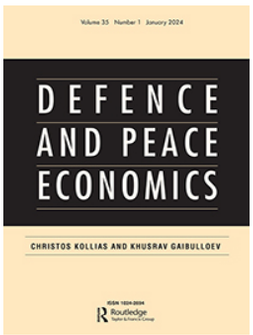

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The Effect of Corruption on Internal Conflict in Iran Using Newspaper Coverage

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ABSTRACT

We study the effect of a corruption reflection index on internal conflict in Iran using a novel measure of corruption based on newspaper coverage. We use the Vector Autoregression (VAR) model and its applied tools of impulse response and variance decomposition analyses to track the response of protests to shocks in corruption levels. Using annual data from 1962 to 2019, we find a positive and significant response of protests to a positive shock in the news-based corruption reflection index. We also show that economic growth and military spending are the main channels where higher corruption may lead to higher internal protests.

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Corruption; protest; conflict; newspaper coverage; Iran; economic growth; revolution

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Introduction

In this study, we examine the dynamic relationship between public corruption and internal conflict in a case study of Iran using more than 50 years of data. We employ the vector autoregressive model, which considers the possible endogeneity of key variables, such as conflict and corruption, and applies impulse response functions and variance decomposition analysis. We aim to understand and measure the response of internal conflict to a positive shock in public corruption, controlling for other important factors. Our measure of conflict is based on three indicators for less violent events of instabilities, such as anti-government demonstrations, general strikes and riots from the Cross-National Time-Series Data Archive (Banks and Wilson 2021). Such events have higher frequency and can better reflect the population's anger over mismanagement and corruption. There may also be early warning indicators for more severe forms of conflict, such as the collapse of a political system or civil war.

Over the past 50 years, Iran has experienced a variety of significant political events, such as the popular uprising of 1978-79 and collapse of the monarchy, leading to the establishment of the Islamic Republic of Iran. The revolution was then associated with a war with Iraq from 1980 to 1988. Following the end of the war, four administrations (Rafsanjani, Khatami, Ahmadinejad and Rouhani) have held the office of the presidency and control of the government budget from its oil-based economy. In its different forms, grand corruption has been a source of tension during both pre- and post-revolution periods. The role of corruption in fueling internal protests is discussed in the traditional press and public spaces, but there has not been a systematic empirical investigation conducted in Iran. Lack of historical data on corruption measurement hindered such investigations.

In this study, we introduce a new index of corruption based on reports from one of Iran's main news outlets, *Eṭṭelāʿāt* (lit. information), which is the oldest functioning Persian daily newspaper in the world (Parvin 1998). It has a long history of continuous publication and has tried to be an

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impartial provider of news. We have followed the methodology developed by Dincer and Johnston (2017) and Dincer and Teoman (2019) in generating the corruption reflection index (CRI) for Iran from 1962 (the earliest year we could access the archives of *Eṭṭelā ʿāt*[1]) to 2019.

Besides the issue of corruption data availability, another technical concern was the simultaneous relationship between conflict and corruption. Our methodological approach assumes that all included variables are endogenous and are interconnected, affecting each other with some optimally selected lag lengths. Using such historical records of data, we simulate the possible reaction of internal conflict to an unexpected increase in public corruption. Our study is therefore related to the literature on the determinants of internal conflict, as well as literature on the consequences of public corruption in oil-rich economies. Moreover, it can explain the resource curse, where wealth from natural resources (e.g. oil in our example) can lead to unsustainable development due to corruption and conflict (Farzanegan, Lessmann, and Markwardt 2018). As a result, we show that the response of internal conflict (based on counted conflict events) to a positive shock in our counted index of public corruption coverage is positive and statistically significant.

Our focus is to track the development of internal conflict following changes in the level of corruption. There are many studies which have quantified the economic effects of internal conflict. For example, Collier (1999) shows that during a period of civil war, countries have 2.2 percentage points less economic growth compared to peacetime. Different case studies have also looked at the economic loss resulting from internal and external conflicts. For instance, Farzanegan (2022) uses the synthetic control method and estimates a 3000 US$ average per capita loss of income in Iran during the revolution and war with Iraq. Similar investigations have also been conducted on conflicts and economic growth during the Arab Spring (Matta, Appleton, and Bleaney 2019 for case of Tunisia; Echevarría and García-Enríquez (2019, 2020) for cases of Libya and Egypt). We are not only interested in tracking conflict based on its significant economic costs. Obviously, conflicts also result in significant human losses. Civil conflicts post-World War II have led to more than 16 million casualties worldwide, far more than the human costs of international conflicts (Arbatlı et al. 2020). Farzanegan (2021) has also quantified the impact of conflict in Iran on the life expectancy of Iranians.

The rest of the paper is organized as follows: the next section provides a conceptual framework on the nexus between civil conflicts and corruption. The section after describes the data and the empirical strategy. The fourth section presents our results. Concluding remarks are presented in the fifth section.

Conceptual Framework: The Nexus between Corruption and Civil Conflicts

In theory, we expect that more media coverage of economic corruption cases may increase its perception and trigger the frustration and disappointment of citizens. It increases the perception of inequality and relative deprivation (Arampatzi et al. 2018), lowers confidence in the government and possibly decreases the opportunity costs of engaging in protests (Kurer et al. 2019). However, a higher level of public corruption, especially in oil-rich countries, may facilitate the accommodation of private interests through a more comfortable distribution of resource rents in different forms, such as heavy subsidies and a large public sector. This was discussed by Fjelde (2009) in the context of civil war, suggesting that 'political corruption can be used to accommodate opposition and placate restive groups by offering private privilege in exchange for political loyalty.' It is shown that governments may use public sector employment as a redistributive tool, mainly to secure re-election (Bjorvatn and Farzanegan 2013). It is therefore interesting to explore how protest activities in Iran have responded to increases in the corruption reflection in society, using 58 years of data.

While our focus is on the relationship between conflict and corruption, in the empirical analysis, we also control for other confounding variables, which may be correlated with both variables. One channel which corruption may affect internal conflict is through its impact on economic

development. The effect of corruption on income per capita is extensively studied in the literature. Some studies find empirical evidence for the 'greasing the wheels' hypothesis, which implies the positive effects of corruption on economic growth with the presence of significant regulatory burden (Huntington 1968; Leys 2002). In this case, corruption may even stabilize the political system by stimulating economic growth and business formation in the short term. Others have shown the negative impacts of corruption on development[2] and support the 'sanding the wheel' hypothesis (Gründler and Potrafke 2019), since corruption distorts the allocation of the government budget and the shift of talent from productive to unproductive activities. Corruption leads to higher educational and income inequality (Farzanegan and Krieger 2019), which is a main driver of conflict (Krieger and Meierrieks 2019; Cockburn 2018). It also results in higher transaction costs, economic uncertainty and reduced investments (especially when corruption has an unpredictable nature as shown by Campos, Lien, and Pradhan 1999). Higher corruption increases the costs of production and imports, which lead to higher consumer prices and inflation. A combination of higher unemployment and inflation leads to lower opportunity costs for people to participate in rebellions. This was also the case in the rapid expansion of the Boko Haram terrorist organization in Nigeria (Onuoha 2014) and the Taliban in Afghanistan (Sopko 2016).

Corruption is a driver of instability especially with a significant youth bulge in a country's demographics (Farzanegan and Witthuhn 2017). By lowering the level of economic development and increasing inflation, corruption may reduce the opportunity costs of becoming involved in violence and the problem of 'free-riding' in collective actions such as protests. Free-riding can hinder the successful mobilization of different segments of the population against political power. In such situations, some significant economic, political or natural events may decrease the cost of participation in collective action (Bazzi and Blattman 2014). Price shocks or large-scale corruption scandals may act as catalyzers in solving the collective action problem, especially when other alternatives for the deprived population are not available (Ishak and Farzanegan 2021). An example is the shock of a sudden increase in gasoline prices in 2019 by the Iranian government during a significant decrease in oil income under sanctions. In response, countrywide anti-government demonstrations formed (Fassihi and Gladstone 2019).

Research Design: Hypothesis, Data, and Empirical Method

Based on the discussed theoretical channels through which corruption may affect internal conflict, we formulate and test the following hypothesis in the case of Iran, using annual data from 1962 to 2019.

Hypothesis: The response of Iran's protest index to positive shocks in the corruption reflection index is positive, *ceteris paribus*.

Description of Variables and Data

We aim to measure the dynamic connection between internal conflict and level of corruption reflection within Iranian society. Our main measure of internal conflict is based on Domestic Conflict Event Data from the Cross-National Time-Series (CNTS) Data Archive (Banks and Wilson 2021). CNTS conflict data are based on the theoretical framework presented by Rummel (1963). It uses the coverage of different events in major international newspapers (e.g. The New York Times) and other additional reliable online news reports, reporting events such as assassinations, general strikes, terrorism/guerrilla warfare, major government crises, purges, riots, revolutions and anti-government demonstrations. This data has been used extensively in conflict studies.[3] We follow

Ishak and Farzanegan (2021) and use the sum of events under riots, strikes and anti-government demonstrations, which have a higher chance of occurring as a response to the institutional performance of a country, generating our news-based protest index.

