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The Tunisian stock market before invoking Article 80 of the Constitution: the (in)direct impact of government interventions during the sanitary crisis

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Abstract

Purpose – The purpose of this study is to investigate the impact of government policies adopted by the Tunisian government to cope with the COVID-19 sanitary crisis on stock market return.
Design/methodology/approach – The author uses daily data from March 2, 2020, to July 23, 2021.
Findings – The author finds that policies interventions have a negative impact on Tunisia's stock market, particularly stock market returns due to stringency, confinement and health measures. Also, Government announcements regarding economic has a negative impact on Tunisia's stock market but this impact is insignificant. By conducting an additional analysis, the author shows that the government interventions policies amplify the negative effect of COVID-19 on stock returns.
Research limitations/implications – These results will be useful for policy authorities seeking to consider the advantages and drawbacks of government measures. Finally, a legislative proposal about the audit of public debt should be included in the Constitution to spur Tunisia's economic and social recovery.
Originality/value – This study contributes to the related literature in two ways: First, it is the first study to examine the impact of government actions on stock market performance. Second, it bridges a gap in the literature by investigating the case of Tunisia, because most studies focus on developed and emerging economies.

Keywords COVID-19, Government interventions, Tunisian stock market
Paper type Research paper

1. Introduction

The rapid spread of COVID-19 adversely affected the global economy. Infection control and strategies adopted to reduce mortality risk harmed all countries' economies to varying extents (Ashraf, 2020b; He *et al.*, 2020; Phan and Narayan, 2020), and most global financial markets fell sharply (Corbet *et al.*, 2021; So *et al.*, 2021). As a result, several countries implemented various emergency measures, such as self-isolation, travel bans, testing and quarantining incoming travelers, and providing economic support packages (Ashraf and

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Goodell, 2021). The objective of these policies was to control the spread of the disease and therefore minimize its negative economic impact.

In this context, the COVID-19 pandemic has not spared North African countries (Alber and Arafa, 2020; Ben Ayed and Lamouchi, 2020; Mdaghri *et al.*, 2020). Indeed, it affected MENA economies through disruptions in oil prices, tourism, travel and the value chain (Arezki and Nguyen, 2020). In response to this, MENA governments reacted differently (Woertz, 2020). While early movers, such as Morocco and Jordan, took important measures to tackle the pandemic, other governments, such as Egypt, failed to recognize the magnitude of the sanitary crisis and instead prioritized their economies. The third group of countries, including Yemen and Syria, lacked the capacity to respond to the crisis due to undermining political and internal military conflicts. However, the situation was noticeably different in Tunisia.

On March 2, 2020, Tunisia announced its first confirmed cases of COVID-19. The Tunisian government reacted quickly with a range of emergency measures, including lockdown and income support. Unlike many other MENA countries, Tunisia successfully managed the early stage of the pandemic. In contrast, during the second and third waves of COVID-19, the country was in great political turmoil, especially following the resignation of Prime Minister Elyes Fakhfakh. During this period, the waves of infection revealed significant vulnerabilities in the Tunisian healthcare system, so the government of Hicham Michichi took various emergency measures. These measures included closing schools and universities, forcing many non-essential businesses to shut down, mandating the wearing of masks in public places and banning inter-city travels. The government integrated new programs to help enterprises and unemployed people. The Tunisian authorities also launched the COVID-19 vaccination campaign. All these measures significantly impacted the Tunisian household welfare (Kokas *et al.*, 2020; Alfani *et al.*, 2021), the economy (ElKadhi *et al.*, 2020; Fridhi, 2020) and the financial market (Ben Ayed and Lamouchi, 2020; Fakhfekh *et al.*, 2021). According to the African Development Bank (2021), the real GDP contracted by 8.8% in 2020 after an increase of 1%. In addition, the budget deficit increased from 3.5% to 13.1% of GDP, due to the significant increase in spending. During the first quarter of 2021, Tunisia's GDP fell by 3% while the public debt increased by 12.2% compared to the same period in 2020. According to the Agency for the Promotion of Industry and Innovation, investment in the industry and service sectors decreased by 11.9% at the end of September 2021, compared to the same month in 2020 (National Institute of Statistics, 2021).

The government's preventive measures had a significant impact on the economic activity and helped to slow down the spread of COVID-19. According to Jeffrey *et al.* (1984), the productivity of firms in the real economy generates the supply of capital market returns. Based on the theory of supply of capital market returns, these preventive measures will have a significant impact on the stock market because they influence wealth creation and investors' expectations. According to the behavioral finance theory, government actions frequently affect investors' behavior by influencing their sentiment, which in turn might affect the stock market (Ibbotson and Chen, 2003; Harjoto *et al.*, 2021).

