ORIGINAL RESEARCH

Corruption and Economic Growth Nexus: What has the Arab Spring Changed?*

Yolsuzluk ve Ekonomik Büyüme İlişkisi: Arap Baharı Neleri Değiştirdi?

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Abstract

Corruption is an everlasting phenomenon in the Middle East and North Africa (MENA). It is considered one of the fundamental reasons for the Arab incidents that started in Tunisia in 2011. Considering its devastating effects, this paper concentrates on the impacts of corruption at the macro level following the Arab uprisings. Notably, it investigates the impact of corruption on economic growth between 1996-2020 in 18 MENA countries. The paper utilizes panel estimators with country-fixed effect regressions given the results of the Hausman test. Panel estimators help control time-variant unobserved heterogeneity and capture both time and country-specific differences. The results indicate that after the Arab Spring, corruption lowers economic growth. One unit increase in control of corruption score of World Governance Indicators (WGI) decreases economic growth between 1.64-2.98 percentage points depending on the model. The results are robust with alternative corruption indexes such as the International Country Risk Guide (ICRG), Varieties of Democracy (V-Dem), and the Corruption Perception Index (CPI). Furthermore, the Chow test confirms that 2011 constitutes a structural break in the history of the MENA region. The outcomes indicate that specific policies need to be implemented to alleviate the adverse impacts of corruption in MENA countries.

Keywords: Corruption, Arab Spring, Economic Growth, Fixed Effects, Chow Test.

JEL Code: D73, N15, N45, 043

Öz

Yolsuzluk, Orta Doğu ve Kuzey Afrika'da (MENA) sonu gelmez bir olgudur. 2011 yılında Tunus'ta başlayan Arap olaylarının temel nedenlerinden biri olarak kabul edilmektedir. Yıkıcı etkileri göz önünde bulundurularak bu makale, Arap ayaklanmaları sonrasındaki yolsuzluğun makro düzeydeki etkilerine odaklanmaktadır. Özellikle, 18 MENA ülkesinde 1996-2020 yılları arasında yolsuzluğun ekonomik büyüme üzerindeki etkisini araştırıyor. Makalede, Hausman testinin sonuçları verilen ülke sabit etkili regresyonlara sahip panel tahmincileri kullanılmaktadır. Panel tahmin edicileri, zamana bağlı gözlemlenmemiş heterojenliği kontrol etmeye ve hem zamana hem de ülkeye özgü farklılıkları yakalamaya yardımcı olmaktadır. Sonuçlar, Arap Baharı sonrasında yolsuzluğun ekonomik büyümeyi düşürdüğünü göstermektedir. Dünya Yönetişim Göstergelerinin (WGI) yolsuzluğun kontrolü puanındaki bir birimlik artış, modele bağlı olarak ekonomik büyümeyi yüzde 1,64-2,98 puan arasında azaltmaktadır. Sonuçlar, Uluslararası Ülke Riski Rehberi (ICRG), Demokrasi Çeşitleri (V-Dem) ve Yolsuzluk Algılama Endeksi (CPI) gibi alternatif yolsuzluk endeksleri ile de sağlamdır. Buna ek olarak, Chow testi, 2011 yılının MENA bölgesinin tarihinde yapısal bir kırılma olduğunu doğrulamaktadır. Sonuçlar, MENA ülkelerinde yolsuzluğun olumsuz etkilerini hafifletmek için belirli politikaların uygulanması gerektiğini göstermektedir.

Anahtar Kelimeler: Yolsuzluk, Arap Baharı, Ekonomik Büyüme, Sabit Etkiler, Chow Testi.

JEL Sınıflandırması: D73, N15, N45, 043

Corruption and Economic Growth Nexus: What Has the Arab Spring Changed?

Corruption as a global phenomenon existed at all times in history and is not prevalent only in developing countries (Basu, 2006). It is a common concern in the Middle East and North Africa (MENA). The reasons considered to make the MENA[i] region susceptible to corruption include unemployment, poverty, low institutional quality, and high oil dependence in some countries, which attracts massive rent-seeking (Warf 2015; Djankov et al. 2008; Ross 2001).

Vulnerability to corruption hurts institutions and affects the trustworthiness of the states in the MENA region. In the recent survey of ASDA'A Cohn & Wolfe and Burson-Marsteller (ASDA'A BCW), a public relations agency based in the United Arab Emirates (UAE), Arab youth consider corruption as the third biggest issue after migration and political unrest (Arab Youth Survey, 2020). In the Corruption Perception Index (CPI), measured by Transparency International (2019), a leading institution measuring the corruption level of countries, MENA scored 39 on average on a scale varying from 0 (most corrupt) to 100 (least corrupt). This is less than the world's average. With this score, MENA is only better than Sub-Saharan Africa, Eastern Europe, and Central Asia (Kubbe & Varraich., 2020) Yemen, Syria, and Libya had the lowest scores among MENA. Syria and Yemen have the lowest scores in the world. On the other hand, all six members of Gulf countries performed relatively better in the region. However, Qatar, Saudi Arabia, and UAE are at the top of the MENA regarding cleanliness from corruption.

