The causal relationship between corruption and irresponsible behavior in the time of COVID-19: Evidence from Tunisia

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Abstract
This paper explores the causal relationship between irresponsible behavior and corruption in Tunisia in the time of COVID-19. In our modeling approach, the abuse of power is used as a proxy for corruption, while lockdown breaches are used as a proxy for irresponsible behavior. Based on the vector error-correction model, the Granger causality test is performed to identify the direction of the causal relationship. An empirical study involving the use of real data from the National Anticorruption Authority is conducted. The results reveal the existence of a unidirectional Granger causal relationship running from lockdown breaches to the abuse of power. These findings imply that the irresponsible behavior of Tunisians may constitute in itself a factor that can exacerbate their exposure to corruption in periods of crisis, especially in the absence of well-established corporate social responsibility. The implications of our findings for public policy are also discussed.

1 | INTRODUCTION

There is no doubt that the COVID-19 pandemic is an unprecedented crisis of our time, whose profound fallouts are imposing severe challenges on the globe and may endure over the years to come. Beyond the global health crisis induced by COVID-19, the socioeconomic impacts of this pandemic are indeed enormous and multidimensional. COVID-19 has affected all aspects and continues to spread further, generating a myriad of damages and risks to all economies and sectors—some authors have qualified it as a complex mega risk, due to its interconnectedness to the global economy (Nygren & Olofsson, 2020). Among the victims of COVID-19, households have been the most impacted by this crisis in many ways, including changes in consumption patterns (Jribi et al., 2020; Sheth, 2020), income (Brewer & Gardiner, 2020; Coibion et al., 2020; Martin et al., 2020), spending (Baker et al., 2020), and well-being (Prime et al., 2020).

As most countries opted for the lockdown to stem the spread of COVID-19, many business activities failed to sustain the continuity of their operations. The result was the disruption of the supply chain of foods (Arouna et al., 2020; Hobbs, 2020; Ivanov & Dolgui, 2020; Rizou et al., 2020), as well as the shortage of facemasks (Wu et al., 2020) and drugs (Badreldin & Attalah, 2021). Under these circumstances and due to the prevalence of uncertainty and the lack of trust in public authorities, households have found themselves surrounded by various risks, which worsened their livelihood conditions and caused abrupt changes in their economic behaviors and decision-making (Kirk & Rifkin, 2020; Laguna et al., 2020).
However, if the major concerns of countries during the COVID-19 crisis are to contain the virus, protect individuals’ lives and mitigate the socioeconomic risks of the pandemic, irrational behaviors of individuals may undermine these efforts. Undoubtedly, the behavior of individuals matters during a crisis period, and it is considered as a double-edged sword that can either help alleviate the impact of the crisis or, on the contrary, exacerbate its negative magnitude. In this regard, Christensen and Lægreid (2020) argued that the outcomes of the COVID-19 crisis are a coproduction depending on two factors, which are (i) the citizens’ behavior based on trust in government and (ii) the government’s capacity. Wong and Jensen (2020) stated that the responsibility of risk management in pandemics is defused across society, rather than being centralized on institutions. This implies that people, through their rational behaviors, self-awareness, and compliance with rules, play a prominent role in minimizing the risks of COVID-19. In a study covering 10 countries with different government policies, Dryhurst et al. (2020) concluded that people's risk perception is higher in those who hold a more prosocial world view. In other words, people having the values of responsibility and the sense of cooperation in society are likely to help governments in implementing efficient risk communication due to their higher levels of risk perception and commitment. Also, the findings of a study carried out in France proved that the individual responsibility was a key factor to overcome the challenges of COVID-19. In brief, the adoption of responsible behavior was an unavoidable solution for many societies to safely weather the pandemic.

In Tunisia, COVID-19 came at a time when the country embraced a difficult context, characterized by simultaneous political, economic, and national security challenges. Until mid-February 2020, the political scene in Tunisia had been marked by a phase of instability and fuzziness due to the difficulties in constituting the government, whose final shape barely came to light after months of political wrangling. Economically, and despite the various reforms and measures that have been implemented during the last decade, Tunisia is struggling to revive its sluggish economy. On the macroeconomic front, the slowdown in economic growth coupled with the high unemployment rate, and relatively high inflation are the major issues of the economy. Within this vulnerable context, the COVID-19 crisis comes to further worsen the Tunisian economic situation by negatively impacting some of its profitable pillars, mainly tourism and exports. Likewise, national security was another issue that has been coincided with the outbreak of the pandemic. Only four days from reporting the first infected case, Tunisia has been exposed to a terrorist attack, carried out by two suicide bombers near the US embassy. Certainly, terrorism alongside the above political and economic issues created a stifling environment that shaped the economic behaviors of Tunisians and eroded their confidence in the government.