Previous literature revealed that the sanitary crisis and associated government policies exerted a significant impact on the stock market performance (Ashraf, 2020a; Zaremba *et al.*, 2020; Hu *et al.*, 2022; Wu *et al.*, 2021; Yang and Deng, 2021). Investor sentiment is influenced by such initiatives in two different ways: First, these actions may successfully minimize the spread of COVID-19 and ultimately reduce investors' fears and uncertainty, which in turn have a significant influence on the stock market (Shen *et al.*, 2020; Aharon and Siev, 2021; Fu *et al.*, 2021). Second, government actions signal to investors that the sanitary crisis is under control, thus decreasing investors' concerns about prospects and increasing their trust in the stock market (Aharon and Siev, 2021; Chang *et al.*, 2021).

Under different market conditions, the effects of government interventions on the stock market can vary, and their effects on the MENA region's financial markets are unknown.

This issue has not been previously addressed, especially in the context of a country that is experiencing a political transition. This study contributes to the related literature in two ways: First, it is the first study to examine the impact of government actions on the stock market performance. Second, it bridges a gap in the literature by investigating the case of Tunisia, since most studies focused on developed and emerging economies.

The remainder of this paper is structured as follows. Section 2 discusses the Tunisian context during the pandemic period and Section 3 describes the methodology. The empirical results are reported in Section 4, and Section 5 concludes the study.

2. COVID-19 in Tunisia: the risk of (un)controlled spread

Tunisia announced its first confirmed cases of the virus on March 2, 2020. During the first wave of the pandemic, the government of Elyes Fakhfakh tried to manage the pandemic with a fresh but realistic approach. On March 13, 2020, the government took a few proactive containment measures to reduce the domestic spread of coronavirus. In addition, the Central Bank of Tunisia agreed to cut the money market interest rate to a level of 6.75%. However, the COVID-19 inevitably affected the stock exchange market, which is characterized by its fragility and vulnerability to shocks. More specifically, on March 16, 2020, the Tunisian Stock Index (TUNINDEX) fell sharply by 4.10%. The effects of COVID-19 were already being felt in the tourism industry, with booking cancellations for Tunisian hotels reaching 45% during the first quarter of the year. In response to this, Elyes Fakhfakh asked the Tunisian people to review the latest actions implemented by the government to reinforce the national plan in order to contain the spread of the disease. The government tried to find the optimal balance between health risks and economic consequences, and it began further initiatives to support export-oriented firms and jobless individuals. Furthermore, aid was received from countries like China, Qatar, Algeria and Turkey, as well as from the World Health Organization (WHO) and the International Monetary Fund, which gave US$745 Million to support the health sector (Karamouzian and Madani, 2020). As a result, Tunisia was able to successfully handle the pandemic's early epidemiological consequences, with the Ministry of Health recording around 1,550 confirmed cases and 50 deaths. On May 11, 2020, Tunisia registered zero new cases during a one-week period. In addition, it reached the final step of releasing restrictions on June 14 with the reopening of mosques and cultural sites, as well as extending restaurant opening hours until 7 P.M. (Abouzzohour and Mimoune, 2020). Nonetheless, the resignation of Prime Minister Elyes Fakhfakh, whose position was rendered unsustainable, in mid-July seemed to mark Tunisia's return to its uncertainty.

In response, the country's president, Kais Saied, designated Hicham Michichi as the new prime minister in August. A package of government intervention policies was then implemented to minimize the adverse economic impact of the second wave of the COVID-19 pandemic. The new government imposed several measures, including (1) mandatory wearing of protective face coverings in public places; (2) establishment of a comprehensive curfew; (3) an increase in the number of intensive care unit *(ICU)* beds to 118 and the number of oxygen beds to 560 by the end of the third quarter*;* (4) a ban on four-person public gatherings; and *(5)* mobilization of resources to strengthen the healthcare system (Ayadi, 2020). Sadly, the virus continued to spread through the country, and 140,557 confirmed cases of COVID-19 were recorded by the end of December 2020, with a positivity rate of 31.23% and 4,730 cumulative fatalities.

In January 2021, Tunisia's public healthcare system was overburdened by an increase in infections and morbidity. Several factors may explain this situation: (1) the social disparity between the rural and coastal cities, (2) the lack of specialized public health services and resources and (3) the overburdened public health institutions existing alongside the development of the private system.

In response to this, the government of Michichi moved to implement emergency and stricter measures, including economic packages, border closures, the closing of small businesses and COVID-19 testing. In addition, civil society groups in certain regions collected funds and offered their expertise to create local laboratories for COVID-19 testing within regional public hospitals. The COVID-19 vaccination campaign was initiated on March 13, 2021, and the Ministry of Health began vaccinating medical employees treating COVID-19 patients and elderly persons living in group facilities and retirement houses. Moreover, Tunisia received new funds from the World Bank in the form of US $100 million for the Tunisia COVID-19 Response Project. However, as the economic and health consequences of the epidemic became more obvious, a series of protests erupted in March and April. Hundreds of unemployed workers protested in the capital against the economic consequences of the confinement restrictions. Jobless people were unable to pay rent and utility bills after two months of no work. On April 9, Kais Saied suggested considering the social and economic sides of the issue.

