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Governmental responses and firm resilience during the COVID-19 pandemic: The role of culture and politics

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ABSTRACT

Using data from 180 countries and 24,833 publicly traded firms worldwide, this study examines how cultural and political factors influence the stringency of a government's response to the COVID-19 pandemic and, in turn, the stock prices of firms and industries operating in a given country. Existing research demonstrates that government behavior during a pandemic can directly or indirectly affect stock prices. This study explores twelve political and cultural characteristics that might influence government policies. Interestingly, our results indicate that democratic and less long-term-oriented countries employ stricter responses to the pandemic. Furthermore, countries with higher individualism, coalition governments, and governments not battling for re-election appear to employ a smoothing strategy: although they implement stringent responses early on, they tend to react less aggressively when the number of COVID-19 cases increases. This study finds that increased stringency has a negative impact on corporate abnormal returns, especially during the early stages of the pandemic. Our study has important policy implications and offers valuable insights to investors: stock price reactions depend on political and cultural factors, industry, and firm characteristics. Most importantly, larger firms with more cash operating in collectivist and politically stable countries are more resilient.

1. Introduction

International responses to the 2019 coronavirus (COVID-19) pandemic provide snapshots of the complex background of social, infrastructural, and economic factors that underpin government emergency measures. The extent of the virus's spread can offer important insights into how regional, cultural, and political characteristics affect both the stringency and success of governmental responses to the pandemic, as countries worldwide with different capacities and institutional environments have responded in diverse ways to the pandemic. From a regulatory and investor perspective, these insights are valuable as they enable improved responses if (or rather when) the next pandemic strikes.

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Illnesses spread differently in otherwise similar countries. Analogous disease patterns have different effects on different economies and, like government actions, can lead to different outcomes. For example, in the early stages of the COVID-19 pandemic, the government of China, a densely populated country, chose to lock down at a specific time (the Spring Festival), seal off the epicenter of the virus, cut off the chain of transmission, and control the pandemic at its source. In contrast, some European and North American countries such as the United States (U.S.) (which ranks first among 195 countries in the 2019 Global Health Security Index and has a medical system ranking among the most sophisticated in the world), missed the chance for early pandemic prevention due to a slower response, insufficient attention, and – in the U.S.'s case – election campaigning, which caused political leaders to prioritize election considerations over medical imperatives (Abbey et al., 2020). These countries often limited their response to increasing medical resources. Moreover, some low-income countries with weak central government controls found themselves unable to carry out reliable medical and social surveys and were hampered by inadequate medical resources which prevented them from conducting nucleic acid tests in a sufficient range. These countries had few choices but to surrender and achieve "herd immunity."

COVID-19 impacted – and continues to impact – the development of every country. According to Alberto Ramos, head of Latin American Economic Research at Goldman Sachs, a country's economic recovery depends in part on "how competent the authorities are or have been in managing the outbreaks" (2020). Different countries' economic models also affect recovery timelines. The spread of COVID-19 pandemic posed a moral dilemma in democratic governments: the rising number of infections and the rate of infection prompted the adoption of measures that were, at least partially, contradictory to democratic principles. In these countries, a balance had to be struck between achieving the principles and goals of public health and upholding the principles of democracy, freedom, and human rights. Considering these challenges, it is important to understand how a country's cultural and political background affects the rigor of government-imposed pandemic prevention policies, how governments weigh and balance these cultural and political factors in their decision-making processes, and what repercussions the sociopolitical environment and the stringency of government responses have on businesses operating in these countries. Our study aims to explain the multifaceted synergistic mechanisms that influence the spread of disease during pandemics and offer insights for a better response to similar pandemics in the future.

We first explore the contributory factors affecting the sternness of government responses – measured by the country's stringency index (SI) – during the pandemic. We then investigate the impact of changes in government prevention and control policies on the stock price performance of listed companies in each country and industry. In the first instance, we use each country's government SI from the Oxford COVID-19 Government Response Tracker (OxCGRT) time series dataset (Hale et al., 2021) as the main study object and obtain the political and cultural characteristics of each country as independent variables for regression analyses. The political factors include a country's corruption index, rule of law, political stability, degree of democracy, the number of years until the next election, and the presence of coalition governments. We determined the cultural characteristics of each country based on Geert Hofstede's six dimensions of cultural factors: power distance, individualism, uncertainty avoidance, masculinity, long-term orientation, and indulgence.

Our findings indicate that countries whose cultures are less long-term oriented, and which focus on individualism and indulgence (rather than collectivism and restraint) implement stricter pandemic prevention and control policies. Furthermore, political factors such as democracy, multi-party governance, and longer periods between election cycles are linked to stricter regulations in some countries, yet when the number of COVID-19 cases increases, these countries respond less aggressively.

In the second part of the paper, we estimate the abnormal returns of firms around the globe and regress them on changes in the SI and various firm and country characteristics. The results suggest that the lagged one-day SI is the best predictor of abnormal returns, with the most pronounced (negative) response in the first quarter of 2020. Finally, we analyze the impact of the interaction between country and firm characteristics on stock prices, i.e., political/cultural characteristics and firm financials, respectively, and changes in the SI during local outbreaks. The results show that government actions are more likely to affect the stock prices negatively in individualistic and hedonistic countries having corrupt governments and multi-party coalitions. At the firm level, larger companies with more cash are less likely to be negatively influenced by changes in the SI.

The remainder of this paper is structured as follows. Section 2 introduces our research objectives and hypotheses. In addition, we discuss the characteristics of firms immune to the consequences of the outbreak and the factors that influence government intervention policies. In Section 3, we describe our data sources, define the variables, and provide descriptive statistics for our data set. Section 4 explains the methodology used to study the impact of the SI and other factors on a firm's stock price performance and the factors influencing the stringency of government responses in the first place. Section 5 presents the empirical results of our analysis. Finally, we discuss the significance of our results and provide concluding remarks in Section 6.

2. Literature review and hypothesis development

The emerging literature on COVID-19 considers various dimensions of the pandemic. While early research was dominated by economic aspects (Hur and Jenuwine, 2020), more recent scholarship also addresses the responses from regulatory authorities and the characteristics of the virus itself (Elgin et al., 2023).

Much of the emerging financial literature on COVID-19 focuses on the shock to the stock markets in the early stages of the outbreak, and on the characteristics of industries or companies that are safe havens in a crisis. Collectively, the pandemic created arbitrage opportunities for traders and speculators, leading to income and wealth inequality in inefficient markets (Hong et al., 2021). At the firm level, corporate performance deteriorated during the COVID-19 pandemic, with some exceptions: firms located in countries with better healthcare systems, more advanced financial systems, and better institutions – in terms of government effectiveness, accountability, and the rule of law – generally experienced attenuated effects (Hu and Zhang, 2021). Ding et al. (2021) evaluate more than 6700 companies around the globe and find that in 2020, companies with better financial health, firms whose

supply chains and customer locations are less affected by the pandemic, and companies with more corporate social responsibility activities were generally least affected by the pandemic. Xiong et al. (2020) reach similar conclusions and suggest that companies with lower leverage ratios and more fixed assets were less adversely affected.

In the wake of COVID-19, the liquidity positions of firms provide further insights into what constitutes corporate financial health. For example, Qin et al. (2020) find a significant increase in cash holdings in severely affected industries and posit that higher cash holdings during a pandemic can protect companies from unexpected events. Similarly, banks, as channels for governments' monetary expansion policies, should maintain higher liquidity buffers in the medium term to absorb future losses (Bitar and Tarazi, 2020). Abedifar et al. (2022) investigate the effect of corporate social responsibility, that is the environmental (E) and social (S) components of the ESG rating, on firms' stock market resilience during the COVID-19 crisis in developed countries but find no strong evidence of any difference. Meanwhile, Shafiullah et al. (2022) find no support for the common assumption that emergency measures affect stock market prices. They reciprocally explore whether the decline of stock markets can explain the size of emergency packages and find that in countries with above-average income, the fall in stock prices results in larger stimulus packages and other monetary actions.

Other lines of enquiry investigate the impact of government responses to the COVID-19 crisis on virus transmission rates, as well as on economic activity and stock market returns, to gauge their effectiveness. In the early days of the pandemic, during which detection capacity was low, Qiu et al. (2020) examine the effects of strict quarantines, urban lockdowns, and local public health measures implemented in China at the end of January 2020. Their findings reveal that government initiatives significantly reduced the transmission rate of the virus. Optimal interventions also include social distancing and other interdiction measures (Hur and Jenuwine, 2020). Ashraf (2020) argues that the social distancing measures that governments implemented had a negative impact on economic activity and stock market returns but had an indirect positive impact by reducing the number of confirmed cases of COVID-19 in the studied countries. On the other hand, he finds that public awareness programs, testing and quarantine policies, and income support programs generated positive market returns. Addressing the causes and consequences of social distancing itself, Attar and Tekin-Koru (2022) explore how this variable varies with a country´s characteristics and affects its economic activity. They construct a social distancing index based on epidemiological, policy, and behavioral data. One of their major findings is that the distancing index behaves very close to mobility indices and explains the loss in economic output, proxied by electricity consumption.

Previous studies document the criticality of socio-political conditions to crisis management and recovery. For instance, Greer et al. (2020) suggest that the regime type (democracy or autocracy), formal political institutions (federalism or presidentialism), and state capacity (control over healthcare systems and public administration) influence governmental responses to the pandemic. Moreover, existing research shows that healthcare infrastructure, experience with prior pandemics (Sharma et al., 2021), and citizens' emotions expressed through social media (specifically blog posts labeled with one of eight effects "Anger", "Disgust", "Fear", "Happiness", "Like", "Sadness", "Surprise", and "None") positively influence government initiatives and agenda-setting (Dai et al., 2021). A further new finding is that the country's fiscal system too has an impact on its economic responses to the pandemic. Elgin et al. (2023) construct measures of fiscal centralization and show that countries with decentralized fiscal systems provided larger financial rescue packages to offset the pandemic's effects, possibly due to local authorities being more powerful and their closeness to COVID-19-affected people.

From the initial outbreak of the COVID-19 pandemic, authoritarian governments imposed severe restrictions on civil liberties, compared to countries with more democratic systems (Trein, 2020). Yet, there is no evidence that authoritarian governments were more effective at reducing travel (Frey et al., 2020). When the threat of death in a given country became serious enough, many democratic governments adopted the same measures as authoritarian governments (Cheibub et al., 2020). In their implementation of specific measures, democratic governments tended to close schools quicker than authoritarian regimes, while countries with high government effectiveness took longer to implement certain measures. Finally, the proximity of competitive elections encouraged democratic leaders to respond more promptly (Cronert, 2020).

Existing research proposes that cultural and political factors may influence government actions and further (directly or indirectly) guide the economic outcomes of the pandemic (Ashraf, 2020; Heyden and Heyden, 2020; Shanaev et al., 2020; Yang and Deng, 2021). However, these factors have received only little attention to date and related investigations were frequently limited to one or few countries at a time. In addition, the interplay of cultural, political, medical, and economic factors is rarely investigated. This study attempts to fill this gap by considering a series of interaction variables that characterize countries' cultural and political environments and their interplay with governmental responses to the pandemic.

We use the cultural dimensions theory of Geert Hofstede, as it explores the multiple facets of culture, depicts the influence of deep-rooted culture on the values of members of society, and provides a rating system that can be used for dimensional comparison. Hofstede classifies the cultural characteristics of the world into six categories: power distance, uncertainty avoidance, individualism/collectivism, masculinity/femininity, long/short-term orientation, and indulgence/strictness. Societies with large power gaps show more inequality, have more submissive education systems, demonstrate more respect for the elderly, and prompt subordinates to be told what to do. Cultures that avoid uncertainty need better clarity and structure and are more willing to make sacrifices to overcome that uncertainty. Collectivist countries value the bigger picture, focusing on the harmonious coexistence of the whole, rather than individual gains and losses. In "feminine" societies, people are more modest and caring, sympathize with the weak, and emphasize non-material perspectives of success. "Masculine" societies are more ambitious and competitive. The long-term orientation pole corresponds to Bond's Confucian Work Dynamism; the values associated with this pole are persistence, frugality, statute-based relationships, and shame. Short-term values, by contrast, are social obligation, respect for tradition, the protection of one's "face" (i.e., the expression of one's self-respect and dignity), and personal stability. Finally, an indulgent culture focuses on the freedom to satisfy basic and natural human desires related to the enjoyment of life and fun.