While the Iranian government generally encourages the media to cover administrative corruption and highlights the willingness of the political system to manage corruption,[4] we do not see this same approach in the coverage of conflict and protests. In the latter case, there is high sensitivity and censorship in the coverage of anti-government demonstrations or strikes in media. Thus, using the New York Times as a source of calculating the protest index by the CNTS provides a more reliable picture of protests in Iran. Figure 1 shows the development of protest index in Iran from 1962 to 2019.

One of the main drivers of protests and conflict in the literature is the perception of corruption and its degree of reflection in society. We focus on tracking the reflection of corruption, in its broad term and variations, in one of the major newspapers of Iran, *Ettelā'āt*. This newspaper is widely known to be a moderate outlet in reflecting the political, economic and social events in Iran with broad readership. We follow Dincer and Johnston (2017) and Dincer and Teoman (2019) for generating the corruption reflection index for Iran.

We chose *Ettelā'āt* because it is one of the oldest daily newspapers in Iran (founded in 1926) and covers economic, social and political issues. The archive of *Ettelā'āt* is accessible from 1961. *Ettelā'āt* archives are digitized from 1961, and every page for each month is copied to a compact disc (CD). To extract the data, we reviewed each CD per month, which covers all daily prints of the newspaper, for each year from 1962 to 2019. We searched for the Persian keywords related to corruption 'رشوه', 'فساد اختلاس', and 'کلاهبرداری' (Persian counterparts for the words 'corruption', 'bribe', 'embezzlement', and 'fraud'). We included 'embezzlement' as a keyword in our research, although Dincer and Johnston (2017) and Dincer and Teoman (2019) did not. From 1962 to 1990, both keywords 'bribe' and 'fraud' were the most common in the *Ettelā'āt* newspaper, but since then, we observed 'corruption' and 'embezzlement' more in media coverage.

We define some criteria to determine which article or text is relevant to our index. First, as the corruption reflection index (CRI) covers the number of reports on corruption in the public sector (grand and petty), we do not count the articles which are related to charges against the private

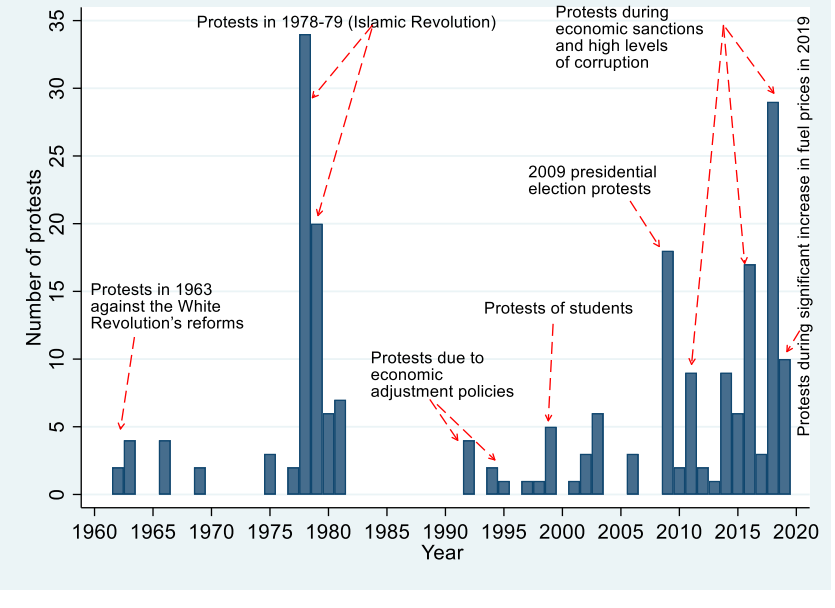


Figure 1. Protests in Iran. Source: Number of protests is from Banks and Wilson (2021).

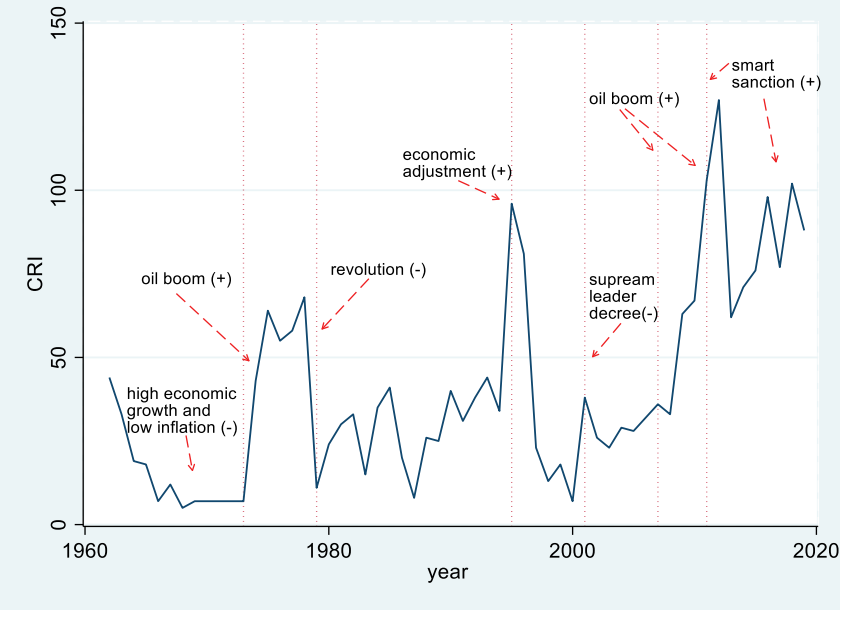


Figure 2. Corruption reflection index in Iran (1962-2019).

sector, unless that private person has close ties with public officials. We included corruption cases related to non-profit organizations in Iran due to their direct and indirect association with the government. We do not consider unverified references to corruption in political slogans and statements of political rival groups.

Following Dincer and Teoman (2019), we consider the corruption of public officials when they are in power. However, we count such cases even if that person is no longer in government. In most cases, former members of the government or parliament in Iran have been appointed to senior positions in non-profit organizations, foundations or government-owned companies.

In line with Dincer and Teoman (2019), we focus on the time of the reported corruption in the newspaper instead of the timing of act of corruption. Moreover, we exclude references to corruption which are not related to economic or financial issues (i.e. references to moral corruption in society). In other words, we consider the context in which the related terms are mentioned by cross-checking the content of news.

Figure 2 represents the CRI from 1962 to 2019 for Iran and Table 1 explains its statistical description. We show all main political or economic events with possible effects on the CRI in Figure 2. Moreover, as the summary statistics of the CRI in Table 1 shows, the level of CRI is completely different in the 5 years before the Islamic revolution of 1979. For a historical perspective, we explain the main reports about corruption in the *Ettelā'āt* newspaper in various years in the Appendix (Table A1). Further explanation is presented in the Appendix A to clarify the drivers of CRI over the period of study.

To check the reliability of the CRI, we compare it with the perception-based control of corruption index (CCI). The CCI is constructed by the World Bank and ranges from −2.5 to 2.5, a lower index represents a higher perception level of corruption and is only available since 1996. The correlation between our news-based CRI and the perception-based CCI is −0.79.

Methodology

To study the response of internal conflict to a positive shock in the news-based corruption index, we use a vector autoregressive (VAR) model (Sims 1986).

Table 1. Summary statistics of CRI.

	Average	Max.	Min.	Std. Dev.
Total Duration (1962-2019)	40.3	127	5	29.5
Before revolution (1962-1979)	27.1	68	5	22.5
After revolution (1980-2019)	45.7	127	7	30.3
Last 5 years before revolution	57.6	68	43	8.6
Last 2 years before revolution	63.0	68	58	5.0
First 2 years after revolution	17.5	24	11	6.5
First decade since revolution	24.4	41	8	9.8
Hashemi Rafsanjani government	48.6	96	25	23.9
Khatami government	22.1	38	7	9.0
Ahmadinejad government	61.1	127	28	34.5
Rouhani government	82.4	105	62	14.2

Following Gholipour et al. (2022), a structural form VAR is written as follows:

$$A_0 Y_t = \alpha_0 + A_1 Y_{t-1} + A_2 Y_{t-2} + \ldots + A_p Y_{t-p} + u_t \quad (1)$$

where Y_t is a (m × 1) vector of endogenous variables at time t; α_0 is a (m × 1) vector of constants; Ai (i = 1, 2, p) is a (m × m) vector of structural parameters, and u_t is a (m × 1) vector of structural shocks. We cannot directly estimate the parameters of a structural VAR in Equation (1). To do so, we multiply equation 1 by the inverse of matrix A_0, resulting in a reduced form VAR model (Eq. 2). We estimate the reduced form by using the Ordinary Least Squares (OLS) method,

$$Y_t = g_0 + G_1 Y_{t-1} + G_2 Y_{t-2} + \ldots + G_p Y_{t-p} + e_1 \quad (2)$$

where Y_t, which is a vector of endogenous variables, depends on its own lags and the lags of other endogenous variables. The forecast error vector e_t; $e_t = A_0^{-1} * u_t$ is a linear combination of structural shocks (u_t). We need to identify the structural parameters in equation 1 from the estimated parameters in equation 2, which is called the identification process in VAR (Sims 1986).