During the period from May to June, Tunisia experienced the biggest health catastrophe in its history, with its healthcare system being on the verge of collapse. A week before the Eid holiday, a total lockdown was declared in several governorates, but an exponential rise in confirmed cases still followed. Relatively to normal periods, the oxygen demand rose rapidly. At the end of June, the country officially recorded 5,921 new confirmed cases, 116 new deaths and 584 patients being hospitalized in intensive care. In July, a storm was brewing. Michichi's team promised to do the needed to support citizens through the COVID-19 pandemic. During this period, the vaccination program that began in March proceeded, but more slowly than expected. Furthermore, all hospitals were operating at full capacity and the oxygen demand exceeded the available stock. Fears that the already strained healthcare system could collapse prompted President Kais Saied to appeal to the international community for assistance. On July 22, 2020, Tunisia reported 563,930 total coronavirus cases and 317 new deaths. Thousands of Tunisians then went to the streets to defeat the government and the Islamist-led Ennahda parliament. On July 25, 2021, Kais Saied declared invoking Article 80 of the Tunisian Constitution, which deals with exceptional circumstances. He dismissed Prime Minister Hicham Michichi and froze the parliamentary activities. Consequently, hundreds of Tunisians defied the COVID-19 curfew and flooded the streets to celebrate.

3. Methodology

3.1 Model specification

The following model is developed:

$$Ret_{it} = \beta_0 + \alpha_1\, Ret_{i,t-1} + \alpha_2\, COVID19_{i,t-1} + \delta_3\, Intervention + \eta_i + \mu_{i,t} \tag{1}$$

where $\boldsymbol{i}$ indicates the sector ($i = 1, \ldots..12$) and indicates the daily time period. $\boldsymbol{\beta}_0$ is a constant term. $\boldsymbol{\alpha}_1$ ***is*** the parameter to be estimated for the lagged endogenous variable, while $\boldsymbol{\alpha}_2$, ***and*** $\boldsymbol{\delta}_3$ are the parameters to be estimated for exploratory variables. $\boldsymbol{\eta}_i$ is the individual-specific effect while $\boldsymbol{\mu}_{it}$ represents the error term.

3.2 Selection of variables and hypotheses development

3.2.1 Dependent variable. The dependent variable used in this research paper is the stock market return computed as the first difference of the logarithmic price ($\boldsymbol{P}_{i,t}$). The return is therefore defined as follows:

$$\boldsymbol{Ret}_{i,t} = \boldsymbol{Ln}[\, \boldsymbol{P}_{i,t}/\boldsymbol{P}_{i,t-1}] \tag{2}$$

3.2.2 Explanatory variables. 3.2.2.1 Daily growth in confirmed cases (GC). It is calculated as $\mathbf{Ln}\left(\frac{Case_{it}}{Case_{i,\,t-1}}\right)$. Previous studies found that the growth in COVID-19 cases had a significant impact on stock market returns (Al-Awadhi *et al.*, 2020; Erdem, 2020). Topcu and Gulal (2020) showed that the impact of COVID-19 varied across countries and regions, with European stock markets being less affected than their Asian and Middle East counterparts. Therefore, we hypothesize the following:

H1. Daily growth in confirmed cases has a negative impact on stock market returns.

3.2.2.2 Government intervention. 3.2.2.2.1 . *Stringency index (Δstring).* Earlier studies argued that government policy responses in terms of social distancing (e.g. closing workplaces, suspending public transport, requiring people to stay at home) had a negative effect on stock market returns (Ashraf, 2020a). This suggests that the harmful effects of COVID-19 on the stock market performance were amplified by stricter measures and isolation policies. However, other researchers found a positive impact on the stock market, suggesting that strict government measures may reduce the epidemic's intensity locally, consequently, mitigating the negative market response to the growth in COVID-19 cases (Greenstone and Nigam, 2020; Chang *et al.*, 2021; Yang and Deng, 2021). Nevertheless, their findings showed that the stock market did not react significantly to any policy intervention. The daily change in the stringency index (i.e. $stringency\ index_t - stringency\ index_{t-1}$) is used to measure the change in stringency, leading to the second hypothesis:

H2. Social distancing measures have a negative impact on stock market returns.

3.2.2.2.2 . *Government response (ΔGovResp).* At the beginning of the pandemic, government executives did not have the experience needed to develop and implement appropriate public policies. Thus, they were much less able to offer balanced approaches aiming at protecting public health and the economy (Moon, 2020). However, the epidemic became a major challenge for the decision-making processes of governments as it created significant divisions and conflicts in the communities of some countries. Afterward, the restrictive policies proposed by governments in response to the epidemic started to exert a significant impact on the spread of COVID-19, succeeding in putting the pandemic under control around the globe (Alfano and Ercolano, 2020). Del Lo *et al.* (2021) showed that government responses can slow the progression of the virus, which could reduce the volatility of the African stock market. Nevertheless, the appearance of various forms of this virus with variations in its trajectory prompted differences in governments' responses. Wu *et al.* (2021) showed that government policies had an unequivocally negative impact on sectoral index returns. Therefore, we hypothesize the following:

H3. Government response measures have a negative impact on stock market returns.