Outside of subjective data sets, The MENA region suffers from informal corruption practices such as wasta (networks and reciprocity) and hamula (clientelism). In the wasta system, citizens who have connections can quickly process their documents through the government bureaucracy and help their close ones get hired for a job. Similarly, hamula (clientelism), more extensive than a tribe, impacts decisions in the country (Kubbe and Varraich, 2020). Membership in more prominent tribes plays a significant role in the state's decision-making process due to their close connections with ruling families. Taking formal and informal corruption practices into account, corruption has played a fundamental role in Arab protests.

In addition to these problems, psychological pressures caused by the dictators made people dissatisfied. In most MENA countries, freedom of speech does not exist, and journalists cannot write about the corrupt behavior of politicians, especially presidents. However, the youth constituting a considerable size of the MENA population (Mnawar, 2015), have been unhappy with these living conditions. Several external factors also contributed to the fires of the Arab Spring. For example, dependence on food imports for essential food supplies (e.g., wheat, corn, sugar, rice, and meat) affected the MENA region negatively when food prices increased sharply from 2002 to 2010 (Arezki & Bruckner, 2011). Another example is the mortgage crisis of 2008, which started in the US but affected the globe. MENA countries were already in enormous debt, and the financial crisis exacerbated the burden, further increasing dissatisfaction and unhappiness among the people (Lagi et al., 2011). Internal and external factors combined ignited the massive protests in the MENA in 2010.

On 17th December 2010, Tunisian food vendor Mohamed Bouazizi immolated himself. Despite numerous similar incidents before, this self-immolation made the conditions unbearable and ignited the Arab Spring (Ansani and Daniele, 2012; Mungiu-Pippidi, 2015; Feldman, 2020). The Jasmine Revolution in Tunisia started as a response to massive macroeconomic problems, including long-standing high unemployment, especially youth unemployment, and a rebellion against government corruption and the regime's extravagance (Feldman, 2020). It then spread to other countries in the region, starting from Egypt, Libya, Yemen, and Syria.

Chronic and massive economic problems such as high youth unemployment, national debts, and

excruciating inequality have been common historical problems in the Middle East and North Africa (Looney, 2015). While the small group of elites close to the authoritarian regimes has benefitted from the nations' wealth, a growing youth population has struggled to get permanent jobs because of insufficient growth and a high level of inequality. The region also experienced a sharp decline in governance indicators across the six dimensions of the World Governance Indicators (WGI) of the World Bank, namely voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, the rule of law, and control of corruption). It has also failed to integrate into the global economic system and implement structural reforms (Looney, 2015).

When the devastating economic consequences of Arab protests and the role of corruption are considered, it is crucial to examine the impact of corruption on economic growth in this regard. The reason is that corruption is considered one of the triggering phenomena of Arab uprisings, and economic growth is perceived to measure a country's macroeconomic stability. The impact of corruption on economic growth in the MENA region after the Arab unrest has not been investigated except Abdel-Latif et al. (2018). However, their research compares the MENA region with non-MENA countries and finds that corruption harms economic growth. On the other hand, this work investigates the impact of corruption on economic growth only within the MENA region by employing different econometric methodology. Due to these reasons, this study significantly contributes to the corruption literature.

Corruption's cultural, social, and economic repercussions may keep the MENA region in a vicious cycle. This cycle of informal and formal practices makes the region suffer from massive economic issues, especially the absence of sustainable economic growth, which is why the paper wants to examine the impact of corruption on economic growth. The subsections of the article are the following: the next section reviews the literature. Section 3 provides data and methodology. Section 4 discusses the results, while section 5 checks the robustness of the results. Finally, section 6 concludes.

Literature Review

Three strands of literature on the relationship between corruption and economic growth exist. Most studies find a negative relationship between economic growth and corruption regardless of region. Another strand of literature supports a positive relationship between corruption and economic growth. That is, the higher corruption, the higher the economic growth. Lastly, the third strand of the literature argues that there is no monotonic nexus between corruption and growth. This section reviews three hypotheses separately.

Positive Relationship

The first strand of the literature finding a positive impact of corruption on growth is known as the "greases the wheels" hypothesis. Corruption boosts economic growth by overcoming bureaucratic obstacles. In this vein, Huntington (1968) said, "In economic growth, the only thing worse than a society with a rigid, over-centralized, dishonest bureaucracy is one with a rigid, over-centralized, honest bureaucracy."

