

Identifying factors associated with the issuance of coronavirus-related stay-at-home orders in the Middle East and North Africa Region

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Abstract

The COVID-19 pandemic has not spared the Middle East and North Africa (MENA) Region. MENA is one of the most politically, socially, and economically heterogeneous regions in the world, a characteristic reflected in its governments' responses to COVID-19. About two-thirds of these governments issued coronavirus-related stay-at-home orders (SAHOs), one of the most effective tools public health officials have for slowing the spread of infectious diseases. While SAHOs are very effective in terms of countering infectious diseases, they are extremely disruptive in nonhealth domains. The objective of this study is to identify reliable factors related to health care policy making that shaped the decisions of MENA governments to issue a SAHO or not in response to COVID-19. The results identify specific political, social, and medical factors that played important roles and provide a look at early government responses to a global health crisis in a heterogeneous region of the world.

Key Points

- About two-thirds of MENA governments issued stay-at-home orders (SAHOs) in response to the early stages of the COVID-19 pandemic.
- While SAHOs are very effective in terms of countering infectious diseases, they are extremely disruptive in non-health domains.
- Among broad factors that typically affect public health policy making, the results suggest medical and political considerations as well as policy diffusion reliably influenced the issuance of SAHOs in MENA.



- This research gives policy makers and researchers a look at early government responses to a global health crisis in a heterogeneous region of the world.

KEYWORDS

coronavirus, COVID-19, lockdowns, MENA, pandemic, policy diffusion, public health, stay-at-home orders

INTRODUCTION

The COVID-19 pandemic has created turmoil around the world. Widespread infection and deaths have led governments to take a number of steps to contain the disease including running public awareness campaigns, limiting public gatherings and domestic travel, imposing curfews, changing prison policies, closing schools and borders, and issuing lockdowns and stay-at-home orders (SAHOs; ACAPS, 2020). The most restrictive health policies can dramatically limit the spread the disease (e.g., Kraemer et al., 2020), but in nonhealth domains the consequences have been severe (e.g., Coetzee & Kagee, 2020). For instance, UNESCO (2020) reports that nationwide school closures have affected more than 60% of the world's student population with localized closures affecting millions of additional students, and, according to some, these closures being among the most disruptive consequences of this pandemic (Hoffman & Miller, 2020). Further, locking down businesses has led to severe economic consequences across a wide range of countries (UNIDO, 2020; World Bank, 2020b). The contraction of economic activity has been substantial, and millions of workers around the world have been furloughed (Jones et al., 2020), including more than 40 million workers in Europe's six biggest economies (O'Brien & Schneeweiss, 2020).

The Middle East and North Africa (MENA) Region has suffered from the consequences of the disease with the rest of the world. Seven months into the pandemic, the United Nations (UN) Office for the Coordination of Humanitarian Affairs (OCHA) reported that the region had suffered almost 1 million confirmed cases and more than 17,000 deaths (OCHA, 2020). Shortly before that, the OECD reported that the pandemic is imposing a “dramatic economic cost” (OECD, 2020, p. 1) and “massive economic turmoil” (OECD, 2020, p. 6) in the region due to simultaneous shocks from large drops in oil prices, economic consumption, and trade.

MENA includes a population of about 550 million people who embody highly heterogeneous governmental, socioeconomic, cultural, linguistic, and religious characteristics. Strategically located between East and West, the MENA region garnered historic interest due to trading routes, but now is better known for having a large share of the world's petroleum reserves. A history of colonialism influenced a statist approach to governing, with a significant emphasis on domestic and national security. Government types include monarchies, theocracies, single-party authoritarian states, consociationalism, and parliamentary democracies. Economies range from some of the world's wealthiest to some of its poorest. Religious cleavages also influence domestic and international policy. The current war in Yemen serves as an example, with Shia Houthi rebels supported by Iran and Sunni former government officials supported by Saudi Arabia as both countries vie for regional hegemony. The MENA Region is complex and worth study under “normal” circumstances. During the COVID-19 pandemic, its varied and complex nature offers researchers and policy makers an important opportunity to evaluate public health decision making within the context of a worldwide health crisis. As Okma and Marmor (2013, p. 490) note, “relationships that hold

over many very different national experiences are likely to be few in number but powerful and thus important.”

As such, this study is designed to identify factors related to health care policy making that shaped the decisions of governments in the MENA Region to disrupt daily life in their countries by issuing a SAHO or not in response to COVID-19. With this objective in mind, the next section of this study presents previous research that provides potential explanations and expectations about MENA government responses and nine associated hypotheses. In particular, this review focuses on political, social, economic, and scientific/medical factors often present in health care policy making. The following section details the method of analysis used, event history analysis (EHA), and the data collected, which come from a wide variety of sources including the World Bank, UN, World Health Organization, and Oxford University. The results section presents several analyses and robustness checks of the findings showing that decisions by MENA governments regarding SAHOs in response to COVID-19 were reliably influenced by two political issues, the policies of other governments, and the extent of the threat of the disease to citizens. Lastly, the discussion summarizes the results, addresses the study's limitations, and places the findings in a larger context about government decision making during major public health crises.

LITERATURE AND HYPOTHESES

Public policy scholars have identified two broad categories of factors that influence the adoption of policies (e.g., Berry & Berry, 2018; Mooney & Lee, 1995). Internal factors include the characteristics of a country that make a policy more or less appropriate for that country and attractive to its policymakers. This factor includes political, social, and economic characteristics, and, specifically regarding public health policy, medical characteristics (Brownson et al., 2009). External factors include policy adoption in other countries that may influence a country's policymakers, such as geographically proximate neighbors or social learning from similar governments (e.g., Berry & Berry, 2018; Mooney & Lee, 1995; Shipan & Volden, 2012).

Starting with political factors, Blank et al. (2018, p. 6) note that health policy is, “at its base...a political matter,” and Spasoff (1999) extends that by arguing that political actors play the principal role in public health decisions. The government processes that shape public health policy are difficult and can occur both formally and informally due to the profound impact, cost, and complexity (e.g., issues regarding provision, financing, and regulation) involved. Irrespective of the policy under consideration, issues regarding the concentration of power (Blank et al., 2018) are important. Making policy becomes easier as fewer actors play a role. In autocratic governments, policy making is centrally concentrated, while in democratic governments it is widely dispersed both within governmental institutions and with voters. Blank et al. (2018, p. 99) argue that one of the primary tenets of democracy is to maximize the choices of patients. This suggests, on one hand, that autocratic governments face fewer constraints on their decisions to issue SAHOs, although it is not clear if they are more or less likely to lock down their societies for public health reasons. On the other hand, democratic societies face more constraints on policy making, and they philosophically tend to prefer to maximize citizen choice. Therefore, limiting citizens' choices by issuing a SAHO may be harder to enact and contrary to their approach to personal freedoms. Overall, this suggests:

H1a: *The probability that a government will issue a SAHO will decrease when it is a democratic versus autocratic government.*

Another political factor related to concentration of power is a government's administrative ability to make and implement policy, regardless of the type of government. A government that cannot function or implement adopted policy has, in practical terms, not made policy. In the case of issuing a coronavirus-related SAHO, government authorities may recognize that they cannot implement or enforce such an order and, in lieu of angering some citizens by restricting their activities, may forgo that intervention. On the other hand, more efficacious governments may be more inclined to issue a SAHO given their abilities to implement them. As such:

H1b: *The probability a government will issue a SAHO will increase when it has greater administrative capacity.*

Social factors also play an important role in health policy. While this policy domain is complex, several clear social dimensions are pertinent: social arrangements, historic legacies, and policies of similar countries. The first social factor captures differing population vulnerability. The populations of some countries may be more vulnerable to an infectious disease than other countries. For instance, living arrangements can be important. Urban populations can be especially vulnerable to pandemics (Kawashima et al., 2016), as a virus is more likely to spread when large concentrations of people live and work in close physical proximity to each other. As a result, governments with more vulnerable populations may be more likely to take aggressive steps to intervene against the disease.