During the period of the general lockdown, which spanned from March 22 to May 3, 2020, lockdown breaches have been a remarkable phenomenon in Tunisia. While the Tunisian society is recognized for its altruism and cohesion, the COVID-19 crisis has unfortunately uncovered some irresponsible behaviors of citizens. The lack of a culture of crisis and the absence of a sense of commitment have been the prevailing features of the Tunisian society during the pandemic. Tunisian households have shown a growing eagerness to fill their needs from basic goods, mainly semolina and flour, which has driven them to breach the general lockdown several times. Relatedly, a close examination of the statistics provided by the Ministry of Interior is quite enough to get an idea about this serious problem. From March 24 to April 26, 2020, police officers seized 15,803 driving licenses, 15,718 car registration papers, and 262 vehicles of people who broke the rules of the general lockdown. Last and not least, the protest movements of citizens who stood at the entrance of cemeteries to prevent the funeral of victims of COVID-19 are a clear indication of the irresponsible behaviors of some Tunisians in the period of lockdown.

Most importantly, lockdown breaches coincided with the rise of corruption through the spread of favoritism and the abuse of power, which begs the question of what is the relationship between lockdown breaches and the exposure of Tunisian households to corruption in the time of COVID-19? The answer to this question can be provided by the signaling theory, which is useful in modeling the behavior of two parties with different access to information (Connelly et al., 2011). Based on this theory, people breaching the lockdown rules (known as signalers) send a signal to public officials (known as receivers) that the COVID-19 crisis persists and its fallouts never cease, at least in the short run, which gives the impression that households are ready to pay anything and at all costs to get supplied with basic goods. Driven by their quest for private gain and interests, public officials exploit this situation by abusing their power and committing illegal conducts. The proposed approach attempts to draw the attention of policy-makers to the key role that behavioral insights could play in the design of responses to crises and crafting better public policies. This scientific branch is gaining ground in many countries; however, it is unfortunately still not well integrated into Tunisian public policies, despite its potential in enhancing the efficiency of decision-making and fixing many forms of ill governance.
In light of the above, this paper explores the causal relationship between irresponsible behavior and corruption in Tunisia in the time of COVID-19. In our modeling approach, the abuse of power is used as a proxy for corruption, while lockdown breaches are used as a proxy for irresponsible behavior. Based on the vector error-correction model, the Granger causality test is performed to identify the direction of the causal relationship. An empirical study involving the use of real data from the National Anticorruption Authority is conducted. The results reveal the existence of a unidirectional Granger causal relationship running from lockdown breaches to the abuse of power. These findings imply that the irresponsible behavior of Tunisians may constitute in itself a factor that can exacerbate their exposure to corruption in periods of crisis, especially in the absence of well-established corporate social responsibility.

This paper is organized as follows. Section 2 describes the data used and the adopted methodology in our empirical study, and Section 3 discusses the obtained results. Section 4 gives policy implications of our research findings, and Section 5 summarizes the paper.

2 | EMPIRICAL STUDY

2.1 | Data

We use the data of the National Anticorruption Authority, referred to as INLUCC, on the detection of suspicions of corruption. On March 18, 2020, the INLUCC launched a proactive strategy to fight price gouging and monopolization of products during the period of the general lockdown, to support the Government's efforts in mitigating the socio-economic impact of COVID-19. A unit crisis has been set up at the INLUCC's headquarters, supported by 18 regional centers to receive reports from citizens on suspected practices of corruption. The data are collected through a toll-free telephone number devoted to citizens. Based on these reports, the INLUUC opened serious investigations and sued many persons and organizations for being involved in corruption and unfair business practices.

From March 21 to May 3, 2020, the INLUCC received 8552 reports, whose daily fluctuations are depicted in Figure 1. Our analysis is focused on the period spanning from April 3 to May 3, 2020 because the classification of reports by category of practices is only available in this period.