This study differs from previous studies in several ways. First, it provides new evidence of the interaction between a country's political and cultural environments and the stringency of its government responses to the pandemic. The specific variables that we consider in this context include the length of time until the next election, the country´s corruption index, the presence of a coalition government, the political positioning of the government in power, and a series of cultural factors that describe the country's predominant cultural orientation. Second, unlike other studies that focus on the effect of government responses on broader stock market indices, our analysis employs firm-specific stock price and accounting data to obtain more detailed insights into the individual and interactive performance drivers for individual firms. Finally, our study is among the most comprehensive to date, as it analyzes data from 180 countries worldwide since COVID-19 was declared a pandemic (March 11, 2020).

Our study addresses four main research questions that explore.

(1) whether the heavy-handedness of a government's policies for battling the pandemic is affected by the cultural and political environment of a given country,

(2) whether the government's stringency and its cultural/political environment affect the stock price performance of firms operating in the said country,

(3) whether firm and/or industry characteristics affect the relative stock price performance of listed firms during the pandemic, and.

(4) how government stringency and cultural/political characteristics interact in affecting a firm's stock price performance during our sample period.

2.1. Main research question 1

Our first research question and the associated hypotheses are the following:

Against the backdrop of the COVID-19 pandemic, how does the political and cultural environment of a given country affect the strength (stringency) of its government´s responses?

Related hypotheses:

H1.1. Governments of countries with collectivistic and long-term oriented cultures arguably place more value on human life and are thus more stringent in their responses to the pandemic.

H1.2. Democratic governments, governments with coalition parties, systems with high corruption, and governments facing upcoming elections are less stringent in their responses than their autocratic, single-ruling party, low corruption, and/or recently elected counterparts.

Cultures with a collectivistic orientation tend to advocate individuals' subordination to society and focus on the cultivation of belonging and social responsibility. This should make it easier to implement strict countermeasures in the face of a common enemy (COVID-19). Similarly, people in societies with a large power distance respect the elderly and are more amenable to following orders from their leaders for the benefit of this demographic, which helps the government implement strict pandemic-fighting measures. Feminine societies are more caring and sympathetic to the weak, and we expect the pandemic to be better controlled in countries in which such a culture is dominant. Long-term-oriented countries are willing to learn from other countries and tend to have a stronger sense of shame. We expect them to learn from countries that have been effective in combating the pandemic, adopt strict anti-pandemic policies, and garner positive responses so that they can better control the virus spread. Finally, indubitably, the most important thing for indulgent cultures is unfettered freedom, and we can expect governments in these cultural contexts not to impose overly restrictive policies.

Authoritarian states have the power to deal with problems quickly and rigorously, without going through slow bureaucratic procedures; consequent to the suppression of media freedom, they need not worry about the broadcasting of these severe measures. Democratic regimes, conversely, may have difficulty enforcing restrictions on civil liberties (Greer et al., 2020; Trein, 2020); thus, the restrictions they impose on their citizens are likely to be milder. In this context, one should also consider the multidimensional nature of democracies. Coalition parties appeal to more varied voting demographics by design than single parties on issues that divide them, especially when the next parliamentary election is imminent (Martin and Vanberg, 2008). This is arguably driven by the eagerness of each coalition party to stand out from its counterparts and express distinctive views, to garner more attention and votes. Of course, the parties are responsible for the policies they propose because voters attribute responsibility to the different parties in the coalition (Angelova et al., 2016). Since the different parties in the coalition cannot easily control each other's civil servants, partner parties (which have a greater likelihood of preferencing differences over one-party regimes) may find it difficult to reach a consensus and may therefore be less effective in pandemic responses (Thies, 2001). Moreover, we expect that the more proximate the next election, the more likely the government in power is to accommodate public opinion (such as anti-mask protests), making their leadership less effective.

2.2. Main research question 2

Against the backdrop of the COVID-19 pandemic, how do the political and cultural environments in a given country affect the stock price performance of firms?

Related hypothesis:

H2.1. Firms in countries with proactive (more stringent) governments exhibit better stock price performance than firms in countries with less proactive governments.

Existing research has found that strict government measures have a negative impact on a country's representative stock index but positively influence the share prices of certain stocks by reducing the severity of the pandemic (Ashraf, 2020; Heyden and Heyden, 2020; Shanaev et al., 2020; Yang and Deng, 2021). However, the aforementioned findings are limited to the macroscopic national level or the financial market of a single region. In this study, we comprehensively examine the impact of the pandemic at the company and industry level over a broad cross-country sample and over a longer timespan. We hypothesize that stock price movements during the early days of the outbreak were primarily panic-driven and that a longer-term analysis is necessary to comprehend the relationship between a country's political/cultural environment, the stringency of its responses, and the performance of firms and industries operating in the country. In this context, we specifically argue that certain types of governments took longer to act and implement their decisions than others. Specifically, we hypothesize that countries with more proactive governments were more efficient in fighting the pandemic and that the firms in these countries exhibited better stock price performance than firms in countries with less proactive governments.

2.3. Main research question 3

How do ex-ante industry and/or firm characteristics affect the stock price reaction of firms to the COVID-19 pandemic?
Related hypothesis:

H3.1. Firms that exhibit less ex-ante risk and better financial health (e.g., larger, more liquid and less overvalued firms with higher return on assets) exhibit a better stock price performance during the pandemic than their counterparts with higher risk or in poorer financial health.

Ding et al. (2020) argue that the coronavirus outbreak imposed several challenges such as a sharp decline in income, rising fixed costs of labor and rent, and the risk of a capital chain rupture on firms. Our hypothesis in this context focuses on the firm characteristics that can help shield companies from these negative effects. For instance, we hypothesize that companies with abundant cash holdings and a high cash flow, as well as firms operating in non-labor-intensive industries, perform better during a pandemic.

2.4. Main research question 4

How do government actions and cultural/political characteristics interact in a given country (and during a given time) and what is their combined effect on stock returns?
Related hypotheses:

H4.1. Government actions in countries with greater power distance, lower uncertainty tolerance, and long-term orientation have a relatively positive effect on stock prices and an adverse effect in countries with a greater emphasis on individualism and hedonism.

H4.2. Politically, government actions in countries with a higher corruption index, a higher democracy score, longer lead times to the next election, and countries with multi-party rule have a relatively positive effect on the stock market, while more politically stable governments and law-abiding societies that can quickly and effectively adjust their responses provide relative benefits to firms listed in those countries and to the stock market.

These hypotheses extend Yang and Deng's (2021) study, which examines the combined effect of the number of confirmed COVID-19 cases in 20 OECD countries and government intervention. Their findings suggest that tighter quarantine and lockdown policies exacerbate the negative impact of COVID-19 on stock market returns. However, considering the different national contexts, our study not only considers a uniform definition of policy leniency or strictness but additionally explores the market response in terms of the interactive effects of policy changes and their own cultural and political contexts.

3. Data

3.1. Sample description

We collect data from Our World in Data, a database that provides real-time, global, and comparable data on different policy responses by governments to pandemics, with a database of 186 countries. The SI includes nine indicators of government interventions from December 17, 2019, the date of the first documented case of COVID-19 worldwide. We collect data on the SI till end-2020 and retrieve stock price data from DataStream for all firms traded globally during the same period. Finally, we obtain daily numbers of confirmed COVID-19 cases and deaths from the Center for Systems Science and Engineering at Johns Hopkins University.

We merge these data sets with a range of cultural and political factors collected from multiple sources, including the Economist Intelligence Unit (EIU), the World Bank, IFES Election Guide, and Geert Hofstede's website. After excluding countries with missing observations from our data set, our final sample accounts for 102 countries. We complement our data set with a series of control variables, namely each country's GDP per capita, healthcare expenditures as a fraction of GDP, airport connectivity, as well as the total assets, return on assets, and book-to-market ratio of individual firms. We provide detailed definitions for all variables in Appendix 1.

3.2. Variable definitions

The stringency index is a composite measure of nine response metrics, including school closures, workplace closures, cancellations of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaigns, restrictions on internal movements, and international travel controls. We choose this index as it focuses on governmental actions and is therefore more suited to reflect a country's cultural and political framework. However, alternative measures of governmental reactions to the pandemic, e.g., a social distancing index (Attar and Tekin-Koru, 2022), could also be considered.

For the political factors, we choose a country's corruption index, rule of law, political stability, level of democracy, number of years until the next election, and the presence of coalition governments. The corruption index measures the perception of businesspeople and other experts regarding the level of corruption in the public sector. The rule of law measures agents' confidence in the country's rules, including the quality of property rights and contract enforcement. Political stability measures the durability of political institutions, calculated as the number of years since the most recent regime change, with higher values indicating a more stable political situation. A high democracy level reflects fewer restrictions on political participation, elected executive recruitment, and substantive restrictions on the country's chief executive. From the IFES Election Guide website, we obtain information on the next scheduled election in each country and calculate the time between March 11, 2020 (when the WHO declared COVID-19 a pandemic) and the said election in years. Coalition governments are those formed by a coalition of two or more parties in a democratic country with a multiparty system. On the one hand, coalition governments better reflect the popular views of voters; on the other, they are more prone to unmanageable tendencies and discordant trends. Consequently, we study the contribution of coalition governments to COVID-19 pandemic prevention and control by obtaining the coalition status of each country from Wikipedia, with a dummy variable of one if it is a coalition government and zero otherwise.[1]

To represent the main cultural characteristics of a country's population, we use Hofstede's (2021) six cultural dimensions. Each dimension has a score ranging from 0 to 100 (or 104, 110, 112), with higher scores representing higher levels of a particular characteristic.[2] Power distance measures how a given society deals with inequalities in its population. Individualism measures preference for a looser society and individual achievement over that of the family and kin as a whole. Uncertainty avoidance measures how a society handles an uncertain future, or whether people prefer to plan for the future, rather than letting events unfold. Masculinity measures whether a society tends to emphasize stereotypically masculine traits such as achievement, heroism, and material rewards, over stereotypically feminine traits such as cooperation, modesty, and quality of life. Long-term orientation measures whether a society tends to encourage efforts to prepare for the future in modern education or maintain traditions and norms. Indulgence measures whether a society allows the freedom to use resources to enjoy life, or whether it suppresses the satisfaction of needs through social norms.

Finally, we add a country's GDP per capita and scaled healthcare expenditures as controls, as they are likely to affect the country's regulatory provisions.[3] At the firm level, we use log-transformed total assets, return on assets, and book-to-market value ratios as control variables.

4. Research methodology

4.1. Factors affecting the stringency index

To test the effect of cultural and political factors on the stringency of governmental responses to the COVID-19 crisis (H1.1 and H1.2), we estimate the following pooled OLS regression:

$$SI_{i,t} = \beta_0 + \beta_1 Cultural/Political_{i,t} + \beta_2 (Cultural/Political_{i,t} * \Delta Covid \quad cases_{i,t})) + \gamma Controls_{i,t} + \epsilon_{i,t} \tag{1}$$

where the dependent variable is the daily (t) stringency index for each country i, *Cultural/Political* is a cultural and political factor, and *Controls* is a vector of control variables. Note that we include each cultural/political factor separately and in interaction with the change in the number of official COVID cases. In this specification, β_1 measures the impact of the overall number of COVID cases on the SI (the average effect) while β_2 reflects the degree to which the stringency of governmental actions changes in response to daily fluctuations in the number of COVID cases (the marginal effect).

As mentioned, we use Hofstede's power distance, individualism, uncertainty avoidance, masculinity, long-term orientation, and indulgence indices as cultural factors. The variables corruption, rule of law, political stability, democracy, number of years until the next election, and coalition government represent our political factors. Following Ceddia et al. (2013), Kuan, Chen, and Bishai

[1] We employ Wikipedia (https://en.wikipedia.org/wiki/List_of_countries_with_coalition_governments) as a data source as it appears to provide the only comprehensive list of coalition governments worldwide. To ensure the reliability of the Wikipedia list, we cross-referenced each Wikipedia entry with news sources and individual country entries on the CIA Factbook; thus, we successfully confirmed all entries.