Leys (1965) and Bayley (1966) view lower-paid civil servants as more prone to corruption and conclude that corruption increases bureaucratic efficiency. Lui (1985) puts forward a game-theoretic model that demonstrates how bribes decrease the time spent in lines and speed up bureaucratic red tape. Beck and Maher's game-theoretic model (1986) shows how corruption can be used as an alternative to competitive bidding in third-world countries to purchase government licensing, which also increases bureaucratic slowness. Lien (1986) extended Beck and Maher (1986) work in another game-theoretic model and found that bribes do not lead to any efficiency loss compared to competitive bidding.

In empirical work, Mironov (2005) investigates the impact of corruption on economic growth in 141

countries. The author finds that residual corruption, which is not correlated with other governance indicators, fosters economic growth in countries where the institutional quality is poor. Likewise, Podobnik et al. (2008) present an empirical analysis, and they find that corruption positively affects GDP per capita growth, and the effect is higher when considering European countries only. Game-theoretic and empirical approaches conclude that corruption positively impacts economic growth by increasing efficiency and reducing bureaucratic slowdowns. Other studies show the negative relationship between corruption and economic growth, and they are the proponents of the sands the wheels hypothesis.

Negative Relationship

Myrdal (1968) finds that civil servants may slow down bureaucratic work to get extra bribes, which eventually causes lower efficiency. Basu et al. (1992) investigate how corruption can be controlled in a game-theoretic model from a different perspective. They find that if the briber can be caught, then the bribee can be caught too, and earlier literature does not consider this. They suggest controlling corruption by making it more costly for both sides of the bargain. Shleifer and Vishny (1993) find that the inability of weak governments to control their institutions causes a high level of corruption. Further, the covert nature of corruption makes it more distortionary and costly than taxation in some undeveloped countries.

Kurer (1993) finds that corruption does not make government licensing and contract processes more efficient. Instead, excessive regulations by the government cause delays and misallocations. In his pioneering piece, Mauro (1995), using the corruption index for the first time, measures the impact of corruption on growth. He finds that corruption decreases economic growth by lowering investment. Brunetti and Weder (1998) support the finding of Mauro (1995) that corruption impacts economic growth negatively through investment. The difference between the two studies is that Brunetti and Weder (1998) use other institutional variables, including government instability, political violence, uncertainty, and corruption.

Kaufmann and Wei (2000), who use firm-level data, find that foreigners who pay more bribes in different countries deal with more bureaucratic hurdles than local citizens since locals know their bureaucratic system better than foreigners, and they may solve their problems faster. Furthermore, Mo (2001) looks into the same relationship by checking the transmission channels between growth and corruption and finds a negative relationship between corruption and growth. Using a game-theoretic model, Mauro (2004) finds that the prevalence of corruption makes the fight against corruption difficult. Prevalent corruption discourages individuals from combating it since it is believed that the corruption issue cannot be solved, and this widespread belief prevents countries from fighting against corruption. Therefore, corruption continues to affect economic growth negatively.

Méon and Sekkat (2005), however, find that corruption harms growth regardless of its effect on investment. They find that the lower quality of institutions makes the impact of corruption on growth more harmful, though the effect becomes less damaging when the institutional quality is improved. Guetat (2006) investigates the impact of corruption on economic growth in MENA countries and compares them with other regions. The author finds that region-specific institutional variables have the highest impact on MENA relative to other regions. Higher institutional and bureaucratic quality increases investment, human capital, and, more importantly, growth in MENA relatively more than in other regions.

Also, Brown and Shackman (2007) find that increasing GDP per capita raises corruption in the short run, but the effects become the opposite in the long run. Further, these studies suggest that corruption is a phenomenon that remains constant for a long time. Aidt et al. (2008) find the negative effect of

corruption on economic growth is quite substantial in countries with stable political institutions, whereas corruption does not affect growth in countries where institutional quality is low. Lučić et al. (2016) find that the impact of corruption on growth is experienced with a lag of six to ten years before any change is observed in the corruption score. Amiri et al. (2017) find that the relationship between transparency and growth is direct and significant, and that is, transparency leads to economic stability, higher growth, and investment. Sbaouelgi (2019) examines the impact of corruption on investment and growth in the MENA region and concludes with the same results as Mauro (1995). Sbaouelgi (2019) also finds that political institutions substantially impact investment and growth.

Non-Linear Relationship

Méndez and Sepúlveda (2006) investigate the impact of corruption on economic growth in the long run by taking political freedom to determine the relationship between the two. They also find a non-monotonic relationship after controlling for several economic indicators and restricting the data to free countries. Heckelman and Powell (2010) study how economic freedom affects the impact of corruption on growth. They find that corruption is growth-enhancing with the most limited economic liberty in a country, and its importance decreases as economic freedom improves.