Using economic and institutional intuition and theoretical discussions, we need to impose restrictions on matrix A_0 (which is the matrix of the contemporaneous links among the endogenous variables of the structural model) for identification of the VAR model. The reason for imposing such restrictions is that the number of unknown elements of a structural VAR is larger than the number of known elements from an estimated reduced VAR model (Nguyen, Papyrakis, and Van Bergeijk 2019). The number of restrictions depends on the number of endogenous variables in VAR. If there are *m* endogenous variables in the VAR model, we need to impose *m*×(*m*-1)/2 restrictions (Gujarati 2009). The Cholesky decomposition is a popular method of imposing restrictions on matrix A_0, which assumes that this matrix is a lower triangular matrix. According to this approach, the variables at higher levels of ordering influence the other variables at lower levels of ordering contemporaneously, but are affected by them with some time lags. The variables with a more exogenous nature are ordered higher in this approach and followed by the more endogenous variables. An alternative approach to the identification of a VAR model is structural decomposition in which matrix A_0 can have another structure with different restrictions. Following Nguyen, Papyrakis, and Van Bergeijk (2019) and others, we prefer to use recursive identification (Cholesky decomposition) instead of structural decomposition as the former imposes fewer restrictions.

As the ordering of variables may influence the post-VAR estimations for the impulse response analysis (IRF), we also use the generalized VARs (GVARs) introduced by Pesaran and Shin (1998) and report the generalized IRFs which are invariant to the variable ordering of a VAR model. Our preferred ordering of variables is [corruption, inflation, GDP growth, protest, oil share of GDP, non-military spending share of GDP, military spending share of GDP].

The Granger causality results also support this ordering. An increase in corruption cases affects the inflation rate contemporaneously. Corruption is shown to increase the costs of production and transactions, which can be easily transferred to consumers. Increasing inflation shows higher price

Table 2. VAR lag order selection criteria.

Sample: 1962 2019, Included observations: 54						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	−1230.726	NA	1.91e+11	45.84169	46.09952	45.94112
1	−1084.947	248.3626	5.39e+09	42.25731	44.31996*	43.05280*
2	−1036.053	70.62579	5.92e+09	42.26121	46.12868	43.75274
3	−975.4305	71.84851*	4.92e+09*	41.83076*	47.50305	44.01834
4	−929.6271	42.41060	9.41e+09	41.94915	49.42626	44.83278

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

volatility and higher costs of monitoring economic agents. It also reduces the purchasing power of public agents and increases the probability of demanding extra-legal payments in the public sector. Inflation can enhance corruption with a lag. The empirical support for the corruption-inflation nexus is presented by Braun and Di Tella (2004). Higher inflation also shows a short-term negative impact on real GDP growth rates, which affects the supply and demand nexus with a lag. For strong evidence on the negative impact of inflation on economic growth and efficiency, see Andrés and Hernando (1997). Decreasing real GDP growth rates following higher corruption and inflation reduces the economic opportunity costs of engaging in protests, increasing the risk of internal conflict. For evidence on the effect of economic growth on internal conflict, see Brückner and Gradstein (2015). Oil export revenues as a share of GDP influence economic growth and can affect it with a lag. Government spending (military and non-military) as a share of GDP is influenced by the development of oil export revenues and other variables ordered at the top of the ranking in the short term. Government budget allocation influences economic growth and the opportunity costs of engaging in conflict with a lag.

To estimate the VAR model, including the above-mentioned seven variables, we need to select the optimal lag length, check the stationarity of the estimated VAR model and confirm that the estimated VAR model does not suffer from residual autocorrelation at selected lag lengths. Table 2 shows the results of optimum lag selection. Based on SC and HQ criteria, we select the lag length of 1 to estimate the VAR model.

The estimated VAR model should be also stable (stationary). If it is unstable, some critical results, such as estimated confidence intervals for impulse responses, are not valid. We have examined the stationarity of each of the included seven variables. Three variables (oil export revenues as share of GDP, military spending and non-military spending as share of GDP) are integrated of the first order, while the other four variables are stationary in levels (Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root tests are available upon request). According to Lütkepohl (2005), the overall stationarity condition of a VAR model is more important than the stationarity of each single series. Following previous studies, we are estimating our VAR model in levels of variables as the results of the stability condition show that the whole estimated model is stationary and stable (see Figure 3). Previous studies have also used the level of the variable, especially when the focus is on the interpretation of impulse responses (e.g. Sims, Stock, and Watson 1990; Sims 1992; Elbourne and de Haan 2009; Farzanegan and Markwardt 2009; Dizaji, Farzanegan, and Naghavi 2016; Nguyen, Papyrakis, and Van Bergeijk 2019, among others).[5]

Moreover, the estimated VAR model shows no residual correlation at the selected lag length of one. Table 3 shows the Lagrange Multiplier (LM) test for autocorrelation. The p-value of 0.23 indicates that we cannot reject the null hypothesis of no residual autocorrelation at the lag of one.

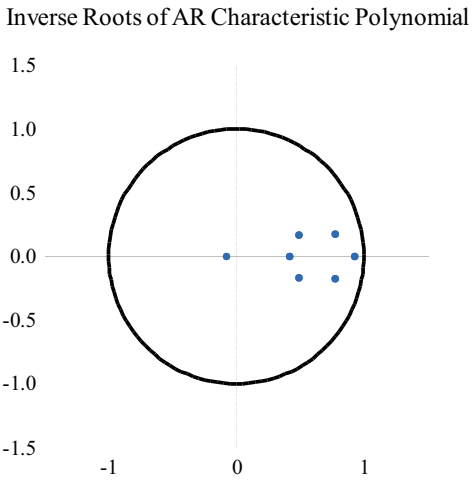


Figure 3. VAR stability condition no root lies outside the unit circle. VAR satisfies the stability condition.

Table 3. VAR residual serial correlation LM tests.

Sample: 1962 2019 Included observations: 57						
Null hypothesis: No serial correlation at lag h						
Lag	LRE* stat	Df	Prob.	Rao F-stat	df	Prob.
1	55.98264	49	0.2293	1.16271	(49, 187.2)	0.2368
2	71.05365	49	0.0214	1.532204	(49, 187.2)	0.023

Results

Impulse Response Functions

In this section, we examine the responses of variables in our estimated VAR model to a positive shock in the corruption reflection index. We employ the impulse response functions (IRFs) which trace responses to such shocks over time, indicating the direction, magnitude and significance of the responses. Our focus is on the response of protests to a positive shock on the corruption index while aiming to shed some light on possible transmission channels. Following Sims and Zha (1999) and Stock and Watson (2001), we report one standard deviation for error bands in the IRFs (68% confidence intervals).[6] To compute impulse response standard errors, we follow Killian's unbiased confidence interval (Kilian 1998). This bias-corrected bootstrap interval approach explicitly corrects for the bias and skewness in the impulse response estimator that arises due to insufficient observations and thus is more relevant for our case study of Iran with annual data.

Figure 4 shows the response of protests and other included variables to a shock (measured by a one standard deviation increase) in the news-based corruption reflection index.

According to the IRF in Figure 4, the response of protests to a positive shock in the corruption reflection index is positive and statistically significant for the 6 years after the initial shock. The maximum increase in protests is about two protests in the first year after the shock, reducing to one protest by the third year. The size of the short-term response of our counted index of protests (including number of riots, strikes and anti-government demonstrations) is significant given the mean of 3.7 and median number of 1 over the 1962–2019 period. This finding supports our main hypothesis of the increasing effect of reported corruption scandals on internal conflict in Iran.

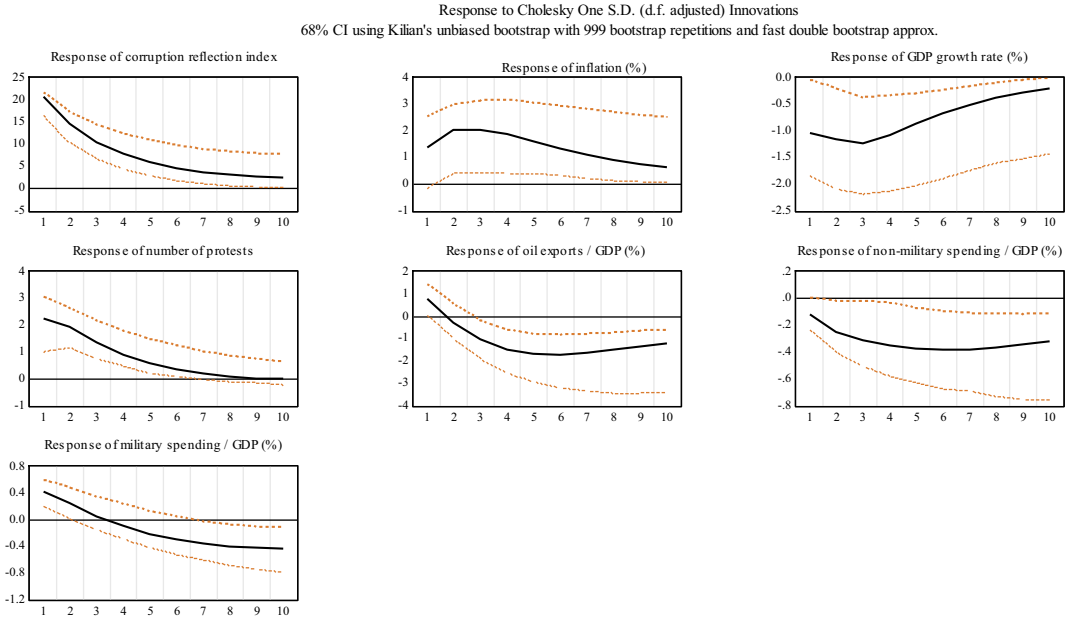


Figure 4. Responses to Cholesky one standard deviation positive shock in corruption reflection index of Iran. Note: the solid line shows the responses to a shock in corruption. The dashed lines show 68% confidence intervals based on Killian bias-corrected bootstrap intervals. The horizontal axis shows the years after the initial shock. The vertical axis shows the magnitude of the response.

