

Article

# National Governance Quality, COVID-19, and Stock Index Returns: OECD Evidence

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**Abstract:** This research argues that national governance quality may moderate the relationship between COVID-19 and stock returns across markets. Building on the well-established relationship between COVID-19 shock and stock returns, we focus on how the quality of a country's governance system affects the relationship between the COVID-19 crisis and stock returns. Using data from the World Governance Indicators, the World Bank, and the John Hopkins University Coronavirus Resource Centre (JHU-CRC) for 29 OECD markets from 23 January to 31 December 2020, our findings confirm this hypothesis. Our results suggest that, the estimated coefficient on the interaction term is negative ( $-0.004$ ) and statistically different from zero at the 5% level of significance. This result can be inferred that the higher the national governance quality is, the weaker the effect of COVID-19 on stock returns will be. Specifically, the negative impact of COVID-19 on stock market returns was more pronounced in countries where the national governance quality index is lower. Our results also show a strong negative association between COVID-19 and stock market returns across the sample. The results are robust to changes in governance quality measures, estimation methods, and explanatory variables. The results have several policy implications such that better institutions may partially offset the adverse impact of the COVID-19 shock on stock market returns.

**Keywords:** national governance quality; stock index returns; COVID-19; OECD markets

**JEL Classification:** E02; F65; G18; G34; G38



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## 1. Introduction

Recently, country-level governance has become one of the most important policy issues in the finance field (Levchenko 2007; Sharma et al. 2022; Nguyen et al. 2015, 2021). It is widely believed that high national governance quality may develop well-established financial intermediaries, which contribute to the free flow of information among parties involved in transactions, which in turn may reduce both transaction costs and agency costs (Hooper et al. 2009; Agyemang et al. 2018).

Prior research has established an important interplay between a country's national governance quality, capital market developments, and firm-level policies. For example, Nguyen et al. (2015) found that national governance quality moderates the relationship between a firm's ownership concentration and its profitability, suggesting that good national governance is likely to encourage low-risk investments, which result in better profitability and lower performance variability of the firm (Ngobo and Fouda 2012). Agyemang et al. (2018) provide evidence that institutional quality plays an important role in stimulating the level of financial market development in Africa. Kuzey et al. (2021) report evidence that institutional quality and its six indicators are major predictors of stock market development. Jabbouri and Almustafa (2020) suggest that firms obtain the most valuable effect of cash holdings under better institutional quality environments.

Hooper et al. (2009) found that good governance quality raises the demand for equity and maximizes stock returns by lowering transaction and agency costs. Similarly,

Low et al. (2015) found consistent evidence that governance quality across multiple dimensions is negatively associated with stock market risk. Chiou et al. (2010) discovered that stock market risk is mitigated by good legal systems, little corruption, strong investor protection rights, and a stable political climate. However, according to evidence presented by Low et al. (2011), on average, countries with weak governance frameworks, which are characterized by political instability, poor investor protection, ineffective government, poor regulatory quality, and a lack of control over corruption, exhibit higher equity returns than countries with strong national governance settings. Generally, the literature suggests that the quality of the country-level governance has an important effect on corporate policies and how capital markets work. Accordingly, the quality of the country-level framework affects the availability of external financing, the cost of funding, the quality of investments, and the valuation of firms and markets, among other things (Low et al. 2011, 2015; Kuzey et al. 2021).

Stock market returns have been widely affected recently by the sudden emergence of the coronavirus (COVID-19) pandemic. COVID-19 has been identified as a pandemic in 215 countries and territories, affecting both developed and emerging economies (Harjoto et al. 2020). As a result, COVID-19 has unleashed massive global economic and financial shockwaves that have had a negative impact on financial markets in both developed and developing nations. Consequently, global stock markets saw one of the most dramatic crashes in 2020 (Mazur et al. 2021; Harjoto et al. 2020). According to most of the studies examining this issue, local COVID-19 outbreaks lowered stock market returns around the world.