De Vaal and Ebben (2011) examine the relationship from an institutional perspective and conclude that the relationship between economic growth and corruption depends on the institutional setting. When a country's institutional quality is low, corruption may help spur economic growth. However, in a formal growth model, corruption would affect growth negatively because of leakages in public goods and the exploitation of individual rent-seeking opportunities. Swaleheen (2011) also finds both a growth-reducing and growth-enhancing level of corruption. In this study, corruption is growth-reducing in countries with the lowest level of corruption, such as Finland.

Ahmad et al. (2012) find a linear-quadratic relationship between economic growth and corruption. They use the Generalized Method of Moments (GMM) with panel data and find that corruption is growth-enhancing until a certain threshold, and then it is growth-reducing. Baklouti and Boujelbene (2015) investigate the relationship between democracy, economic growth, and corruption and find bi-directional causal relations between democracy and economic growth and between economic growth and the level of perception of corruption. They find a unidirectional causal relationship between democracy and the perception of the corruption index.

Data and Methodology

Drawing on the literature that shows positive, negative, and non-linear relationships between growth and corruption, this work contributes to the corruption literature from the perspective of the Arab Spring. Since there are significant socioeconomic gaps between the countries in the MENA region, Table 1 below may be helpful in illustrating average GDP and GDP per capita growth rates before and after the Arab Spring.

The table clearly shows that in countries severely affected by the Arab uprisings (Egypt, Libya, Tunisia, Syria, and Yemen), the growth rates were lower after 2011. When it comes to Gulf Cooperation Countries (GCC), Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and UAE, they are not affected as much as the previous five countries. Lastly, the rest of the countries are in the moderately affected group, where their GDP and GDP per capita are between the severely affected group and GCC countries[ii].

Table 1

Average GDP and GDP Per Capita Growth Rates (%)

Country	GDP (1996-2010)	GDP (2011-2020)	GDP Per Capita (1996-2010)	GDP Per Capita (2011-2020)
Algeria	4.0	1.8	2.2	-0.2
Bahrain	5.0	2.4	-0.4	-0.8
Egypt	5.1	3.6	3.2	1.5
Iran	3.9	0.4	2.7	-0.9
Iraq	9.1	3.9	6.3	0.7
Jordan	5.3	2.0	2.1	-1.4
Kuwait	3.8	2.0	-0.3	-1.8
Lebanon	4.9	-1.7	2.7	-4.9
Libya	3.7	2.5	2.1	1.5
Morocco	4.7	2.4	3.4	1.0
Oman	3.3	3.2	1.0	-2.3
Palestine	5.3	2.5	2.3	0.1
Qatar	11.0	3.4	3.4	-1.1
Saudi Arabia	2.9	2.6	0.3	0.1
Syria[iii]	4.6	-7.4	1.3	-5.0
Tunisia	4.7	0.7	3.7	-0.3
UAE	4.5	3.8	-3.9	2.3
Yemen[iv]	4.6	-5.0	1.6	-7.4
Average	**5.0**	**1.3**	**1.9**	**-1.0**

Note. From https://databank.worldbank.org/source/world-development-indicators/preview/on

Data

This study takes a widely used and cited definition of corruption: the abuse of public power for private gain. This definition of WGI and TI (and others) includes petty (political) and grand (bureaucratic) corruption. Defining corruption this way may raise questions about private corruption due to the concentration on public corruption. However, private corruption can be eliminated with competition and regulations (Bardhan 2005). Undoubtedly, private entities engage in corrupt activities; however, the overwhelming majority of corruption studies focus on public corruption, not private corruption (Rothstein and Varraich 2017).

The most cited corruption indexes are WGI, CPI, ICRG, and V-Dem, and there is a strong positive correlation between these indexes. The comparison before and after the Arab Spring is impossible for the CPI data set since TI changed the methodology in 2012. There are enough data points in V-Dem and ICRG data sets; however, their corruption scores are too sticky for a long time. Nevertheless, V-Dem, ICRG, and CPI data sets are still utilized for robustness checks.

Considering data constraints and limitations, WGI is used. WGI displays more variation over time, making the data set more reliable than ICRG and V-Dem. The index started in 1996 and ranges between -2.5 and +2.5, where a higher score represents low corruption. The data is rescaled to interpret the results better, and a higher score means higher corruption (Méon and Sekkat 2005; Johnston 2005). Moreover, since WGI decided to provide corruption scores every year after 2002, it has missing data points for the odd years of 1997, 1999, and 2001. To obtain more observations, data is imputed by taking the simple averages of one year before and after.

Macroeconomic variables are from the World Development Indicators (WDI) of the World Bank, and durability score, which is the number of years that the current political order has continued since the last transition, is from the Polity IV. Several socioeconomic variables drive the GDP per capita growth rate as an independent variable. These are an investment as a percentage of GDP, annual population growth rate, and oil rent, which is the difference between the value of crude oil production at world prices and the total production costs.