3.2.2.2.3 . *Containment and health (ΔC&Health).* Chang *et al.* (2021) showed that government measures concerning the health system had a slight effect on stock market returns, implying that the stock market did not react to government responses (e.g. public communication campaigns, testing policies, etc.). This conclusion contradicts the findings of Ashraf (2020a) and Thunström *et al.* (2020), who argued that government policy responses for testing policy and contact tracing resulted in higher stock market returns. However, Hu *et al.* (2022) found a strong negative impact of the containment and health index, suggesting that these government severe measures had a significant negative effect on the stock prices of most energy companies. This disparity in results could be attributed to the fact that stronger government intervention might signal to the stock market that the COVID-19 pandemic is far from over. The proxy for the containment and health index is the daily change in the associated index (i.e. $containment\ \&\ health_t - containment\ \&\ health_{t-1}$). We, therefore,

expect that the announcement of stricter containment and health measures negatively affects stock market returns, as follows:

H4. Containment and health measures have a negative impact on stock market returns.

3.2.2.2.4 . *Economic support (ΔEcoSupport).* Governments should respond by providing the most vulnerable people with sufficient resources, such as offering financial help for households who have directly or indirectly lost their jobs due to the pandemic. The government-funded sick leave enables people to stay at home while maintaining their jobs and incomes, reducing the movement of people and hence the risk of contagion. In addition, unemployment benefits were often expanded and extended. In this vein, Yang and Deng (2021) argued that these benefits supported the demand, by allowing families to purchase necessary goods while being locked down. Therefore, governments attempted to mitigate and counter the adverse impact of the social distancing measures on income and employment. Consequently, investors might react favorably to such actions. However, Ashraf (2020a) showed that the economic-support measures failed to exert any statistically significant effect and the stock market's reaction to these actions was limited. In line with this, we propose that the economic support negatively affects stock returns, so we hypothesize the following:

H5. Economic support has a negative impact on stock market returns.

3.3 Selection of estimation technique

To estimate the parameters of Equation (1), we adopt the two-step generalized method of moments (GMM) approach, which was initially developed by Arellano and Bond (1991)**.** This choice is based on the presence of the dependent variable as an explanatory variable, so the endogeneity problem may be persistent. Given the specificity of our sample, we followed Ben Ayed *et al.* (2021) and Daher *et al.* (2015) who used the panel technique developed by Roodman (2009). This approach is suitable for data with a short time series (Roodman, 2020).

4. Data, preliminary analysis and estimation results

4.1 Data

The data in this study ranges from 2 March 2020 to 23 July 2021. During this period, Tunisia had two governments before the Tunisian president sacked Prime Minister Hicham Michichi and suspended parliamentary activities on July 25, which is Republic Day in Tunisia. The data are obtained from the website of the Tunisian stock exchange (BVMT), which includes the daily closing prices of all listed companies in Tunisia. Daily data on the global coronavirus infections are collected from the website of the Tunisian Ministry of Health. Finally, following Ashraf (2020a), Wang *et al.* (2021), Phan and Narayan (2020), four policy indices are used to control for the government response: stringency, government response, containment and health, and economic-support indices. The data are obtained from the Oxford COVID-19 Government Response Tracker (O×CGRT) database (Hale *et al.*, 2020).

Table 1 presents the descriptive statistics for the daily stock return. In 2020, the average daily returns were negative and close to zero. The highest (lowest) returns were 1.920 (−4.100). In 2021, the average daily returns were also close to zero with a standard deviation of 0.391. The highest (lowest) value was 1.620 (−1.120). The descriptive statistics confirm the presence of significant volatility in the stock market. Overall, the daily stock returns did not differ significantly from zero, confirming the poor performance of all firms during the study period.

The average daily growth in the confirmed cases was 17.5%. In 2020, the growth rate reached 25.6%. However, in 2021, the growth rate fell to 7.5%. These results confirm that during the first and second waves of the sanitary crisis, the efforts made by the Tunisian

		Mean	Sd	Min	Max
Ret	All	0.006	0.597	−4.100	1.920
GC		0.175	0.876	−1	6
ΔString		0.146	3.348	−38.89	29.63
ΔGovResp		0.123	2.028	−28.12	16.67
ΔC&Health		0.120	2.302	−32.14	19.05
ΔEco Support		0.148	3.676	−25	75
Ret	2020	−0.017	0.700	−4.100	1.920
GC		0.256	1.111	−1	6
ΔString		0.234	3.782	−38.89	29.63
ΔGovResp		0.196	2.537	−28.12	16.67
ΔC&Health		0.189	2.837	−32.14	19.05
ΔEco Support		0.246	4.288	0	75
Ret	2021	0.042	0.391	−1.120	1.620
GC		0.075	0.411	−0.824	1.743
ΔString		0.014	2.556	−16.67	19.44
ΔGovResp		0.013	0.774	−6.25	4.16
ΔC&Health		0.015	1.076	−7.14	5.94
ΔEco Support		0	2.482	−25	25

Note(s): Ret, GC, ΔString, ΔGovResp, ΔC&Health, ΔEco Support represents respectively The daily change of prices, The daily growth rate of confirmed cases, The daily change of Stringency index, The daily change of government response index, the daily change of Containment and Health index, the Daily change of the economic support index

Table 1.
Descriptive statistics

government were insufficient to contain the spread of COVID-19 despite tight restrictions across the country.