For example, Xu (2021) provides evidence that increased COVID-19 cases has a negative effect on stock returns in the United States and Canada. Kumeka and Adeniyi (2022) found that stock markets appeared to be more negatively responsive to growth in total number of COVID-19 reported cases than the growth in deaths in the case of Nigeria and South Africa. Using U.S. data, Hsu and Liao (2021) show that COVID-19 has a positive effect on stock price volatility and trading volume and that it is negatively associated with stock returns. Chancharat and Meeprom (2021) show that stock market returns are significantly negatively associated with daily growth in total confirmed COVID-19 cases in the hospitality and tourism industry in Thailand. Moreover, Topcu and Gulal (2020) reveal that COVID-19 has a general negative effect on stock markets in emerging markets. However, they made the analysis based on regional classification, and they report that Asian emerging markets were most affected by the outbreak, while European markets were least affected. Using data from 53 emerging and 23 developed countries between 14 January and 20 August 2020, Harjoto et al. (2021) examined the effect of the COVID-19 crisis on the stock market's performance. The authors concluded that COVID-19 cases and deaths have a negative impact on stock returns and increase market volatility and volume. However, the market reaction was not consistent across countries and varied significantly in magnitude (Ashraf 2021). Engelhardt et al. (2021) report evidence that the stock market volatility during the COVID-19 crisis depends on the population's trust in the country's government. Rahman et al. (2021) show that government stimulus package-related announcements reduced the COVID-19 shock on stock market returns. Sharkasi et al. (2006) studied the reaction of stock markets to crises and events and reported that emerging markets can take up to two months to recover from a crash, whereas developed markets typically recover in less than a month after a crash. This demonstrates the difference in how mature and emerging markets react to crashes. Donadelli and Persha (2014) report evidence suggesting a link between governance indicators at the national level and stock market performance. Eslamloueyan and Jafari (2019) demonstrate that the quality of institutions is a significant factor in attracting investment and has played an important role protecting the countries of East Asia from financial crises in the past.

Since differences in the national governance quality settings of the hosting country may affect the level of the capital markets development and the equity risk premium, we would expect that the relationship between COVID-19 and stock index returns may depend on the quality of the national governance system. This research examines the moderating

impact of national governance quality on the relationship between COVID-19 and stock index returns in 29 OECD markets. Specifically, this study attempts to answer the following two questions:

- (1) Does COVID-19 affect the stock index returns in OECD markets?
- (2) Does the national governance quality affect the nature of the relationship between COVID-19 and stock index returns?

In this study, we use panel data regression to look at how the quality of a country's government affects the relationship between the COVID-19 crisis and stock returns in the OECD markets from 23 January to 31 December 2020. Consistent with the theory that stable institutions are associated with smaller variability in stock returns (Hooper et al. 2009), the results of this research indicate that better institutions partially offset the adverse impact of the COVID-19 crisis on stock returns. Furthermore, we document evidence that COVID-19 had significant negative impact on stock returns across our sample. Our findings are robust to an alternative measure of national governance quality and alternative estimating methods.

This study makes two contributions: first, it adds to the growing body of research that spans several countries and examines the effect of COVID-19 on stock returns globally (e.g., Ashraf (2021); Narayan et al. (2021); Harjoto et al. (2021); Gao et al. (2021); Bouri et al. (2021b); Sun et al. (2021); Scherf et al. (2022); among others). This study examines 29 OECD member countries and thus reaches a global conclusion. Second, this study extends a growing body of literature on the role of institutional development in corporate market policy (e.g., Le et al. (2021); Jabbouri and Almustafa (2020); Dejuan-Bitria and Mora-Sanguinetti (2021); Buchanan et al. (2012); Eslamloueyan and Kahromi (2022); Chen et al. (2021); Eslamloueyan and Jafari (2019); Hsu and Liao (2021); Ahmed (2020) among others). This research extends this literature by looking at the country's national governance quality's important role in shaping the relationship between COVID-19 and stock index returns. To the best of my knowledge, no study has yet examined how a country's institutional quality may affect or shape the magnitude of the impact of the COVID-19 shock on different stock exchanges. The remainder of the paper proceeds as follows. Section 2 reviews the current literature. Section 3 describes the methodology and data. Section 4 provides description of the data and discusses the empirical results. Section 5 discusses implications and conclusions.

## 2. Literature Review and Hypotheses

Prior related literature proposed several theoretical arguments for refining and understanding the effect of COVID-19 on stock markets. Harjoto et al. (2021) proposed three theories considering their usefulness for explaining this issue. First, they argue that the return on the stock market is determined by the productivity of businesses. The COVID-19 outbreak has caused significant disruptions to real economic activities around the world, such as supply chains, productions, and consumptions. This is because countries all over the world have instituted lockdowns and quarantine during the pandemic. As a result, investors responded to the disruptions that real economic activities experienced by immediately withdrawing their investments from the equity markets. This resulted in negative returns, increased volatility, and increased trading volume. This is the so-called supply of stock market hypothesis (Diermeier et al. 1984).