In our study, we use a data set comprising 6563 reports on various practices, which are classified into two main categories. The first category regroups a set of five unfair business practices, namely price hike (PH), monopolization of basic goods (M), scarcity of products (S), tied selling (T), and favoritism in the distribution of subsidized products (FDSP). The first three practices are the most frequent and account for more than 50% of the total number of reports, as shown in Figure 2. Regarding the second set, it is essentially composed of two main forms of corruption, which are the abuse of power (AP) and favoritism in the distribution of administrative certificates (FDAC).

As the purpose of our study is to examine the causal relationship between corruption and the irresponsible behavior of Tunisian households during the general lockdown, we use the number of daily reports on AP as a proxy for measuring corruption and the number of daily reports on lockdown breaches (LB) as a proxy for measuring irresponsible behavior.

As shown in Table 1, the average number of daily reports on LB is estimated at 27 reports against 10 reports on AP. The descriptive statistics of the variables show that the variability of the reports on LB, which is measured by the
standard deviation (SD), is approximately two times higher than the variability of the reports on AP. The total number of the analyzed reports on LB is 848 reports against 302 reports on AP.

Figure 3 depicts the daily fluctuations in the number of reports on AP and LB during the general lockdown.

### 2.2 | Methodology

To study the causal relationship between AP and LB using the Granger causality test (Granger, 1969), we first perform an estimation of the vector autoregressive (VAR) model, which is expressed as follows:

\[
LB_t = \alpha_0 + \sum_{i=1}^{n} \beta_i LB_{t-i} + \sum_{j=1}^{m} \theta_j AP_{t-j} + \mu_t, \tag{1}
\]

\[
AP_t = \tau_0 + \sum_{j=1}^{m} \psi_j AP_{t-j} + \sum_{i=1}^{n} \phi_i LB_{t-i} + \nu_t, \tag{2}
\]

where \(\beta_i, \phi_j, \theta_j\), and \(\psi_j\) are the coefficients of the VAR model, \(\alpha_0\) and \(\tau_0\) are constants, \(\mu_t\) and \(\nu_t\) are independent random errors, and the subscript \(t\) denotes time.

To determine the causality running from AP to LB in Equation (1), we test the following null hypothesis:

\[
H_0: \theta_1 = \ldots = \theta_j = 0 \text{ vs } H_1: \text{Not } H_0. \tag{3}
\]
The causality from \( AP \) to \( LB \) exists, if \( H_0 \) is rejected. Similarly, the causality running from \( LB \) to \( AP \) in Equation (2) exists, once the null hypothesis defined in Equation (4) is rejected:

\[
H_0: \phi_1 = \ldots = \phi_l = 0 \text{ vs } H_1: \text{ Not } H_0.
\]  

The rejection or acceptance of the null hypothesis in Equations (3) and (4) are based on the \( F \)-test, whose statistic is computed as follows:

\[
F = \frac{[(RSS_r - RSS_u)/m]}{[RSS_u/(T - m - n - 1)]},
\]

where \( RSS_r \) and \( RSS_u \) are, respectively, the sum of squared residuals of the restricted and unrestricted forms of Equation (1) (to check the Granger causality running from \( AP \) to \( LB \)), \( T \) is the sample size, \( m \) and \( n \) are the lag length. If the \( F \)-statistic is greater than the critical values, the null hypothesis is rejected, which means that the Granger causality running from \( AP \) to \( LB \) is confirmed. The same procedure of the \( F \)-test remains applicable to Equation (2) to check the Granger causality running from \( LB \) to \( AP \).

In sum, the application of the Granger causality test leads to four possible results, which are summarized as follows:

- **Unidirectional Granger causality from \( AP \) to \( LB \)**, denoted by \( AP \rightarrow LB \), if \( H_0 \) in Equation (3) is rejected and \( H_0 \) in Equation (4) is accepted.

- **Unidirectional Granger causality from \( LB \) to \( AP \)**, denoted by \( LB \rightarrow AP \), if \( H_0 \) in Equation (4) is rejected and \( H_0 \) in Equation (3) is accepted.

- **Bidirectional Granger causality between \( AP \) and \( LB \)**, denoted by \( AP \leftrightarrow LB \), if \( H_0 \) is rejected in Equations (3) and (4).

- **No Granger causality between \( AP \) and \( LB \)**, if \( H_0 \) is accepted in Equations (3) and (4).