H2a: *The probability a government will issue a SAHO will increase when residents are more vulnerable to the disease.*

Another social factor is countries' historic legacies, which may capture long-term effects on how their health care systems were created and how their health-related cultural and philosophical expectations evolved (Blank et al., 2018). The British and French together colonized more than half of the MENA countries, while several others were never colonized at all. Further, many of the countries did not gain their independence from their colonizers until the 20th Century (Wolfe, 2013). Research suggests British and French colonial legacies are reflected in the current political order in Africa due to more direct French administration of their colonies, which promoted more centralized rule (Müller-Crepon, 2020). As a result, countries with French colonial legacies may be more likely to issue a SAHO. As such:

H2b: *The probability a government will issue a SAHO will increase when the country was a French versus of British colony.*

The final social dimension is the only external factor addressed in this study. A country's policies may be affected by the policy choices of other countries, a process known as policy diffusion (e.g., Berry & Berry, 2018). A policy may diffuse from one country to the next, including health care policy (Linos, 2013), in a process that is often considered forms of competition, coercion, or learning (e.g., Dobbin et al., 2007; Mooney & Lee, 1995). First, policies may diffuse to geographically proximate or neighboring countries (Berry & Berry, 2018; Chamberlain & Haider-Markel, 2005). This may particularly be the case due to concerns about the physical spread of a disease across country borders as demonstrated, for instance, by the diffusion of impaired driving laws from neighboring states in the United States (Macinko & Silver, 2015). Although diffusion has classically been assessed in terms of geographically proximate neighbors, other factors such as political, economic, and demographic similarities may be the actual influence (Shipan & Volden, 2012) and may be

reflected in temporal patterns. For example, Mooney and Lee (1995) find that countries learn from the policy successes and failures of similar countries leading to common patterns of policy adoption over time. They describe one frequent, S-shaped curve or pattern that involves one or two regional leaders implementing a new policy while other countries observe the outcomes. Learning from the leaders and adjusting as appropriate for national conditions, several observing countries adopt the policy and it picks up momentum. As momentum picks up, nonadopting countries feel pressure to adopt and a small number do adopt. Finally, a limited number of other governments resist adoption. These two bodies of literature suggest:

H2c: *The probability a government will issue a SAHO will increase when geographically proximate governments have issued a SAHO.*

H2d: *The probability a government will issue a SAHO will vary over time in response to similar governments issuing a SAHO.*

Economic factors also play a role in health care policy making. Many studies have identified wealth, in the form of GDP per capita, as one of the most important predictors of health care expenditures (e.g., Ke et al., 2011). Simply put, countries with greater wealth have more disposable income to spend on health care. On a broader scale, citizen satisfaction with government plays a large role in government sustainability, even in autocracies, and research suggests that economic prosperity plays a meaningful role in citizen satisfaction with democratic (e.g., Jung & Oh, 2019) and authoritarian (e.g., Klymenko & Gherghina, 2012) government. SAHOs, which affect employment and consumption patterns, have the potential to substantially disrupt economic systems and, therefore, wealth and economic prosperity. Governments with stronger economies may be more likely to estimate that they can afford to disrupt their economies than those with weaker economies. As such:

H3: *The probability a government will issue a SAHO will increase as the strength of its economy increases.*

The previous literature outlines expectations regarding political, social, and economic factors that may influence governments' decisions to issue SAHOs. Researchers have argued that scientific/medical factors also influence public health policy (e.g., Brownson et al., 2009). One scientific/medical factor is type of health care system, which Blank et al. (2018) broadly categorize as health care provision based on a national health service, social insurance, or private insurance. This generally indicates systems' macro-institutional characteristics, which range from government monopoly to free market. Specifically, on one extreme are national health services, which are characterized by universal health care coverage financed by taxes on the general public and which imply health care is viewed more as a public good. On the other extreme is private insurance, which is characterized by individual responsibility for health care acquisition financed by personal or employer contributions and which implies health care is viewed more as a private good. In many countries this would be considered a social factor related to societal values and more specifically to important citizen expectations (Blank et al., 2018) related to collectivism versus individualism (e.g., Triandis, 1988). But in the heavily nondemocratic region of MENA where 12 of the 21 governments are categorized as authoritarian (Marshall & Elzinga-Marshall, 2017), this is more reasonably classified as a medical factor because it reflects the preferences of the high-level leaders and not specifically the people. Otherwise, a government with a monopoly on health care services may be more likely to issue a SAHO as their

responsibility to their citizens, while leaders with free market systems may be less likely to treat this as a government responsibility. As such:

H4a: *The probability a government will issue a SAHO will be greater in countries in which health care is viewed more as a public than private responsibility.*

Another scientific/medical factor that may affect leaders' decisions regarding SAHOs is the threat or prevalence of the disease. When a disease spreads too quickly, a health care system may have insufficient capacity in the form of staff, equipment, or other medical resources to care for patients. In epidemiology, taking steps to slow disease transmission to reduce the likelihood that a health care system will become overwhelmed with patients is known as “flattening the curve” (Centers for Disease Control, 2007). SAHOs force social distancing and slow transmission, therefore, helping to flatten the curve. Leaders in countries with a greater presence of the disease may be more concerned about their country's health care system becoming overwhelmed and, therefore, be more aggressive in issuing a SAHO. This suggests:

H4b: *The likelihood that a government will issue a SAHO will increase as the prevalence of the disease increases.*

DATA AND METHODS

There is no definitive list of MENA countries,¹ so this study takes a geographic focus by including the 19 countries and one territory (Palestine) that constitute the World Bank MENA region plus Israel, which results in a total of 21 governments. The data include 61 days of observations starting on January 31 and ending March 31, 2020. January 31 is the day following the World Health Organization's declaration of a “public health emergency of international concern” related to COVID-19 (World Health Organization, 2020), and March 31 follows shortly after the last MENA government issued a SAHO during the initial wave of the disease. While many dates could have been used to start and end data collection, these are the dates of fairly unambiguous events that offer reasonable justifications.

We construct the dependent variable of the issuance of a SAHO (coded 1) or not (coded 0) from data provided by the Oxford COVID-19 Government Response Tracker (Hale et al., 2020). This study employs EHA to assess the effects of political, social, economic, and scientific/medical factors on the government issuance of SAHOs in response to COVID-19 in MENA. EHA is a statistical technique commonly used in policy adoption research to analyze time-series data to investigate rare or one-time events and factors that affect them (Berry & Berry, 1992). As with survival analysis, in EHA a subject drops out of the analysis once it is no longer at “risk” of adopting the policy (once the government has issued a SAHO). For example, Jordan issued a SAHO on March 18. It was coded 0 for the 45 observations from January 31 to March 17, then 1 on the one observation on March 18, the day on which the order was issued, and subsequently omitted from the data from March 19 to March 31. As a result of this coding, Iraq, the first country in which a SAHO went into effect (March 13), contributes 43 observations to the data set and Egypt, the last country in which a SAHO went into effect (March 25), contributes 55 observations. The six governments that did not issue a SAHO contribute 61 observations each. The data set includes 1134 country-day observations when capturing all 21 governments. See Appendix A for details on all variables.

The following independent variables are used in the theoretically strongest model. We collected the data from sources such as the World Bank, UN, and World Health

Organization. Two measures are used to capture the political factor: regime type (H1a) and government effectiveness (H1b). Regime type is indicated by Polity scores, a widely used measure of countries' levels of autocracy versus democracy as estimated by The Center for Systemic Peace (Marshall & Gurr, 2020). This continuous measure ranges from a score of -10 (strong autocracy) to 10 (strong democracy). The hypothesis indicates the relationship will be negative. Government effectiveness is a measure from the World Bank indicating the quality and credibility of each country's policy processes and public services as rated in 2018. This continuous measure ranges from -2.5 (low effectiveness) to 2.5 (high effectiveness). The hypothesis indicates the relationship will be positive.

The social factors include percent urban population, colonial legacy, and geographic and temporal diffusion. The first reflects population vulnerability based on living arrangements (H2a). Urban populations can be especially vulnerable to pandemics (Kawashima et al., 2016) due to residents' close living conditions and large numbers of people. Its effect is captured in the percentage of a country's population that lives in urbanized areas as reported by the UN. The hypothesis indicates the relationship will be positive.

The second social factor indicates historic ties between countries (H2b), which may suggest similarities in healthcare systems that were created in countries with common colonizers and how they relate to cultural and philosophical expectations regarding health and healthcare. This measure captures colonial legacy and categorizes the countries as colonized by Britain (coded 0), France (coded 1), or not colonized by Britain or France (coded 2). This last category includes the six remaining MENA countries that were never colonized by Britain or France and the one country, Libya, that was colonized by Italy. This variable is entered into the regression models as two indicator variables where the former British colonies serve as the comparison group. The hypothesis indicates the relationship regarding formerly French colonies will be positive.