Second, they highlight the role of overreaction hypothesis (De Bondt and Thaler 1985), and they argue that the effect of COVID-19 on equity markets during the rising infection period (before April) is different from its effect during the stabilizing period (post-April). When COVID-19 comes up, the market tends to overreact, but as it learns more about the pandemic, it tends to calm down. Finally, they suggest that institutional theory may help to understand the COVID-19 impact on stock returns. Consequently, based on the institutional theory (North 1991), we hypothesize that the impact of COVID-19 is different in countries with higher institutional characteristics from those with lower quality characteristics. Research has found different investment behaviors between well-developed and

under-developed markets, such as risk and return framework (Salomons and Grootveld 2003; Donadelli and Persha 2014).

The pandemic caused by COVID-19 is a threat on a global scale (Tinungki et al. 2022; Li et al. 2021; Hsu and Liao 2021; Kumeka and Adeniyi 2022; Bouri et al. 2021a). In addition to its widespread transmission, it compelled most countries to impose large-scale social restrictions, which restrict human movements to stop the spread of this virus. This paralyzed economies, affecting business activities systemically (Tinungki et al. 2022). Due to uncertainty about the pandemic's duration, and there was no specific medical treatment or vaccine during the year 2020, most of the capital markets experienced a fall in stock prices (Mazur et al. 2021; Tinungki et al. 2022). Consequently, an increasing number of studies are examining the effect of COVID-19 on stock markets across countries.

This new body of research suggests that the financial markets have dropped significantly because of the higher risk premium needed on risky assets as a result of the increasing uncertainty around economic conditions brought on by the epidemic (Bouri et al. 2021b). However, the restrictions imposed by the pandemic have had different effects on different markets around the world (Scherf et al. 2022). Given this, it is interesting to consider whether the heterogeneity in how global financial markets respond to the COVID-19 pandemic is influenced by a country's national governance quality. Considering the evidence of increased uncertainty due to the pandemic and the evidence that establishes a link between national governance quality and stock market performance (e.g., Eslamloueyan and Jafari 2019; Tinungki et al. 2022; Harjoto et al. 2021; Eldomiaty et al. 2016; Lin et al. 2018; Salomons and Grootveld 2003; among others), this paper provides new insight into the role of a country's institutional quality in determining the relationship between COVID-19 and stock returns.

Recently, few research studies have examined the country-level governance influence on COVID-19. Zaremba et al. (2021) report that government effectiveness affects stock market returns during the COVID-19 pandemic. Jebran and Chen (2021) evaluated the literature on corporate governance and earlier financial crises to discuss the potential role of corporate governance in the COVID-19 crisis and suggested further research to offer firm-level evidence. Koutoupis et al. (2021) analyzed the literature on corporate governance and COVID-19 and concluded that more empirical evidence is needed. Moreover, Hsu and Liao (2021) examined the effect of firm-level corporate governance (e.g., board and ownership structures) on the stock market performance in the U.S. during the COVID-19 crisis and suggest that good corporate governance can reduce COVID-19's impact on stock price volatility and trading volume but not on stock returns. Therefore, the findings of this study will make a significant contribution to the existing body of literature on corporate finance by offering empirical evidence on the significant role that country-level governance plays in determining the nature of the link between COVID-19 and stock returns. Moreover, Hsu and Liao (2021) argue that COVID-19 is prominent in local and global economies, and several countries have developed laws to help businesses. It is not apparent if these policies are helpful, and researchers have called for more research on how governments might mitigate COVID-19's effects (Goodell 2020).

Based on the above-mentioned theoretical and empirical arguments, we propose our hypotheses as follows:

**Hypothesis 1.** *The COVID-19 pandemic is significantly associated with stock index returns in the OECD markets.*

**Hypothesis 2.** *The relationship between the COVID-19 pandemic and stock index returns in the OECD is significantly influenced by the national governance quality.*

### 3. Methodology

#### 3.1. Data and Sample

Data for this research were obtained as follows; first, we collected daily stock market returns from the website (<http://www.investing.com>; accessed on 26 February 2022) covering the period from 23 January to 31 December 2020 for twenty-nine (29) OECD countries. Country selection was mainly based on the data availability from the data sources. We deleted observations with missing stock return data, notably on weekends or national holidays. We winsorized daily returns at 1% in both tails to remove the outliers' effect. Second, we obtained daily COVID-19-verified cases from the John Hopkins University Coronavirus Resource Centre (JHU-CRC) website. Third, country-level national governance data are sourced from the World Bank's Worldwide Governance Indicators (WGI) project (Kaufmann et al. 2011). We also gathered data on additional country-level characteristics, i.e., economic freedom and country-level GDP, from the World Bank website. Based on our available database, we combined daily COVID-19 and stock returns with country-level and other control variables, which led to a final dataset of 4819 daily observations from 29 OECD countries from 23 January to 31 December 2020. Table 1 summarizes the countries, stock market indices, and the first COVID-19 cases observed in each country.