From a practical standpoint, the estimation of Equations (1) and (2) requires some prerequisites. On the one hand, the variables of the model are assumed to be stationary, for such reason the Augmented Dickey–Fuller (ADF) test (Dickey & Fuller, 1979) is used. According to Tsay (2010), the implementation of the ADF test is based on the estimation of the following regression model:

\[
x_t = \alpha + \delta t + \phi x_{t-1} + \sum_{i=1}^{p-1} \rho_i \Delta x_{t-i} + \epsilon_t,
\]

where \( \Delta \) is the difference operator, \( \alpha \) is the intercept, \( \delta \) is the coefficient of time trend, \( p \) is the number of lags of the differenced terms, and \( \epsilon_t \) are the residuals of the model.

The principle of the ADF consists of testing the null hypothesis of nonstationarity \( H_0: \phi = 1 \) against the alternative hypothesis of \( H_1: \phi < 1 \), based on the test statistic given by:

\[
t_{ADF} = \frac{\hat{\phi} - 1}{\text{std} (\hat{\phi})},
\]

where \( \hat{\phi} \) is the least-squares estimate of \( \phi \) and \( \text{std} (\hat{\phi}) \) is the standard deviation of \( \hat{\phi} \). The null hypothesis is rejected if \( t_{ADF} \) is smaller than the critical value.

The Phillips–Perron (PP) test (Phillips & Perron, 1988) is also recommended for measuring the stationarity of time series variables. The advantage of this test compared with the ADF test is its robustness against heteroscedasticity of the error terms. These two stationarity tests remain applicable if the time series variables do not contain structural breaks otherwise it is the Zivot–Andrews test (Zivot & Andrews, 1992) that performs well in the presence of structural breaks.

On the other hand, the specification of the nature of the causal relationship (short run or long run) between \( AP \) and \( LB \) is paramount to the development of the Granger causality test. For this purpose, cointegration tests are used. The Johansen cointegration test (Johansen, 1988) is applied to time series variables that are not contaminated by structural breaks. On the contrary, in the presence of an unknown structural break, the Gregory–Hansen (Gregory & Hansen, 1996) test is used.

To determine the optimal lag length, we use the Akaike Information Criterion (AIC) (Akaike, 1974). This criterion is suitable for our study because it is recommended for samples with a size of fewer than 60 observations (Liew, 2004). The computation of AIC is given by:
where $\hat{\sigma}_p = \left( T - p - 1 \right)^{-1} \sum_{t=p}^{T} \hat{\varepsilon}_t^2$, $\hat{\varepsilon}_t$ are the residuals of the model, $p$ is the lag length and $T$ is the sample size.

Finally, the detection of structural breaks is ensured by the supremum Wald test (Andrews, 1993). All calculations are carried out in STATA 16.

3 | RESULTS AND DISCUSSION

The analysis of our data set for the detection of structural breaks leads to two different results. The outputs of the supremum Wald test support the rejection of the null hypothesis of no structural break at the significance level of 1% and indicate that the estimated break date for $AP$ is April 25, 2020, as shown in Table 2. On the contrary, $LB$ does not contain structural breaks since the $p$-value is greater than the significance level of 5%, which means that there is not enough evidence to reject the null hypothesis of no structural breaks. Based on these results, the ADF and PP tests are applied to measure the stationarity of $LB$, while the Zivot–Andrews test is performed to measure the stationarity of $AP$.

According to the results reported in Table 3, two different views of the used stationarity tests for $LB$ are obtained. While the calculated $t$-statistic of the ADF test does not support the rejection of the null hypothesis of the unit root when including intercept, and intercept and trend, the results of the PP test indicate that $LB$ is stationary at level, at the significance level of 5% when including intercept, and intercept and trend. The use of the first difference turns $LB$ into a stationary variable at the significance level of 1%. As the PP test has power over the ADF test, $LB$ can be considered as stationary at level.

The results of the Zivot–Andrews test indicate that $AP$ is stationary at the significance level of 5%. As shown in Table 4, the absolute value of $t$-statistics of this test is higher than the 5% critical value when allowing breaks in intercept only, and in intercept and trend. In conclusion, the obtained results from the performed stationarity tests lead to the conclusion that $LB$ and $AP$ are stationary at level.