The final social factor captures geographic and temporal policy diffusion from other countries. Policies may diffuse geographically (H2c; Berry & Berry, 2018; Chamberlain & Haider-Markel, 2005), which is captured here as the proportion of a country's bordering countries with a SAHO in effect by country-day. The hypothesis indicates the relationship will be positive. They may also diffuse temporally (H2d) following an S-shaped curve in which one or two regional leaders implement a new policy after which several other countries quickly adopt with a remaining few laggards that resist adoption over a longer period of time. In technical terms, this process represents a policy's hazard rate; that is, the probability a government will adopt a policy given that it has not adopted it yet (Mooney & Lee, 1995). Table 1 presents data pertinent to the hazard rate in the form of a life table. It shows the S-curve pattern of regional leaders issuing SAHOs followed by an acceleration of SAHOs going into March 20 with the peak on March 23 then the deceleration. The temporal diffusion measure is calculated by taking the square root of the number of days between a given day and the day with the highest hazard rate, which for this study is March 23. The hypothesis indicates the relationship will be negative as the S-curve learning pattern suggests the probability of a SAHO rises toward the day of peak adoption then falls after that.

Following substantial evidence of the effect of wealth on government health care spending and, in particular, GDP per capita (e.g., Ke et al., 2011), the economic factor (H3) is captured by GDP per capita in 2017 from the *UN Statistical Yearbook*. A higher GDP per capita indicates a stronger economy. The hypothesis indicates the relationship will be positive.

Finally, the scientific/medical factor is captured by two measures: type of health care system (H4a) and extent of coronavirus threat (H4b). Type of health care system reflects a country's macro-institutional health care arrangements ranging from government monopoly to free market. One fundamental measure of this is government health care spending as a proportion of total health care spending (Blank et al., 2018), which is used to assess H4a.

**TABLE 1** Life table and temporal diffusion

| Day | SAHOs implemented | Risk set | Hazard rate |
|----------|-------------------|----------|-------------|
| 12-March | 0 | 21 | 0.00 |
| 13-March | 1 | 21 | 0.05 |
| 18-March | 2 | 20 | 0.10 |
| 20-March | 3 | 18 | 0.17 |
| 22-March | 3 | 15 | 0.20 |
| 23-March | 5 | 12 | 0.42 |
| 25-March | 1 | 7 | 0.14 |

Note: Day indicates day and month a SAHO took effect. SAHOs implemented indicates the number of SAHOs taking effect that day and month. Risk set indicates the number of governments that have not yet implemented a SAHO. Hazard rate is the proportion of countries that implemented a SAHO that could have implemented a SAHO.

In countries in which the government contributes a very large proportion the system is closer to a government monopoly, while in countries where the government contribution is very small the system is closer to a free market system. A greater contribution indicates a greater government responsibility for health care. The hypothesis indicates the relationship will be positive.

The next measure captures that extent to which COVID-19 is threatening the country (H4b). It indicates the number of cases in the country per 100,000 residents. A higher number of cases per capita would signal greater threat. The hypothesis indicates the relationship will be positive.

RESULTS

This section presents an overview of the data followed by fundamental relationships based on bivariate analyses then relationships based on multivariate analyses that account for the full set of predictors. Table 2 presents descriptions of the variables used in the analyses. It shows that 15 of the 21 MENA governments issued a SAHO at some point during the period under consideration, with Iraq issuing the first order on March 13 and Egypt issuing the last on March 25. Politically, based on Polity scores, 12 of the governments are authoritarian, seven democratic, and two are failed states. Freedom House categorizes 14 of the countries as “not free,” four as “partially free,” and three as “free.” Government effectiveness ranges from a low of -2.5 to a high of 2.5 with a mean score in MENA of a bit less than zero.

There are many other indications of the heterogeneity of this region. Socially, in Qatar and Kuwait nearly everyone lives in an urban setting, while in Egypt and Yemen only about four in 10 do. It is also worth noting that the largest country (Egypt, 98.4 million) is more than 200 times the size of the smallest (Malta, 0.5 million). Britain has the largest colonial legacy in the region (eight), but France follows closely behind (six). Economically, MENA's largest GDP per capita (Qatar) is 76 times its smallest (Syria). The World Bank classifies the MENA region as “high income” (World Bank, 2020a), which may be at least partly attributable to the fact that MENA countries account for seven of the 13 members of the Organization of the Petroleum Exporting Countries (OPEC). It categorizes seven countries as “high income” and two as “low income” with the remaining not quite evenly split between “low-” and “upper-middle” income (not reported in the table). UN data indicate unemployment ranges widely from around 1% (Qatar) to more than 25% (Palestine). Finally, medically and in terms of

TABLE 2 Variable descriptions

| Country | SAHO date | Political | | Social | | | Economic | | Medical/scientific | | | |
|--------------|-----------|---------------------|-----------|----------|----------------|-----------|----------|-----------------|--------------------|-----------|---------------------|------------------|
| | | Polity/ (regime) | FH status | Govt Eff | Fragility | Urban (%) | Pop Den | Colonial legacy | GDPpc | Inflation | Govt Hlth spend (%) | Service coverage |
| Algeria | 23-March | 2 (D) | NF | -0.44 | 11 | 73.2 | 17.7 | France | 4055 | 2.0 | 66.0 | 78 |
| Bahrain | Never | -10 (A) | NF | 0.18 | 9 | 89.4 | 2107.3 | Never | 23,668 | 1.0 | 58.0 | 77 |
| Djibouti | 23-March | 3 (D) | NF | -0.90 | 12 | 77.9 | 41.4 | France | 1928 | 3.3 | 47.0 | 47 |
| Egypt | 25-March | -4 (A) | NF | -0.58 | 10 | 42.7 | 98.9 | Britain | 2000 | 13.9 | 33.0 | 68 |
| Iran | Never | -7 (A) | NF | -0.43 | 9 | 75.4 | 50.2 | Never | 5680 | 41.1 | 51.2 | 72 |
| Iraq | 13-March | 6 (D) | NF | -1.32 | 18 | 70.7 | 88.5 | Britain | 4756 | -0.2 | 41.9 | 61 |
| Israel | 20-March | 6 (D) | F | 1.21 | 7 | 92.5 | 410.5 | Britain | 42,452 | 0.8 | 63.6 | 82 |
| Jordan | 18-March | -3 (A) | PF | 0.11 | 6 | 91.2 | 112.1 | Britain | 4196 | 0.3 | 44.8 | 76 |
| Kuwait | 22-March | -7 (A) | PF | -0.09 | 4 | 100.0 | 232.2 | Never | 28,897 | 1.1 | 87.4 | 76 |
| Lebanon | 18-March | 6 (D) | PF | -0.64 | 5 | 88.8 | 669.5 | France | 8778 | 2.9 | 50.0 | 73 |
| Libya | 22-March | 0 (F) | NF | -1.85 | 14 | 80.4 | 3.8 | Italy | 3942 | 4.6 | 63.3 | 64 |
| Malta | 23-March | 5 ^b (D) | F | 0.97 | 7 ^a | 94.7 | 1514.5 | Britain | 29,137 | 1.5 | 63.1 | 82 |
| Morocco | 20-March | -4 (A) | PF | -0.21 | 7 | 63.0 | 80.7 | France | 3070 | 0.0 | 42.9 | 70 |
| Oman | Never | -8 (A) | NF | 0.19 | 5 | 85.4 | 15.6 | Britain | 15,267 | 0.1 | 87.7 | 69 |
| Palestine | 22-March | -7 ^a (A) | NF | -0.76 | 4 ^a | 76.4 | 759.0 | Britain | 2946 | 1.6 | 43.6 | 59 ^a |
| Qatar | Never | -10 (A) | NF | 0.63 | 3 | 99.2 | 239.6 | Never | 63,506 | -0.6 | 80.7 | 68 |
| Saudi Arabia | 23-March | -10 (A) | NF | 0.32 | 8 | 84.1 | 15.7 | Never | 20,761 | -1.2 | 64.1 | 74 |
| Syria | Never | -9 (A) | NF | -1.67 | 14 | 54.8 | 92.1 | France | 831 | 14.4 | 45.3 | 60 |

(Continues)