The daily change in the stringency index (ΔString) decreased on average from 23.4% in 2020 to 1.4% in 2021. The stringency index covers many policies, such as the closure of schools, universities, workplaces and public places, in addition to travel restrictions. Figure 1 shows that the index ranged between zero and 90 in 2020. However, in 2021, it ranged between 48.15 and 74.07. The results show the presence of a big gap in the intensity of announcements for government social distancing policies. In 2020, the government launched a COVID-19 vaccination drive, but it did not recognize the ongoing severity of COVID-19, so the social distancing measures were lower than in 2020.

The average value of ΔGovResp was 12.3%, indicating a low government overall response, although it reached 19.6% in 2020. Figure 1 shows that the maximum value was in 2020, reaching 72.92% before declining to 70.94% in 2021. The main factor might be the political turmoil that occurred during the study period with the resignation of Prime Minister Elyes Fakhfakh on July 15, 2020, followed by the nomination of Hicham Michichi as the next prime minister.

The mean ΔC&Health was 12% with a standard deviation of 2.302. The containment and health Index covers government policy statements on public awareness campaigns, testing policies and contact tracing. Figure 1 shows that this index ranged between 5.21 and 72.92 in 2020 and between 56.55 and 73.93 in 2021, reflecting an improvement in the government's health-related emergency policies. The number of fully vaccinated people in 2021 rose to 825,410 as compared to zero in 2020. In addition, the government increased its communication about the status of health establishments.

The mean value of the ΔEcoSupport variable was 15%, ranging between 0 and 24.6% during the study period. The economic support index corresponds to government declarations of financial support and debt/contract relief for households. Figure 1 shows that this index went from zero to 75 in 2020.

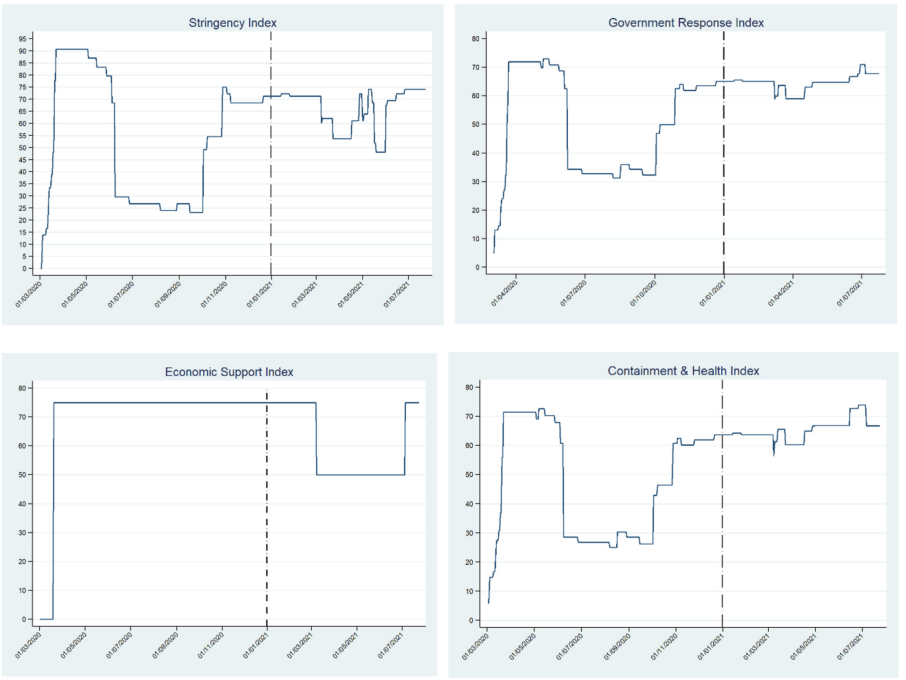

Figure 1.
Government intervention indexes

5. Estimation results

5.1 Main results

We used an extension of the two-step GMM approach developed by Roodman (2009). In the baseline regression equation, we applied six specifications. In model (1), only the lagged daily growth rate of the confirmed cases was used. In models (2), (3), (4) and (5), the stringency index, government response index, containment and health index, and economic support index were added, respectively. In model (6), all four comprehensive indices were simultaneously regressed.