After checking the stationarity of our variables, an analysis of the cointegration test should take place. This step is crucial because it allows us to determine which model should be used for the implementation of the Granger causality test. In the case of no cointegration between $LB$ and $AP$, the VAR model is used. On the contrary, the vector error-correction model (VECM) is used when $LB$ and $AP$ are cointegrated. The analysis of cointegration is ensured by the Gregory–Hansen test, whose results, reported in Table 5, confirm a long-run relationship between $AP$ and $LB$. For the model that considers breaks in the intercept, the absolute values of ADF and $Zt$ statistics estimated respectively at $-5.17$ and $-5.25$ are higher than the 1% critical value set at $-5.13$, implying hence the rejection of the null hypothesis of no cointegration. Similarly, the absolute values of ADF and $Zt$ statistics remain higher than the 5% critical value for models that incorporate breaks in the intercept and trend, and in the regime. However, the null hypothesis of no cointegration is rejected at the significance level of 10% when incorporating breaks in the regime and trend. The absolute values of ADF and $Zt$ statistics, respectively estimated at $-5.25$ and $-5.34$, are higher than the 10% critical value.

In sum, we can conclude that there is enough evidence to support the cointegration between $AP$ and $LB$. The linear combination of the two variables has stable properties in the long run when incorporating the estimated break date. In this case, the VECM becomes a suitable model for performing the Granger causality test. Hence, Equations (1) and (2) are re-written as follows:

$$
\Delta LB_t = \alpha_0 + \sum_{j=1}^{m-1} \delta_j \Delta AP_{t-j} + \sum_{i=1}^{\kappa-1} \beta_i \Delta LB_{t-i} + \sum_{j=1}^{m-1} \gamma_j \Delta \hat{\varepsilon}_{t-j} + \omega_1 \delta + \lambda_1 \text{ECT}_{t-1} + \mu_t, \quad (9)
$$

| Table 2 | Results of the detection of structural breaks |
|---|---|---|---|
| Variable | Wald statistic | $p$-value | Estimated break date |
| $AP$ | 15.5443 | .0089 | April 25, 2020 |
| $LB$ | 9.4288 | .1188 | No structural break |

Abbreviations: $AP$, abuse of power; $LB$, lockdown breaches.
\[ \Delta AR_t = r_0 + \sum_{j=1}^{m-1} \phi_j \Delta AR_{t-j} + \sum_{i=1}^{n-1} \phi_i \Delta LB_{t-i} + \omega_2 \delta + \lambda_2 ECT_{t-1} + \nu_t, \]  

where \( \omega_1 \) and \( \omega_2 \) are the coefficients associated with the dummy variable \( \delta \), ECT denotes the error-correction term, and \( \lambda_1 \) and \( \lambda_2 \) are the error-correction coefficients.

### TABLE 3 Results of the ADF and PP tests

| Variable | ADF test | PP test |
|----------|----------|---------|
| \( LB(-1) \) | Intercept | -1.583 | -2.910** |
| \( LB(-1) \) | Intercept & trend | -2.407 | -3.942** |
| \( \Delta LB (-1) \) | Intercept | -4.008*** | -8.752*** |
| \( \Delta LB (-1) \) | Intercept & trend | -4.068*** | -8.727*** |

Notes: Significance at the 1% (**), 5% (**), and 10% (*) level.
\( \Delta LB \) denotes the first difference of \( LB \).
Abbreviation: \( LB \), lockdown breaches.

### TABLE 4 Results of the Zivot–Andrews test

| Variable | t-statistic | Estimated break date | Order of integration |
|----------|-------------|----------------------|---------------------|
| \( AP \) | Intercept | -5.522** | April 25, 2020 | I(0) |
| \( AP \) | Trend | -4.135* | April 23, 2020 | I(0) |
| \( AP \) | Intercept & trend | -5.394** | April 25, 2020 | I(0) |
| \( \Delta AP \) | Intercept | -7.275*** | April 25, 2020 | I(1) |
| \( \Delta AP \) | Trend | -6.750*** | April 11, 2020 | I(1) |
| \( \Delta AP \) | Intercept & trend | 17.494*** | April 25, 2020 | I(1) |

Notes: Significance at the 1% (**), 5% (**), and 10% (*) level.
\( \Delta AP \) denotes the first difference of \( AP \).
Abbreviation: \( AP \), abuse of power.