TABLE 2 (Continued)

| Country | SAHO date | Political | | Social | | | Economic | | Medical/scientific | | | |
|-------------|-----------|---------------------|---------------|----------|-----------|-----------|----------|--------------------|--------------------|-----------|------------------------|---------------------|
| | | Polity/ (regime) | FH status | Govt Eff | Fragility | Urban (%) | Pop Den | Colonial legacy | GDPpc | Inflation | Govt Hlth spend (%) | Service coverage |
| Tunisia | 20-March | 7 (D) | <i>F</i> | -0.11 | 4 | 69.3 | 74.4 | France | 3475 | 6.7 | 57.1 | 70 |
| UAE | 23-March | -8 (A) | <i>NF</i> | 1.43 | 5 | 86.8 | 135.6 | Never | 40,699 | -1.9 | 72.0 | 76 |
| Yemen | Never | 0 (<i>F</i>) | <i>NF</i> | -2.24 | 21 | 37.3 | 54.0 | Britain | 990 | 10.0 | 10.2 | 42 |
| Mean [mode] | [Never] | -2.5 [A] | [<i>NF</i>] | -0.30 | 8.7 | 77.8 | 320.2 | [Britain] | 14,811 | 4.8 | 55.9 | 69 |
| SD | | 6.2 | | 0.97 | 4.8 | 17.1 | 528.8 | | 17,341 | 9.5 | 18.3 | 10 |

Note: Columns in italics indicate alternative measures. Polity: positive scores indicate a Democratic (D) government, negative scores an Authoritarian (A) government, and 0 a failed state (F). Abbreviations: F, free; FH, Freedom House; NF, not free; PF, partially free.

^aImputed value.

health care systems, eight MENA governments spend less than half the total spent on health care and three governments spend more than 80%. In other data reported by WHO the most fully resourced country (Malta) has 17 times the number of physicians and more than six times the number of hospital beds per capita than the least resourced (Djibouti and Yemen, respectively).

Bivariate results

Appendix B reports bivariate correlations between the dependent variable and each independent variable as estimated using bivariate regression models. All regression results are based on probit models because the dependent variable is dichotomous. Diagnostic tests suggest the presence of heteroskedasticity, so the regression models use robust standard errors. All p values are based on two-tailed tests. The bivariate results demonstrate the complexity of the effects. Most of the relationships are statistically insignificant, although the multivariate results indicate a number of important relationships when confounding effects are controlled for. The two strongest bivariate effects are the external effects related to policy diffusion by social learning from other governments. In particular, the bivariate results suggest a government is more likely to issue a SAHO if bordering states have already issued one. Notably, though, the strongest single predictor by far is social learning through temporal diffusion. Its pseudo R^2 is significantly larger than that of the other independent variables, and its pseudo log likelihood and BIC are significantly smaller than that of the other independent variables.

Multivariate results

The multivariate results clarify the associations between the dependent variable and each independent variable by accounting for the effects of the other specified independent variables. Table 3 reports the relationships in terms of probit coefficients for each independent variable, which can be translated into marginal effects that indicate the probability that a government will issue a COVID-19-related SAHO on any given day. The marginal effects or estimated changes in that probability on any given day are reported in square brackets. Model 1 is the theoretically best model. The remaining models provide robustness checks in the form of alternative specifications for the relationships identified in Model 1, which will be reported in the next section. All of the multivariate models include at least one measure of each factor (i.e., political, social, economic, and scientific/medical).

Model 1 includes 1110 observations, as represented by country-days. Its overall model fit is statistically significant ($X^2 = 35.43$, $p < 0.05$), and it produces a McFadden's pseudo R^2 of 0.59 and BIC of 142.17. The results suggest that political factors play a meaningful role in the issuance of SAHOs. They show that as governments become more democratic, as indicated by Polity score, they become more likely to issue a SAHO. Although the substantive effect is small (i.e., two-tenths of 1% per day for each one-point increase in Polity score), it is statistically significant. This contradicts H1a, which suggests autocratic governments should be more likely to issue a SAHO than democratic governments. One interpretation of this result may be that democratic governments, which are subject to the preferences of their voters, may feel their voters want an aggressive public health response to the pandemic, while autocratic governments may feel they are free to protect their economies. The results provide limited support for H1b. That is, as governmental processes and services are higher in quality and credibility, MENA governments are more likely to issue a SAHO, but the effect is only marginally statistically significant (i.e., $p < 0.10$). Overall,



TABLE 3 Multivariate results

| Factor and variable | Hyp/ Sign | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 | Model 9 |
|----------------------|------------------|--------------------------------------|-------------------------------|--------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Political | | | | | | | | | | |
| Government type | H1a/- | 0.153* (0.060) [0.002*] | | 0.161* (0.062) [0.003*] | 0.146* (0.047) [0.003*] | 0.179* (0.062) [0.004*] | 0.156* (0.050) [0.002*] | 0.143* (0.058) [0.002*] | 0.142* (0.048) [0.002*] | |
| Freedom house | H1a/- | | 0.980 (0.629) [0.018] | | | | | | | 0.915* (0.411) [0.027*] |
| | 2/Partially free | | | | | | | | | |
| | H1a/- | | 1.476* (0.832) [0.034]* | | | | | | | 0.947 (0.597) [0.029] |
| Govt effectiveness | H1b/+ | 0.702* (0.375) [0.011*] | 0.104 (0.358) [0.002] | | 0.736* (0.368) [0.013*] | 1.155* (0.462) [0.023*] | 0.169 (0.283) [0.003] | 0.418 (0.420) [0.007] | 0.709* (0.372) [0.012*] | |
| State fragility | H1b/- | | | -0.115 (0.078) [-0.002*] | | | | | | 0.067 (0.064) [0.002] |
| Social | | | | | | | | | | |
| Urban population (%) | H2a/+ | 0.054* (0.022) [0.001*] | 0.047* (0.021) [0.001*] | 0.046* (0.021) [0.001*] | | 0.061* (0.027) [0.001*] | 0.028 (0.031) [0.000] | 0.028 (0.018) [0.000*] | 0.042* (0.020) [0.001*] | |
| Population density | H2a/+ | | | 0.000 (0.000) [0.000] | | | | | | -0.000 (0.000) [-0.000] |

TABLE 3 (Continued)

| Factor and variable | Hyp/ Sign | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 | Model 9 |
|-----------------------------|--------------|--|---------------------------------|---------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|---------------------------------|--------------------------------------|-------------------------------|
| Colonial legacy | | | | | | | | | | |
| 1/France | H2b/+ | -0.428 (0.636) [-0.006] | -0.121 (0.399) [-0.002] | -0.625 (0.608) [-0.008] | -0.473 (0.651) [-0.006] | -0.147 (0.539) [-0.002] | 0.042 (0.490) [0.001] | -0.695 (0.620) [-0.010] | -0.164 (0.557) [-0.002] | 0.213 (0.404) [0.006] |
| 2/Never | na | 1.002* (0.487) [0.025*] | 0.289 (0.586) [0.006] | 0.780 (0.516) [0.019] | 1.031* (0.448) [0.030*] | 1.941* (0.767) [0.064*] | 0.721* (0.425) [0.014] | 0.445 (0.491) [0.011] | 1.301* (0.644) [0.035*] | -0.141 (0.445) [-0.003] |
| diff Never—France | | 1.43* | 0.41 | 1.41* | 1.50* | 2.09* | 0.68 | 1.14 | 1.47* | 0.35 |
| Geographic diffusion | | | | | | | | | | |
| | H2c/+ | 0.010 (0.008) [0.000] | 0.004 (0.006) [0.000] | 0.008 (0.007) [0.000] | 0.005 (0.006) [0.000] | 0.012 (0.009) [0.000] | 0.019* (0.007) [0.000*] | 0.006 (0.008) [0.000] | 0.014* (0.008) [0.000*] | 0.000 (0.007) [0.000] |
| | H2d/- | -1.244* (0.234) [-0.020*] | -1.231* (0.343) [-0.022*] | -1.291* (0.293) [-0.021*] | -1.042* (0.171) [-0.018*] | | -1.196* (0.203) [-0.018*] | -1.179* (0.207) [-0.020*] | -0.978* (0.160) [-0.016*] | 0.126* (0.039) [0.003*] |
| Temporal diffusion (linear) | | | | | | | | | | |
| | H2d/+ | | | | | 0.235* (0.072) [0.005*] | | | | |
| Economic | | | | | | | | | | |
| GDP per capita | H3/+ | -0.000* (0.000) [-0.000*] | -0.000 (0.000) [-0.000] | -0.000 (0.000) [-0.000] | -0.000 (0.000) [-0.000] | -0.000* (0.000) [-0.000*] | | -0.000* (0.000) [-0.000*] | -0.000* (0.000) [-0.000*] | |
| Inflation | H3/- | | | | | | -0.167 (0.112) [-0.003] | | | -0.080 (0.073) [-0.002] |

