA) and identifying non-treated countries (non-MENA countries) with the most similar propensity scores.

Table 5: Matching based Diff-in-Diff Estimations

Dep.Var.	(16) GDP	(17) *polity*	(18) Corr
MENA	1.214***	-3.275***	0.072***
	(0.073)	(0.166)	(0.015)
Arab Spring	0.547***	0.097	0.011
	(0.069)	(0.196)	(0.019)
DiD	-0.330**	0.922***	-0.067**
	(0.145)	(0.353)	(0.032)
Cons.	7.279***	6.505***	0.610***
	(0.035)	(0.097)	(0.008)
N	3351	4000	3959

As the linear regression estimates in Table 4, the matching results in

Table 5 suggest that due to the political shock represented by the sequence of events known as the Arab Spring, the rate of growth in MENA countries has fallen by 0.33% (mode 16), the *Polity* index, which represents institutional quality, has increased by 0.922% (model 17), and the level of corruption has dropped slightly by 0.067% (model 18).

5. Conclusion

This paper provides new cross-country evidence on the relationship between corruption, political settings, and economic growth. Unlike the majority of the existing literature, we study how the three variables interact simultaneously as well as separately. For this purpose, we use a large panel dataset for 140 countries from 1990 to 2017 and follow the existing literature by applying the conventional fixed effects (FE) and random effects (RE) estimations for static panel models as well as the popular general method of moments (GMM) for dynamic panel models. However, our main contribution to this large and extensive body of literature is twofold. First, we show how corruption, political settings, and economic growth interact together simultaneously, allowing for bidirectional causality between every two variables. For this purpose, we estimate a panel VAR model and produce a set of impulse response functions (IRFs). Second, we exploit the incidence of the Arab Spring as an exogenous shock which is associated with political instability, to build up a quasi-natural experiment environment to measure the short-term effects of political shocks on our three variables of interest.

Our findings provide evidence of bidirectional causality between each pair of our three variables of interest (i.e., corruption, political settings, and economic growth). We show that higher levels of corruption will lead to reduced rates of economic growth and weak institutions. Moreover, good and healthy institutions would boost growth and limit the spread of corrupt behavior among officials. Our results also show that higher rates of economic growth support institutional quality and help in combating corruption. Finally, our empirical findings suggest that while times of political instability are bad for economic growth, they might be taken as an opportunity to improve institutional quality and combat the spread of corruption.

References

Abrigo, M. R., Love, I., et al., 2015. Estimation of panel vector autoregression in stata: A package of programs. manuscript, Febr 2015 available on http://paneldataconference2015. ceu. hu/Program/Michael-Abrigo. pdf.

Adefeso, H., 2018. Corruption, political instability and development nexus in africa: A call for sequential policies reforms MPRA No 85277.

Aidt, T., Dutta, J., Sena, V., 2008. Governance regimes, corruption and growth: Theory and evidence. Journal of Comparative Economics 36 (2), 195–220.

Ali, A. M., Isse, H. S., 2002. Determinants of economic corruption: a cross-country comparison. Cato J. 22, 449.

Anh, N. N., Minh, N. N., Tran-Nam, B., 2016. Corruption and economic growth, with a focus on vietnam. Crime, Law and Social Change 65 (4-5), 307–324.

Anoruo, E., Braha, H., 2005. Corruption and economic growth: the african experience. Journal of Sustainable Development in Africa 7 (1), 43–55.

Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte carlo evidence and an application to employment equations. The review of economic studies 58 (2), 277–297.

Arellano, M., Bover, O., 1995. Another look at the instrumental variable estimation of error-components models. Journal of econometrics 68 (1), 29–51.

Asongu, S., Nwachukwu, J., 2015. A good turn deserves another: Political stability, corruption and corruption-control WP/15/039.

Bai, J., Jayachandran, S., Malesky, E. J., Olken, B. A., 2013. Does economic growth reduce corruption? theory and evidence from vietnam. Tech. rep., National Bureau of Economic Research.

Bardhan, P., 1997. Corruption and development: a review of issues. Journal of economic literature 35 (3), 1320–1346.

Campante, F. R., Chor, D., DO, Q.-A., 2009. Instability and the incentives for corruption. Economics & Politics 21 (1), 42–92.

Cooray, A., Dzhumashev, R., Schneider, F., 2017. How does corruption affect public debt? an empirical analysis. World development 90, 115–127.

Davoodi, H., Tanzi, V., 2002. Corruption, growth, and public finances. In: The political economy of corruption. Routledge, pp. 101–122.

dAgostino, G., Dunne, J. P., Pieroni, L., 2016. Government spending, corruption and economic growth. World Development 84, 190–205.

Egger, P., Winner, H., 2005. Evidence on corruption as an incentive for foreign direct investment. European journal of political economy 21 (4), 932–952.

Egunjobi, T. A., 2013. An econometric analysis of the impact of corruption on economic growth in nigeria. Journal of business management and Economics 4 (3), 054–065.

Goel, R. K., Nelson, M. A., 2010. Causes of corruption: History, geography and government. Journal of Policy Modeling 32 (4), 433–447.

Gupta, S., Davoodi, H., Alonso-Terme, R., 2002. Does corruption affect income inequality and poverty? Economics of governance 3 (1), 23–45.

Hodge, A., Shankar, S., Rao, D. P., Duhs, A., 2011. Exploring the links between corruption and growth. Review of Development Economics 15 (3), 474–490.

Iyer, N., Samociuk, M., 2016. Fraud and corruption: Prevention and detection. Routledge.

Lederman, D., Loayza, N. V., Soares, R. R., 2005. Accountability and corruption: Political institutions matter. Economics & Politics 17 (1), 1–35.

Lučić, D., Radišić, M., Dobromirov, D., 2016. Causality between corruption and the level of gdp. Economic research-Ekonomska istraživanja 29 (1), 360–379.

Marshall, M. G., Jaggers, K., Gurr, T. R., 2014. Polity iv annual time-series, 1800–2013. Center for International Development and Conflict Management at the University of Maryland College Park.

Mauro, P., 1998. Corruption and the composition of government expenditure. Journal of Public economics 69 (2), 263–279.

Méndez, F., Sepúlveda, F., 2006. Corruption, growth and political regimes: Cross country evidence. European Journal of political economy 22 (1), 82–98.

Mironov, M., 2005. Bad corruption, good corruption and growth. University of Chicago, mimeo.

Mo, P. H., 2001. Corruption and economic growth. Journal of comparative economics 29 (1), 66–79.

Nurudeen, A., Abd Karim, M. Z., Aziz, M. I., 2015. Corruption, political instability and economic development in the economic community of west african states (ecowas): is there a causal relationship? Contemporary Economics 9 (1), 45–60.

Pellegrini, L., Gerlagh, R., 2004. Corruption's effect on growth and its transmission channels. Kyklos 57 (3), 429–456.

Rock, M. T., 2009. Corruption and democracy. The Journal of Development Studies 45 (1), 55–75.

Shabbir, G., Anwar, M., Adil, S., 2016. Corruption, political stability and economic growth. The Pakistan Development Review 55 (4 Part I &), 689–702.

Tanzi, V., 1998. Corruption around the world: Causes, consequences, scope, and cures. Staff Papers 45 (4), 559–594.

Wei, S.-J., Kaufmann, D., 1999. Does grease money speed up the wheels of commerce? The World Bank.