### TABLE 5 Results of the Gregory-Hansen cointegration test

| Change | Test statistic | Break date | 1% critical value | 5% critical value | 10% critical value |
|--------|----------------|------------|------------------|------------------|-------------------|
| Intercept | ADF | -5.17 | April 17, 2020 | -5.13 | -4.61 | -4.34 |
| Zt | -5.25 | April 17, 2020 | -5.13 | -4.61 | -4.34 |
| Za | -29.63 | April 17, 2020 | -50.07 | -40.48 | -36.19 |
| Intercept & trend | ADF | -5.15 | April 17, 2020 | -5.45 | -4.99 | -4.72 |
| Zt | -5.24 | April 17, 2020 | -5.45 | -4.99 | -4.72 |
| Za | -29.55 | April 17, 2020 | -57.28 | -47.96 | -43.22 |
| Regime | ADF | -5.16 | April 17, 2020 | -5.47 | -4.95 | -4.68 |
| Zt | -5.25 | April 17, 2020 | -5.47 | -4.95 | -4.68 |
| Za | -29.60 | April 17, 2020 | -57.17 | -47.04 | -41.85 |
| Regime & trend | ADF | -5.25 | April 25, 2020 | -6.02 | -5.50 | -5.24 |
| Zt | -5.34 | April 25, 2020 | -6.02 | -5.50 | -5.24 |
| Za | -30.13 | April 25, 2020 | -69.37 | -58.58 | -53.31 |

where \( \omega_1 \) and \( \omega_2 \) are the coefficients associated with the dummy variable \( \delta \), ECT denotes the error-correction term, and \( \lambda_1 \) and \( \lambda_2 \) are the error-correction coefficients.
Based on AIC, a lag length of 7 days is selected to estimate the VECM, whose results are reported in Table 6. The break date of April 25, 2020 is included in our model through the introduction of the dummy variable $\delta$. Our estimation shows that the values of the coefficients $\omega_1$ and $\omega_2$ are found to be negative. However, $\omega_2$ is statistically significant at the 1% level, which indicates that the detected break negatively impacts the prediction of $AP$. Regarding the error-correction coefficients, the results of our estimation reveal that they have a negative sign. The error-correction coefficient measures the speed of the convergence towards the long-run equilibrium. The greater the absolute value of this coefficient the higher is the speed of the adjustment. A negative and significant value of this coefficient indicates the presence of a causal relationship in the long run. Basically, the value of the error-correction coefficient is set between $-1$ and $0$. However, some authors suggest an extended range for the value of this coefficient. According to Narayan and Smyth (2006), if the value of the coefficient is between $-1$ and $-2$ this means that the error correction process fluctuates around the long-run value in a dampening manner, instead of monotonically converging to the equilibrium path directly.

In our model, the error-correction coefficient $\lambda_1$ is estimated at around $-0.5055$. Though it has a negative sign, this coefficient is insignificant implying hence the absence of a causal relationship running from $AP$ to $LB$. On the contrary, the coefficient $\lambda_2$ is estimated at $-1.3930$, which means that the speed of the adjustment is about 139.30%. Moreover, $\lambda_2$ is found to be statistically significant at the 1% level, which supports the existence of a long-run causal relationship running from $LB$ to $AP$.

The results of the Wald test, reported in Table 7, bolster the rejection of the null hypothesis in favor of a unidirectional Granger causality running from $LB$ to $AP$ at the significance level of 1%. This means that the irresponsible behavior of Tunisians, during the general lockdown, causes corruption. On the contrary, it seems that corruption does not Granger cause irresponsible behavior given that the results of the Wald test fail to reject the null hypothesis.

**Table 6  Results of VECM**

|        | $\Delta AP$       | $\Delta LB$       |
|--------|-------------------|-------------------|
| ECT(−1)| $-1.3930^{***}$  | $-0.5055$         |
| $\Delta AP(−1)$ | 0.0678 (0.2239) | 0.2723 (0.7185) |
| $\Delta AP(−2)$ | $-0.15559$ (0.2458) | 0.1686 (0.7887) |
| $\Delta AP(−3)$ | 0.1317 (0.2158) | $-0.0252$ (0.6924) |
| $\Delta AP(−4)$ | 0.2027 (0.2297) | 0.0819 (0.7371) |
| $\Delta AP(−5)$ | 0.5227$^{***}$ (0.1766) | $-0.14991$ (0.5667) |
| $\Delta AP(−6)$ | 0.3808* (0.2026) | $-0.0772$ (0.6501) |
| $\Delta LB(−1)$ | 0.8072$^{***}$ (0.1744) | $-0.1475$ (0.5598) |
| $\Delta LB(−2)$ | 0.5393$^{***}$ (0.1770) | 0.1608 (0.5680) |
| $\Delta LB(−3)$ | 0.1722 (0.1259) | $-0.1516$ (0.4041) |
| $\Delta LB(−4)$ | 0.0132 (0.1102) | $-0.2156$ (0.3536) |
| $\Delta LB(−5)$ | $-0.1561$ (0.1011) | $-0.1672$ (0.3243) |
| $\Delta LB(−6)$ | $-0.1629^{**}$ (0.0774) | $-0.2595$ (0.2484) |
| $\delta$ | $-3.9715^{***}$ (1.3395) | $-4.8710$ (4.2987) |
| Constant | 0.0929 (0.7898) | $-0.2559$ (2.5347) |
| $R^2$   | 0.9058            | 0.5365            |
| Log likelihood | $-114.4824$ | 0.5365 |
| AIC     | 12.1235           | 0.5365            |