(Continues)



TABLE 3 (Continued)

| Factor and variable | Hyp/ Sign | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 | Model 9 |
|------------------------|--------------|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|-------------------------------|
| Medical/scientific | | | | | | | | | | |
| Govt Hlth spending (%) | H4a/+ | -0.038* (0.016) [-0.001*] | -0.032* (0.017) [-0.001*] | -0.039* (0.019) [-0.001*] | -0.003 (0.011) [-0.000] | -0.045* (0.020) [-0.001*] | -0.044* (0.019) [-0.001*] | -0.034* (0.018) [-0.001*] | | |
| Service coverage | H4a/+ | | | | | | | 0.016 (0.023) [0.000] | | 0.019 (0.027) [0.000] |
| Cumulative cases | H4b/+ | -0.131* (0.036) [-0.002] | -0.118* (0.043) [-0.002*] | -0.125* (0.039) [-0.002*] | -0.102* (0.035) [-0.002*] | -0.125* (0.038) [-0.003*] | -0.106* (0.038) [-0.002*] | -0.112* (0.036) [-0.002*] | | |
| Cumulative deaths | H4b/+ | | | | | | | | -3.057* (1.782) [-0.051*] | -1.153 (4.301) [-0.027] |
| Constant | | 0.960* (0.444) | 0.354 (0.408) | 2.051* (0.963) | 0.706* (0.412) | -13.229* (3.855) | 0.181 (0.479) | -0.045 (1.623) | -0.001 (0.396) | -8.366* (2.016) |
| N | | 1110 | 1110 | 1110 | 1110 | 1110 | 1110 | 1110 | 1110 | 1110 |
| Pseudo Log likelihood | | -32.518 | -34.670 | -32.278 | -36.146 | -40.031 | -31.868 | -34.254 | -34.202 | -49.622 |
| χ^2 | | 35.43* | 26.98* | 37.88* | 46.03* | 37.03* | 56.37* | 41.09* | 52.58* | 49.96* |
| Pseudo R ² | | 0.591 | 0.564 | 0.594 | 0.545 | 0.496 | 0.599 | 0.569 | 0.570 | 0.376 |
| BIC ^a | | 142.170 | 153.485 | 141.688 | 149.425 | 157.195 | 140.869 | 145.642 | 145.537 | 183.390 |

Note: DV = SAHO. Numbers in parentheses indicate robust SEs; numbers in square brackets indicate the marginal effect or change in probability of the issuance of a SAHO on any given day given a one-unit increase in the independent variable. Bold values highlight Model 1, the theoretically best model. Italic values indicate results for alternative measures.

^aBIC assesses model fit; smaller BIC is preferred/better model.

*Statistical significance at the 5% using two-tailed tests and robust SEs.

*Statistical significance at the 10% using two-tailed tests and robust SEs.

the evidence contradicts H1a and somewhat supports H1b, but both results suggest political factors play a role in the issuance of SAHOs in MENA.

In terms of the social factors, living arrangements in the form of urbanicity are statistically related to the issuance of SAHOs as asserted by H2a. Each percentage-point increase in population living in an urban setting is associated with one-tenth of 1% increase in the probability a government will issue a SAHO. The results do not support H2b regarding colonial legacies, but the analyses uncover a related effect that is notable. The evidence suggests that governments with British and French colonial legacies do not differ in likelihood of issuing a SAHO. But governments with no colonial legacy do statistically differ from those with British legacies, and the substantive effect is about 2.5 percentage points per day, although it is only marginally statistically significant. Similarly, the governments with no colonial legacy also may differ from those with French legacies, but, again, the difference is only marginally statistically significant. Contrary to H2c, the results indicate that SAHOs did not diffuse geographically, but in support of H2d they did diffuse temporally. The negative coefficient for the measure of temporal diffusion indicates that the probability of a government issuing a SAHO order followed the S-curve learning pattern as proposed in H2d by rising toward the day of peak adoption then falling after that day. It is worth noting that the bivariate results showing a pseudo R^2 of 0.41 suggest temporal diffusion accounts for a large proportion of the variance in the dependent variable. The multiple regression results confirm this. Removing this measure from the model results in a drop in pseudo R^2 of 75% from 0.59 to 0.15. A likelihood-ratio test without robust standard errors indicates the difference between the two models is statistically significant ($\chi^2 = 70.04$; $p < 0.05$). Overall, the evidence suggests social factors play a meaningful role in the issuance of SAHOs, but it offers mixed support for the hypotheses.

Contrary to H3, economically stronger countries were not more likely to issue a SAHO; they were less likely. Specifically, as GDP per capita increases the likelihood of a SAHO decreases. This may suggest that instead of wealthy governments calculating that their economies can endure a public health shock, they simply want to protect their economies. While unexpected, this result is consistent with a report regarding the issuance of SAHOs in US states (Murray & Murray, 2020). Finally, the results indicate that medical factors played a role but not as hypothesized. Contrary to H4a, governments with a more nationalized health care system as indicated by greater government contribution to health care spending were less likely to issue a SAHO. One interpretation of this result is that these governments felt better able to handle a large number of patients given their greater coverage of the population and, therefore, they did not believe they needed to take drastic measures. Further, contrary to H4b, the results show the greater the number of coronavirus cases per capita the less likely a government was to issue a SAHO.

Overall, Model 1, the theoretically best model, suggests that political, social, economic, and scientific/medical considerations played a role in MENA governments issuing a SAHO or not in response to the coronavirus, but the effects are complicated.

Robustness check: Alternative variable specification

The next models specify alternative measures to test the robustness of the effects found in Model 1. Appendix A contains detailed descriptions of the alternative measures. Model 2 replaces the Polity measure with the Freedom House measure of regime type, which classifies countries as “not free,” “partially free,” or “free” based on civil liberties and political freedom. These measures are a bit more than moderately correlated (Spearman's $\rho = 0.55$, $p < 0.05$), but they are different enough to test whether the effect found in Model 1 is random. Model 2 indicates that partially free countries are not more likely to issue a SAHO than not free countries, but free countries may be, although the effect is only marginally statistically significant. The results also indicate that free countries are not statistically more likely to



issue a SAHO than partially free countries. Overall, though, the marginal results are consistent with the results from Model 1 that government type affects the issuance of SAHOs and, therefore, the contrary evidence regarding H1a is at least somewhat robust.

Model 3 replaces the government effectiveness measure, the second measure of the political factors, with a measure of state fragility. The State Fragility Index measures a government's capacity and systemic resilience (Marshall & Elzinga-Marshall, 2017). Scores range from 0 (no fragility) to 25 (extreme fragility); therefore, the effect is expected to be negative. These measures are strongly correlated ($r = -0.75$, $p < 0.05$), but they are calculated differently and provided by different organizations, so they should provide a reasonable test of whether the effect found in Model 1 is random. In this case, as a MENA country's fragility increased its likelihood of issuing a SAHO decreased but only in terms of the marginal effect, and that effect does not achieve conventional levels of statistical significance. This is somewhat consistent with the results from Model 1. Overall, the results in support of H1b are robust but only weakly.

Model 4 replaces percent urban population with population density for the second test of H2a. These measures are a bit more than weakly correlated ($r = -0.36$, $p < 0.05$), but both provide reasonable indications of living conditions. The results do not confirm the significant effect of living arrangements found in Model 1. The results for colonial legacy and geographic diffusion are not tested due to the lack of satisfactory alternative measures. Model 5, then, tests the robustness of the temporal effect found in Model 1, but in this case using a linear versus S-curve pattern. The results confirm the robustness of the temporal effect, but the three model fit statistics indicate linear time is a much weaker predictor of a SAHO than the S-curve measure. Overall, these results confirm the Model 1 results for temporal diffusion and, therefore, the evidence in support of H2d is robust.