[2] The index of each Hofstede dimension is calculated by a specific formula, for example, the power distance index is given by the formula:
PDI = –35 m(03) + 35 m(06) + 25 m(14) –20 m(17) –20
where m(03) is the average score of question 03, etc. Although the value of this index is usually between 0 (small power distance) and 100 (large power distance), values below 0 and above 100 are technically possible. The 112 and 104 mentioned in the text are the highest observed country scores.

[3] In unreported tests, we estimated the pairwise correlation coefficients among the political and cultural variables used in this study. In line with the extant literature in this area, many country-level variables exhibit high correlations. To address this issue and to mitigate any multicollinearity concerns, we estimate regression models with each country characteristic included separately.

(2020), Ozkan et al. (2020), and Thakur et al. (2020), we control for the percentage change in COVID-19 confirmed cases, a country's degree of integration in the global air transport network (airport connectivity), national prosperity (GDP per capita), and health (life expectancy, healthcare expenditures).[4]

To check the robustness of our findings and to account for potential omitted variables, we also perform panel regression analyses with country and year fixed effects. In these models, only the interaction terms are included in Eq. (1) as the cultural/political factors and the control variables are time-invariant and hence assumed in the fixed effects.

4.2. The impact of the stringency index on company performance

We estimate the following pooled OLS regression model to study the effect of governmental stringency concerning battling the pandemic on the abnormal returns of individual firms and broader industry indices (H2.1 and H3.1):

$$ABR_{h,i,t} = \beta_0 + \beta_1 \Delta SI + \beta_2 F1.\ \Delta SI + \ldots + \beta_5 F5.\ \Delta SI + \beta_6 Cultural/Political_{i,t} + Controls_{h,i,t} + \epsilon_{h,i,t} \quad (2)$$

where the abnormal return *ABR* is simply the actual return of firm *h* that trades in country *i* on day *t* minus the expected return for that trading day as specified in Eq. (3) below, with $R_{h,i,t}$ and $R_{m,i,t}$ representing period returns on security *h* and the market portfolio *m*, respectively, and $\epsilon_{h,i,t}$ the zero-mean disturbance term. $\hat{\alpha}_h$ and $\hat{\beta}_h$ are the estimated parameters of the market model.

$$ABR_{h,i,t} = R_{h,i,t} - \hat{\alpha}_h - \hat{\beta}_h R_{m,i,t} \quad (3)$$

Since abnormal returns are daily point-in-time changes, we use ΔSI (SI on day t minus SI on the previous day) to represent the change in stringency. We also consider changes in the SI over the subsequent five days (*F1.*ΔSI to *F5.*ΔSI) to capture any forward-looking stock market reactions to anticipated changes in government initiatives that market participants may expect based on, e.g., rising case numbers, and to detect the point in time that best explains abnormal returns.[5] *Cultural/Political* is a vector of cultural/political factors and *Controls* is a vector of country- and firm-specific control variables. We run separate regressions for the full year and the four quarters of 2020 to explain how government actions may affect stock prices differently at various stages of the pandemic.

To check for robustness and to account for potentially omitted variables, here again, we perform panel regression analyses with country and time fixed effects. In the panel regression models, time-invariant cultural/political factors and country-level controls in Eq. (2) are not included explicitly as these are assumed in the fixed effects.

4.3. Interaction effects between governmental stringency and country/firm characteristics

To consider the impact of government actions on the stock market in the cultural and political context of each country (H4.1), we use a pooled OLS model with interactions as follows:

$$ABR_{h,i,t} = \beta_0 + \beta_1 Mean\ \ \Delta SI_{i,t} + \beta_2 (Mean\ \ \Delta SI_{i,t} * Cultural/Political_{i,t}) + \beta_3 Cultural/Political_{i,t} + Controls_{h,i,t} + \epsilon_{h,i,t} \quad (4)$$

where *ABR* is the abnormal return for firm *h* trading in country *i* on day *t*, *Mean* ΔSI is the average change in SI during the subsequent five days for country *i*, and *Mean* ΔSI **Cultural/Political* is the interaction term between the average change in SI and the cultural/political characteristics of the country.

As a robustness check, we examine an alternative to Eq. (4), where, instead of the Mean ΔSI, we include ΔSI values separately as foreseen for the following five days.

Besides country characteristics, firm characteristics too can influence the impact of governmental actions on stock prices (H.4.2); to address this issue, we estimate the following pooled OLS model:

$$ABR_{h,i,t} = \beta_0 + \beta_1 Mean\ \ \Delta SI_{i,t} + \beta_2 (Mean\ \ \Delta SI_{i,t} * Firm_{h,i,t}) + \beta_3 Cultural/Political_{i,t} + Controls_{h,i,t} + \epsilon_{h,i,t} \quad (5)$$

where *Mean* ΔSI **Firm* is the interaction term between the average change in SI in the following five days and the characteristics of the firm (the natural log of total assets, ROA, the book-to-market ratio, and the cash ratio).

5. Results and discussion

We summarize the results of the tested hypotheses as follows:

H1.1. Evidence does not support our hypothesis that governments in countries with a culture of collectivism and long-term orientation develop more stringent pandemic preparedness policies. Contrary to our expectations, in collectivist and long-term-oriented countries, policy measures are less stringent.

H1.2. Democratic governments, governments with a coalition of parties, and governments with longer periods between elections are more stringent in their responses than authoritarian, single-party governments, and those that face upcoming elections. Moreover, cleaner (less corrupt) governments implement less stringent prevention policies.

[4] We also performed a series of robustness tests in which we used COVID-related deaths as an alternative control variable and the results were similar.

[5] In unreported tests, we calculated the correlation coefficients between current and future SIs. While they are positively correlated, none of the correlation coefficients exceeds the critical absolute threshold of 0.7, largely mitigating any multicollinearity concerns.

Table 1
Summary Statistics. This table reports the summary statistics (i.e., the mean, median, standard deviation, 25% and 75% quantiles, and the number of data points) for our main variables. Variable definitions are provided in Appendix A. Panel A is for the sample in which we investigate the question of how a country's political and cultural environments affect the strength (stringency) of government responses. Panel B is for the sample in which we investigate the question of how government stringency as well as the political and cultural environments in a given country affect the stock price performance of firms in that country.

Panel A: The effect of culture and politics on the stringency of government responses

Variable Name	Obs.	Mean	S.D.	Median	P25	P75
Stringency index (SI)	15,594	55.62	24.67	60.190	41.200	74.070
Power distance	15,594	54.26	21.94	57.000	35.000	69.000
Individualism	15,594	50.35	24.19	51.000	27.000	71.000
Uncertainty avoidance	15,594	65.84	23.97	70.000	48.000	86.000
Masculinity	15,594	50.23	19.82	50.000	42.000	64.000
Long-term orientation	15,594	47.21	19.19	45.466	32.242	61.713
Indulgence	15,594	52.07	19.36	55.580	41.071	68.040
Corruption	15,594	59.72	19.16	60.000	41.000	80.000
Democracy	15,594	8.41	2.66	9.500	8.000	10.000
Political stability	15,594	57.65	44.88	43.500	27.000	73.000
Rule of law	15,594	72.52	22.99	80.529	53.365	92.788
Years to next election	15,594	2.61	1.29	2.562	1.523	3.589
Coalition	15,594	0.93	0.25	1.000	1.000	1.000
Δ Cases (%)	15,594	0.95	2.40	0.164	0.011	0.844
Airport connectivity	15,594	0.59	1.25	0.159	0.090	0.595
Healthy life expectancy	15,594	68.23	3.72	69.585	66.565	70.396
GDP per capita	15,594	3.21	2.59	2.699	0.973	4.866
Healthcare exp./GDP	15,594	7.87	2.93	8.150	5.158	10.101

Panel B: The effect of government stringency, culture, and politics on abnormal stock price returns

Variable Name	Obs.	Mean	S.D.	Median	P25	P75
Abnormal return (ABR)	6635,671	0.64	3.96	-0.021	-1.348	1.087
Δ Stringency index (SI)	6635,671	0.26	2.60	0.000	0.000	0.000
Δ Cases (%)	6635,671	0.92	2.20	0.154	0.011	0.817
Power distance	6635,671	53.18	18.90	50.000	39.000	68.000
Individualism	6635,671	62.14	25.07	67.000	46.000	89.000
Uncertainty avoidance	6635,671	56.93	22.32	48.000	40.000	76.000
Masculinity	6635,671	59.35	19.61	61.000	50.000	66.000
Long-term orientation	6635,671	48.38	21.96	45.592	25.693	61.965
Indulgence	6635,671	53.36	17.66	57.143	41.741	68.304
Corruption	6635,671	65.59	16.76	71.000	47.000	80.000
Democracy	6635,671	8.54	2.28	9.000	8.000	10.000
Political stability	6635,671	96.66	65.21	68.000	53.000	138.000
Rule of law	6635,671	80.36	18.83	89.423	66.827	91.827
Years to next election	6635,671	2.42	1.30	2.225	1.523	3.559
Coalition	6635,671	0.83	0.37	1.000	1.000	1.000
GDP per capita	6635,671	3.85	2.32	4.230	1.141	5.491
Healthcare exp./GDP	6635,671	9.68	4.48	10.446	4.446	11.019
log (Total assets)	6635,671	18.83	2.94	18.841	16.979	20.763
ROA	6635,671	-0.02	0.09	0.000	-0.001	0.001
B/M ratio	6635,671	1.93	3.09	1.058	0.487	2.100
Cash ratio	6635,671	0.31	6.27	0.081	0.022	0.233

H2.1. There is insufficient evidence to conclude that proactive government responses to outbreaks can have a positive impact on companies' stock prices.

H3.1. Firms that exhibit less *ex-ante* risk and better financial health in terms of higher assets and cash ratios exhibit better stock price performance during the pandemic than their smaller counterparts with less liquid assets.

H4.1 and H4.2. While tightening government policies independently can have a significant negative impact on stock prices, stock markets in countries with different political and cultural backgrounds react very differently to changes in anti-pandemic policies.

We provide a more detailed discussion of our findings below.

5.1. Part I: Factors that affect the stringency index

When examining the influence of cultural characteristics on governmental actions, we find, to our surprise, that societies that place more emphasis on self-interest and a loosely knit social framework, as well as those that encourage indulgence, implemented stricter policies in response to the pandemic (see Table 2). Governments that have stricter rules in place and whose societies prefer maintaining traditions and norms have less stringent controls. However, it is noteworthy that stricter government control, on the one

Table 2

Regressions of the Stringency Index against Various Factors (Full Year 2020). In Panel A, we estimate a series of pooled OLS regressions to examine the effect of cultural and political factors on the government SI. The dependent variable is the SI as reported by the Oxford COVID-19 Government Response Tracker (OxCGRT). We include Hofstede's cultural dimensions as our independent variables in models one to six. Our political proxies of interest in model seven to twelve include the corruption index (the level of corruption in a country), democracy (a score indicating the level of democracy in a country), political stability (the number of years since the most recent regime change), the rule of law (the extent to which agents abide by the rules of the society), years to the next election, and coalition (whether governments are formed by two or more parties in a parliamentary country where there is a multiparty system). The models include 12 explanatory variables (EV) of interest separately (culture and politics) and also their interaction with Δ Cases (%). To account for relevant country characteristics, we include control variables such as airport connectivity, healthy life expectancy, GDP per capita, and healthcare expenditure per GDP. Detailed variable definitions are provided in the Appendix. In Panel B, we estimate a series of panel regression models with country and year fixed effects to test robustness. For each variable, we report the coefficient and the corresponding heteroscedasticity-adjusted *p*-value below the coefficient. * **, * *, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Pooled OLS regression models