Control variables are added in the regression to test whether corruption ceases to impact GDP per capita growth after the Arab Spring[v]. These variables are urbanization as a percentage of the total population (Billger and Goel 2009; Reinsberg et al., 2020), mineral rents as a percentage of GDP (Reinsberg et al., 2020; Treisman 2000), log GDP per capita[vi], unemployment, government expenditure as a % of GDP, and savings also as a % of GDP. Lastly, the corruption square is added to test the political Kuznets curve argument.

Model

Mankiw et al. (1992) and Barro (1991), pioneer economic growth studies, use cross-country regressions. Corruption studies use similar growth regressions, including those investigating economic growth and corruption nexus. However, this paper utilizes a panel (longitudinal) data set to capture cross-sectional effects. The advantage of panel data is that it shows both time and country-specific effects in the regression analysis while capturing time-invariant unobserved heterogeneity. Dynamic panel data settings could also be used, but since it uses numerous instruments (i.e., system GMM uses more instruments than difference GMM) and this study already has a low number of observations due to the short time passed after the Arab Spring, fixed effect regressions are ideal methodology to employ. The same argument can be made for instrumental variables (IV) estimation. Finding an appropriate IV for corruption is difficult, and it becomes more challenging to find one under panel data as the potential IV must be a time-variant variable. Therefore, fixed effect regressions are the most appropriate estimation for this paper. Hence, the model is the following:

$$(\Delta\%)\ GDPPC_{i,t} = \alpha\ (Investment)_{i,t} + \beta\ (Population)_{i,t} + \phi\ (OilRent)_{i,t} + \gamma\ (Durability)_{i,t}$$
$$+\ \eta\ (Corruption)_{i,t} + \varphi\ (Arab\ Spring\ DV)_{i,t}$$
$$+\ \delta(Corruption * Arab\ Spring\ DV)_{i,t} + \theta_i + \varepsilon_{i,t}$$

In this model, the GDP per capita growth rate is the response (dependent) variable for country i at time t. Explanatory (independent) variables are investment, population growth rate, oil rent, durability, the time under the current administration, corruption scores, and the interaction term between corruption and the Arab Spring dummy. θ_i is country-specific effects, and ε is the error term. The interaction term measures how the Arab Spring affects the impact of corruption on the growth rate. Arab Spring dummy takes 1 for 2011 and onwards and 0 before 2011. Therefore, the interaction term measures the change in the impact of corruption on economic growth in MENA after 2011, when the Arab Spring erupted. The coefficient of interest in this model is δ. If the interaction term is negative, the Arab Spring negatively affects the impact of corruption on economic growth. If the interaction term is positive, then Arab Spring positively affected the impact of corruption on economic growth.

Results

Table 2 and Table 3 below present descriptive statistics and correlation matrix. The research question and model support fixed effect regressions since the Hausman test favors fixed effects over random effects[vii]. Fixed effects models assume that the error is correlated with the intercept. If this is not the case and the error term is not correlated with the intercept, the fixed effects regressions are not suitable. In Table 2, it may be easily noticed that there is a significant difference between the minimum and

maximum growth values. Both maximum and minimum values belong to Libya, and the regression results do not alter when these outliers are excluded from the regressions. For oil rent, durability, and mineral rent, minimum values are 0 when there is no rent from oil or mineral and when the administration could not stand until the end of the first year. Lastly, Arab Spring takes only 0 or 1 as a dummy variable.

In Table 3, corruption has a positive correlation with growth, but this relationship is not the same before and after the Arab Spring, as seen in Table 4 below. When looking at the correlation between growth and the Arab Spring, economic growth decreased after the Arab uprisings. The other correlations between variables are primarily in line with the literature.

Table 2

Summary Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Year	450			1996	2020
Growth	445	0.744	9.274	-62.378	121.78
Investment	381	25.662	8.387	7.905	50.781
Population	450	2.782	2.57	-4.537	17.511
Oil Rent	411	19.029	17.796	0	66.713
Durability	425	27.567	24.414	0	94
Mineral Rent	411	0.222	0.707	0	5.805
Urbanization	450	72.447	17.843	24.249	100
Log [GDPPC]	443	8.872	1.17	6.504	11.152
Unemployment	450	9.554	6.284	0.091	29.77
Gov't Expenditure	385	17.501	5.532	2.442	33.012
Savings	370	28.945	24.301	-36.345	75.55
Corruption	450	0.301	0.714	-1.57	1.713
Arab Spring	450	0.4	0.49	0	1