To what extent are the results in Figure 4 sensitive to the ordering of variables in the estimated VAR model? To check this issue and continue our discussion, we report the Generalized IRF which are insensitive to variable ordering. Figure 5 shows the responses to a generalized one standard deviation positive shock in the corruption reflection index. There are some minor differences, but overall, the direction and magnitude of responses are similar to the previous results. We consider the significant response of protests to positive shocks in corruption. The highest response is observed within the first 2 years after the shock and remains statistically significant for the following 6 years.

The results contain some more useful information on possible channels through which protests may expand following an increase in corruption. For example, we observe that the response of inflation rates to the corruption shock is positive and statistically significant within the first 6 years following the shock. The maximum response to inflation is observed in the second and third years after the shock (increase of 2 percentage points). An increase in corruption cases is associated with higher costs of doing business and transactions, which may lead to higher production costs. The producers transfer the cost to consumers and thus consumer prices will also increase. It is also shown that an increase in inflation by reducing household disposable income reduces the opportunity costs of participating in protests. Although this effect is theoretically plausible, the response of protests to a positive shock in the inflation rate in Iran is not statistically significant. This may be related to the higher costs of participating in protests (e.g. high repressive power of the state and severe consequences for the arrested participants) which exceed the costs imposed on them by higher inflation.

There are two other interesting observations. The response of non-military spending to a positive shock in the corruption reflection index of Iran is negative and statistically significant from the second year following initial shock. The non-military spending of Iran (which is calculated as the difference between the total government spending share of GDP and its military spending share of GDP) reaches its minimum level by 5th year after the shock. As also

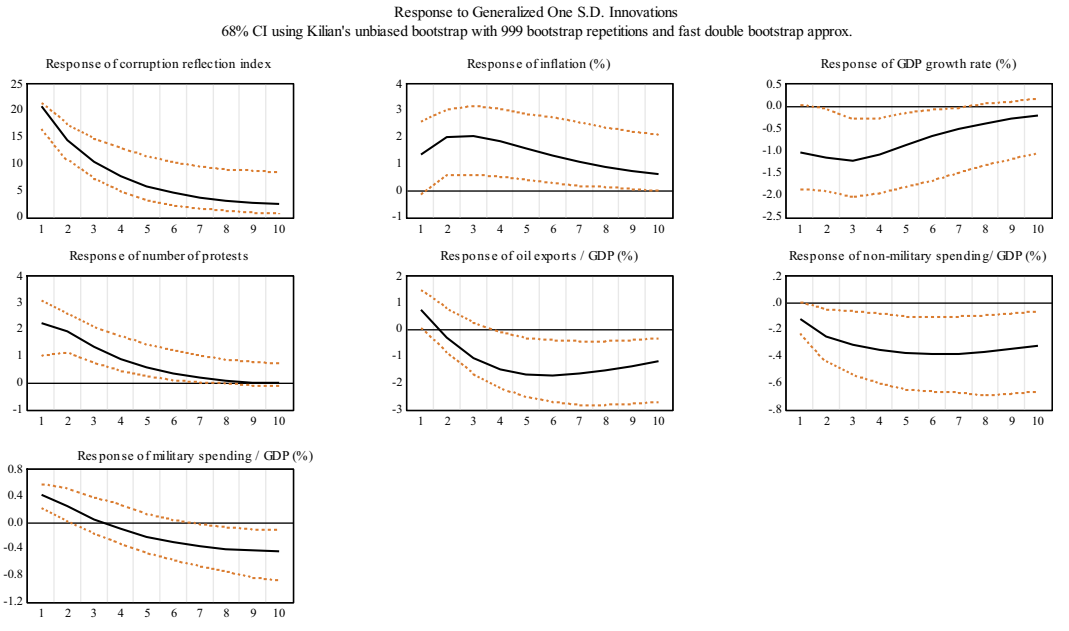


Figure 5. Generalized IRF: response of variables to the shock in corruption reflection index. Note: the solid line shows the generalized responses to a shock in corruption. The dashed lines show 68% confidence intervals based on Killian bias-corrected bootstrap intervals. The horizontal axis shows the years after the initial shock. The vertical axis shows the magnitude of the response.

seen in the literature, there is a positive association between corruption and military spending. The response of military spending in Iran is positive and statistically significant for the first 2 years after the shock. Military projects have lower levels of transparency and lower risk of detection of corruption. They are also prone to more corruption due to higher transaction values. According to the Transparency International Government Defence Anti-Corruption Index, Iran is in the high-risk category for corruption in the defense and security sector. The country's highest risk area is finance and procurement.[7] Our further investigation supports our prior expectation that the response of protests to a positive shock in military spending is positive and statistically significant in the second year after the shock. The response of protests to a positive shock in military spending in Iran reaches its maximum in the second year after the shock (an increase by one protest). An interesting point is also the negative response of economic growth rates in Iran to a positive shock in military spending. Of course, the negative response of economic growth to an increase in military spending is only marginally significant in the first year after the shock. Increasing military spending is also associated with a decreasing relative share of non-military spending. This is also evident in the negative response of non-military spending to a positive shock in military spending. This negative response is statistically significant within the first 2 years after the shock (results are available upon request).

One important channel through which corruption may influence the number of protests is overall economic growth. The response of GDP growth rates to a positive shock in the corruption index is negative for the entire 10 years after the shock. This negative response is statistically significant for the initial 6 years after the shock. The minimum response to economic growth is reached by the third year after the shock (approximately 1.5 percentage points decline). Our further investigation shows the significant negative response in the number of protests to a positive shock in economic growth rates. This decreasing response

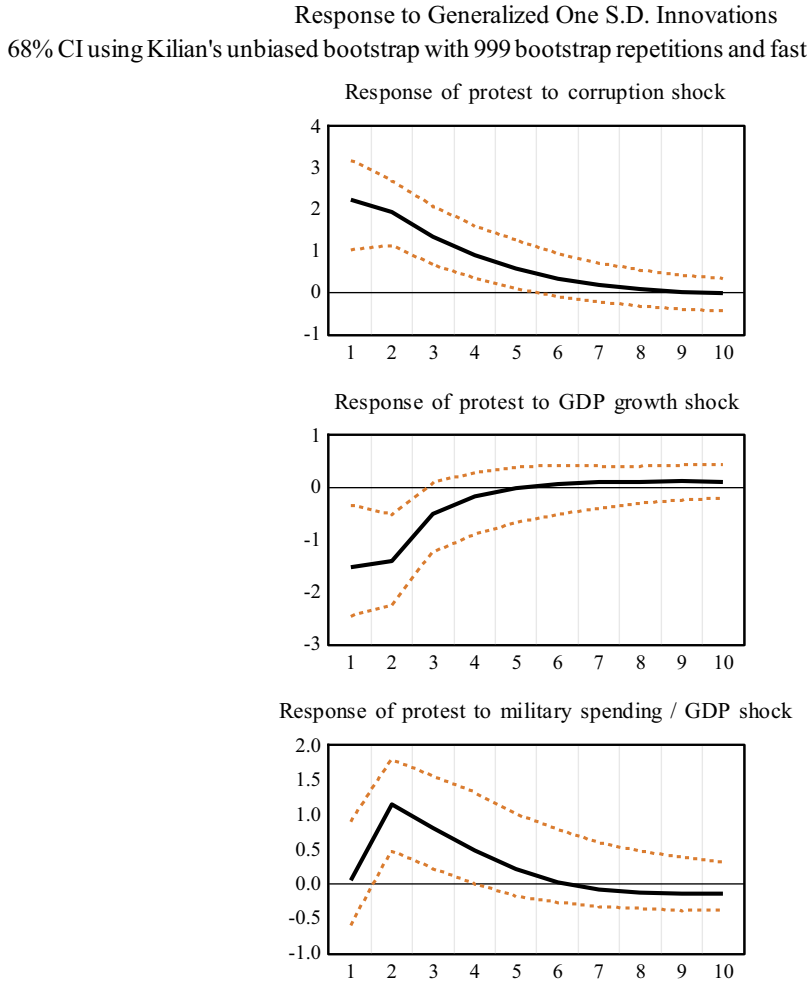


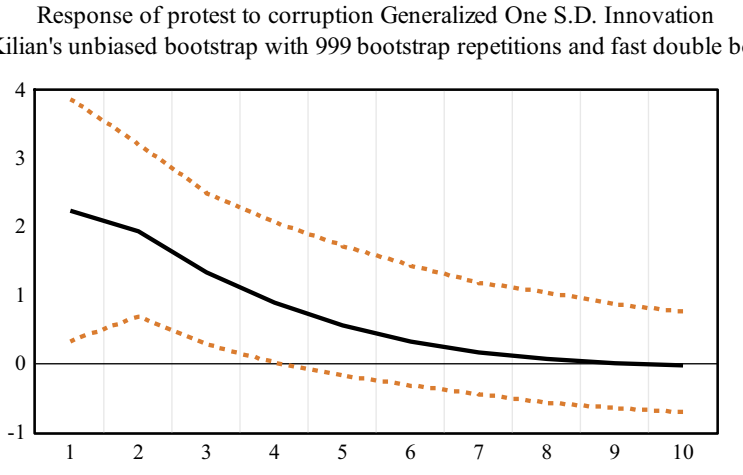
Figure 6. Response of protest variable to shocks in relevant variables.