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DV	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI
EV	Power distance	Individualism	Uncertainty avoidance	Masculinity	Long-term orientation	Indulgence	Corruption	Democracy	Political stability	Rule of law	Years to next election	Coalition
EV	-0.003	0.049 * **	-0.057 * **	-0.002	-0.113 * **	0.116 * **	-0.203 * **	0.195 *	0.038 * **	-0.221 * **	2.120 * **	1.119 * **
	(0.839)	(0.000)	(0.000)	(0.833)	(0.000)	(0.000)	(0.000)	(0.057)	(0.000)	(0.000)	(0.000)	(0.000)
EV * Δ Cases (%)	-2.061 * **	-0.933 *	-1.172 * *	2.329 * **	-6.260 * **	1.888 * *	-0.966	25.482 * **	0.143	0.318	-124.146 * **	-220.003 * **
	(0.000)	(0.091)	(0.032)	(0.000)	(0.000)	(0.015)	(0.108)	(0.000)	(0.481)	(0.504)	(0.000)	(0.000)
Δ Cases (%)	362.356 * **	309.715 * **	351.625 * **	148.220 * **	605.871 * **	162.241 * **	317.160 * **	69.056 * **	258.079 * **	229.837 * **	641.592 * **	2493.777 * **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)
Airport connectivity	2.024 * **	2.164 * **	1.642 * **	1.983 * **	2.077 * **	2.297 * **	1.551 * **	2.334 * **	1.587 * **	1.528 * **	1.390 * **	3.052 * **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Healthy life expectancy	0.192 * *	0.245 * **	0.271 * **	0.194 * **	0.217 * **	0.061	0.202 * **	0.181 * **	0.168 * *	0.328 * **	0.236 * **	0.372 * **
	(0.010)	(0.002)	(0.000)	(0.010)	(0.001)	(0.347)	(0.002)	(0.008)	(0.010)	(0.000)	(0.001)	(0.000)
GDP per capita	-0.181 * **	-0.189 * **	-0.210 * **	-0.173 * **	-0.139 * **	-0.185 * **	-0.061 * **	-0.171 * **	-0.197 * **	-0.052 * **	-0.172 * **	-0.171 * **-*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Healthcare exp./ GDP	-0.578 * **	-0.782 * **	-0.404 * **	-0.567 * **	-0.715 * **	-0.817 * **	-0.060	-0.641 * **	-0.694 * **	0.047	-0.368 * **	-0.731 * **-*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.526)	(0.000)	(0.000)	(0.604)	(0.000)	(0.000)
N	15,594	15,594	15,594	15,594	15,594	15,594	15,594	15,594	15,594	15,594	15,594	15,594
Adj. R2	0.079	0.079	0.081	0.079	0.091	0.085	0.077	0.072	0.073	0.082	0.068	0.076

Panel B: Panel regression models with country and year fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DV	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI
EV	Power distance	Individualism	Uncertainty avoidance	Masculinity	Long-term orientation	Indulgence	Corruption	Democracy	Political stability	Rule of law	Years to next election	Coalition
EV * Δ Cases	-0.754 * *	-0.628 * *	-0.027	1.844 * **	-3.724 * **	0.652	-1.099 * **	17.450 * **	0.027	0.162	-52.850 * **	-219.629
	(0.010)	(0.027)	(0.923)	(0.000)	(0.000)	(0.101)	(0.000)	(0.000)	(0.792)	(0.500)	(0.000)	(0.123)
Δ Cases (%)	158.866 * **	154.270 * **	122.229 * **	35.409 * *	336.268 * **	95.386 * **	197.746 * **	6.651	129.555 * **	118.716 * **	295.142 * **	350.215 * *
	(0.000)	(0.000)	(0.000)	(0.012)	(0.000)	(0.000)	(0.000)	(0.561)	(0.000)	(0.000)	(0.000)	(0.014)
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	15,594	15,594	15,594	15,594	15,594	15,594	15,594	15,594	15,594	15,594	15,255	15,594
Adj. R2	0.784	0.784	0.784	0.784	0.783	0.785	0.789	0.784	0.782	0.782	0.800	0.782

hand, reflects the government's high degree of attention and decisive ruling ability. On the other, it also indicates that as the pandemic situation in these regions might have been more serious, the governments had to take rigorous control. This in turn suggests that the scale of the pandemic's spread is smaller, and the control effect is significant in collectivist, long-term orientated, non-uncertainty-tolerant, and restrained cultural regions. We cannot rule out, however, that governments in these regions might have been unaware of the severity of the pandemic, leading to inaction.

From a political point of view, countries with democratic, politically stable, multi-party coalitions, and governments with more time until the next election implemented more stringent policies against the pandemic. Countries with corrupt systems but an otherwise strong rule of law tend to be less regulated. Because the SI is highly positively correlated to the number of cases, we know that a government's strict policies are probably due to the intensification of the pandemic: regimes that are democratic but score poorly concerning the rule of law have a higher risk level, as their members abide less by governmental policies and therefore need stricter regulatory actions from the authorities. It is highly unlikely that these governments will rely on voluntary vigilance by the population. We assume that the ruling party in a coalition government may downplay the severity of the pandemic's spread or take a softer stance in its actions for the sake of votes, which may delay the introduction of time-sensitive pandemic prevention and control policies. Contrary to our predictions, governments free of electoral pressure, that are politically stable, and have multi-party powers at their back are more assertive in making policy to manage the situation once they realize its seriousness.

When investigating the interactions between cultural/political factors and the change in the number of COVID cases (Table 2, Panel A), we observe a recurring pattern concerning the variables of *individualism*, *years to the next election*, and *coalition*. Notably, these variables have significant positive coefficients, while the coefficients for their interaction terms with the number of COVID cases are significantly negative. This suggests that countries with a higher degree of individualism, a longer time to the next election, and a coalition government tend to implement stricter policy measures on average. However, their response to short-term fluctuations in the number of COVID cases is comparatively muted. These findings are also supported by the results of our panel regressions, in which we introduce country and year fixed effects (see Table 2, Panel B).

These patterns can be attributed to a smoothing strategy aimed at avoiding sudden increases in the stringency of policy measures. The respective countries appear to establish a high level of stringency early on and keep it relatively stable thereafter. This seems reasonable, since in countries with coalition governments and individualistic societies, political negotiations may be slow, and it may become difficult to implement new policies, and people do not respond well to frequent state interventions.

After all, the SI can only indicate the severity of the prevention and control policies adopted by countries; but it is difficult to evaluate the reasonableness and effectiveness of the measures taken in various countries. Overly strict prevention policies may cause severe damage to normal economic operations and social order, both of which are difficult to restore and will affect the effectiveness of prevention and control. Pandemic and social conditions vary from country to country, and there is no single standard for the appropriateness and effectiveness of policies. As mentioned above, policy responses to pandemics may be complemented by further parameters, e.g., epidemiological and behavioral characteristics (Attar and Tekin-Koru, 2022).

Whether pandemic prevention and control policies are reasonable and effective depends also on the timing of their introduction. Broadly speaking, however, if decisive measures are taken before the outbreak and the rapid spread of the virus, more can be accomplished with less. A comparison of several major countries, for example, shows that countries such as China and South Korea kept the number of confirmed cases under control by adopting timely anti-pandemic policies (Kennedy et al., 2020). Relatively speaking, the U.S., the United Kingdom, and other countries took measures late, resulting in a passive pandemic response and a loss of control. Although France, Italy, and other countries adopted timely prevention and control policies, the lack of their strict implementation resulted in the serious spread of the virus (Gu et al., 2020).

5.2. Part II: Factors that affect stock prices

Our results essentially support Yang and Deng (2021), who find that strict government measures reinforce the negative impact of the pandemic on stock prices. To explore this effect in more detail, we divide our sample period (i.e., the year 2020) into four quarters and estimate our stock price regressions during different phases of the pandemic. For the whole year 2020, the next day's change in the stringency index is the most significant driver of share price changes across different sectors, especially in the consumer durables, chemicals and applied products, utilities, and wholesale sector, wherein stock prices tend to increase as government controls are relaxed (see Table 3). In 2020, the supply chain was repeatedly affected by limited transport capacity, rising product procurement costs, insufficient production and supply, and delayed distribution. Therefore, during times when the pandemic situation was ameliorated, it is likely that consumer demand rose, the retail and consumer durables industries rebounded, and public utilities were increasingly put into use.

The first quarter of 2020 saw the greatest negative impact on stock prices (significant negative stock price impacts in eight of the twelve sectors) as the government tightened its policies and short-term consumer demand weakened (see Table 4). This result aligns with that of Ramelli and Wagner (2020) and Hale et al. (2020): the most important period is the first three months. Similar to the pattern throughout the remainder of the year, the change in SI a day ahead has the most significant effect on stock prices during the first quarter. This applies to consumer non-durable goods, financial, and other sectors, which are in direct contact with consumers and tend to have high fixed costs such as labor and rent. The change in SI is therefore persistent in its effect on stock prices, being negatively significant from day one throughout the following five days. While it has a very weak impact on the healthcare sector, possibly due to the elevated demand for medical supplies, with a rise in governmental healthcare spending and, in the long run, deeper reform of the healthcare system, the effect is insignificant. Our political and cultural variables best explain share price movements in non-durable consumer goods, finance, and other sectors. These industries are closely linked to government policies

Table 3
Regression of Daily Stock Returns (CARs and ABRs) against Various Factors for the Full Year 2020, Including Future Changes in SI. In Panel A, we estimate a series of pooled OLS regressions to examine the effect of changes in the government stringency index (SI) related to COVID-19 on the abnormal returns of various industries in 2020. The dependent variable is the total market abnormal return (column 1) and the abnormal return of firms in 12 different industries, respectively (columns 2–13). The independent variable is the change and the one to five day forward change in the stringency index as reported by the Oxford COVID-19 Government Response Tracker (OxCGRT). We also include Hofstede's six cultural dimensions and six political proxies of interest as independent variables. The political variables include the corruption index (the level of corruption in a country), democracy (a score indicating the level of democracy in a country), political stability (the number of years since the most recent regime change), rule of law (the extent to which agents abide by the rules of society), years to the next election, and coalition (whether governments are formed by two or more parties in a democratic country with a multiparty system). We also include control variables such as the GDP per capita, healthcare expenditures as a percentage of a country's GDP, as well as a firm's total assets, return on assets (ROA), and book-to-market (B/M) ratio. In Panel B, we estimate a series of Panel regression models with country and date fixed effects to test robustness. For each variable, we report the coefficient and the corresponding heteroscedasticity-adjusted *p*-value below the coefficient. * **, * *, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Ind1	Consumer Non-Durables – Food, Tobacco, Textiles, Apparel, Leather, Toys
Ind2	Consumer Durables – Cars, TV's, Furniture, Household Appliances
Ind3	Manufacturing – Machinery, Trucks, Planes, Office Furniture, Paper, Com. Printing
Ind4	Oil, Gas, and Coal Extraction and Products
Ind5	Chemicals and Allied Products
Ind6	Business Equipment – Computers, Software, and Electronic Equipment
Ind7	Telephone and Television Transmission
Ind8	Utilities
Ind9	Wholesale, Retail, and Some Services (Laundries, Repair Shops)
Ind10	Healthcare, Medical Equipment, and Drugs
Ind11	Finance
Ind12	Other – Mines, Construction, Building Mat., Transp., Hotels, Bus. Services, Entertainment