The result of the Hansen (1982) test confirmed the validity of the instruments employed in this study. In addition, the *p*-value of the first- and second-order autocorrelation in the residual AR (1) and AR (2) confirmed that the estimates were consistent (Arellano and Bond, 1991).

The regression results reported in Table 2 matched our expectations. The coefficient of the lagged return was positive and significant across the six models, confirming that the dynamic approach is more suitable than the static approach for panel data. This, in turn, suggests that the current performance can be predicted based on previous performance, indicating that the previous day's trading affects stock market returns of the next day's trading, and vice-versa. It also implies that investors act based on previous information disclosed by the market.

The coefficient of the lagged daily growth rate in confirmed cases ($\boldsymbol{GC}_{t-1}$) was negative and significant, confirming our expectations and showing that the disease was spreading quickly across the country, generating negative shocks in the equity markets. Similarly, Akhtaruzzaman *et al.* (2021) and Zhang *et al.* (2020) showed that the pandemic announcement negatively affected the prices of listed firms. Haroon and Rizvi (2020) analyzed the relationships between the stock market and news about the COVID-19 pandemic and found

Table 2.
Estimation results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ret_{t-1}	0.185*** (0.022)	0.177*** (0.029)	0.175*** (0.030)	0.176*** (0.030)	0.194*** (0.057)	0.160* (0.089)	0.124* (0.066)	0.125* (0.065)	0.125* (0.065)	0.178* (0.102)
GC_{t-1}	−0.027*** (0.003)	−0.025*** (0.003)	−0.026*** (0.003)	−0.026*** (0.003)	−0.029** (0.010)	−0.0241*** (0.004)	−0.021** (0.009)	−0.024** (0.009)	−0.023** (0.009)	−0.029*** (0.009)
ΔString	–	−0.022*** (0.001)	–			−0.016*** (0.002)	−0.019*** (0.003)			
ΔString* GC_{t-1}							−0.017* (0.009)			
ΔGovResp			−0.045*** (0.005)			−0.027*** (0.008)		−0.034*** (0.009)		
ΔGovResp* GC_{t-1}								−0.025* (0.014)		
ΔC&Health				−0.0383*** (0.004)		−0.018*** (0.004)			−0.030*** (0.007)	
ΔC&Health * GC_{t-1}									−0.028* (0.015)	
ΔEco Support					−0.0002 (0.001)	0.015*** (0.002)				−0.005** (0.002)
ΔEco Support * GC_{t-1}										−0.019*** (0.004)
C	0.009*** (0.001)	0.013*** (0.005)	0.017*** (0.004)	0.015*** (0.004)	0.009 (0.008)	0.015*** (0.004)	0.01 (0.007)	0.015** (0.007)	0.015** (0.006)	0.01 (0.008)
Observations	5,448	5,448	5,448	5,448	5,448	5,448	5,268	5,268	5,268	5,268
Hansen (*p*-value)	0.899	0.889	0.900	0.80	0.78	0.78	0.999	0.880	0.990	0.890
AR (1) (*p*-value)	0.002	0.002	0.002	0.002	0.003	0.0069	0.005	0.005	0.004	0.008
AR (2) (*p*-value)	0.256	0.376	0.381	0.417	0.373	0.406	0.14	0.13	0.17	0.34

Note(s): *, ** and *** denote significance at 1, 5 and 10%, respectively

that panic-laden news about the growth in confirmed cases intensified stock market volatility. According to IACE (2020), during the first and second waves of the pandemic, Tunisian firms faced many difficulties. In this context, 60% of industrial and 90.9% of construction companies closed their doors permanently. In addition, total income dropped by an average of 25%.

Regarding the coefficients for the government intervention indices, three of four indices had a negative and highly statistically significant relationship, except the economic support index.

The estimation results for ΔString showed a negative impact, implying that the efforts of the Tunisian government to enforce social distancing led to a decline in stock market returns. This result supports our hypothesis that a positive change in the stringency index can lead to lower stock performance. Indeed, national authorities took several measures during the different stages of the pandemic. For instance, they banned travel between governorates, canceled all gatherings and events, closed the weekly markets, and established a curfew from 7 P.M. to 5 A.M. In 2021, despite the initiation of the vaccination campaign, the authorities extended lockdowns in the governorates where the infection rate exceeded 400 cases per 100,000 people. These findings corroborated the results of Ashraf (2020a) and Zaremba *et al.* (2020), who observed a negative effect of social distancing on the economic activity leading to a decline in firm valuation. The authors, therefore, concluded that social measures may indeed curb economic growth.