Table 3

Correlation Matrix

Variables	Growth	Investment	Population	Oil Rent	Durability	Mineral Rent	Urbanization	Log [GDPPC]	Unemployment	Gov't Expenditure	Savings	Corruption	Arab Spring
Growth	1												
Investment	0.017	1											
Population	-0.082*	0.072	1										
Oil Rent	0.092*	-0.156***	0.124**	1									
Durability	0.005	-0.059	0.124**	0.332***	1								
Mineral Rent	0.015	0.197***	-0.089*	-0.253***	0.027	1							
Urbanization	-0.038	0.034	0.363***	0.160***	0.266***	-0.078	1						
Log [GDPPC]	-0.017	0.016	0.486***	0.415***	0.409***	-0.194***	0.789***	1					
Unemployment	0.055	-0.048	-0.419***	-0.208***	-0.376***	0.088*	-0.431***	-0.689***	1				
Gov't Expenditure	0.034	-0.074	-0.149***	0.042	0.316***	-0.039	0.251***	0.043	0.104**	1			
Savings	0.041	0.285***	0.232***	0.637***	0.414***	-0.018	0.211***	0.600***	-0.495***	-0.295***	1		
Corruption	0.022	-0.057	-0.441***	0.073	-0.318***	-0.006	-0.555***	-0.661***	0.512***	-0.155***	-0.204***	1	
Arab Spring	-0.152***	0.106**	-0.152***	-0.087*	-0.026	0.086*	0.110**	0.016	0.002	0.051	-0.036	0.102**	1

*** p<0.01, ** p<0.05, * p<0.1

Table 4 below shows the regression results of fixed effects, where the second column is the result of the preferred model for the entire dataset because, according to the literature, the explanatory variables, namely investment, population, oil rents, and durability, explain this model better and straightforward way and the value of R^2 supports that finding as elaborated below. Lastly, the standard errors are in parentheses which are robust and clustered across the countries. Columns 3-9 add each control variable to regressions one by one.

In the preferred specification, in the second column, all the variables are significant except corruption, but its sign is negative. Corruption does not have a statistically significant impact on growth before the Arab Spring. It is also seen that the impact of the Arab Spring is to lower economic growth. Still, economic growth is further decreased when the additional impact of corruption is included in estimating the impact of the Arab Spring. In column 2, after the Arab Spring, economic growth reduces by 1.54%, and corruption further decreases economic growth by an additional 1.64%. Thus, an increase in corruption by 1-point post-Arab Spring leads to a decline in economic growth by about 3.2%. That means while corruption does not have a statistically significant impact on reducing economic growth prior to the Arab Spring, higher levels of corruption after the Arab protests exacerbated the impact of the Arab Spring on economic growth.

In the first column, it is seen that corruption affects economic growth negatively after the Arab Spring, which is significant at the 5% level. In the third column, the coefficient of interest continues to be significant after controlling for mineral rent. In this column, the coefficient of the Arab Spring is almost the same in magnitude as the preferred model, which is significant. Other variables are also significant, except the corruption and mineral rent coefficient.

Between columns 4-8, log GDP per capita, unemployment, government expenditure, and savings are added to the regressions. After adding all the controls, the coefficient of interest is still negative and significant. Also, the coefficient of the Arab Spring is negative and significant. The corruption coefficient never reaches significance but is negative in most regressions. Population, oil rent, and investment are significant in all columns, and durability is not significant after the second column. Interestingly, except for unemployment, the coefficients of control variables do not reach significance in any regressions. Lastly, the political Kuznets curve argument is tested for non-linearity; nonetheless, it is not verified.

Overall, the coefficient of interest is negative and significant in all regressions. Economically, the relationship between corruption and economic growth becomes more robust after the Arab Spring, when economic growth is lower. In other words, corruption plays an important role in explaining the decrease in economic growth after the Arab Spring incidents. The negative coefficient shows that after the Arab Spring, the impact of corruption on economic growth is negative and significant. It can also be seen that while corruption does not impact the growth rate before the Arab Spring, its impact is felt more after the protests.