Panel A: Pooled OLS regression models

	(1) ALL ABR	(2) Ind1 ABR	(3) Ind2 ABR	(4) Ind3 ABR	(5) Ind4 ABR	(6) Ind5 ABR	(7) Ind6 ABR	(8) Ind7 ABR	(9) Ind8 ABR	(10) Ind9 ABR	(11) Ind10 ABR	(12) Ind11 ABR	(13) Ind12 ABR
Δ Stringency index (SI)	-0.071	-0.025	-0.014 * **	-0.044 * *	0.026	-0.010 * *	-0.391	-0.002	-0.047 * **	-0.012	0.016	-0.037	-0.038
	(0.667)	(0.685)	(0.006)	(0.020)	(0.160)	(0.031)	(0.791)	(0.956)	(0.000)	(0.519)	(0.564)	(0.632)	(0.502)
F1.ΔSI	-0.296 *	-0.031	-0.049 * **	-0.045 * *	-0.030 *	-0.034 * **	-2.493 *	-0.026	-0.021 * *	-0.037 * *	-0.037	-0.030	-0.023
	(0.073)	(0.621)	(0.000)	(0.018)	(0.099)	(0.000)	(0.090)	(0.559)	(0.015)	(0.041)	(0.184)	(0.697)	(0.687)
F2.ΔSI	0.334 * *	-0.024	-0.016 * **	-0.014	0.002	-0.010 * *	3.366 * *	0.005	-0.033 * **	-0.033 *	-0.015	-0.039	-0.050
	(0.045)	(0.705)	(0.003)	(0.459)	(0.905)	(0.043)	(0.023)	(0.907)	(0.000)	(0.068)	(0.590)	(0.607)	(0.389)
F3.ΔSI	-0.032	-0.029	-0.018 * **	-0.012	-0.088 * **	-0.014 * **	0.007	-0.023	0.061 * **	-0.043 * *	-0.050 *	-0.047	-0.059
	(0.847)	(0.651)	(0.001)	(0.542)	(0.000)	(0.005)	(0.996)	(0.615)	(0.000)	(0.020)	(0.075)	(0.542)	(0.311)
F4.ΔSI	-0.072	-0.024	-0.025 * **	-0.026	-0.039 * *	-0.025 * **	-0.258	-0.018	-0.010	-0.036 *	-0.029	-0.018	-0.088
	(0.665)	(0.699)	(0.000)	(0.178)	(0.034)	(0.000)	(0.861)	(0.678)	(0.259)	(0.051)	(0.300)	(0.812)	(0.128)
F5.ΔSI	-0.067	-0.030	-0.004	0.003	-0.086 * **	-0.012 * *	-0.417	-0.015	-0.033 * **	-0.032 *	-0.029	-0.035	-0.050
	(0.686)	(0.638)	(0.460)	(0.885)	(0.000)	(0.012)	(0.778)	(0.730)	(0.000)	(0.084)	(0.293)	(0.643)	(0.386)
Δ Cases (%)	0.123	0.201 * *	0.015 * *	0.004	0.030	-0.002	0.490	0.007	0.016	-0.002	-0.015	0.182 * *	0.021
	(0.550)	(0.024)	(0.021)	(0.880)	(0.233)	(0.807)	(0.771)	(0.904)	(0.130)	(0.940)	(0.610)	(0.030)	(0.795)
Power distance	0.069	0.008	0.000	-0.009	0.004	0.002	0.661	0.002	0.001	0.001	0.008	-0.006	0.003
	(0.182)	(0.695)	(0.784)	(0.113)	(0.607)	(0.348)	(0.195)	(0.853)	(0.631)	(0.810)	(0.415)	(0.818)	(0.862)
Individualism	-0.053	-0.011	0.002	0.015 * *	0.015 *	0.000	-0.535	-0.004	-0.006 * *	-0.005	-0.009	-0.006	-0.004
	(0.362)	(0.604)	(0.272)	(0.020)	(0.077)	(0.938)	(0.397)	(0.763)	(0.017)	(0.498)	(0.447)	(0.803)	(0.863)
Uncertainty avoidance	-0.055	0.008	0.001	0.004	-0.002	0.001	-0.491	-0.004	0.001	-0.003	-0.000	0.000	-0.001
	(0.193)	(0.622)	(0.667)	(0.433)	(0.769)	(0.552)	(0.221)	(0.719)	(0.742)	(0.512)	(0.998)	(0.981)	(0.947)
Masculinity	0.067	-0.009	-0.001	0.005	-0.005	-0.000	0.558	0.002	0.006 * *	0.004	0.009	-0.003	0.008
	(0.125)	(0.652)	(0.514)	(0.352)	(0.458)	(0.978)	(0.105)	(0.840)	(0.030)	(0.417)	(0.208)	(0.870)	(0.642)
Long-term orientation	-0.009	-0.028	-0.002	-0.009	0.009	-0.001	0.017	-0.011	-0.003	-0.003	0.006	0.001	0.003
	(0.853)	(0.169)	(0.270)	(0.104)	(0.178)	(0.480)	(0.969)	(0.415)	(0.300)	(0.674)	(0.478)	(0.960)	(0.856)
Indulgence	0.044	0.004	-0.003 *	0.006	0.004	-0.001	0.780	0.005	0.000	-0.000	0.001	0.004	-0.001
	(0.349)	(0.799)	(0.054)	(0.273)	(0.537)	(0.410)	(0.214)	(0.601)	(0.895)	(0.984)	(0.890)	(0.838)	(0.968)
Corruption	-0.170	0.057	-0.001	-0.013	0.007	0.006	-1.742	0.021	0.002	0.005	0.006	-0.052	-0.024
	(0.214)	(0.293)	(0.845)	(0.430)	(0.668)	(0.188)	(0.257)	(0.539)	(0.710)	(0.757)	(0.819)	(0.427)	(0.603)
Democracy	0.041	0.034	-0.025 * **	0.038	-0.054	-0.015 * *	1.211	-0.004	0.011	-0.020	-0.017	0.031	-0.052
	(0.866)	(0.696)	(0.003)	(0.145)	(0.137)	(0.045)	(0.695)	(0.950)	(0.379)	(0.454)	(0.739)	(0.770)	(0.561)
Political stability	-0.039	0.006	-0.000	-0.002	-0.001	0.001	-0.308	-0.003	0.002 *	-0.002	0.002	-0.001	0.002
	(0.165)	(0.615)	(0.929)	(0.456)	(0.736)	(0.374)	(0.250)	(0.681)	(0.080)	(0.597)	(0.720)	(0.944)	(0.861)
Rule of law	0.167 *	-0.020	0.007 * *	0.015	-0.019	0.002	1.633	-0.008	0.000	-0.002	-0.001	0.017	0.009
	(0.096)	(0.586)	(0.034)	(0.187)	(0.143)	(0.440)	(0.253)	(0.738)	(0.968)	(0.874)	(0.956)	(0.717)	(0.789)

(*continued on next page*)

Table 3 (*continued*)

Years to next election	0.353 (0.642)	0.437 (0.147)	0.056 * (0.050)	-0.161 * (0.087)	0.051 (0.565)	-0.000 (0.996)	2.052 (0.781)	0.267 (0.172)	-0.027 (0.428)	0.029 (0.738)	0.085 (0.505)	-0.061 (0.862)	-0.122 (0.657)
Coalition	3.389 (0.360)	-1.313 (0.401)	0.059 (0.617)	-0.092 (0.818)	-0.227 (0.743)	0.118 (0.334)	27.941 (0.390)	-0.241 (0.815)	0.342 * (0.079)	0.398 (0.370)	0.814 (0.201)	-0.542 (0.749)	0.629 (0.672)
GDP per capita	0.391 (0.526)	-0.125 (0.597)	-0.027 (0.341)	0.008 (0.911)	0.040 (0.562)	-0.045 * (0.073)	1.718 (0.769)	-0.013 (0.925)	0.025 (0.398)	0.015 (0.839)	0.076 (0.474)	0.253 (0.354)	0.075 (0.749)
Healthcare exp./GDP	0.531 (0.220)	0.060 (0.728)	0.016 (0.309)	-0.178 * ** (0.001)	0.007 (0.898)	-0.005 (0.721)	3.790 (0.357)	0.087 (0.410)	-0.030 (0.134)	0.083 * (0.098)	0.037 (0.632)	0.043 (0.830)	0.063 (0.691)
log (Total assets)	-0.620 * ** (0.000)	-0.212 * * (0.012)	-0.005 (0.435)	0.036 (0.114)	-0.006 (0.688)	-0.022 * ** (0.000)	-3.867 * ** (0.006)	-0.108 * ** (0.007)	-0.016 (0.115)	-0.103 * ** (0.000)	-0.142 * ** (0.000)	-0.345 * ** (0.000)	-0.228 * ** (0.000)
ROA	-0.004 (0.854)	-2.531 (0.726)	-2.062 (0.193)	4.065 * ** (0.002)	-0.020 (0.885)	-3.345 * ** (0.000)	-0.016 (0.775)	7.433 * * (0.010)	-8.627 * ** (0.000)	-5.992 * * (0.027)	0.026 (0.627)	-0.440 * * (0.033)	0.098 (0.539)
B/M ratio	0.082 (0.960)	-0.958 (0.921)	-5.138 * ** (0.002)	-1.052 (0.662)	-3.377 (0.477)	-0.233 (0.319)	611.548 (0.885)	-0.304 (0.978)	-0.674 (0.811)	-1.390 (0.882)	-56.870 (0.496)	0.040 (0.904)	-5.798 (0.791)
Cash ratio	-0.001 (0.753)	0.000 (0.557)	-0.000 (0.142)	0.000 (0.144)	0.000 (0.852)	-0.000 (0.431)	-0.014 (0.705)	-0.001 (0.701)	0.000 * * (0.011)	-0.000 (0.853)	0.000 (0.972)	-0.000 (0.914)	-0.000 (0.995)
N	6635,671	506,419	166,735	747,604	214,939	204,248	769,093	113,498	143,506	554,658	401,839	122,4231	1588,175
Adj. R^2	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000

Panel B: Panel regression models with country and date fixed effects

	(1) ALL ABR	(2) Ind1 ABR	(3) Ind2 ABR	(4) Ind3 ABR	(5) Ind4 ABR	(6) Ind5 ABR	(7) Ind6 ABR	(8) Ind7 ABR	(9) Ind8 ABR	(10) Ind9 ABR	(11) Ind10 ABR	(12) Ind11 ABR	(13) Ind12 ABR
Δ Stringency index (SI)	-0.023 * (0.051)	-0.019 * (0.090)	-0.007 * * (0.028)	-0.025 (0.257)	0.021 * * (0.012)	-0.005 (0.108)	-0.074 (0.251)	0.006 (0.595)	-0.014 * (0.062)	-0.005 (0.128)	0.007 (0.262)	-0.000 (0.921)	-0.018 * ** (0.000)
F1.ΔSI	-0.186 (0.305)	-0.007 * * (0.014)	-0.012 * ** (0.000)	-0.009 * (0.088)	-0.028 * ** (0.006)	-0.002 (0.466)	-1.352 (0.325)	0.121 (0.314)	-0.019 * * (0.043)	0.000 (0.978)	-0.020 * ** (0.000)	-0.016 * ** (0.000)	-0.010 * ** (0.001)
F2.ΔSI	0.217 (0.344)	-0.012 * ** (0.000)	-0.013 * ** (0.000)	-0.012 * ** (0.000)	0.005 (0.546)	-0.013 * ** (0.000)	1.631 (0.324)	0.037 (0.249)	-0.009 * * (0.048)	-0.019 * ** (0.000)	-0.003 (0.494)	-0.010 (0.345)	-0.007 (0.529)
F3.ΔSI	-0.008 (0.221)	-0.014 * ** (0.007)	-0.007 * * (0.030)	-0.011 * * (0.010)	-0.052 * ** (0.001)	-0.015 * ** (0.000)	0.027 (0.418)	-0.021 (0.351)	0.047 (0.445)	-0.022 * ** (0.000)	-0.031 * * (0.024)	-0.025 * (0.081)	-0.019 * ** (0.000)
F4.ΔSI	-0.017 * (0.050)	-0.001 (0.862)	-0.009 * * (0.025)	-0.006 (0.308)	-0.020 (0.439)	-0.006 * (0.055)	-0.021 (0.450)	0.022 (0.477)	0.004 (0.405)	-0.006 * * (0.031)	-0.000 (0.928)	0.001 (0.767)	-0.036 (0.182)
F5.ΔSI	-0.013 (0.281)	-0.013 (0.347)	0.012 * ** (0.000)	0.009 (0.128)	-0.007 (0.330)	0.005 * (0.063)	-0.119 (0.315)	0.005 (0.741)	0.001 (0.903)	-0.004 (0.311)	0.002 (0.706)	0.006 (0.221)	-0.005 * * (0.025)
Δ Cases (%)	-0.018 (0.819)	0.125 (0.322)	0.013 * (0.085)	-0.025 (0.437)	-0.001 (0.944)	0.004 (0.635)	-0.611 (0.308)	0.032 (0.123)	0.008 (0.546)	0.004 (0.843)	0.008 (0.479)	0.176 (0.256)	0.033 * ** (0.000)
log (Total assets)	-0.558 (0.169)	-0.132 (0.252)	-0.003 (0.865)	0.049 (0.597)	-0.008 (0.561)	-0.024 * ** (0.003)	-3.414 (0.287)	-0.063 (0.645)	-0.013 (0.369)	-0.085 * (0.059)	-0.134 * (0.061)	-0.316 (0.272)	-0.220 (0.264)
ROA	-0.003 * * (0.044)	-2.926 (0.506)	-2.841 (0.404)	3.634 (0.485)	-0.020 (0.374)	-3.157 * ** (0.000)	-0.015 (0.254)	6.723 (0.282)	-8.744 (0.117)	-6.282 (0.454)	0.023 (0.494)	-0.449 (0.492)	0.095 (0.325)
B/M ratio	0.000 (0.162)	-0.000 (0.142)	-0.000 (0.118)	-0.000 (0.406)	-0.000 (0.236)	-0.000 * ** (0.000)	-0.000 (0.321)	-0.000 (0.121)	-0.000 (0.740)	-0.000 (0.252)	-0.000 * ** (0.000)	0.000 (0.114)	-0.000 * (0.091)
Cash ratio	-0.000 (0.330)	0.000 * * (0.032)	0.002 * ** (0.002)	0.000 * (0.056)	0.000 * ** (0.003)	-0.000 * (0.060)	-0.006 (0.394)	0.000 (0.785)	0.000 * ** (0.000)	-0.000 (0.113)	-0.000 (0.405)	-0.000 (0.150)	0.000 (0.780)
Country Level Controls	No	No	No	No	No	No	No	No	No	No	No	No	No
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Date	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	6635,671	506,419	166,735	747,604	214,939	204,248	769,093	113,498	143,506	554,658	401,839	122,4231	1588,175
Adj. R2	0.000	0.000	0.006	0.000	0.003	0.005	0.000	0.004	0.004	0.000	0.000	0.000	-0.000

such as stay-at-home orders and restrictions on overseas travel. In general, companies in collectivist, politically stable, and multi-party coalition countries performed better when the global stock markets took a hit in the first quarter of 2020.