of protests is statistically significant for the first 2 years following the shock. Protest response to a positive shock in economic growth is at its lowest levels in the first 2 years (a drop of 1.5 events). Positive shocks in economic growth rates in Iran are associated with the negative responses in inflation (statistically significant for the first 5 years after the shock), decreases in military spending (statistically significant for the first 2 years) and increases in oil export revenues (significant for whole period after the shock). The last finding highlights the strong association between oil rents and economic growth in Iran, which is also shown by other studies (e.g. Farzanegan and Markwardt 2009).

In Figure 6, we summarize the significant responses of protests to positive shocks in key variables (corruption, economic growth and military spending share in GDP).

Finally, we also show that the positive response of the protest variable to a positive shock in the corruption reflection index remains statistically significant at higher levels of confidence of 90% and 95% levels.

In Figure 7, we show the response of protests to corruption at levels of 90% and 95% levels of confidence.



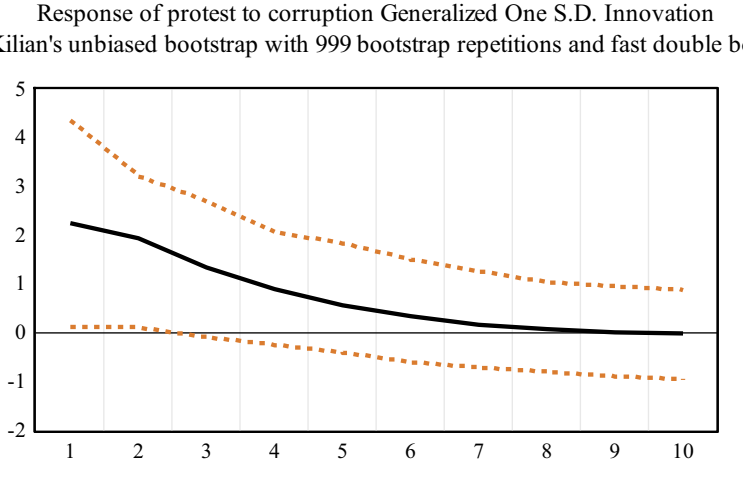


Figure 7. Response of protest to a corruption shock at 90% and 95% confidence intervals.

Variance Decomposition

In this section, we decompose the fluctuations of protests that arise from shocks in other variables, including the corruption reflection index in the VAR system. In other words, we explain the fluctuations in protests that are explained by fluctuations in other variables. A higher share of explanatory power will indicate a higher weight of that shock in predicting the variance in protests. The results are shown in Table 4.

Table 4. Variance decomposition of protests.

Period after shock	Corruption	Inflation	GDP growth	Protests	Oil export / GDP	Non-military spending / GDP	Military spending / GDP
1	11.03	5.63	7.92	75.42	0.00	0.00	0.00
5	20.87	4.88	9.74	62.09	2.16	0.10	0.15
10	20.87	4.86	9.78	61.36	2.46	0.30	0.38

The results show that after variation in the protest variable itself, which explains between 60% and 70% of its variance, the corruption reflection index is the most important variable. In the first year after the shock, the corruption index explains 11% of the fluctuations in protest and increases to approximately 21% by the fifth year after the shock, remaining at this level by the 10th year. The next important variable to predict the fluctuation of protests is the economic growth rate. This variable explains 8% to 10% of the fluctuations in the short and long term. Fluctuations in inflation have a more moderate power (about 5%). Military and non-military spending and oil export revenues have no explanatory power for protests in the first year after the shock. Their importance remains low in the long term.

Conclusions

Our study introduces a new index for corruption reflection using media coverage in Iran over the past 50 years. It is the first news-based index of corruption reflection in the case of Iran. We examine how protests in Iran, which is the sum of events under riots, strikes and anti-government demonstrations, are interconnected with corruption within the Iranian society, controlling for other channels.

Our VAR model and its applied tools (impulse responses and variance decomposition analyses) show a robust effect of the corruption reflection index on protests. The response of economic growth to corruption in Iran is negative, and we also show that the response of protests to a positive shock in economic growth is negative. Thus, one effect of corruption is to lower economic growth and reduce the opportunity costs of engaging in protests. Military spending also shows a positive response to corruption shocks. The militarization of the economy decreases non-military spending, lowering Iran's economic growth in our analysis. The response of protests to a positive shock in military spending is positive and significant in the short term. We also show that the inflation response to a positive shock in corruption is positive and significant. However, the response of protests to a positive shock in inflation is statistically insignificant.

Notes

1. We bought a compact disc of the newspaper's archives and investigated each year.
2. Biswas, Farzanegan, and Thum (2012) show how corruption and shadow economy damage quality of environment.
3. A list of such studies using CNTS data is presented at https://www.cntsdata.com/citations
4. See, for example, Anti-Corruption Road Map presented by Iranian president in 2021: https://www.tasnimnews.com/en/news/2021/09/15/2572139/iran-s-president-unveils-anti-corruption-road-map or approval to establish Special Corruption Courts by the Iran's Supreme Leader in 2018: https://www.rferl.org/a/iran-s-supreme-leader-approves-special-corruption-courts/29427873.html
5. According to Hamilton (1994), even if the true model is a VAR in differences, the specific functions of the parameters and hypothesis tests based on a VAR in levels have the same asymptotic distribution as when estimated based on VAR in differences.
6. The main result of response of protest to corruption shock is also significant at 95% confidence intervals.
7. https://government.defenceindex.org/downloads/docs/iranislamicrep.pdf
8. In this study, we use official exchange rate to calculate the value of corruption in the US$.
9. https://en.irna.ir/news/84112325/Iran-protests-to-Interpol-for-Canada-s-lack-of-cooperation
10. https://www.bbc.com/news/world-middle-east-27554069
11. https://www.al-monitor.com/originals/2014/05/iran-businessman-hanged-embezzlement.html
12. This is a reserve fund for about one million teachers.
13. Long before the imposition of sanctions, he was employed as a driver for Iran's Central Bank. He was supposed to help the Iranian government bypass oil sanctions, using his large banking networks. He was arrested under the Rouhani government. Bijan Zanganeh, the former Oil Minister under Rouhani called him a 'corrupt parasite'. Zanganeh said that 'Zanjani's total debt, including its interests, amounts to $3.5 billion.' Babak Zanjani was sentenced to death in 2016 on charges of embezzling money earned from black market oil exports. See https://www.bbc.com/news/world-middle-east-35739377 and https://en.radiofarda.com/a/iran-billionaire-zanjani-to-be-hanged-after-he-pays/29656321.html

14. https://www.reuters.com/article/us-iran-oil-scandal-idUSKCN0R41I920150904
15. https://www.bbc.com/news/world-middle-east-46206435
16. https://en.radiofarda.com/a/suspect-in-alleged-money-laundering-sanction-busting-case-rejects-all-charges/29826068.html

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Data Availability Statement

Data will be available upon request.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

Ethical Approval

This article does not contain any studies with human participants or animals performed by any of the authors.

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References

Andrés, J., and I. Hernando. 1997. "Does Inflation Harm Economic Growth? Evidence for the OECD." NBER Working Papers 6062. National Bureau of Economic Research. https://repositorio.bde.es/bitstream/123456789/6627/1/dt9706e.pdf

Arampatzi, E., M. Burger, E. Ianchovichina, T. Röhricht, and R. Veenhoven. 2018. "Unhappy Development: Dissatisfaction with Life on the Eve of the Arab Spring." *Review of Income and Wealth* 64: S80–S113. doi:10.1111/roiw.12388.

Arbatlı, C. E., Q. H. Ashraf, O. Galor, and M. Klemp. 2020. "Diversity and Conflict." *Econometrica* 88: 727–797. doi:10.3982/ECTA13734.

Banks, A. S., and K. A. Wilson. 2021. "Cross-National Time-Series Data Archive." *Databanks International*. https://www.cntsdata.com/

Bazzi, S., and C. Blattman. 2014. "Economic Shocks and Conflict: Evidence from Commodity Prices." *American Economic Journal: Macroeconomics* 6 (4): 1–38. doi:10.1257/mac.6.4.1.