*Notes: Significance at the 1% (***) and 5% (**) level. Parentheses indicate standard errors.

Abbreviations: $AP$, abuse of power; $LB$, lockdown breaches.*
TABLE 7 Results of the VEC Granger causality/block exogeneity Wald test

| Null hypothesis              | $\chi^2$-statistic | df | $p$-value | Direction |
|------------------------------|--------------------|----|-----------|-----------|
| $AP$ does not Granger cause $LB$ | 0.62               | 6  | .9961     |           |
| $LB$ does not Granger cause $AP$ | 43.21              | 6  | .0000     | $LB \rightarrow AP$ |

Abbreviations: $AP$, abuse of power; $LB$, lockdown breaches.

4 | POLICY IMPLICATIONS

In essence, the results of the empirical study confirm the existence of a causal relationship between irrational behaviors of Tunisian households, represented by lockdown breaches, and corruption that takes the form of abuse of power. Moving towards a deeper analysis, this causal relationship entails broader implications. It raises many questions about the effectiveness of the Tunisian strategy in coping with the COVID-19 crisis and unveils many drawbacks regarding the management of this pandemic from a socioeconomic viewpoint.

Although it is clear from our empirical study that irresponsible behaviors of Tunisian households may constitute in itself a factor that can exacerbate the socioeconomic impacts of the pandemic, this does not mean that all the blame should be put on them. The point is that the irrational behaviors of people are the outcome of the governance system and the policies adopted by decision-makers. In this regard, Tunisia has opted for a socially oriented strategy, centered on valuing human beings rather than looking for a trade-off between the protection of the national economy and the safety of individuals’ lives (Sahraoui & Gani, 2020). This social feature stems from the declarations of both the Tunisian President and the Head of Government, in official media and press conferences, who stressed the necessity to support the most vulnerable social class during the crisis and committed to not leave any Tunisian behind. As a response to this policy, various social measures took place to alleviate the socioeconomic impacts of COVID-19 on vulnerable households. Thousands of needy and low-income households benefitted from immediate cash aid of 200 Tunisian dinars, as well as a free supply of electricity and running water for two months. Unfortunately, this bundle of measures neither soothed the anger of Tunisians nor halted lockdown breaches. Even more, the economic stimulus packages in favor of business activities were not enough to stop unfair business practices in the period of the general lockdown.

The inefficiency of these measures can be explained by two main factors, which are: the nature of the adopted governance model and the lack of trust in public authorities. The bet on the centralized governance model as the winning horse was the ultimate solution for the Tunisian Government to cope with the pandemic. This model has entailed hidden costs and failed to predict some immediate socioeconomic effects of the crisis, notably the phenomenon of lockdown breaches. It is no secret that Tunisia still has great loyalty to centralized governance. This is due to the heavy heritage of the public administration, which has spanned over six decades. In a speech before the parliament on March 26, 2020, the Head of Government explicitly expressed his deep faith in centralization as the ultimate refuge in times of crisis, though this governance model suffered from a lack of adaptability. According to Janssen and van der Voort (2020), adaptability is a recommended feature for effective management of the COVID-19 crisis, but it requires that decision-making and responsibilities are scattered among centralized and decentralized levels, something which is not tailored to the centralized governance model of the Tunisian Government. The latter has been decisive on the question of the centralized decision-making during the COVID-19 crisis and curbed the powers of local authorities; through the enactment of the Circular no. 2020-9 dated March 25, 2020. This Circular required Governors and Mayors to not take measures outside the framework of decisions announced by the Government and requested them to refer to the supervisory authority beforehand, in case of taking other measures. The Circular no. 2020-9 has been a source of tensions and conflicts between the central and local authorities, because it is in contrast with the provisions of the Organic Law no. 2018-29 of May 9, 2018, which defined well the scope of competencies of local authorities.