Table 4

Regression Results

Dept. Var: Growth	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Investment		0.0882**	0.0895**	0.0902**	0.0890**	0.112**	0.126***	0.117**	0.120**
		(0.0349)	(0.0354)	(0.0337)	(0.0329)	(0.0401)	(0.0394)	(0.0492)	(0.0518)
Population		-0.668***	-0.666***	-0.665***	-0.665***	-0.681***	-0.545**	-0.531**	-0.517**
		(0.160)	(0.160)	(0.156)	(0.156)	(0.152)	(0.235)	(0.240)	(0.220)
Oil Rent		0.175***	0.176***	0.176***	0.169***	0.176***	0.239***	0.220**	0.220**
		(0.0402)	(0.0402)	(0.0403)	(0.0432)	(0.0421)	(0.0768)	(0.0837)	(0.0806)
Durability		-0.0305**	-0.0300**	-0.0291	-0.0282	-0.0264	-0.0133	-0.0126	-0.0168
		(0.0133)	(0.0134)	(0.0176)	(0.0195)	(0.0178)	(0.0150)	(0.0150)	(0.0164)
Corruption	1.389	-0.301	-0.283	-0.294	-0.0436	-0.308	-0.608	-0.781	-0.244
	(1.279)	(1.044)	(1.066)	(1.068)	(1.047)	(1.102)	(1.182)	(1.260)	(1.301)
Arab Spring	-1.978**	-1.545***	-1.535***	-1.488*	-1.539*	-1.722**	-1.428**	-1.477**	-1.513**
	(0.876)	(0.518)	(0.516)	(0.757)	(0.791)	(0.791)	(0.667)	(0.652)	(0.708)
Corruption*Arab Spring	-2.980**	-1.640*	-1.641*	-1.646*	-1.982*	-1.858*	-2.269**	-2.034*	-2.152*
	(1.247)	(0.867)	(0.871)	(0.894)	(1.028)	(1.053)	(0.892)	(0.989)	(1.027)
Mineral Rent			-0.0856	-0.0773	-0.178	-0.175	-0.183	-0.189	-0.223
			(0.132)	(0.151)	(0.161)	(0.170)	(0.167)	(0.179)	(0.181)
Urbanization				-0.0121	-0.0435	0.0195	-0.00119	0.00409	-0.00427
				(0.0924)	(0.102)	(0.113)	(0.0941)	(0.0928)	(0.108)
Log [GDPPC]					2.045	2.007	2.498	2.658	2.703
					(1.287)	(1.285)	(1.629)	(1.752)	(1.779)
Unemployment						0.149	0.220*	0.242**	0.214*
						(0.0974)	(0.108)	(0.112)	(0.105)
Gov't Expenditure							0.267	0.329	0.347
							(0.189)	(0.233)	(0.236)
Savings								0.0383	0.0397
								(0.0615)	(0.0600)
Corruption^2									1.363
									(0.995)
Constant	1.561***	-0.860	-0.904	-0.0588	-16.14	-22.44*	-32.88**	-36.96**	-37.56**
	(0.393)	(1.209)	(1.228)	(6.831)	(10.78)	(11.56)	(15.33)	(16.43)	(16.72)
Observations	445	344	344	344	344	344	343	328	328
R-squared	0.037	0.213	0.213	0.213	0.218	0.221	0.241	0.248	0.252
Number of Country	18	16	16	16	16	16	16	16	16
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Yemen and Palestine are excluded.

Robustness Checks

In the previous section, the regression results clearly illustrate that corruption lowered economic growth after the Arab Spring. However, these significant results need to be checked for robustness. In this section, I present the results with alternative corruption indexes and check whether 2011 constitutes a structural break.

Alternative Corruption Indexes

To check the validity of results for the entire data set, ICRG, V-Dem, and CPI data sets are employed. Although ICRG and V-Dem provide identical corruption scores for several consecutive years for some MENA countries, they are widely used in other studies. Likewise, CPI data is not comparable before 2012; however, since the Arab Spring started in 2011, it can only be used to show the impact of the Arab Spring, not before. Tables 7 and 8 demonstrate the correlation matrix between corruption indexes and regressions.

Table 5

Matrix of Correlations

Variables	WGI	ICRG	CPI	V-Dem
WGI	1			
ICRG	0.951	1		
CPI	0.979	0.951	1	
V-Dem	0.825	0.777	0.786	1

As Table 5 presents, there is a strong positive correlation between corruption measures. The correlations between WGI and ICRG, and CPI are approximately 96% and 97%. The weakest correlation is between ICRG and V-Dem, and even that is around 78%. The strong correlation between the indices hint that even though their methodologies are different, they end up getting similar corruption scores for countries.

In Table 6, the regressions are run for these indexes. The model is run with the preferred specification but without the control variables to save space, but the results are consistent when control variables are added into regressions. The coefficient of interest shows that the Arab Spring negatively affects the impact of corruption on economic growth in the MENA region. This result is robust with respect to different corruption indexes.

It can be said that The Arab Spring uncovered corruption that was already present, thus making the negative impacts of corruption more visible. The reason is that before the Arab Spring, the corruption coefficient is not significant in any alternative corruption indexes. However, after the Arab Spring, corruption lowers economic growth, and the result is robust with alternative corruption indexes. One important note about the magnitude of the coefficients of interest. ICRG index varies between 0 and 6, whereas V-Dem is between 0 and 1. Lastly, CPI varies between 0 and 100. Thus, the difference between the range of values affects the magnitudes of the coefficients.