**Table 1.** Sample information.

| Sr.#       | Country        | Stock Index  | Date of 1st COVID-19 Reported Cases | Obs. | NGI   |
|------------|----------------|--|-------------------------------------|------|-------|
| 1          | Australia      | S&P_ASX 200  | 29 January 2020                     | 189  | 1.48  |
| 2          | Austria        | ATX  | 26 February 2020                    | 170  | 1.44  |
| 3          | Belgium        | BEL 20   | 5 February 2020                     | 186  | 1.20  |
| 4          | Canada         | S&P_TSX  | 28 January 2020                     | 185  | 1.52  |
| 5          | Chile          | S&P CLX IPSA   | 25 February 2020                    | 166  | 0.89  |
| 6          | Czech Republic | PX   | 3 March 2020                        | 162  | 0.96  |
| 7          | Denmark        | OMX Copenhagen 20  | 28 February 2020                    | 165  | 1.71  |
| 8          | Finland        | OMX Helsinki 25  | 28 January 2020                     | 184  | 1.77  |
| 9          | France         | CAC 40   | 28 January 2020                     | 191  | 1.05  |
| 10         | Germany        | Euro Stoxx 50/Dax  | 28 January 2020                     | 379  | 1.4   |
| 11         | Greece         | Athens General Composite   | 27 February 2020                    | 164  | 0.41  |
| 12         | Hungary        | Budapest SE  | 5 March 2020                        | 163  | 0.49  |
| 13         | Iceland        | ICEX Main  | 3 March 2020                        | 158  | 1.54  |
| 14         | Ireland        | ISEQ Overall   | 3 March 2020                        | 171  | 1.40  |
| 15         | Japan          | Nikkei 225   | 23 January 2020                     | 179  | 1.34  |
| 16         | Korea          | KOSPI 50/KOSPI   | 23 March 2020                       | 364  | 0.96  |
| 17         | Netherlands    | AEX  | 28 February 2020                    | 171  | 1.63  |
| 18         | New Zealand    | NZX 50/NZX MidCap  | 2 March 2020                        | 420  | 1.77  |
| 19         | Norway         | OSE Benchmark/Oslo OBX   | 27 February 2020                    | 334  | 1.78  |
| 20         | Poland         | WIG20/WIG30  | 5 March 2020                        | 326  | 0.61  |
| 21         | Portugal       | PSI 20   | 3 March 2020                        | 171  | 1.01  |
| 22         | Slovakia       | SAX  | 10 March 2020                       | 158  | 0.66  |
| 23         | Slovenia       | Blue-Chip SBITOP   | 6 March 2020                        | 163  | 0.94  |
| 24         | Spain          | IBEX 35  | 4 February 2020                     | 187  | 0.79  |
| 25         | Sweden         | OMX Stockholm 30   | 4 February 2020                     | 182  | 1.64  |
| 26         | Switzerland    | SMI  | 26 February 2020                    | 169  | 1.71  |
| 27         | Turkey         | BIST 100   | 12 March 2020                       | 156  | −0.47 |
| 28         | UK             | FTSE_100   | 4 February 2020                     | 184  | 1.30  |
| 29         | USA            | Dow Jones Industrial Average/NASDAQ Composite/Nasdaq 100/S&P 500 | 23 January 2020                     | 756  | 0.98  |
| Total/Mean |                |  |                                     | 6553 | 1.19  |

Note: This table reports the sample country, the major stock market indices, the date of first COVID-19 reported cases, observations per country sample, and the national governance quality aggregate index information.



### 3.2. Model and Variables

We examined the effect of the national governance quality on the relationship between stock return and COVID-19 by specifying the below model:

$$y_{i,t} = \gamma_0 + \gamma_1 \text{COVID}_{j,t-1} + \gamma_2 \text{NGI}_{j,t} + \gamma_3 (\text{COVID}_{j,t-1} \times \text{NGI}_{j,t}) + \gamma_4 C_{j,t} + \mu_j + \eta_t + \epsilon_{i,t} \quad (1)$$

where  $y_{i,t}$  represents our dependent variable, which is the stock return of index  $i$  on date  $t$ . Following Narayan et al. (2022), Ashraf (2021), and Hsu and Liao (2021), among others, we calculated stock returns as  $(\text{price}_t - \text{price}_{t-1} / \text{price}_{t-1})$ ;  $\gamma_0$  is the constant. Following Dharani et al. (2022), Xu (2021), Ashraf (2021), Kumeka and Adeniyi (2022), and Chancharat and Meepprom (2021), we proxied COVID-19 as the daily growth in confirmed cases. The effect of the COVID-19 virus, which is treated here as a proxy for panic and fear, may reflect on the financial markets on the other following day. More specifically, we assumed that the changes in the cases of COVID-19 have a contemporaneous effect on stock return (Xu 2021). Therefore, we considered the lagged COVID-19 ( $t - 1$ ) to control a piece of past information. This approach has been used in prior related literature (e.g., Ashraf 2021, 2020).