Model 6 replaces GDP per capita with inflation. Generally speaking, high or negative inflation is considered harmful to an economy. These measures are a bit more than weakly correlated ($r = -0.35$, $p < 0.05$), but both provide reasonable measures of the health of an economy. The MENA region includes both, with four countries being slightly negative and the remainder positive and ranging up to a very high 41.1%. Therefore, the expected direction of effect is expected to be negative. Regardless, Model 6 indicates the effect is not statistically significant, so the economic effect found in Model 1 regarding H3 is not robust. Model 7 starts the tests of the medical/scientific factors and replaces government spending as a percent of total health care spending with the World Health Organization Service Coverage Index, which indicates how widely essential health care services are provided in a country. This measure is considered an indication of universal health care coverage. These measures are a bit more than moderately strongly correlated ($r = 0.59$, $p < 0.05$), but they are different enough to test whether the effect found in Model 1 is random. The results are not statistically significant and, again, do not support H4a, although they are not contrary to expectations as found in Model 1. Model 8 provides an alternative measure of increased threat by replacing per capita cumulative cases with per capita cumulative deaths. These measures are a bit more than moderately strongly correlated ($r = 0.60$, $p < 0.05$), but they are different enough to test whether the effect found in Model 1 is random. Again, the results are contrary to H4b and, like in Model 1, they indicate that as threat of the disease increases MENA governments become less likely to issue a SAHO. In further confirmation of this unexpected finding, other results not detailed in the table similarly indicate that as the number of cases and deaths per available hospital bed go up the probability of a SAHO goes down.

Together, these nine robustness checks provide mixed results for the primary findings. They support findings that political factors matter (H1a and 1b). They confirm the findings for social factors related to temporal diffusion (H2d) but not living arrangements (H2a). They do not confirm the original and unexpected findings regarding economic considerations (H3) or regarding medical factors related to type of health care system (H4a). But, contrary to H4b, they confirm Model 1 results that increased disease threat is associated with a decreased probability of issuing a SAHO.

Robustness check: Effects across multiple models

There is another reasonable way to assess the hypotheses in terms of these results. There are nine multivariate models with all the variables except colonial history and geographic diffusion being replaced to test robustness. That is, there are at least eight different tests of the hypothesized relationships. The government-type measure was conventionally statistically significant in all of the models, and the measure used to test robustness also offered some statistical support for the effect. This provides relatively robust contrary evidence for H1a, but indicates that government type affects the issuance of SAHOs in MENA. Support for government efficacy is moderate, with four of the models indicating a statistical relationship of some kind, and the alternative measure also offering at least some support. This provides moderate support for H1b.

Similarly, there is some support for an association based on living arrangements in six of the models and, therefore, H2a. In five of the models governments with no colonial legacy were at least marginally statistically more likely than former British colonies to issue SAHOs, and in five of the models they were statistically more likely to issue a SAHO than governments with a French legacy. Although these effects are not consistent with H2b, which focuses on a comparison of British and French colonies, they do uncover an important social effect. Although there is little support for H2c in regard to geographic diffusion, by far the results provide the strongest support for H2d in regard to S-curve temporal diffusion. All the models indicate that the probability a country will issue a SAHO followed an S-curve pattern. The results do not support H3, and they provide some indication that the economic effect is actually opposite the hypothesized effect. Lastly, the results provide no support for H4a regarding type of health care system, but six of the models indicate a statistically detectable effect that is contrary to the hypothesis suggesting this may be an important consideration for government leaders. The same can be said regarding the second scientific/medical hypothesis. The results show, contrary to H4b, that in all the models increased disease threat decreased likelihood of a SAHO.

Robustness check: Alternative specifications only

Finally, there is one more reasonable way to assess the robustness of the effects. Model 9 includes only the alternative specifications used to test each hypothesis. This model replaces seven of the nine measures in Model 1 with their alternative measures. It includes 1110 observations. Its overall fit is statistically significant ($\chi^2 = 49.96$, $p < 0.05$), and it produces a McFadden's pseudo R^2 of 0.38 and BIC of 183.390. Although its fit statistics indicate it does not capture the effects in the data as well as Model 1, which has a pseudo R^2 of 0.59, with a pseudo R^2 of 0.38 it still accounts for a reasonable level of the variance in the dependent variable. More importantly, its results continue to suggest that more democratic governments are more likely to issue SAHOs, offering additional evidence regarding H1a, and that temporal diffusion plays a powerful role, offering additional support of H2d.

DISCUSSION

The purpose of this paper is to gain an understanding of the decisions of MENA governments to take the disruptive step of closing their societies in response to the coronavirus pandemic. Following a general theoretical framework for health care policy making (Brownson et al., 2009), it examines political, social, economic, and scientific/medical factors in MENA that may be related to the issuance of SAHO orders or not in response to



COVID-19. Table 4 presents a summary of the findings in terms of the nine proposed hypotheses. It reports the expected relationships between the dependent variable and each measure (Column A); the statistical results for the measure from the primary model, Model 1, (Column B); and whether the Model 1 results support the hypothesis (Column C). The next column (Column D) indicates the model number for each alternative measure used to test the robustness of effects found in Model 1, the statistical significance of each alternative measure (Column E), and whether the results of the alternative measures support the pertinent hypothesis (Column F). The last column (Column G), indicates whether the results from the alternative models are consistent with the results from Model 1 to summarize robustness. Overall, it shows the findings give substantial support to certain political, social, and medical factors.

First, the results strongly indicate that MENA governments learned over time from other governments in the region following a classic social learning or innovation pattern (H2d; e.g., Mooney & Lee, 1995). As shown in Table 1, a small number of governments issued SAHOs in mid-March followed by a large group in the third week of the month then another one during the last week of the month. This is consistent with the policy adoption process in which countries learn from the policy successes and failures of similar countries and adjust the policy for national conditions.

The results provide consistent, but sometimes weak, evidence that the political factors mattered. Contrary to H1a, more democratic governments were more likely to issue a SAHO. It is notable that in this case democratic governments were more likely to restrict the actions of their citizens than autocratic governments. It may be they concluded that their citizens wanted that, that autocratic governments were more concerned about their economies than public health, or some combination of the two. The results also provide consistent but weak evidence of an effect for government capacity. Although this is consistent with H1b, the supporting evidence is not substantial.

The medical factor related to disease threat is the final reliable effect, but the relationship is opposite what was expected. Contrary to H4b, the results suggest that as the levels of coronavirus-related illness and death increase, the likelihood a government will issue a SAHO decreases. This might indicate that governments took proactive steps and issued SAHOs before the number of cases and deaths started to grow dramatically. This policy approach would likely be applauded by public health experts, but it clearly calls for further investigation.

Otherwise, there is nontrivial evidence that colonial legacy plays a role although not specifically as asserted in H2b. While the results did not demonstrate a difference between British and French colonies, they did provide nontrivial evidence that governments with no colonial legacy stood out from those with British or French legacies in their likelihood of issuing a SAHO. This result was not subject to a robustness check due to the lack of a reasonable alternative measure, though. There are a number of relationships that did not survive the robustness checks (e.g., the negative effect of wealth as represented by GDP per capita) but are worthy of further investigation.

This study is limited in several ways that should be noted and that will hopefully inform future research. In narrow terms, the study does not capture the effects of media on these governments' decisions. While research suggests the media can play an important role in policy making, in particular agenda setting (e.g., Sato, 2003), resource constraints prevented the collection of pertinent Arabic-language media data. This study does not consider related subnational policies, which may serve as an impetus or hindrance to national action (Quinton, 2017). More broadly, the SAHOs were issued over a two-week period, which is a very short period of time for policy research. That said, the urgent nature of the pandemic and the profound actions many governments were taking by shutting down their societies suggest the policy window on this issue was tightly compressed for good reason. This study

TABLE 4 Summary of predictors of MENA stay-at-home orders

| Hypothesis | Factor | Measure | (A) Exp. Sign | (B) Model 1 Stat sig | (C) Hypotheses supported (Model 1) | (D) Alt. Model # | (E) Alt. model Stat sig | (F) Hypotheses supported (alt models) | (G) Model 1 and Alt Model consistent |
|------------|-----------|-------------------|---------------|----------------------|------------------------------------|------------------|-------------------------|---------------------------------------|--------------------------------------|
| H1a | Political | Govt Type | - | {*} | No | 2 | {+} | No | ✓ |
| H1b | Political | Govt Eff | + | + | Weakly | 3 | [+] | Weakly | ✓ |
| H2a | Social | Live Arrange | + | * | Yes | 4 | NS | No | |
| H2b | Social | Col Legacy | + | NS | No | NA | NA | NA | |
| H2c | Social | Geo Diff | + | NS | No | NA | NA | NA | |
| H2d | Social | Temp Diff | - | * | Yes | 5 | * | Yes | ✓ |
| H3 | Economic | GDP _{pc} | + | {*} | No | 6 | NS | No | |
| H4a | Med/Sci | System | + | {*} | No | 7 | NS | No | |
| H4b | Med/Sci | Threat | + | {*} | No | 8 | {+} | No | ✓ |

Note: All variables defined in Appendix A.