Table 6

Alternative Corruption Datasets

Dept. Var: Growth	ICRG	V-Dem	CPI
Investment	0.0733*	0.0820**	-0.0365
	(0.0358)	(0.0380)	(0.108)
Population	-0.696***	-0.716***	-0.282
	(0.174)	(0.177)	(0.239)
Oil Rent	0.171***	0.168***	-0.0303
	(0.0476)	(0.0413)	(0.0762)
Durability	-0.0247*	-0.0274	-0.253*
	(0.0130)	(0.0161)	(0.138)
Corruption	0.228	1.347	
	(0.484)	(1.570)	
Arab Spring	3.702	2.418	
	(2.237)	(2.813)	
Corruption*Arab Spring	-1.516**	-5.315*	-0.112**
	(0.535)	(2.805)	(0.0397)
Constant	-1.366	-2.059	16.13***
	(1.494)	(1.867)	(4.303)
Observations	334	334	108
R-squared	0.211	0.211	0.044
Number of Country	16	16	14
Country FE	Yes	Yes	Yes

Note. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Chow Test

To check whether the Arab Spring constitutes any structural break, the Chow test is conducted with WGI[viii]. Chow test is employed where three regressions are run, one for the complete data set and two for before and after the Arab Spring data sets. After running each regression through residuals, the F-statistics is obtained by using the following formula:

$$\frac{(RSS_T - RSS_1 - RSS_2)/k}{(RSS_1 + RSS_2)/(T - 2k)}$$

The test resulted in $F_{value} = 2.064$ and $F_{critical} = 0.00001$. The null hypothesis of the Chow test that there is no structural break is rejected. Thus, there was a structural break in 2011 when the Arab Spring started.

Conclusion

This study investigates how the Arab Spring affected the impact of corruption on economic growth in the MENA region. Overall, the results align with most of the literature, which finds the adverse effects of corruption on growth. The results confirm the sands-the-wheel hypothesis. However, it should be noted that the results were not significant pre-Arab Spring. Although this seems counterintuitive since corruption was considered one of the fundamental determinants of the uprisings, economic growth might have been achieved through rampant crony capitalism in the region. That is, interwoven state-class relations may have maintained economic growth and curtailed the negative repercussions of corruption before the unrest. Since these relationships were cut off during and after the Arab uprisings,

corruption has negatively affected economic growth.

While being aware of all limitations of corruption studies in terms of methodology and world ranking, we can say that corruption is one of the fundamental issues of the MENA region. Warf (2015) thinks that corruption is widespread and intractable in MENA and that MENA experiences every type of bribery, kickbacks, embezzlement, and peculation. Corruption becomes more ubiquitous and uncontrollable in weak civil societies and institutions since government elites and officers are already corrupted (Warf 2015). The region suffers from a vicious cycle in which high corruption feeds lower economic growth and increases corruption. The Arab Spring paradoxically seems to have exacerbated this cycle, although the protests sought more egalitarianism, lower corruption, and social justice. Conversely, they kept the status quo and worsened the economic conditions, particularly economic growth.

Considering the limitations and the outcomes of the Arab uprisings, this study has some policy implications. First, there is a consensus that corruption hinders economic growth. Thus, governments should utilize their resources to alleviate corruption in political and bureaucratic spheres. Second, economic growth is a complex phenomenon, and it is not always known which variables cause higher economic growth. Yet, the negative relationship between corruption and economic growth is proven in this study which means that investments should be systematically made to foster and sustain economic growth. Eliminating corruption and boosting economic growth simultaneously will provide opportunities to lower corruption further, improve institutional quality, and sustain the economic development of each MENA country. Hence, the results and policies of this study may be the roadmap for future research regarding country or group-specific policy suggestions.

Compliance with Ethical Standards

Ethical Approval

Ethical approval for this study is not applicable.

Author Contributions

The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Notes

ⁱ List of MENA countries under this study: Algeria, Bahrain, Egypt, Iran, Iraq, Kuwait, Jordan, Lebanon, Libya, Morocco, Oman, Qatar, Palestine, Saudi Arabia, Syria, Tunisia, The United Arab Emirates, Yemen

ⁱⁱ An important note that the data starts from 1996 as corruption data, WGI started to measure corruption scores in 1996. Otherwise, data availability for GDP and GDP per capita growth rates goes much further.

ⁱⁱⁱ Averages of Yemen and Syria are until 2020.

^{iv} Averages of Yemen and Syria are until 2020.

^v There were several missing data points for Syria. To tackle this issue, Syria's GDP per capita is calculated by dividing the total GDP by population from 2008 to 2018. Besides, some countries were missing several observations that imputation could not be implemented.

^{vi} Since GDP per capita is provided as raw value in the data source, taking the natural logarithm helps to make better mathematical comparisons.

^{vii} Hausman test results with $p < 0.024$ supports that the fixed effect is an appropriate model.

^{viii} ICRG and V-Dem data also show that there exists a structural break in 2011. Since there is no data before 2012, The Chow test for the CPI data set cannot be checked.