$\text{NGI}_{j,t}$  is a vector of national governance variables used in the model for country  $j$  on date  $t$ . We followed Buchanan et al. (2012) and conducted the initial empirical analysis for this paper utilizing an aggregate measure of governance to avoid multicollinearity issues developed by the Worldwide Governance Indicators (WGI) that reports indicators for several countries over years, for six dimensions of governance, e.g., voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption (Kaufmann et al. 2011).

We further used two methods to extract national governance quality indicators (Nguyen et al. 2015; Jabbouri and Almustafa 2020; Nguyen et al. 2021). NGI (a) = Government Effectiveness + Regulatory Quality + Rule of Law. Second, factor analysis was used to extract the first principal components of the three measures (NGI (b) = principal component of the three measures) to form another aggregate national governance quality index. These two national governance quality indices will be used to verify the results obtained by employing the first index (NGI). ( $\text{COVID}_{j,t-1} \times \text{NGI}_{j,t}$ ) is the interaction term. If the value of the interaction term is negative, it indicates that the impact of COVID-19 on stock return is less pronounced in countries where the NGI values are higher and vice versa.

$C$  is a vector of explanatory variables used in the model. We included some country-level variables that can predict stock market returns due to the cross-country variations and differences in institutions and macroeconomic conditions based on prior studies (e.g., Ashraf 2021, 2020). Specifically, we accounted for investment freedom index from the Heritage Foundation that measures stock market liberalization. We also accounted for the level of economic development by using the log of the country's GDP from the World Bank database. Moreover, we further added two explanatory variables in the robustness analysis: interest rate and inflation.

$\mu_j$  represents unobserved country fixed effect;  $\eta_t$  represents unobserved time-specific effects; and  $\epsilon_{i,t}$  is the independent error term.

To formally test our hypotheses, we employed the panel data approach. Our choice of this model is ideal given that such a model allows us to more accurately capture the time-varying relationship between dependent and independent variables, due to its capacity to extract changes from panel data and minimize estimation bias (Sun et al. 2021; Ashraf 2020; Dharani et al. 2022). Furthermore, unlike classical event study, panel data analysis extracts cross-sectional and time-series variation from panel data and minimizes multicollinearity, heteroscedasticity, and estimation bias (Semykina and Wooldridge 2010).

In terms of econometric techniques, this research applies a fixed-effect approach based on the results of the Hausman test. Furthermore, to ensure the robustness of our results, we used the OLS and system GMM estimations. To produce robust parameters, the model specifications must be tested to ensure that the estimates produced are consistent and unbiased. The Arellano-Bond consistency test was performed to ensure that there

was no serial autocorrelation between error terms in the system GMM estimator. Our specification test results suggest that our model fits the panel data regression. Specifically, first-order autocorrelation AR (1) in first difference residuals rejects the no-autocorrelation null hypothesis in all models, while AR (2) in the first difference residuals cannot reject the null hypothesis, indicating no autocorrelation (Biresselioglu et al. 2016; Alam et al. 2020). Table 2 reports variable definitions and summary statistics.