Biswas, A., M. R. Farzanegan, and M. Thum. 2012. "Pollution, Shadow Economy and Corruption: Theory and Evidence." *Ecological Economics* 75: 114–125. doi:10.1016/j.ecolecon.2012.01.007.

Bjorvatn, K., and M. R. Farzanegan. 2013. "Demographic Transition in Resource Rich Countries: A Bonus or a Curse?" *World Development* 45: 337–351. doi:10.1016/j.worlddev.2013.01.026.

Braun, M., and R. Di Tella. 2004. "Inflation, Inflation Variability, and Corruption." *Economics & Politics* 16: 77–100. doi:10.1111/j.1468-0343.2004.00132.x.

Brückner, M., and M. Gradstein. 2015. "Income Growth, Ethnic Polarization, and Political Risk: Evidence from International Oil Price Shocks." *Journal of Comparative Economics* 43: 575–594. doi:10.1016/j.jce.2014.05.005.

Campos, J. E., D. Lien, and S. Pradhan. 1999. "The Impact of Corruption on Investment: Predictability Matters." *World Development* 27: 1059–1067. doi:10.1016/S0305-750X(99)00040-6.

Cockburn, P. 2018. "Corruption and Inequality Fuelling Protests in Iran as Rouhani Faces Pressure to Crack down." *Independent*, January 01. https://www.independent.co.uk/news/world/middle-east/why-iran-protests-demonstrations-violence-corruption-inequality-hassan-rouhani-donald-trump-a8137051.html

Collier, P. 1999. "On the Economic Consequences of Civil War." *Oxford Economics Papers* 51 (1): 168–183. doi:10.1093/oep/51.1.168.

Dincer, O., and M. Johnston. 2017. "Political Culture and Corruption Issues in State Politics: A New Measure of Corruption Issues and a Test of Relationships to Political Culture." *Publius: The Journal of Federalism* 47: 131–148. doi:10.1093/publius/pjw026.
Dincer, O., and O. Teoman. 2019. "Does Corruption Kill? Evidence from Half a Century Infant Mortality Data." *Social Science & Medicine* 232: 332–339. doi:10.1016/j.socscimed.2019.05.017.
Dizaji, S. F., M. R. Farzanegan, and A. Naghavi. 2016. "Political Institutions and Government Spending Behavior: Theory and Evidence from Iran." *International Tax and Public Finance* 23: 522–549. doi:10.1007/s10797-015-9378-8.
Echevarría, C. A., and J. García-Enríquez. 2019. "The Economic Consequences of the Libyan Spring: A Synthetic Control Analysis." *Defence and Peace Economics* 30 (5): 592–608. doi:10.1080/10242694.2018.1446241.
Echevarría, C. A., and J. García-Enríquez. 2020. "The Economic Cost of the Arab Spring: The Case of the Egyptian Revolution." *Empirical Economics* 59: 1453–1477. doi:10.1007/s00181-019-01684-7.
Elbourne, A., and J. de Haan. 2009. "Modeling Monetary Policy Transmission in Acceding Countries: Vector Autoregression versus Structural Vector Autoregression." *Emerging Markets Finance and Trade* 45 (2): 4–20. doi:10.2753/REE1540-496X450201.
Faghihi, R. 2019. "Record Corruption Scandal Puts Spotlight on Iranians in Iran, US." Al Monitor, March 11. https://www.al-monitor.com/originals/2019/03/iran-corruption-case-petrochemical-hamzelou-sheikholeslami.html
Farzanegan, M. R., and G. Markwardt. 2009. "The Effects of Oil Price Shocks on the Iranian Economy." *Energy Economics* 31 (1): 134–151. doi:10.1016/j.eneco.2008.09.003.
Farzanegan, M. R. 2009. "Illegal Trade in the Iranian Economy: Evidence from Structural Equation Model." *European Journal of Political Economy* 25 (4): 489–507. doi:10.1016/j.ejpoleco.2009.02.008.
Farzanegan, M. R. 2013. "Effects of International Financial and Energy Sanctions on Iran's Informal Economy." *The SAIS Review of International Affair* 33: 13–36. doi:10.1353/sais.2013.0008.
Farzanegan, M. R., and S. Witthuhn. 2017. "Corruption and Political Stability: Does the Youth Bulge Matter?" *European Journal of Political Economy* 49 (C): 47–70. doi:10.1016/j.ejpoleco.2016.12.007.
Farzanegan, M. R., C. Lessmann, and G. Markwardt. 2018. "Natural Resource Rents and Internal Conflicts: Can Decentralization Lift the Curse?" *Economic Systems* 42 (2): 186–205. doi:10.1016/j.ecosys.2017.05.009.
Farzanegan, M. R., and T. Krieger. 2019. "Oil Booms and Inequality in Iran." *Review of Development Economics* 23: 830–859. doi:10.1111/rode.12569.
Farzanegan, M. R. 2021. "Years of Life Lost to Revolution and War in Iran." *CESifo Working Paper* No. 9063, Munich. doi: 10.2139/ssrn.3842327.
Farzanegan, M. R. 2022. "The Economic Cost of the Islamic Revolution and War for Iran: Synthetic Counterfactual Evidence." *Defence and Peace Economics* 33: 129–149. doi:10.1080/10242694.2020.1825314.
Fassihi, F., and R. Gladstone. 2019. "With Brutal Crackdown, Iran Is Convulsed by Worst Unrest in 40 Years." *The New York Times*, December. 01. https://www.nytimes.com/2019/12/01/world/middleeast/iran-protests-deaths.html
Fjelde, H. 2009. "Buying Peace? Oil Wealth, Corruption and Civil War, 1985—99." *Journal of Peace Research* 46: 199–218. doi:10.1177/0022343308100715.
Gholipour, H. F., A. Arjomandi, M. R. Farzanegan, and S. Yam. 2022. "Global and Local Economic Uncertainties and Office Vacancy in Australia: A sub-class Analysis." *Applied Economics* 1–19. doi:10.1080/00036846.2022.2044998.
Gründler, K., and N. Potrafke. 2019. "Corruption and Economic Growth: New Empirical Evidence." *European Journal of Political Economy* 60: 101810. doi:10.1016/j.ejpoleco.2019.08.001.
Gujarati, D. N. 2009. *Basic Econometrics*. New York: Tata McGraw-Hill Education.
Hamilton, J. D. 1994. *Time Series Analysis*. New Jersey: Princeton University Press.
Huntington, S. P. 1968. *Political Order in Changing Societies*. New Haven: Yale University Press.
Ishak, P. W., and M. R. Farzanegan. 2021. "Oil Price Shocks, Protest, and the Shadow Economy: Is There a Mitigation Effect?" *Economics & Politics*. doi:10.1111/ecpo.12199.
Kilian, L. 1998. "Small-sample Confidence Intervals for Impulse Response Functions." *Review of Economics and Statistics* 80: 218–230. doi:10.1162/003465398557465.
Krieger, T., and D. Meierrieks. 2019. "Income Inequality, Redistribution and Domestic Terrorism." *World Development* 116: 125–136. doi:10.1016/j.worlddev.2018.12.008.
Kurer, T., S. Häusermann, B. Wüest, and M. Enggist. 2019. "Economic Grievances and Political Protest." *European Journal of Political Research* 58 (3): 866–892. doi:10.1111/1475-6765.12318.
Leys, C. 2002. "What Is the Problem about Corruption? Heidenheimer, Arnold J., Johnston, Michael" In *Political Corruption: Concepts & Contexts* 3rd ed. , . New York: Routledge 59–73 doi:10.4324/9781315126647 .
Lütkepohl, H. 2005. *New Introduction to Multiple Time Series Analysis*. Berlin: Springer Science & Business Media, Springer-Verlag.
Matta, S., S. Appleton, and M. Bleaney. 2019. "The Impact of the Arab Spring on the Tunisian Economy." *World Bank Economic Review* 33 (1): 231–258. doi:10.1093/wber/lhw059.
Nguyen, T. M. L., E. Papyrakis, and P. A. G. Van Bergeijk. 2019. "Assessing the Price and Output Effects of Monetary Policy in Vietnam: Evidence from a VAR Analysis." *Applied Economics* 51: 4800–4819. doi:10.1080/00036846.2019.1602708.
Onuoha, F. C. 2014. "Why Do Youth Join Boko Haram?" Special Report 348, Washington DC: United States Institute of Peace.