Abbreviations: Alt., alternative; Exp. Sign, expected sign; NA, not applicable; NS, not significant.

*and + in columns B and E indicate statistical significance at the 5% and 10% levels, respectively, using two-tailed tests and robust standard errors. {} indicates statistically significant two-tailed test but in the wrong direction. [] indicates statistical significance of the marginal effect only.



only examines the MENA region, which includes an extremely heterogeneous set of governments and countries. One should generalize to other countries and regions with great caution, if at all. The results are based on analyses of publicly available quantitative data. Data such as these that come from autocratic governments, of which there are many in the MENA region, should be thoughtfully scrutinized in terms of integrity and validity. Finally, the data do not and cannot indicate the effects of nonpublic data to which government leaders had access or the leaders' personal motivations or fears.

In conclusion, This study gives policy makers and researchers a look at early government responses to a global health crisis in a heterogeneous region of the world. It strongly indicates that these governments learned from each other. It suggests that political institutions in the form of regime type and government capacity play an important role as do medical factors related to the threat of the disease. These results indicate the world has a great deal to learn about government responses to this and other dangerous infectious diseases. This study may offer a number of learning opportunities to those concerned about and responsible for addressing such matters.

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CONFLICT OF INTERESTS

The authors declare there are no conflicts of interest.

ENDNOTE

¹The authors recognize that a territory is not a country, but for ease of communication this article sometimes refers to a territory as a country.

REFERENCES

- ACAPS (Assessment Capacities Project). (2020). "COVID-19: Government Measures Dataset." <https://www.acaps.org/covid19-government-measures-dataset>
- Berry, F. S., & Berry, W. D. (1992). Tax innovation in the states: Capitalizing on political opportunity. *American Journal of Political Science*, 36, 715–742.
- Berry, F. S., & Berry, W. D. (2018). Innovation and diffusion models in policy research. In C. M. Weible, & P. A. Sabatier (Eds.), *Theories of the policy process* (4th ed., pp. 263–308). Routledge/Westview.
- Blank, R., Burau, V., & Kuhlmann, E. (2018). *Comparative health policy* (5th ed.). Macmillan International Higher Education.
- Brownson, R. C., Chiqui, J. F., & Stamatakis, K. A. (2009). Understanding evidence-based public health policy. *American Journal of Public Health*, 99, 1576–1583.
- Centers for Disease Control and Prevention. (2007). Interim pre-pandemic planning guidance: community strategy for pandemic influenza mitigation in the United States-early, targeted, layered use of nonpharmaceutical interventions. http://www.pandemicflu.gov/plan/community/community_mitigation.pdf
- Chamberlain, R., & Haider-Markel, D. P. (2005). 'Lien on me': State policy innovation in response to paper terrorism. *Political Research Quarterly*, 58(3), 449–460.
- Coetzee, B. J., & Kagee, A. (2020). Structural barriers to adhering to health behaviours in the context of the COVID-19 crisis: Considerations for low-and middle-income countries. *Global Public Health*, 15(8), 1093–1102.
- Dobbin, F., Simmons, B., & Garrett, G. (2007). The global diffusion of public policies: Social construction, coercion, competition, or learning? *Annual Review of Sociology*, 33, 449–472.
- Hale, T., Webster, S., Petherick, A., Phillips, T., & Kira, B. (2020). Oxford COVID-19 Government Response Tracker. Blavatnik School of Government. <https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker>
- Hoffman, J. A., & Miller, E. A. (2020). Addressing the consequences of school closure due to COVID-19 on children's physical and mental well-being. *World Medical and Health Policy*, 12(3), 300–310. <https://doi.org/10.1002/wmh3.365>

- Jones, L., Palumbo, D., & Brown, D. (2020, June 30). Coronavirus: A visual guide to the economic impact. *BBC News*. <https://www.bbc.com/news/business-51706225>
- Jung, J. W., & Oh, J. (2019). Determinants of presidential approval ratings: Cross-country analyses with reference to Latin America. *International Area Studies Review*, 23(3), 251–267. <https://doi.org/10.1177/2233865919888373>
- Kawashima, K., Matsumoto, T., & Akashi, H. (2016). Disease outbreaks: Critical biological factors and control strategies. In Y. Yamagata, & H. Maruyama (Eds.), *Urban resilience: A transformative approach* (pp. 173–204). Springer.
- Ke, X., Saksena, P., & Holly, A. (2011). The determinants of health expenditure: A country-level panel data analysis. *Geneva: World Health Organization*, 26, 1–28.
- Klymenko, L., & Gherghina, S. (2012). Determinants of positive attitudes towards an authoritarian regime: The case of Belarus. *Soviet and Post-Soviet Review*, 39(2), 249–269.
- Kraemer, M., Yang, C. H., Gutierrez, B., Wu, C. H., Klein, B., Pigott, D. M., Open COVID- Data Working, G., du Plessis, L., Faria, N. R., Li, R., Hanage, W. P., Brownstein, J. S., Layan, M., Vespignani, A., Tian, H., Dye, C., Pybus, O. G., & Scarpino, S. V. (2020). The effect of human mobility and control measures on the COVID-19 epidemic in China. *Science*, 368(6490), 493–497.
- Linos, K. (2013). *The democratic foundations of policy diffusion: How health, family, and employment laws spread across countries*. Oxford University Press.
- Macinko, J., & Silver, D. (2015). Diffusion of impaired driving laws among US states. *American Journal of Public Health*, 105(9), 1893–1900.
- Marshall, M. G., & Elzinga-Marshall, G. (2017). *Global report 2017: Conflict, governance, and state fragility*. Vienna, Virginia: Center for Systemic Peace.
- Marshall, M. G., & Gurr, T. R. (2020). *Polity 5: Political regime characteristics and transitions, 1800-2018 (data users' manual)*. Vienna, Virginia: Center for Systemic Peace.
- Mooney, C. Z., & Lee, M.-H. (1995). Legislative morality in the American states: The case of pre-Roe abortion regulation reform. *American Journal of Political Science*, 39, 599–627.
- Müller-Crepon, C. (2020). Continuity or change? (In)direct rule in British and French colonial Africa. *International Organization*, 74, 707–741. <https://doi.org/10.1017/S0020818320000211>
- Murray, G. R., & Murray, S. M. (2020, May 6). Following doctors' advice: Explaining the issuance of stay-at-home orders related to the coronavirus disease 2019 (COVID-19) by US governors. OSF Preprints. <https://doi.org/10.31219/osf.io/92ay6>
- O'Brien, F., & Schneeweiss, Z. (2020, May 5). Europe's virus furlough programs bail out 40 million workers. *Bloomberg*. <https://www.bloomberg.com/news/articles/2020-05-05/europe-hits-40-million-workers-on-virus-furlough-programs>
- OCHA (UN Office for the Coordination of Humanitarian Affairs). (2020, 23 July–06 August). *IOM regional office for Middle East and North Africa COVID-19 Response—Situation Report 9*. <https://reliefweb.int/report/yemen/iom-regional-office-middle-east-and-north-africa-covid-19-response-situation-report-9>
- OECD. (2020). *COVID-19 crisis response in MENA countries*. <https://www.oecd.org/coronavirus/policy-responses/covid-19-crisis-response-in-mena-countries-4b366396/>
- Okma, K. G. H., & Marmor, T. R. (2013). Comparative studies and healthcare policy: Learning and mislearning across borders. *Clinical Medicine*, 13(5), 487–491.
- Quinton, S. (2017, January 25). Expect more conflict between cities and states. *Pew Charitable Trusts: Stateline*.
- Sato, H. (2003). Agenda setting for smoking control in Japan, 1945-1990: Influence of the mass media on national health policy making. *Journal of Health Communication*, 8(1), 23–40.
- Shipan, C. R., & Volden, C. (2012). Policy diffusion: Seven lessons for scholars and practitioners. *Public Administration Review*, 72(6), 788–796.
- Spasoff, R. A. (1999). *Epidemiologic methods for health policy*. Oxford University Press.
- Triandis, H. (1988). Collectivism v. individualism: A reconceptualisation of a basic concept in cross-cultural social psychology. In C. Bagley, & G. K. Verma (Eds.), *Cross-cultural studies of personality, attitudes and cognition* (pp. 60–95). Palgrave Macmillan.
- UNESCO (United Nations Educational, Scientific and Cultural Organisation). (2020). *Education: From disruption to recovery*. <https://en.unesco.org/covid19/educationresponse>
- UNIDO (United Nations Industrial Development Organization). (2020). *Coronavirus: The economic impact—10 July 2020*. <https://www.unido.org/stories/coronavirus-economic-impact-10-july-2020>
- Wolfe, L. R. (2013). *History of colonization in the Middle East and North Africa (MENA): Precursor to cold war conflict*. <https://coldwarstudies.com/2013/01/11/history-of-colonization-in-the-middle-east-and-north-africa-mena-precursor-to-cold-war-conflict/>
- World Bank. (2020a). *World Bank country and lending groups: Country classification*. <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>