Furthermore, building the bridge of trust between citizens and their government is a fundamental pillar for the successful management of the COVID-19 crisis (Balog-Way & McComas, 2020; Sibley et al., 2020; Bavel et al., 2020). Unfortunately, this factor has been neglected in the different steps of planning, preparedness, and implementation of the Tunisian strategy for fighting the pandemic, and can be seen as the first driver of lockdown breaches and protest movements. The rise of corruption during the period of the general lockdown, as shown in our empirical study, is an indication of a lack of trust in Tunisian public authorities. As stated by Khemani (2020), the perceived high level of corruption is interpreted as a lack of trust in public institutions.
The fragility of the governance model and the lack of trust in public institutions are not the only factors that stirred up lockdown breaches. On the economic front, the absence of well-established corporate social responsibility is also a key factor that triggered both corruption and irresponsible behavior during the COVID-19 pandemic. The prevalence of speculations on basic foods, as well as many other forms of unfair business practices, has been the norm during the general lockdown. In addition to their role in favoring the spread of corruption, these unfair practices are extremely harmful to the livelihood of Tunisian households because they deteriorate their purchasing power, affect their consumption patterns, and shrink their welfare.

To sum up, the lessons that should be drawn from the crisis of COVID-19 are the necessity to understand the behavior of Tunisians, how they think, how they see their governors, and how much confidence they have in their government. The advocacy of some social values such as building a sense of commitment, developing self-awareness, and strengthening the confidence in the government is crucial for the good governance of crises. The geographic proximity of administrative authorities may help disseminate these values and foster social cohesion during a period of crisis. Certainly, the bridge that will facilitate the implementation of these values is the local governance model. That model becomes an unavoidable need in the presence of the fragility demonstrated by the centralized governance model in the management of the COVID-19 crisis.

Finally, the ultimate lesson is to turn the COVID-19 crisis into opportunities and look for new prospects capable of ensuring a strong economic recovery. On the one hand, the resilience shown by the digital economy during the pandemic may offer Tunisia the opportunity to unleash its potentials in this field. The well-educated and skilled youth population in digital technology, alongside the national strategy for the digitalization of public services, constitute the pillars for the realization of digital leapfrogging. Besides, the capacity of the digital sector in ending youth unemployment is promising (Metu et al., 2021) and makes it a vector of economic development. On the other hand, the African Continental Free Trade Area that has recently been launched may constitute breathing space for Tunisian exports, if well harnessed. That is why the focus should be on further consolidating and diversifying trading partnerships with African economies to benefit from the economic spinoffs generated by the regional trade agreements (Kayizzi-Mugerwa et al., 2014; Makochekanwa, 2014; Shinyekwa et al., 2019; Umulisa, 2020).

5 | CONCLUSION

This paper sheds light on the causal relationship between lockdown breaches and the exposure of Tunisian households to the abuse of power during the COVID-19 crisis. The purpose is to study the interactions between corruption and irresponsible behavior during the pandemic, and their implications for the management of the COVID-19 crisis in Tunisia. To this end, the Granger causality test is performed to examine the nature of this causal relationship using real data from the National Anticorruption Authority on daily reports on suspicions of corruption during the general lockdown.

The findings of our empirical study reveal the existence of a unidirectional Granger causal relationship running from LB to AP, supporting hence the hypothesis that irresponsible behavior causes corruption. The most important conclusion to be drawn from these results is that the irresponsible behavior of Tunisians in periods of crisis may trap them into serious risks and deteriorate their livelihood conditions.

The implications of this study are numerous. It aims to prompt decision-makers towards rethinking the relevance of the local governance model in building the bridge of trust between citizens and the government, to effectively cope with the socioeconomic impacts of crises in the future. Attention should also be paid to the problem of poverty in Tunisia and the inequality between regions in terms of economic development. These two factors have largely influenced the economic behaviors of households during the COVID-19 pandemic, and they can significantly alter their risk perception. Neglecting these two factors may trigger a new wave of unrest and generate consequently another crisis for the country, which has already suffered from an economic slowdown. In short, Tunisia needs to avoid being plunged into a spiral of crises, especially in its current context characterized by political instability and a fragile governance system.

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