**Table 2.** Summary statistics and variables definitions.

| Panel A: Summary Statistics  |   |        |      |       |       |
|------------------------------|---|--------|------|-------|-------|
|                              | Obs.  | Mean   | SD   | Min   | Max   |
| Stock market return          | 6553  | 0.0005 | 0.02 | −0.14 | 0.12  |
| COVID-19                     | 4819  | 0.05   | 0.19 | −0.07 | 7.00  |
| Government Effectiveness     | 6553  | 1.31   | 0.48 | −0.04 | 2.02  |
| Regulatory Quality           | 6553  | 1.30   | 0.43 | −0.01 | 1.88  |
| Rule of Law                  | 6553  | 1.36   | 0.52 | −0.36 | 2.08  |
| Overall Index (NGI)          | 6553  | 1.19   | 0.47 | −0.47 | 1.78  |
| Alternative NGI (a)          | 6553  | 1.30   | 1.69 | −1.31 | 2.31  |
| Alternative NGI (b)          | 6553  | 0.97   | 1.39 | −0.41 | 1.88  |
| Economic freedom index       | 6553  | 74.07  | 5.68 | 59.90 | 84.10 |
| Log (GDP)                    | 6553  | 11.91  | 0.71 | 10.29 | 13.28 |
| Panel B: Variable Definition |   |        |      |       |       |
| Stock market return          | The daily stock market returns are calculated as follows $(price_t - price_{t-1}/price_{t-1})$ .  |        |      |       |       |
| COVID-19                     | The COVID-19 effect is calculated as the lagged daily growth in confirmed cases.  |        |      |       |       |
| Government Effectiveness     | Capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. |        |      |       |       |
| Regulatory Quality           | Capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.  |        |      |       |       |
| Rule of Law                  | Capturing perceptions of the extent to which agents have confidence in and abide by the rules of society and, in particular, the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.                   |        |      |       |       |
| Overall index (NGI)          | The composite score includes the six dimensions of governance presented above, which are from approximately −2.5 (weak) to 2.5 (strong) (Kaufmann et al. 2011).   |        |      |       |       |
| Alternative NGI (a)          | An alternative composite score includes only three dimensions (namely, government effectiveness, regulatory quality, and rule of law).  |        |      |       |       |
| Alternative NGI (b)          | Using factor analysis, an alternative national governance index constructed by extracting the first principal component of the three national governance quality indicators, namely, government effectiveness, regulatory quality, and rule of law.                               |        |      |       |       |
| Economic Freedom index       | The index measures 12 specific components of economic freedom, each of which is graded on a scale from 0 to 100; the higher the ranking, the higher the freedom.  |        |      |       |       |
| Log of GDP                   | The natural logarithms of the country's GDP.  |        |      |       |       |

Note: This table reports the descriptive statistics of the variables used in this research and their definitions.

## 4. Empirical Results and Discussion

### 4.1. Descriptive Statistics and Correlation Matrix

Panel A of Table 2 reports summary statistics. The small mean fraction (0.0005) of the overall stock market returns suggests that stocks have not performed well during the entire sampling period across countries during the COVID-19 crisis. The wide variation between the minimum (−0.14) and the maximum (0.12) suggests a wide range of daily market fluctuations. COVID-19 instances have grown by 5% on average, with a wide-ranging standard deviation of 17%. All national governance indices and subindices demonstrate considerable variation across minimum and maximum values. Similarly, the economic

freedom index has a mean value of 74.07 and ranges from 59.90 to 84.10. Finally, the natural logarithm of the country's GDP has a mean value of 11.91.

Data presented in Table 3 show the Pearson correlations among the variables. When looking at the association between COVID-19 and stock index returns, it is clear that the COVID-19 crisis has had a major impact on them all ( $p = -0.16$ ). Furthermore, multicollinearity is less likely in the multivariate analysis since the correlations between the other variables are also not high.

**Table 3.** Correlation matrix.

|                        | Stock Market Return | COVID-19 | NGI       | Economic Freedom Index | Log (GDP) |
|------------------------|---------------------|----------|-----------|------------------------|-----------|
| Stock market return    | 1.00                |          |           |                        |           |
| COVID-19               | −0.16 ***           | 1.00     |           |                        |           |
| NGI                    | 0.01                | −0.01    | 1.00      |                        |           |
| Economic Freedom Index | 0.01                | −0.01    | 0.70 ***  | 1.00                   |           |
| Log (GDP)              | −0.00               | 0.02     | −0.10 *** | 0.16 ***               | 1.00      |

Note: Asterisks indicate significance at 1% (\*\*\*).

#### 4.2. Panel Regression Reports

First, the findings in Table 4 show that COVID-19 considerably impacted the total market return during the pandemic across the sample OECD countries. Our findings support the proposition drawn from the supply of stock market hypothesis (Diermeier et al. 1984) that stock return is determined by the productivity of businesses, which has been severely affected during the pandemic, and investors withdrew from equity markets in response to economic disruptions. It also supports the empirical claim provided recently that the negative effect is significant, implying that stock returns fell during the COVID-19 crisis across the world (Sun et al. 2021; Ashraf 2021; He et al. 2020).