- World Bank. (2020b). *COVID-19 to plunge global economy into worst recession since World War II* (press release). <https://www.worldbank.org/en/news/press-release/2020/06/08/covid-19-to-plunge-global-economy-into-worst-recession-since-world-war-ii>
- World Health Organization (WHO). (2020). *WHO Director-General's statement on IHR Emergency Committee on Novel Coronavirus (2019-nCoV) (30 January 2020)*. By Tedros Adhanom Ghebreyesus. Geneva, Switzerland: World Health Organization. [https://www.who.int/dg/speeches/detail/who-director-general-s-statement-on-ih-ermergency-committee-on-novel-coronavirus-\(2019-ncov\)](https://www.who.int/dg/speeches/detail/who-director-general-s-statement-on-ih-ermergency-committee-on-novel-coronavirus-(2019-ncov))

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APPENDIX A: VARIABLE DESCRIPTIONS

DEPENDENT VARIABLE

Stay-at-home order (SAHO). Coded 1 on the effective date of a SAHO in a country/territory and 0 on all days prior the effective date. Coded as missing on days after the effective date. A country-day is determined to have a SAHO when the government required “not leaving house with exceptions for daily exercise, grocery shopping, and ‘essential’ trips” (coded 2 in original data) or “not leaving house with minimal exceptions (eg allowed to leave once a week, or only one person can leave at a time, etc)” (coded 3 in original data).

Source: Oxford COVID-19 Government Response Tracker, Blavatnik School of Government (Hale et al., 2020).

INDEPENDENT VARIABLES

(alternative measures for robustness checks appear in italics)

Political factors

Polity

Polity 2 is a composite index of Autocracy/Democracy where a score of –10 indicates a strong autocracy and +10 a strong democracy.

Source: Center for Systemic Peace; see Marshall and Gurr (2020).

Freedom House regime type

Freedom House Status categorized as “not free,” “partly free,” and “free” based on scores given to each country for political rights and civil liberties granted to its citizens in 2018 by Freedom House, a not-for-profit organization that researches issues related to political freedom around the world.

Source: Freedom in the World 2018: The Annual Survey of Political Rights and Civil Liberties.

Government effectiveness

According to the World Bank Data Catalog: This measure “captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 [low effectiveness] to 2.5 [high effectiveness].”

Source: World Bank variable GE.EST.

State Fragility Index

According to Marshall and Elzinga-Marshall (2017), “The State Fragility Index...combines scores on the eight indicators [of security, political, economic, and social effectiveness and legitimacy] and ranges from 0 ‘no fragility’ to 25 ‘extreme fragility.’ A country's fragility is closely associated with its state capacity to manage conflict, make and implement public policy, and deliver essential services, and its systemic resilience in maintaining system coherence, cohesion, and quality of life, responding effectively to challenges and crises, and sustaining progressive development.”

Source: Center for Systemic Peace.

Social factors

Urban population

Urban population as percent of total population. Centered in the models.

Source: United Nations Statistics variable SYB082.

Population density

Population density in terms of people per km² of land area in 2018. Centered in the models.

Source: World Bank variable EN.POP.DNST.

Colonial legacy

Identifies the colonial history of each country as colonized by Britain (coded 0; eight countries/territories), colonized by France (coded 1; six countries), or not colonized by Britain or France (coded 2; seven countries/territories). This last category includes the six countries in MENA that were never colonized and the one country, Libya, that was colonized by Italy.

Source: Wolfe (2013).

Geographic diffusion

The proportion of bordering countries with a SAHO in effect by country-day.

Source: calculated by the authors.

Temporal diffusion—S-curve

A nonlinear trend variable that is constructed by taking the square root of the number of days between a given day and the day with the highest hazard rate, in this study March 23.

Source: calculated by the authors.

Temporal diffusion—Linear

A linear trend variable that is constructed by consecutively numbering the dates in the data set from 1 to 61.

Source: calculated by the authors.

Economic factors

GDP per capita

Gross Domestic Product per capita in 2017 in US dollars. Centered in the models.

Source: UN Stats variable SYB025.

Inflation

Inflation in terms of consumer prices (annual percent). Centered in the models.

Source: IMF variable FP.CPI.TOTL.ZG.

Scientific/medical factors

Percent government health care spending

Government health expenditure as a percent of total health expenditures. Centered in the models.

Source: World Health Organization variable SH.XPD.GHED.CH.ZS.

Service Coverage Index

A measure of provision of selected essential health services and indication of progress toward universal health coverage.

Source: World Health Organization report on “World Health Statistics 2020: Monitoring Health for SDGs,” Annex 2.

Cumulative Cases (Deaths)

Daily cumulative COVID-19 cases (*deaths*) per 100,000 population in a country lagged one day.

Source: European Centre for Disease Prevention and Control (ECDC) at <https://www.ecdc.europa.eu/en/publicationsdata/download-todays-data-geographic-distribution-covid-19-cases-worldwide>.



APPENDIX B: BIVARIATE RELATIONSHIPS AS ESTIMATED BY PROBIT REGRESSIONS

| Factor and variables | Hypo | Sign | H1a | H1b | H2a | H2b | H2c | H2d | H3 | H4a | H4b |
|--------------------------|------|------|------------------|------------------|------------------|------------------|-------------------|--------------------|-------------------|-------------------|------------------|
| Political | | | | | | | | | | | |
| Government type | H1a | - | 0.025 (0.016) | | | | | | | | |
| Government effectiveness | H1b | + | | 0.049 (0.100) | | | | | | | |
| Social | | | | | | | | | | | |
| Urban population (%) | H2a | + | | | 0.003 (0.005) | | | | | | |
| Colonial legacy | | | | | | | | | | | |
| 1/France | H2b | + | | | | 0.045 (0.238) | | | | | |
| 2/never | na | | | | | | | -0.128 (0.246) | | | |
| Geographic diffusion | H2c | + | | | | | 0.011* (0.003) | | | | |
| Temporal diffusion | H2d | - | | | | | | -0.722* (0.135) | | | |
| Economic | | | | | | | | | | | |
| GDP per capita | H3 | + | | | | | | | -0.000 (0.000) | | |
| Medical/scientific | | | | | | | | | | | |
| Govt health spending (%) | H4a | + | | | | | | | | -0.000 (0.004) | |
| Cumulative Cases | H4b | + | | | | | | | | | 0.011 (0.012) |

(Continues)



| Factor and variables | Hypo | Sign | H1a | H1b | H2a | H2b | H2c | H2d | H3 | H4a | H4b |
|-----------------------|------|------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------------|--------------------|--------------------|--------------------|
| Constant | | | -2.173* (0.103) | -2.206* (0.102) | -2.220* (0.100) | -2.192* (0.159) | -2.365* (0.112) | -0.290 (0.263) | -2.220* (0.100) | -2.218* (0.100) | -2.231* (0.128) |
| <i>N</i> | | | 1131 | 1131 | 1131 | 1131 | 1131 | 1131 | 1131 | 1131 | 1110 |
| Pseudo Log Likelihood | | | -78.640 | -79.637 | -79.636 | -79.496 | -74.119 | -46.895 | -79.664 | -79.742 | -79.244 |
| χ^2 | | | 2.38 | 0.24 | 0.26 | 0.48 | 17.90* | 28.75* | 0.19 | 0.00 | 0.95 |
| Pseudo R^2 | | | 0.014 | 0.001 | 0.001 | 0.003 | 0.071 | 0.412 | 0.001 | 0.000 | 0.003 |
| BIC ^a | | | 171.342 | 173.335 | 173.334 | 180.085 | 162.300 | 107.852 | 173.390 | 173.546 | 172.512 |

Note: DV = SAHO. * and + indicate statistical significance at the 5% and 10% levels, respectively, using two-tailed tests and robust standard errors. Smaller BIC is preferred/better model.
^aBIC assesses model fit.