In the second quarter, the influence of the government's SI on share prices gradually diminished, with a few sectors like manufacturing and chemicals experiencing a turn from a negative to a positive effect in the third quarter. Personal protective equipment (PPE), such as face masks and medical gloves, may have played a significant role in fighting the pandemic. This recovery, coupled with hoarding-related purchases, may have contributed to the steady recovery of manufacturing. From the second quarter onward, the effect of regional political and cultural factors either weakened or did not play a decisive role in the impact on stock prices. In

Table 4

. Regression of Daily Stock Returns against Various Factors for the Four Quarters of 2020, Including Future Changes in the Stringency Index. We estimate a series of pooled OLS regressions to examine the effect of changes in the government stringency index (SI) related to COVID-19 on the abnormal returns of firms in various industries in the first to the fourth quarter of 2020, presented in Panels A to D, respectively. The dependent variables are the abnormal return for the full sample of publicly traded firms around the world (column 1) and those operating in 12 different industries, respectively (Columns 2–13). The independent variable is the change and forward one to five day change in the SI as reported by the Oxford COVID-19 Government Response Tracker (OxCGRT). We include Hofstede's cultural dimensions as our independent variables. We also include control variables such as the GDP per capita, healthcare expenditures as a percentage of a country's GDP, as well as a firm's total assets, return on assets (ROA), and book-to-market (B/M) ratio. Detailed variable definitions are provided in the Appendix. For each variable, we report the coefficient and the corresponding heteroscedasticity-adjusted *p*-value below the coefficient. * **, * *, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: 2020-Q1

	(1) ALL ABR	(2) Ind1 ABR	(3) Ind2 ABR	(4) Ind3 ABR	(5) Ind4 ABR	(6) Ind5 ABR	(7) Ind6 ABR	(8) Ind7 ABR	(9) Ind8 ABR	(10) Ind9 ABR	(11) Ind10 ABR	(12) Ind11 ABR	(13) Ind12 ABR
ΔSI	-0.023 * **	-0.021 * **	-0.004	0.012	0.045	-0.009	-0.017	0.010	-0.079 * **	-0.002	0.020	-0.042 * **	-0.048 * **
	(0.000)	(0.000)	(0.581)	(0.124)	(0.351)	(0.186)	(0.605)	(0.463)	(0.000)	(0.663)	(0.574)	(0.000)	(0.000)
F1.ΔSI	-0.036 * **	-0.035 * **	-0.071 * **	-0.064 * **	-0.040	-0.050 * **	-0.022	-0.036 * **	-0.032	-0.043 * **	-0.059	-0.029 * **	-0.020 * **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.397)	(0.000)	(0.494)	(0.009)	(0.139)	(0.000)	(0.102)	(0.000)	(0.000)
F2.ΔSI	-0.038 * **	-0.025 * **	-0.012	-0.024 * **	0.018	-0.015 * *	-0.042	0.014	-0.041 *	-0.038 * **	-0.034	-0.029 * **	-0.073 * **
	(0.000)	(0.000)	(0.144)	(0.003)	(0.718)	(0.030)	(0.195)	(0.318)	(0.059)	(0.000)	(0.347)	(0.000)	(0.000)
F3.ΔSI	-0.041 * **	-0.018 * **	-0.003	-0.003	-0.109 * *	-0.011	-0.063 *	-0.021	0.107 * **	-0.048 * **	-0.067 *	-0.057 * **	-0.051 * **
	(0.000)	(0.000)	(0.727)	(0.752)	(0.027)	(0.122)	(0.056)	(0.134)	(0.000)	(0.000)	(0.067)	(0.000)	(0.000)
F4.ΔSI	-0.032 * **	-0.018 * **	-0.030 * **	-0.033 * **	-0.043	-0.029 * **	-0.040	-0.015	-0.006	-0.048 * **	-0.044	-0.018 * **	-0.042 * **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.368)	(0.000)	(0.219)	(0.263)	(0.781)	(0.000)	(0.227)	(0.000)	(0.000)
F5.ΔSI	-0.044 * **	-0.035 * **	0.010	0.012	-0.132 * **	-0.017 * *	-0.047	-0.015	-0.064 * **	-0.039 * **	-0.048	-0.055 * **	-0.058 * **
	(0.000)	(0.000)	(0.199)	(0.125)	(0.006)	(0.018)	(0.147)	(0.292)	(0.003)	(0.000)	(0.183)	(0.000)	(0.000)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1343,441	102,515	33,760	151,362	43,459	41,356	155,740	22,981	29,057	112,308	81,425	247,908	321,423
Adj. R^2	0.000	0.004	0.004	0.001	0.000	0.005	0.000	0.001	0.002	0.005	0.000	0.004	0.004

Panel B: 2020-Q2

	(1) ALL ABR	(2) Ind1 ABR	(3) Ind2 ABR	(4) Ind3 ABR	(5) Ind4 ABR	(6) Ind5 ABR	(7) Ind6 ABR	(8) Ind7 ABR	(9) Ind8 ABR	(10) Ind9 ABR	(11) Ind10 ABR	(12) Ind11 ABR	(13) Ind12 ABR
ΔSI	0.004	0.009	-0.036 * *	-0.028 * **	0.067 *	0.006	0.002	0.015	-0.004	-0.001	0.005	-0.010	0.027
	(0.805)	(0.821)	(0.024)	(0.006)	(0.080)	(0.728)	(0.909)	(0.946)	(0.742)	(0.991)	(0.809)	(0.603)	(0.588)
F.ΔSI	0.008	0.019	-0.002	0.002	0.081 * *	-0.002	0.004	0.040	-0.004	0.002	0.018	-0.003	0.009
	(0.584)	(0.633)	(0.880)	(0.860)	(0.040)	(0.892)	(0.810)	(0.860)	(0.751)	(0.984)	(0.432)	(0.889)	(0.861)
F2.ΔSI	0.021	0.026	0.011	0.022 * *	0.043	0.051 * **	0.002	0.032	0.014	0.012	0.049 * *	0.009	0.026
	(0.147)	(0.504)	(0.474)	(0.028)	(0.217)	(0.003)	(0.890)	(0.884)	(0.254)	(0.885)	(0.025)	(0.631)	(0.565)
F3.ΔSI	-0.023	-0.040	-0.011	0.004	0.012	0.022	-0.024	-0.002	0.008	-0.016	0.007	0.011	-0.080 *
	(0.124)	(0.315)	(0.479)	(0.717)	(0.739)	(0.219)	(0.113)	(0.993)	(0.536)	(0.842)	(0.735)	(0.553)	(0.082)
F4.ΔSI	0.010	0.009	0.008	0.023 * *	0.008	0.010	0.025	0.014	-0.003	0.022	0.014	-0.006	0.002
	(0.498)	(0.820)	(0.596)	(0.023)	(0.814)	(0.569)	(0.108)	(0.950)	(0.831)	(0.788)	(0.519)	(0.763)	(0.969)
F5.ΔSI	0.002	0.018	-0.004	0.019 *	-0.034	0.016	-0.002	0.011	0.009	-0.001	-0.002	-0.006	-0.004
	(0.896)	(0.658)	(0.791)	(0.066)	(0.330)	(0.364)	(0.908)	(0.959)	(0.432)	(0.992)	(0.917)	(0.730)	(0.924)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1754,874	133,928	44,094	197,723	56,896	54,016	203,414	30,016	37,952	146,688	106,284	323,744	419,927
Adj. R^2	0.000	0.000	0.001	0.002	0.000	0.001	0.000	0.000	0.003	0.000	0.001	0.000	0.000

(*continued on next page*)

Table 4 (*continued*)

Panel C: 2020-Q3

	(1) ALL ABR	(2) Ind1 ABR	(3) Ind2 ABR	(4) Ind3 ABR	(5) Ind4 ABR	(6) Ind5 ABR	(7) Ind6 ABR	(8) Ind7 ABR	(9) Ind8 ABR	(10) Ind9 ABR	(11) Ind10 ABR	(12) Ind11 ABR	(13) Ind12 ABR
ΔSI	0.031	0.006	0.025	0.033***	0.027	0.048***	0.025	0.017	0.013	0.006	0.097	-0.003	0.066
	(0.731)	(0.577)	(0.159)	(0.002)	(0.419)	(0.000)	(0.157)	(0.471)	(0.427)	(0.864)	(0.579)	(0.975)	(0.858)
F.ΔSI	0.005	-0.002	-0.007	0.004	-0.000	0.018	-0.017	-0.007	-0.004	0.008	0.006	0.004	0.015
	(0.953)	(0.887)	(0.705)	(0.675)	(0.999)	(0.159)	(0.346)	(0.772)	(0.789)	(0.798)	(0.972)	(0.966)	(0.967)
F2.ΔSI	0.000	-0.012	0.003	-0.005	0.016	0.006	0.020	-0.011	0.015	-0.003	0.030	-0.112	0.084
	(0.998)	(0.311)	(0.853)	(0.677)	(0.685)	(0.644)	(0.301)	(0.675)	(0.378)	(0.936)	(0.870)	(0.237)	(0.839)
F3.ΔSI	0.013	0.002	0.005	0.009	-0.022	0.028**	0.000	0.014	0.028*	0.005	0.001	0.004	0.039
	(0.898)	(0.842)	(0.790)	(0.394)	(0.573)	(0.038)	(0.985)	(0.593)	(0.094)	(0.892)	(0.997)	(0.963)	(0.926)
F4.ΔSI	-0.126	-0.017	-0.029*	-0.018*	-0.058	-0.011	-0.033*	-0.025	-0.019	-0.002	-0.032	0.001	-0.546
	(0.178)	(0.109)	(0.095)	(0.081)	(0.122)	(0.369)	(0.077)	(0.331)	(0.234)	(0.942)	(0.856)	(0.989)	(0.183)
F5.ΔSI	0.006	-0.013	0.007	-0.019*	0.002	-0.026**	-0.021	-0.006	-0.017	0.004	0.049	0.001	0.049
	(0.950)	(0.232)	(0.704)	(0.067)	(0.960)	(0.036)	(0.286)	(0.819)	(0.295)	(0.900)	(0.786)	(0.996)	(0.907)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1755,059	133,977	44,096	197,716	56,895	54,016	203,390	30,016	37,952	146,688	106,240	323,723	420,158
Adj. R^2	0.000	0.000	0.001	0.003	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000