The government response index (ΔGovResp) had a significant negative effect on stock performance. The coefficient of −0.045 indicates that a 1% increase in ΔGovResp causes a 0.045% decrease in market return, confirming our expectation. The regression results in column (3) were in line with the findings of Bonaccorsi *et al.* (2020) and Tisdell (2020), who suggested that the pandemic intervention measures negatively affected stock returns, leading to poverty and inequality. This further suggests that government involvement during the pandemic period in preventing and controlling the crisis reduced the performance of listed companies on the Tunisian stock exchange. In this context, during the period of our study, the Tunisian parliament elected two governments led by Elyes Fakhfakh and Hicham Michichi. Hicham Michichi was the third Tunisian prime minister since the election of October 2019. The period between the appointment of Michichi and his predecessor was characterized as one of intense socio-political unrest, having a strong inhibitory effect on investors' decisions.

Regarding the containment and health index (ΔC&Health), there was a negative relationship, significant at the 10% level, suggesting that government emergency healthcare measures decreased the performance of listed firms. Several measures—such as public campaigns, testing policies and contact tracing—were supposed to reduce the spread of the virus and save lives (Alfano and Ercolano, 2020; Greenstone and Nigam, 2020). However, this study found that the health measures taken by governments led to a national economic loss. In the early stage of the pandemic (27 May 2020), the Scientific Committee decided to reopen borders, cultural venues and mosques, as well as extend the opening hours of cafes to 7 P.M. In addition, it introduced lighter health measures. Thus, after recording zero new cases for six consecutive days with the best mortality rate (3.8%) in North Africa, Tunisia reached a record level of infections with 317 deaths on July 23, 2021. Hospitals were dealing with a new surge in COVID-19 patients and a staff shortage. Despite the establishment of a military care center with beds and monitoring equipment, the tremendous pressure continued. According to a statement from the Ministry of Health, Tunisia had one of the highest rates of coronavirus infections in Africa. On July 23, 2021, the ministry reported 5,624 cases in the last 24 h. Such news seriously increased risk aversion, created fear and discouraged investors who were seeking to maximize returns.

In addition, ΔEco Support had a negative, but insignificant impact on the stock market performance, suggesting that the stock market's reaction to such measures was limited.

Thus, the stock market might have reacted negatively to the news of government economic support initiatives because such programs cannot mitigate all the negative effects of the economic slowdown, such as job losses. For instance, Elyes Fakhfakh called on Tunisian citizens to donate cash, and the government established a special fund, known as the 1818 fund, to collect donations within Tunisia and abroad. However, official sources did not appear to provide information on the qualifications required for social assistance, distribution methods, appeal procedures or policies for assisting COVID-19 victims. In addition, in October 2020, the new prime minister claimed that part of the 1818 money had been used, although there was some debate about how it had been spent. This fact might lead to increased uncertainty avoidance following Tunisia's initial general confinement. This result suggested that national culture can mediate the relationship between government policies, stock market returns and COVID-19 confirmed cases. Our results confirmed the previous studies of Inklaar and Yang (2012), who showed that cultural differences might also have an impact on the magnitude of the financial distress in each national economy. The financial crisis increased the level of uncertainty, which raised the real option value of postponing investment. This impact is stronger in countries with a low tolerance for uncertainty. In this context, several cultural and social factors can influence behavioral changes, namely, social inequality, economic position, and social norms and conventions. Fernandez-Perez *et al.* (2021) confirmed that countries with low individualism and high uncertainty-avoidance attitudes reacted negatively and experienced greater stock volatility than countries with high individualism and low uncertainty-avoidance tendencies. Also, they found that the stringency index harmed cumulative abnormal returns. Recently, Ashraf (2021) demonstrated that culture has a significant role in explaining the disparities in the market reaction to COVID-19 across countries. The results revealed that national culture plays an essential role in determining cross-country variances in investors' reactions to the news.

Finally, we simultaneously regressed the four government-intervention indices (column 6). The results confirmed the previous findings, although ΔEcoSupport variable had a positive impact on stock performance. These mixed results reflected those of Ashraf (2020a). One explanation might be that the economic support measures only provided income and debt relief support for people but not companies. As such, the Ministry of Social Affairs announced in April that 1,174,000 Tunisians benefitted from the government's direct financial support program in 2020. This initiative provided a payment of 200 dinars to individuals, and it may be a fertile subject for future research.

5.2 Further analysis

This section examined the impact of the interaction between government policies and the growth rate in COVID-19 confirmed cases on stock market returns as shown in Table 2 (models (7), (8), (9), and (10)). The interaction term enables us to assess if the market's reaction to an increase or a decrease in COVID-19 cases was indirectly influenced by government policies.

First, the interaction term of Δ String* $\boldsymbol{GC}_{t-1}$ was significantly negative, indicating that general confinement and inter-city travel bans exacerbated the negative effect of COVID-19 on stock market returns. This finding indicates that social distancing measures exerted a negative impact on markets as this policy was not able to stem the rise in the number of COVID-19 confirmed cases in Tunisia. For example, to avoid the spread of COVID-19 during Eid in May 2021, the Tunisian president declared general confinement with lockdown measures preventing large gatherings. Forty-eight hours following such an announcement, these measures showed their inefficiencies. Tunisian citizens started striking and protesting for money in massive numbers reflecting their budget deadlock for Eid.