To explore the remarkable impact of the country's national governance system quality on this relationship, we introduced NGI into model (2) of Table 4. Initially, our results suggest that the national governance variable NGI enters positive, indicating that national governance quality has significant positive impact on stock index returns. One possible justification is that good national governance tends to encourage and protect investments, which lead to higher profits and less variation (Ngobo and Fouda 2012). Furthermore, and most importantly, the interaction term (COVID-19  $\times$  NGI) presented in model (3) of Table 4 is negative and significant, indicating that higher national governance institutions reduce the negative impact of COVID-19 on stock market returns. The results suggest that the quality of the country's national governance system moderates the relationship between COVID-19 and stock market returns. These results support the conjectures that an improvement in institutional quality reduces the negative impact of the financial crisis on investment (Eslamloueyan and Jafari 2019). Chen et al. (2021) argue that the quality of institutions plays an important role in stimulating private investment. Moreover, Le et al. (2021) provide evidence suggesting that improvements on institutional quality can reduce firm risk, as the positive effect of NGI on stock returns can be seen in line with the notion that higher-quality institutions are associated with lower volatility in stock returns. Accordingly, countries with more established governance systems have stock markets with higher returns on equity and lower risk. This is reasonable, as countries with a high score on national governance quality tend to be developed countries, which lend support to the view that better governance environments can increase returns to shareholders by reducing both transaction costs and agency costs (Nguyen et al. 2021; Hooper et al. 2009). We performed several robustness analyses to ensure the consistency of our main findings. First, Table 5 reports tests with alternative national governance variables and different estimator techniques. Despite replacing the main independent variable (NGI) with alternative measures and using an alternative estimator, mainly OLS and System GMM, and re-estimating all specifications presented in Table 4., we observed that the results are unchanged when both interaction terms are negative and significant. Moreover, in Table 6, we extended



the analysis to include each national governance factor (six in total) in a separate model to check the robustness of the results; we also observed that findings largely remained the same.

Furthermore, we investigated the potential determinant of national governance lag on the relationship between COVID-19 and stock returns. Specifically, in Table 7, we explored how long it takes to obtain significant results after the national governance decision has been made. We found that only two lags are important determinates of this relationship, and the results obtained confirm the initial relationship presented earlier, suggesting that national governance quality played an important protective role during the recent COVID-19 crisis that affected most of the capital markets around the world.

**Table 4.** The moderating effect of national governance quality on the relationship between COVID-19 and stock returns: The main specification.

| Dependent Variable: Stock Market Returns |           |          |           |          |            |          |
|--|-----------|----------|-----------|----------|------------|----------|
|  | (1)       |          | (2)       |          | (3)        |          |
|  | b/[p]     | (t)      | b/[p]     | (t)      | b/[p]      | (t)      |
| COVID-19                                 | −0.002 *  | (−1.761) | −0.002 *  | (−1.831) | −0.008 *** | (−2.751) |
|  | [0.078]   |          | [0.067]   |          | [0.006]    |          |
| NGI                                      |           |          | 0.002 *** | (2.834)  | 0.002 ***  | (3.183)  |
|  |           |          | [0.005]   |          | [0.001]    |          |
| COVID-19 × NGI                           |           |          |           |          | −0.004 **  | (−2.180) |
| Economic Freedom Index                   | 0.000     | (1.161)  | 0.000 *** | (2.852)  | 0.000 ***  | (2.855)  |
|  | [0.246]   |          | [0.004]   |          | [0.004]    |          |
| Log (GDP)                                | −0.000    | (−1.058) | −0.001 *  | (−1.859) | −0.001 *   | (−1.858) |
|  | [0.290]   |          | [0.063]   |          | [0.063]    |          |
| Intercept                                | −0.000    | (−0.056) | −0.003    | (−0.727) | −0.002     | (−0.651) |
|  | [0.956]   |          | [0.467]   |          | [0.515]    |          |
| Observations                             | 4819      |          | 4819      |          | 4819       |          |
| R-squared                                | 0.551     |          | 0.552     |          | 0.552      |          |
| F statistic                              | 1.741 *** |          | 3.315 *** |          | 3.605 ***  |          |

Note: This table reports the results of the panel pooled ordinary least squares model, with heteroskedasticity robust standard errors regarding the moderating effect of the country's institutional quality on the relationship between COVID-19 and stock market returns. Our dependent variable is the stock market returns in all models (1–3). Stock market returns are measured as the daily change in the major stock index. We used stock index data from 29 OECD countries during the year 2020. Our main independent variables are COVID-19, NGI, and the interaction term (COVID-19×NGI). Following [Ashraf \(2021\)](#), we measured the COVID-19 variable as the daily growth in COVID-19 confirmed cases in a country (lagged value). Following [Mollagholamali and Rao \(2021\)](#), we measured NGI as the aggregate national governance components of the World Governance Indicators (WGI) ([Kaufmann et al. 2011](#)). The economic freedom index is taken from the heritage website to control for operating environment quality and economic growth. In contrast, Log (GDP) is taken from the World Development Indicators (WDI) of the World Bank ([Asteriou et al. 2021](#)). Asterisks indicate significance at 10% (\*), 5% (\*\*), and 1% (\*\*\*), respectively.