Parvin, N., 1998. ETṬELĀʿĀT. Encyclopædia Iranica Foundation. https://iranicaonline.org/articles/ettelaat
Pesaran, H. H., and Y. Shin. 1998. "Generalized Impulse Response Analysis in Linear Multivariate Models." *Economics Letters* 58 (1): 17–29. doi:10.1016/S0165-1765(97)00214-0.
Rummel, R. J. 1963. "Dimensions of Conflict Behavior within and between Nations." *General Systems Yearbook* 8: 1–50.
Sims, C. A. 1986. "Are Forecasting Models Usable for Policy Analysis?" *Quarterly Review (Win)* 10 (1): 2–16.
Sims, C. A., J. H. Stock, and M. W. Watson. 1990. "Inference in Linear Time Series Models with Some Unit Roots." *Econometrica* 58 (1): 113–144. doi:10.2307/2938337.
Sims, C. A. 1992. "Interpreting the Macroeconomic Time Series Facts: The Effects of Monetary Policy." *European Economic Review* 36 (5): 975–1000. doi:10.1016/0014-2921(92)90041-T.
Sims, C. A., and T. Zha. 1999. "Error Bands for Impulse Responses." *Econometrica* 67: 1113–1156. doi:10.1111/1468-0262.00071.
Sopko, J. F. 2016. "Corruption in Conflict: Lessons from the U.S. Experience in Afghanistan." In *Special Inspector General for Afghanistan Reconstruction*. Arlington United States: SIGAR. https://apps.dtic.mil/sti/pdfs/AD1016886.pdf
Stock, J. H., and M. Watson. 2001. "Vector Autoregressions." *Journal of Economic Perspectives* 15 (4): 101–115. doi:10.1257/jep.15.4.101.
Zamani, O., M. R. Farzanegan, J. P. Loy, and M. Einian. 2021. "The Impacts of Energy Sanctions on the Black-Market Premium: Evidence from Iran." *Economics Bulletin* 41 (2): 432–443. http://www.accessecon.com/Pubs/EB/2021/Volume41/EB-21-V41-I2-P38.pdf

Appendix A.

Table A1. Coverage of corruption in *Ettelā'āt* newspaper in selected years from 1962 to 2019.

Year(s)	Major issues (related to corruption) covered in *Ettelā'āt* newspaper
1962-1966	-Most reports of corruption, covered by the *Ettelā'āt* newspaper, were in the military sector.
1972-1973	-The *Ettelā'āt* newspaper covered corruption in Western countries. -Start of oil boom which leads to higher levels of corruption in the following years.
1974	-New networks of corruption, such as Isfahan Sugar and Gazvin Plain, were detected.
1976	-Various people who were sentenced after being found corrupt escaped to the U.S.
1977	-As the level of corruption sharply increased during these years, both the parliament and government tried to control corruption. They passed an anti-corruption law and created anticorruption committees. -Iran suggested to the U.N. to control corruption at the international level. -Corruption in Post, Municipalities, SOEs, and international companies were detected. -A $42.25 million (Three billion *rial*)[8] corruption scandal reported. -People who were accused of taking part in corrupt activities escaped to the United States.
1978	-The government created various committees to apply an administrative resolution to control corruption.
1979	-The level of corruption reports decreased due to the revolution news. -Declaration of some officials, related to the previous political regime, as corrupt people. -Several people were executed due to charges of corruption (e.g. the shooting of Gen. Hojjat Kashani).
1980	-The new post-revolution political regime focused on the corruption of people related to the previous political regime.
1981	-The *Ettelā'āt* newspaper covered corruption in other countries (such as Saudi Arabia, Iraq, the U.S., China, and Israel).
1982	-The *Ettelā'āt* newspaper covered corruption in other countries (such as China, England, France, and Israel). -The creation of an anti-corruption committee is suggested by Iran to Muslim countries to control corruption in Muslim states.
1983	-The *Ettelā'āt* newspaper covered corruption in other countries.
1984	-The *Ettelā'āt* newspaper covered corruption in other countries. -Anti-bribery bill was discussed in the parliament. -The *Ettelā'āt* newspaper covered corruption of politicians' relatives.
1985	-The *Ettelā'āt* newspaper covered corruption in other countries. -Corruption in Ahvaz Steel Company was detected. -A $2 million bribery scandal in the trade ministry was detected.
1986	-Iran suggested to UNESCO to fight against corruption at the international level.
1987	-The *Ettelā'āt* newspaper covered moral corruption.
1988	-Due to the multiple exchange rate regime, there was a corruption scandal in the steel industry.
1989	-Government applied price discrimination on various goods which increased corruption.
1990	-Bribery from foreigners was reported.
1991	-Due to the new strategy of the president and its team, municipalities entered into various investment projects, and some of them had high levels of corruption.
1992	-The *Ettelā'āt* newspaper covered corruption in Russia.
1993	-Corruption in municipalities of Tehran and Kerman were reported. -The *Ettelā'āt* newspaper covered court hearings for a significant dealer of currency and gold, as he was accused of corruptive activities.
1994	-Corruption in municipalities and customs were reported. -Embezzlement in two banks (*Bank Saderat Iran* and *Tejarat Bank*) were reported. -$702.86 million (1230 billion *rial*) corruption scandal by Fazel Khodadad and Morteza Refighdoost was reported. It was the biggest corruption scandal since the Islamic revolution in 1979.
1995	-Execution of Khodadad, due to corruption. -Various embezzlement scandals in four banks (*Bank Saderat Iran, Tejarat Bank, Bank Maskan,* and *Sepah Bank*) were reported.
1996	-Due to the criticism of some journalists and government rivals about the government's poor performance in addressing corruption, the speaker of the parliament argued that talking or writing about the administrative corruption is a conspiracy.
1997	-The *Ettelā'āt* newspaper covered corruption in other countries.
1998	–44 people were accused of manipulation in the export system. -Gholamhossein Karbaschi, mayor of Tehran, was accused of engaging in corruptive activities.
1999	-The *Ettelā'āt* newspaper covered some writings which criticized the previous president's (Hashemi Rafsanjani) ideas about corruption. They argued that his idea created a corruptive structure in various parts of the economy, such as municipalities.

(*Continued*)

Table A1. (Continued).

Year(s)	Major issues (related to corruption) covered in *Ettelā'āt* newspaper
2001	-The supreme leader issued a decree (with 8-articles) against corruption. -New period of anti-corruption activities started in the country. -A $4.56 million (eight billion *rial*) corruption scandal was reported in the large city of Mashhad. -Various embezzlement scandals in banks were reported in the *Ettelā'āt* newspaper. -Shahram Jazayeri Arab arrested.
2002	-The Ministry of Economic Affairs and Finance started to fight against corruption. -The exchange rate systems were unified in 2002.
2003	-Parliament approved the new version of the tenders' law, as it increased transparency in tenders in the public sector. -The *Ettelā'āt* newspaper covered some papers that argued that higher levels of democracy leads to lower levels of corruption.
2004	-Parliament and the government defined 17 bills about administrative health issues and argued that these bills can reduce corruption and increase transparency. -The *Ettelā'āt* newspaper covered a $1.36 million (12 Billion *rial*) embezzlement scandal at the *Bank Saderat Iran*. -The *Ettelā'āt* newspaper covered a $280,000 embezzlement scandal in banking system.
2005	-The *Ettelā'āt* newspaper covered the ideas of the new president and his team. They argued that an international center is needed to fight corruption at an international level. -An executive letter of anti-corruption law was written.
2006	-The *Ettelā'āt* newspaper reported a *$76 million* (700 billion *rial*) embezzlement scandal in Mashhad.
2007	-The *Ettelā'āt* newspaper covered some corruption and embezzlement scandals, including: $323,000 (three billion rial) embezzlement scandal, $37.7 million (350 billion *rial*) corruption scandal, and $21.5 million (200 billion *rial*) embezzlement scandal at the *Tejarat Bank*. -Shahram Jazayeri rearrested.
2008	-The *Ettelā'āt* newspaper reported a $3 million (30 billion *rial*) embezzlement scandal.
2009	-There were discussions/arguments that the government should improve the administrative system capacity to control corruption. -The *Ettelā'āt* newspaper reported a $5.44 million (54 billion *rial*) embezzlement scandal in Zanjan (another large city). -The *Ettelā'āt* newspaper reported a $3.3 million (33 billion *rial*) embezzlement scandal in the city of Kerman. -There were various protests after the presidential election this year.
2010	-The *Ettelā'āt* newspaper reported a $3.38 million (35 billion rial) embezzlement scandal in automobile industry. -Various unauthorized institutions were created in this year that increased corruption.
2011	-The *Ettelā'āt* newspaper reported embezzlment scandals at various institutions and organizations, including: $2.7 billion (30,000 billion *rial*) embezzlement scandal, $912 million (10,000 billion *rial*) embezzlement scandal at Shasta (Social Security Investment Company). -The chairman of Bank Melli Iran, Mahmoud Reza Khavari escaped to Canada. -Mahafarid Amir Khosravi arrested. His charge was involvement in money laundering, forgery and bribery.
2012	-Continuation of the $2.7 billion embezzlement story -The multiple exchange rate system was continued and the government defined a priority mechanism and allocated dollars to activities base on this mechanism, which led to corruption.
2013	-Embezzlement scandal the in Iranian Social Security Organization, Insurance, and 'Taavoni Farhangian' -Arrest of Babak Zanjani because of 2.5 billion Euro corruption scandal
2014	-The *Ettelā'āt* newspaper reported a $452.7 million (12,000 billion *rial*) embezzlement scandal -Execution of Mahafarid Amir Khosravi, who was arrested in 2011 -The story of Babak Zanjani continued in all newspapers
2015	-The *Ettelā'āt* newspaper reported a $2.7 billion (80,000 billion *rial*) embezzlement scandal in the Teachers Investment Fund ('Taavoni Farhangian'). -Newspapers reported a missing of oil rig. -Various unauthorized institutions were created in this year which increased corruption. -The *Ettelā'āt* newspaper reported corruption in municipalities. -The story of Babak Zanjani continued in all newspapers.
2016	-Newspapers reported large scale corruption and embezzlement scandals including: continuation of embezzlement scandal at the Teachers Investment Fund, and embezzlement scandals in banking system.
2017	-The *Ettelā'āt* newspaper reported a $29 million (1000 billion *rial*) embezzlement scandal in the oil industry. -The *Ettelā'āt* newspaper reported the smuggling of dollars when it was dominant currency. -Due to multiple exchange rate system, the government defined the list of commodities and allocated dollars to them with the subsidised rate, which led to corruption. People tried to buy US dollars at lower prices (official exchange rate) and sell them in the free market at higher prices.
2018	-There was a $500 million (21,000 billion *rial*) corruption scandal in one year reported in newspapers. -The execution of Vahid Mazloumin due to corruption in the currency and gold markets (known as the 'Sultan of Coins').