Panel D: 2020-Q4

	(1) ALL ABR	(2) Ind1 ABR	(3) Ind2 ABR	(4) Ind3 ABR	(5) Ind4 ABR	(6) Ind5 ABR	(7) Ind6 ABR	(8) Ind7 ABR	(9) Ind8 ABR	(10) Ind9 ABR	(11) Ind10 ABR	(12) Ind11 ABR	(13) Ind12 ABR
ΔSI	-0.085	-0.041	0.016	-0.234***	0.017	-0.006	-0.453	-0.021	0.008	0.009	-0.020*	-0.021	-0.006
	(0.911)	(0.889)	(0.126)	(0.008)	(0.297)	(0.475)	(0.946)	(0.208)	(0.551)	(0.225)	(0.083)	(0.953)	(0.260)
F.ΔSI	-1.394*	-0.034	0.015	-0.020	0.009	0.020**	-12.316*	-0.002	-0.012	-0.008	-0.007	-0.039	0.004
	(0.067)	(0.908)	(0.148)	(0.821)	(0.565)	(0.017)	(0.063)	(0.922)	(0.378)	(0.305)	(0.567)	(0.913)	(0.515)
F2.ΔSI	1.981***	-0.028	-0.006	-0.004	-0.007	0.003	17.771***	0.013	-0.030**	-0.010	-0.000	-0.051	-0.009
	(0.009)	(0.924)	(0.528)	(0.964)	(0.658)	(0.734)	(0.007)	(0.427)	(0.022)	(0.190)	(0.968)	(0.885)	(0.110)
F3.ΔSI	-0.042	-0.022	-0.027***	-0.034	-0.029*	-0.012	-0.266	-0.009	0.001	-0.005	-0.032***	-0.043	-0.002
	(0.956)	(0.941)	(0.008)	(0.695)	(0.073)	(0.151)	(0.968)	(0.573)	(0.957)	(0.536)	(0.007)	(0.902)	(0.744)
F4.ΔSI	-0.046	-0.028	0.017	-0.014	-0.005	0.011	-0.293	0.000	0.001	0.001	0.011	-0.018	-0.008
	(0.952)	(0.927)	(0.106)	(0.874)	(0.742)	(0.223)	(0.965)	(0.983)	(0.929)	(0.948)	(0.342)	(0.961)	(0.171)
F5.ΔSI	-0.043	-0.023	-0.001	0.009	0.054***	0.035***	-0.367	0.004	0.036***	0.018**	0.004	0.023	-0.004
	(0.956)	(0.942)	(0.898)	(0.915)	(0.001)	(0.000)	(0.956)	(0.809)	(0.008)	(0.018)	(0.731)	(0.948)	(0.522)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1782,297	135,999	44,785	200,803	57,689	54,860	206,549	30,485	38,545	148,974	107,890	328,856	426,667
Adj. R^2	0.000	0.000	0.001	0.000	0.001	0.002	0.000	0.000	0.005	0.001	0.001	0.000	0.000

Table 5

. Robustness Tests. We run separate pooled OLS regressions including political or cultural indicators to test the robustness of the impact of changes in the COVID-19-related government stringency index (SI) on firms' abnormal returns by industry in 2020, presented in Panels A and B, respectively. The dependent variables are the abnormal return for the full sample of publicly traded firms around the world (column 1) and those operating in 12 different industries, respectively (Columns 2–13). The independent variable is the change and forward one to five day change in the SI as reported by the Oxford COVID-19 Government Response Tracker (OxCGRT). In Panel A, our political proxies of interest include the corruption index (the level of corruption in a country), democracy (a score indicating the level of democracy in a country), political stability (the number of years since the most recent regime change), the rule of law (the extent to which agents abide by the rules of society), years to the next election, and coalition (whether governments are formed by two or more parties in a democratic country with a multiparty system). In Panel B, we include Hofstede's cultural dimensions as our independent variables. We also include control variables such as the GDP per capita, healthcare expenditures as a percentage of a country's GDP, as well as a firm's total assets, return on assets (ROA), and book-to-market (B/M) ratio. Detailed variable definitions are provided in the Appendix. For each variable, we report the coefficient and the corresponding heteroscedasticity-adjusted *p*-value below the coefficient. * **, * *, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: The effect of government stringency on abnormal stock price returns, controlling for political factors

	(1) ALL ABR	(2) Ind1 ABR	(3) Ind2 ABR	(4) Ind3 ABR	(5) Ind4 ABR	(6) Ind5 ABR	(7) Ind6 ABR	(8) Ind7 ABR	(9) Ind8 ABR	(10) Ind9 ABR	(11) Ind10 ABR	(12) Ind11 ABR	(13) Ind12 ABR
ΔSI	-0.067	-0.024	-0.014 * **	-0.044 * *	0.018	-0.011 * *	-0.329	-0.061	-0.039 * **	-0.013	0.012	-0.037	-0.038
	(0.662)	(0.679)	(0.006)	(0.041)	(0.281)	(0.026)	(0.810)	(0.279)	(0.000)	(0.420)	(0.635)	(0.597)	(0.473)
F.ΔSI	-0.267 *	-0.029	-0.046 * **	-0.037 *	-0.027	-0.031 * **	-2.250 *	0.100 *	-0.021 * *	-0.033 * *	-0.035	-0.029	-0.021
	(0.082)	(0.622)	(0.000)	(0.085)	(0.109)	(0.000)	(0.099)	(0.075)	(0.014)	(0.049)	(0.167)	(0.673)	(0.687)
F2.ΔSI	0.296 *	-0.023	-0.015 * **	-0.016	0.002	-0.014 * **	2.992 * *	-0.013	-0.033 * **	-0.030 *	-0.014	-0.037	-0.047
	(0.055)	(0.702)	(0.003)	(0.460)	(0.889)	(0.005)	(0.029)	(0.812)	(0.000)	(0.069)	(0.593)	(0.596)	(0.384)
F3.ΔSI	-0.034	-0.025	-0.017 * **	-0.013	-0.080 * **	-0.013 * **	-0.032	-0.081	0.058 * **	-0.039 * *	-0.044 *	-0.042	-0.054
	(0.827)	(0.671)	(0.001)	(0.547)	(0.000)	(0.008)	(0.981)	(0.153)	(0.000)	(0.020)	(0.086)	(0.548)	(0.315)
F4.ΔSI	-0.067	-0.024	-0.025 * **	-0.021	-0.038 * *	-0.023 * **	-0.237	-0.004	-0.009	-0.032 *	-0.026	-0.018	-0.081
	(0.663)	(0.687)	(0.000)	(0.338)	(0.029)	(0.000)	(0.862)	(0.938)	(0.300)	(0.055)	(0.308)	(0.791)	(0.131)
F5.ΔSI	-0.066	-0.028	-0.005	-0.003	-0.083 * **	-0.016 * **	-0.364	-0.101 *	-0.036 * **	-0.031 *	-0.030	-0.035	-0.049
	(0.667)	(0.630)	(0.362)	(0.898)	(0.000)	(0.001)	(0.790)	(0.074)	(0.000)	(0.062)	(0.236)	(0.620)	(0.358)
Only Political Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	6900,633	528,925	169,155	768,812	222,748	210,540	796,439	119,790	145,926	581,762	416,359	1290,292	1649,159
Adj. R^2	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000

Panel B: The effect of government stringency on abnormal stock price returns, controlling for cultural factors

	(1) ALL	(2) Ind1	(3) Ind2	(4) Ind3	(5) Ind4	(6) Ind5	(7) Ind6	(8) Ind7	(9) Ind8	(10) Ind9	(11) Ind10	(12) Ind11	(13) Ind12
	ABR	ABR	ABR	ABR	ABR	ABR	ABR	ABR	ABR	ABR	ABR	ABR	ABR
ΔSI	-0.047	-0.020	-0.013 * **	-0.026 * *	0.014	-0.012 * **	-0.172	-0.003	-0.032 * **	-0.012	0.010	-0.033	-0.034
	(0.673)	(0.639)	(0.000)	(0.012)	(0.333)	(0.000)	(0.831)	(0.925)	(0.000)	(0.371)	(0.572)	(0.615)	(0.435)
F.ΔSI	-0.173	-0.017	-0.018 * **	-0.014	-0.027 *	-0.007 * **	-1.100	-0.018	-0.011 *	-0.024 *	-0.020	-0.026	-0.018
	(0.125)	(0.684)	(0.000)	(0.182)	(0.071)	(0.008)	(0.178)	(0.620)	(0.059)	(0.070)	(0.240)	(0.699)	(0.686)
F2.ΔSI	0.191 *	-0.022	-0.016 * **	-0.016	-0.002	-0.013 * **	1.489 *	-0.003	-0.022 * **	-0.028 * *	-0.011	-0.037	-0.033
	(0.093)	(0.611)	(0.000)	(0.135)	(0.914)	(0.000)	(0.070)	(0.940)	(0.000)	(0.037)	(0.534)	(0.584)	(0.456)
F3.ΔSI	-0.031	-0.024	-0.015 * **	-0.017	-0.073 * **	-0.017 * **	-0.049	-0.018	0.030 * **	-0.035 * *	-0.038 * *	-0.042	-0.047
	(0.787)	(0.589)	(0.000)	(0.127)	(0.000)	(0.000)	(0.954)	(0.630)	(0.000)	(0.011)	(0.033)	(0.538)	(0.295)
F4.ΔSI	-0.041	-0.015	-0.012 * **	-0.014	-0.027 *	-0.008 * **	-0.104	-0.016	-0.003	-0.023	-0.009	-0.015	-0.063
	(0.722)	(0.725)	(0.000)	(0.199)	(0.077)	(0.003)	(0.901)	(0.672)	(0.604)	(0.101)	(0.592)	(0.825)	(0.158)
F5.ΔSI	-0.039	-0.018	0.004	0.007	-0.068 * **	0.003	-0.160	-0.012	-0.020 * **	-0.020	-0.014	-0.031	-0.038
	(0.736)	(0.674)	(0.235)	(0.499)	(0.000)	(0.297)	(0.849)	(0.752)	(0.001)	(0.140)	(0.439)	(0.644)	(0.398)
Only Cultural Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	8365,706	651,619	262,083	1092,938	242,769	324,764	1106,199	128,744	187,792	657,508	530,341	1327,565	1852,658
Adj. R^2	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000

Table 6

Regression of Daily Stock Returns against the Stringency Index and its Interaction with Cultural/Political Characteristics. In panel A, we estimate a series of pooled OLS regressions to examine the interaction effect of changes in the government stringency index (SI) and a country's cultural/political characteristics related to COVID-19 on the abnormal return of firms in various countries in 2020. In Panel B, we estimate a series of Panel regression models with country and day fixed effects to test robustness. The dependent variable is the daily abnormal return in the first quarter of 2020. In panel A: The main independent variables of interest are the mean changes in the stringency index over the subsequent five days for country *i* as reported by the Oxford COVID-19 Government Response Tracker (OxCGRT) and their interactions with a county's cultural/political characteristics, respectively. In panel B: The main independent variables of interest are the changes in the SI for each day over the subsequent five days for country *i* as reported by the Oxford Covid-19 Government Response Tracker (OxCGRT) and their interactions with a county's cultural/political characteristics, respectively. We consider Hofstede's cultural dimensions in models one to six. Our political proxies of interest in models seven to twelve include the corruption index (the level of corruption in a country), democracy (a score indicating the level of democracy in a country), political stability (the number of years since the most recent regime change), the rule of law (the extent to which agents abide by the rules of the society), years to the next election, and coalition (whether governments are formed by two or more parties in a democracy country with a multiparty system). In Panel A, we also include control variables such as the GDP per capita, healthcare expenditures as a percentage of a country's GDP, as well as a firm's total assets, return on assets (ROA), and book-to-market (B/M) ratio. In Panel B, we also include control variables such as a firm's total assets, return on assets (ROA), and book-to-market (B/M) ratio, and our models include country and date fixrd effects as well. Detailed variable definitions are provided in the Appendix. For each variable, we report the coefficient and the corresponding heteroscedasticity-adjusted *p*-value below the coefficient. * **, * *, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Pooled OLS regression models

DV EV	(1) ABR Power distance	(2) ABR Individualism	(3) ABR Uncertainty avoidance	(4) ABR Masculinity	(5) ABR Long-term orientation	(6) ABR Indulgence	(7) ABR Corruption	(8) ABR Democracy	(9) ABR Political stability	(10) ABR Rule of law	(11) ABR Years to next election	(12) ABR Coalition
Mean ΔSI	-0.034 * **	-0.029 * **	-0.035 * **	-0.035 * **	-0.032 * **	-0.032 * **	-0.034 * **	-0.037 * **	-0.034 * **	-0.034 * **	-0.036 * **	-0.029 * **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mean ΔSI * EV	0.005 * **	-0.006 * **	0.003 * **	0.002 * *	0.003 * **	-0.006 * **	-0.008 * **	0.009	-0.001 * **	-0.006 * **	0.009	-0.366 * **
	(0.000)	(0.000)	(0.000)	(0.026)	(0.001)	(0.000)	(0.000)	(0.323)	(0.000)	(0.000)	(0.430)	(0.000)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441
Adj. R^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Panel B: Panel regression models with country and day fixed effects