Second, the interaction term of ΔGovResp* GC_{t-1} had a negative impact on market returns, significant at 10%, suggesting that the various government response measures aggravated the effect of the pandemic on the stock market. In this context, during the first wave of the pandemic (from March 2020 to June 2020), the parliament authorized the first head of the Tunisian government to implement decrees/laws to fight the "invisible enemy" [1]. The prime minister then took the responsibility for putting in place legal restrictions during an exceptional period. However, the parliament did not empower Prime Minister Hicham Michichi to promulgate such laws during the second and third waves. Therefore, the prime minister continued to take actions aiming at combating the virus by referring to the views of the Scientific Commission. Subsequently, the measures were simply decisions with some doubts about their legality. More specifically, these decisions were only symbolically signed by the head of government and did not have the legality required for rigorous and indisputable enforcement.

Third, regarding the interaction term of ΔC&Health* GC_{t-1} , it was statistically significant and negative, indicating that government healthcare initiatives were not diverted by a drop in confirmed cases due to several reasons. First, there had been three different health ministers since the outbreak of the pandemic. Second, the medical staff working in the Tunisian public healthcare system went on strike several times to claim for better working conditions and a pay rise. Finally, health institutions were overloaded, raising questions about their capacity to deal with the health crisis.

Finally, the interaction term of ΔEcoSupport* GC_{t-1} was negative and significant, suggesting its negative impact on stock returns. In this context, despite that the Tunisian government imposed several lockdown measures which forced the closure of many small enterprises, no official economic aid plans were revealed before the most recent lockdown measures. During the pandemic, many people lost their jobs or had a cut in their working hours as a direct result of the mandated lockdown and curfew restrictions. This might have weakened consumer and company confidence, consequently, discouraging investment.

6. Conclusion

This study aims to examine the impact of COVID-19-related government measures on the Tunisian stock market. It is the first study that attempts to assess the direct influence of various government policies on the stock market in the MENA region during a period of political turbulence. More specifically, this paper focuses on the stock market's reaction to four types of government action: social distancing, government response, containment and health responses, and economic support programs. The data consists of daily stock market returns, the growth in the COVID-19 confirmed cases, and the government interventions from March 2, 2020, to July 23, 2021. During this period, Tunisia experienced great political turmoil.

The results revealed that the policy responses hurt Tunisian stock market returns, particularly stringency and containment and health measures. Government announcements regarding economic-support measures were also counterproductive, although this impact was insignificant. Our findings supported those of Zaremba *et al.* (2020) and Shanaev *et al.* (2020), who found that stock markets react unfavorably to the announcement of government programs.

Next, the study investigates the impact of the interaction between government measures and the increase in COVID-19 confirmed cases on stock market returns. The finding showed that such actions have an indirect economic disadvantage by increasing the severity of the pandemic.

The interaction terms between the growth in confirmed cases and several government measures indices were statistically significant, indicating that the influence of government measures was being channeled through an increase in confirmed cases. The negative sign of

the interaction term between the *economic support index* and the growth in confirmed cases possibly suggests the contradictory policies adopted by officials regarding the pandemic funds and aid. The probability of corruption can increase when there is a lack of transparency and sharing of information.

This paper offers some important implications for directing the efforts toward boosting stock returns and ensuring stock stability. Thus, given the specific nature of the Tunisian context, especially after invoking Article 80 of the Constitution, Kais Saied should carefully consider the advantages and drawbacks of government measures. Following the release of decrees regulating the exceptional circumstances, much confusion and controversy have arisen over the interpretations of Article 80 of the Constitution.

Regulatory authorities should consider calls from civil society for a debt audit, an idea that was suggested by Raid Attac/Cadtm Tunisie following the Arab Spring revolution on December 17, 2010 (Chamkhi, 2010; Toussaint, 2019). However, the debt system did not end with the fall of the Ben Ali regime in 2011. In contrast, due to pressure from creditors, successive governments continued to push Tunisia deeper into debt (Toussaint, 2022). In 2011, Raid Attac/Cadtm Tunisie made an urgent call to all revolutionary-protection organizations to unify their efforts to secure an immediate suspension of a 577-million-euro payment. Debt has hindered Tunisia's efforts toward economic and social progress, as well as political emancipation. During the payment-suspension period, an audit of the entire public debt should be conducted to determine any illegitimate portions that have not benefited the people of Tunisia. In 2021, Tunisia's national debt was estimated to be about 91.19% of GDP (National Institute of Statistics, 2021), so Tunisia has little choice other than to escape the chains of debt and stop the cycle of dominance and underdevelopment. Furthermore, the refusal to pay debt may help in the recovery of the Tunisian economy. In addition, a legislative proposal about the audit of public debt should be included in the Constitution. Finally, it is important to avoid thinking of all passed-on Tunisians as numbers, because to us, they are not just numbers.

Notes

1. Tunisia Head of Government Elyes Elfakhfakh's speech of March 25, 2020.

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