(*Continued*)

Table A1. (Continued).

Year(s)	Major issues (related to corruption) covered in *Ettelā'āt* newspaper
2019	-Embezzlement scandal of 616 million Euro in petro chemistry was reported. -Marjan Sheikholeslami Aleagha, accused of corruption in petro chemistry, escaped to Canada. -Iranian government accused U.S. politicians of focusing on corruption in Iran for political purposes. -Government introduced the official exchange rate (one dollar equals to 42,000 *rial*) to control the exchange market, leading to higher levels of corruption.

Most reports from 1962-1966 refer to the corruption in the military sector. After that, the *Ettelā'āt* newspaper covers corruption in Western countries, especially in 1972 and 1973. After the oil boom in 1973, the level of corruption changed significantly. In 1974, new networks of corruption were detected, and various corrupt people escaped to the United States in 1976 and 1977. For the first time since 1962 (the beginning of our research), fighting corruption became the main political agenda. In 1977, an anti-corruption law was enacted and various related committees were established. In this period, there was frequent coverage of corruption cases in different public sectors such as postal services, telecommunication, municipalities and state-owned enterprises.

After the 1979 revolution, the level of the CRI decreased. In the first two years after revolution, revolutionists tried to investigate corruption cases related to the previous political regime. From 1980 to 1985, corruption reports in the *Ettelā'āt* newspaper covered corruption in both Western and Eastern countries. Moreover, revolutionists had ideas to fight corruption in the Muslim world in 1982 and offered suggestions to UNESCO in fighting against corruption in 1986. From 1984, for the first time since the revolution, corruption within economic companies or politicians' relatives are covered in the *Ettelā'āt* newspaper. This newspaper covered a $2 million corruption scandal in a ministry in 1985. Moreover, due to the Iran-Iraq war, the multiple exchange rate system and price discrimination was applied to the Iranian economy and raised the level of the CRI, in comparison to the initial years of the revolution (see Farzanegan 2009 and Farzanegan 2013 for discussions on black market premium in Iran). After the war with Iraq, economic adjustment policy was the main agenda of the Hashemi Rafsanjani government for reconstruction of the Iranian economy, reducing the size of government and promoting privatization and liberalization. Economic liberalization was not associated with political openness and we observe a surge in the level of corruption. Moreover, municipalities appeared in corruption cases from 1991 and various related cases detected in 1993 and 1994. For the first time since revolution, a major corruption scandal of 1230 billion *rial* ($702.85 million), by two persons (Khodadad and Rafighdost) was detected in 1994. Due to the execution of Khodadad in 1995 and corruption in banking system, the CRI reached more than 60 in 1995, a record since the Islamic revolution.

During the Mohammad Khatami reformist government (1997-2005), the CRI decreased notably, reaching its minimum level since the revolution. Although the CRI was low in the first three years of the Khatami administration, it increased in his second term (2001-2005). In 2001, some corruption scandals (approximately $4.5 million) were detected, and the anti-corruption decree of Ayatollah Khamenei (Leader of Islamic Republic) was declared. Moreover, Shahram Jazayeri, an Iranian businessman who was involved in a high-profile corruption case through connections with influential public officials, was arrested in this year. Although the level of corruption increased in the Khatami's second term, the unification of the exchange rate regime in 2002 and reform of the tenders' law in 2003 were two fundamental reforms which increased the level of transparency in public investment projects. Moreover, the Khatami government promoted freedom of the media and the engagement of civil society in political debates that led to higher level of transparency.

In August 2005, Mahmoud Ahmadinejad was elected as Iran's president. His office was also associated with a series of international economic sanctions against Iran due to its nuclear program, distorting markets such as currencies, which increased black market premiums and new rent-seeking opportunities. Banking and oil embargos also increased transaction costs, resulting to the application of different methods and channels to bypass them by Iranian authorities (see Farzanegan 2013). In 2007, Shahram Jazayeri escaped from prison in February but was rearrested by the Ministry of Intelligence of Iran in March.

In 2011, Mahmoud Reza Khavari, who was appointed as the chairman of *Bank Melli Iran* (National Bank of Iran) by Ahmadinejad in 2010 and head of *Sepah Bank* during Khatami's presidency, was accused of embezzling approximately $2.6 billion. He escaped to Canada. In 2020, Iran's Interpol Chief Brigadier-General Hadi Shirzad announced that Iran has protested to the Interpol chief over Canada's lack of cooperation in returning Khavari to Iran over his corruption scandal.[9]

In another major corruption case in Iran's banking history, a businessman, Mahafarid Amir-Khosravi, and 39 other individuals were convicted in 2011 over their involvement in money laundering, forgery and bribery at private and state banks from 2007 to 2010. The arrest and escape of Khavari was connected to this case. Amir Khosravi and his team used fake documents to obtain large credits, which were partly used to buy government-owned companies under the privatization plan of government.[10] He admitted to bribing Khavari and others in the Iranian banking system to facilitate

access to banking credits. He was executed by hanging in Evin Prison in Tehran on May 24, 2014. This case was comparable (but not in size) with the 1995 execution of Fazel Khodadad over a $400 million corruption case at *Bank Saderaat*. None of the Ahmadinejad top officials convicted over this case.[11]

Due to various corruption cases and high levels of embezzlement, the CRI had its highest level in 2011 in our study. The economic and oil sanctions against Iran began in 2011/2012 and the relative value of Iran's currency (*rial*) per dollar decreased significantly. This resulted in higher levels of inflation and unemployment. Zamani et al. (2021) show the positive effect of sanctions on the black market premiums of Iran's currency. In 2013, the eight years of Ahmadinejad's government ended and Hassan Rouhani took office. During the Rouhani administration, we also observe a high level of the CRI. His administration was associated with the partial lifting of sanctions in 2016 and 2017 and consequent reinstatement under the Trump administration's "maximum pressure" campaign against Iran. The main corruption and embezzlement scandals covered in newspapers during his first years of government (2013-2016) included the "*Taavoni Farhangian*" reserve fund[12] (corruption of approximately $ 2.7 billion), the case of another politically connected businessman, Babak Zanjani[13] (estimated $3.5 billion), and the case of a missing oil rig (estimated $87 million).[14] The corruption cases continued in Rouhani's second term. Following the reinstatement of economic sanctions against Iran by the Trump administration, the price of dollar (relative to Iranian currency (rial)) and gold coin fluctuated significantly. Vahdid Mazlumin (known in Iran as the Sultan of Coins) was accused of hoarding two tonnes of gold coins to manipulate prices. He received the death penalty for "spreading corruption on earth" and was executed in 2018.[15]

In another example, in 2019, media executive Marjan Sheikholoslami and a group of business executives were accused of profiting from the country's multiple exchange rate regime while assisting the Iranian Petrochemical Commercial Company in evading sanctions under President Ahmadinejad. The accused either failed to reimburse government companies in hard currency - converting the proceeds to local currency at the low official exchange before returning the money, thus making a profit - or outright embezzled.[16] They are accused of withholding foreign exchange that was sold for up to three times the formal rate on the black market. Most of the suspects in this case were reportedly managers of the Iranian Petrochemical Commercial Company at the time of detection (Faghihi 2019). Sheikholeslami had a background in Iranian journalism and politics as well. She was a political writer for the Reformist daily *Hambasteg* and managed the Cultural Heritage News Agency in the early 2000s. Moreover, she participated as a reformist candidate in the 2000 parliamentary elections and later on as a conservative in the 2008 legislative polls (Faghihi 2019).

Due to various large scale corruption scandals in the Rouhani administration, the CRI average reached its the maximum level. Table A2 summarizes selected major (nonpolitical) corruption scandals in Iran.

Table A2. Major (nonpolitical) corruption scandals in Iran.

	Prisoned	Executed	Escaped (to)
1976-1977			Corrupt people (to the U.S.)
1995		Fazel Khodadad	
2001	Shahram Jazayeri		
2011			Mahmoud Reza Khavari (to Canada)
2013	Babak Zanjani		
2014		Mahafarid Khosravi	
2018		Vahid Mazlumin	
2019			Marjan Sheikholeslami Aleagha (to Canada)