DV EV	(1) ABR Power distance	(2) ABR Individualism	(3) ABR Uncertainty avoidance	(4) ABR Masculinity	(5) ABR Long-term orientation	(6) ABR Indulgence	(7) ABR Corruption	(8) ABR Democracy	(9) ABR Political stability	(10) ABR Rule of law	(11) ABR Years to next election	(12) ABR Coalition
ΔSI * EV	0.177	-0.135	0.131 *	1.720 * **	0.306 * *	-0.361 * *	-0.210	-4.506 * **	0.337 * **	-0.113	-26.429 * **	-55.441 * **
	(0.158)	(0.228)	(0.072)	(0.000)	(0.017)	(0.011)	(0.290)	(0.000)	(0.000)	(0.493)	(0.000)	(0.000)
F1.ΔSI * EV	0.065	-0.402 * **	0.094	0.015	0.375	0.247	-0.248	-3.666 * **	-0.172	-0.496 * *	12.030 * **	-32.866 * **
	(0.642)	(0.004)	(0.318)	(0.925)	(0.132)	(0.339)	(0.346)	(0.000)	(0.144)	(0.029)	(0.008)	(0.000)
F2.ΔSI * EV	-0.214 *	0.586 * **	-0.614 * **	0.774 * **	-0.796 * **	0.250 *	-0.170	1.188 * *	0.310 * **	-0.314 * *	5.361 * *	-9.338 * *
	(0.099)	(0.000)	(0.000)	(0.000)	(0.000)	(0.083)	(0.335)	(0.036)	(0.000)	(0.018)	(0.013)	(0.028)
F3. ΔSI * EV	0.817 * **	-1.070 * **	0.494 * **	-0.270	0.628 * *	-0.586 *	-0.922 * **	-4.449 * **	-0.411 * **	-0.637 * *	-3.739	-11.564
	(0.000)	(0.000)	(0.006)	(0.235)	(0.041)	(0.073)	(0.006)	(0.000)	(0.000)	(0.042)	(0.154)	(0.135)
F4.ΔSI * EV	1.292 * **	-1.306 * **	0.594 * **	-1.420 * **	0.991 * **	-1.691 * **	-1.273 * **	2.311 * *	-0.554 * **	-0.825 * **	-1.480	-19.273 * *
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.031)	(0.000)	(0.000)	(0.551)	(0.024)
F5.ΔSI *EV	1.078 * **	-0.749 * **	0.055	-0.383 * *	0.287 *	-1.476 * **	-1.211 * **	-0.840	-0.051	-0.620 * **	-12.568 * **	-18.584 * **
	(0.000)	(0.000)	(0.529)	(0.018)	(0.051)	(0.000)	(0.000)	(0.229)	(0.533)	(0.001)	(0.000)	(0.001)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Date	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441	1343,441
Adj. R^2	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

other words, in the early stage of the outbreak, the political system and cultural characteristics of a region and other factors interactively determined the extent to which the region was affected by COVID-19, but the role of these country-specific determinants waned as the pandemic was gradually controlled and the panic subsided.

The robustness test results in Table 5, which largely coincide with those in Table 3 (Panels A and B), suggest that cultural and political factors, together or separately, as control variables, do not change the pattern of abnormal returns, ruling out the possibility of endogeneity problems.

5.3. Part III: Interactive effects between country and firm characteristics and the actions of a country on stock prices

This section explores the impact of governmental actions on stock prices, based on the diverse cultural and political contexts of our sample countries. When we focus on the first quarter of 2020, the period when the impact of the pandemic was the most severe, we find that the independent impact of government actions on stock prices was consistently negative and significant (see Table 6, Panel A, row 1). Yet, when combined with different country characteristics, their interactive effect on stock prices could be positive. For example, in countries with greater power distance, greater uncertainty acceptance, a male bias, and a long-term orientation, government actions in response to the pandemic stimulated stock price increases. In contrast, in societies that are more individualistic and practice permissive hedonism, stock prices reacted more negatively to restrictive government initiatives during the pandemic.

As for political factors, countries with less corrupt governments, politically stable governments, a high degree of rule of law, and multi-party coalitions have a (relatively) more negative impact on stock prices for changes in the SI, while the presence of a democratic government or an impending election have a positive but insignificant effect on stock prices.

We also analyze the impact of changes in a government's SI on the stock prices of companies with different financial profiles (see Appendix 2). We find that larger companies (i.e., firms with more assets) are less negatively affected by government intervention in a pandemic. Moreover, the abnormal stock returns of companies with more cash, i.e., higher cash ratios in the year before the pandemic, are also less negatively affected by government actions. This further supports and extends the findings of Ding et al. (2021).

6. Conclusions

In this study, we explore how the cultural and political environment in a given country affects the stringency of governmental responses to the COVID-19 pandemic (captured by the stringency index SI) and the factors that influence changes in governmental responses to the pandemic over time. Specifically, we examine both the mean relationship between the SI and a series of socio-political variables during our sample period (average effect), as well as the dynamic reaction of governments to domestic COVID-19 infection rates, considering their socio-political environment (marginal effect). A major insight from this analysis is that governments that impose stringent (less stringent) measures early on subsequently exhibit a low (high) degree of flexibility in adjusting their policies to the virus. In future pandemics, policymakers should thus distinguish between (1) the cultural/political characteristics that influence their policies in general and (2) their short-term reactions to changes in the infection rate and how these changes are affected by the explanatory variables.

Although this study cannot provide a specific and overall optimal setting of factors supporting the best strategy against a pandemic, there is value in recognizing the diversity of potentially efficient responses. Because the socio-political framework of a country cannot be changed over a short- or medium-term time horizon, our study aims to provide policymakers with insights regarding the efficiency of hard or soft stringency measures–both on average and concerning immediate actions–that consider the country's ex-ante characteristics.

In a second inquiry, we hypothesized a positive association between the strictness of policy measures and abnormal stock market returns. This was based on the premise that stock prices reflect long-term expectations, and that more prudent policies should be viewed positively by market participants because they bolster long-term growth. However, our findings indicate a negative relation, especially in the first quarter of 2020, which may be attributed to a market overreaction to adverse news and an investor focus on the short-term effects of the pandemic. Some industries such as consumer non-durables, telecommunications, and finance experienced no significant negative effect, and also larger firms with more cash prove to be more resilient in this context.

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Declaration of interest

None.

Data statement

The data supporting the findings of this paper can be obtained from the corresponding author upon a reasonable request.

Appendix 1. Definition of variables

Variable	Definition	Source
Stringency Index (SI)	An additive score of nine indicators of the stringency of government responses to the COVID-19 pandemic; measured on an ordinal scale and rescaled to vary from 0 to 100. The responses captured include school closures, workplace closures, cancellations of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaigns, restrictions on internal movements, and international travel controls.	Our World in Data, OxCGRT
ΔSI	The difference between the stringency index on day t and the previous day (t-1).	Our World in Data, OxCGRT
Mean ΔSI	The mean change in the stringency index over the five days following day t.	Our World in Data, OxCGRT
ΔCases	Daily/monthly/quarterly number of COVID-19-related confirmed cases per 100 K citizens	Center for Systems Science and Engineering, Johns Hopkins University
Abnormal return (ABR)	Daily abnormal return of a given firm on day t, calculated by the authors using a market model	DataStream
Political variables (Data frequency: Time invariant, one value per country)		
Corruption	Corruption perception index, ranging from 0 to 100. A higher value indicates more corruption in the system	Transparency International, Corruption Perceptions Index 2019
Rule of law	The rule of law reflects perceptions of the extent to which agents have confidence in and abide by the rules of society. It includes the quality of property rights, police, courts, and contract enforcement	World Bank
Political stability	Political stability ranges from − 2.5 to 2.5, it measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism	World Bank
Democracy	The democracy score ranges from 0 to 10, with a higher score indicating a higher level of democracy	Economist Intelligence Unit
Years to next election	The number of years from March 11, 2020, until the date of the next presidential election.	IFES Election Guide
Coalition	Binary variable, with 1 representing a multi-party government	Wikipedia, CIA Factbook
Cultural variables (Data frequency: Time invariant, one value per country)		
Power distance	A measure of how society handles inequalities among the population. A higher index indicates an acceptance of hierarchical order in the society. Range: 0 to 104	Geert Hofstede's website (https://geerthofstede.com)
Individualism	Individualism versus collectivism: A measure of preference for a loosely-knit social framework. An individualistic society expects individuals to take care of only themselves and their immediate families. Range: 0 to 100	Geert Hofstede's website (https://geerthofstede.com)
Uncertainty avoidance	A measure of how society deals with an uncertain future, i.e., preplanning for the future vs. leaving events to unfold by themselves. Range: 0 to 112	Geert Hofstede's website (https://geerthofstede.com)
Masculinity	Masculinity versus femininity: A measure of a tough versus tender culture. A high masculinity score suggests a preference for achievement, heroism, and material rewards while a low masculinity (high femininity) score suggests a preference for cooperation, modesty, and quality of life. Range: 0 to 110	Geert Hofstede's website (https://geerthofstede.com)
Long-term orientation	Long-term orientation versus short-term orientation: A measure of whether society prefers to encourage efforts in modern education to prepare for the future or prefers to maintain traditions and norms. Range: 0 to 100	Geert Hofstede's website (https://geerthofstede.com)
Indulgence	Indulgence versus restraint: A a measure of whether society allows for free gratification of resources to enjoy life or suppresses the gratification of needs via social norms. Range: 0 to 100	Geert Hofstede's website (https://geerthofstede.com)
Control variables (Data frequency: Time invariant, one value per country/firm, unless stated otherwise)		
GDP per capita	GDP per capita of a given country, measured in USD	World Bank
Health exp./GDP	Healthcare goods and services consumed as a percentage of a country's GDP	World Bank
Healthy life expectancy	Average age at death of a country's citizens	OurWorldInData.org
Airport connectivity	IATA airport connectivity: A measure of the degree of integration of a country within the global air transport network, ranging from 0 to 100.	World Economic Forum
log (Total assets)	Natural logarithm of a firm's total assets at the end of 2019	Worldscope
ROA	Net income/total assets of a firm, measured at the end of 2019	Worldscope
B/M ratio	Book value/Market value of a firm, measured at the end of 2019	Worldscope
Cash ratio	Cash or cash equivalent/total assets of a firm, measured at the end of 2019	Worldscope

Appendix 2. Regression of Daily Stock Returns against the Stringency Index and its Interaction with Financial Indicators

We estimate a series of pooled OLS regressions to examine the interaction effect of changes in the government stringency index (SI) and firms' financial indicators related to COVID-19 on the abnormal returns of those firms in various countries in 2020. The dependent variable is the daily abnormal return in the first quarter of 2020. The main independent variables of interest are the interactions of mean changes in the SI over the subsequent five days for country *i* as reported by the Oxford COVID-19 Government Response Tracker (OxCGRT) and companies' financial conditions (the log of total assets, return on assets (ROA), book-to-market (B/M) ratio, and cash ratio), respectively. We include control variables such as a country's GDP per capita, healthcare expenditures as a percentage of a country's GDP, as well as the firm's total assets, return on assets, book-to-market (B/M) ratio, and cash ratio. Detailed variable definitions are provided in Appendix 1. For each variable, we report the coefficient and the corresponding heteroscedasticity-adjusted *p*-value below the coefficient. * **, * *, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
DV	ABR	ABR	ABR	ABR
	log (Total assets)	ROA	B/M ratio	Cash ratio
Mean ΔSI	-0.036 * **	-0.036 * **	-0.036 * **	-0.036 * **
	(0.000)	(0.000)	(0.000)	(0.000)
Mean ΔSI * EV	0.119 * *	1.058	0.007	0.020 * *
	(0.033)	(0.599)	(0.307)	(0.028)
Controls	Yes	Yes	Yes	Yes
N	1343,441	1343,441	1343,441	1343,441
Adj. R^2	0.000	0.000	0.000	0.000

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