**Table 5.** The moderating effect of national governance quality on the relationship between COVID-19 and stock returns: robustness tests with alternative national governance variables and different estimator techniques.

| Dependent Variable: Stock Market Returns      |                       |                       |                            |                            |
|---|-----------------------|-----------------------|----------------------------|----------------------------|
|   | (1)<br>OLS<br>b/(t)   | (2)<br>OLS<br>b/(t)   | (3)<br>System GMM<br>b/(t) | (4)<br>System GMM<br>b/(t) |
| COVID-19                                      | 0.009 ***<br>(2.867)  | 0.003 **<br>(2.255)   | 0.026 ***<br>(4.865)       | −0.015 ***<br>(−8.186)     |
| NGI (a)                                       | 0.001 ***<br>(2.695)  |                       | 0.001 ***<br>(2.680)       |                            |
| COVID-19xNGI (a)                              | −0.002 **<br>(−2.347) |                       | −0.003 **<br>(−2.451)      |                            |
| NGI (b)                                       |                       | 0.000 ***<br>(2.724)  |                            | 0.001 ***<br>(2.691)       |
| COVID-19xNGI (b)                              |                       | −0.001 **<br>(−2.357) |                            | −0.002 **<br>(−2.455)      |
| Economic Freedom Index                        | 0.000 **<br>(2.498)   | 0.000 **<br>(2.523)   | 0.000 **<br>(2.295)        | 0.000 **<br>(2.308)        |
| Log (GDP)                                     | −0.000<br>(−1.262)    | −0.000<br>(−1.268)    | −0.001 *<br>(−1.696)       | −0.001 *<br>(−1.700)       |
| Intercept                                     | −0.004<br>(−0.915)    | −0.006<br>(−1.349)    | −0.001<br>(−0.225)         | −0.005<br>(−0.712)         |
| Observations                                  | 4819                  | 4819                  | 4819                       | 4819                       |
| R-squared                                     | 0.552                 | 0.552                 |                            |                            |
| F statistic                                   | 3.230 ***             | 3.266 ***             |                            |                            |
| Wald $\chi^2$ statistic                       |                       |                       | 75.822 ***                 | 75.894 ***                 |
| Number of instruments                         |                       |                       | 7                          | 7                          |
| AR (1) in first differences ( <i>p</i> value) |                       |                       | 0.000                      | 0.000                      |
| AR (2) in first differences ( <i>p</i> value) |                       |                       | 0.139                      | 0.139                      |

Note: This table reports the results of the robustness tests regarding the moderating effect of the national governance quality on the relationship between COVID-19 and stock index return of the OECD countries using alternative national governance quality variables and alternative modeling estimates. Asterisks indicate significance at 10% (\*), 5% (\*\*), and 1% (\*\*\*), respectively.

**Table 6.** The moderating effect of national governance quality on the relationship between COVID-19 and stock returns: robustness tests using national governance quality sub-indices.

| DV: Stock Market Returns                   | (1)        | (2)       | (3)        | (4)        | (5)      | (6)       | (7)       | (8)        | (9)       | (10)       | (11)      | (12)       |
|--|------------|-----------|------------|------------|----------|-----------|-----------|------------|-----------|------------|-----------|------------|
|  | b/t        | b/t       | b/t        | b/t        | b/t      | b/t       | b/t       | b/t        | b/t       | b/t        | b/t       | b/t        |
| COVID-19                                   | −0.002 *   | −0.004    | −0.002 *   | −0.005 **  | −0.002 * | −0.007 ** | −0.002 *  | −0.010 *** | −0.002 *  | −0.008 *** | −0.002 *  | −0.008 *** |
| Voice and Accountability                   | (−1.832)   | (−1.571)  | (−1.820)   | (−2.438)   | (−1.800) | (−2.519)  | (−1.833)  | (−3.053)   | (−1.832)  | (−2.928)   | (−1.792)  | (−3.188)   |
| COVID-19 × Voice and Accountability        | −0.001 *** | 0.002 *** |            |            |          |           |           |            |           |            |           |            |
|  | (−3.049)   | (−3.172)  |            |            |          |           |           |            |           |            |           |            |
| Political Stability and Absence            |            | −0.002    | 0.001 ***  | 0.002 ***  |          |           |           |            |           |            |           |            |
|  |            | (−0.891)  | (2.811)    | (3.083)    |          |           |           |            |           |            |           |            |
| COVID-19 × Political Stability and Absence |            |           |            | −0.003 *   |          |           |           |            |           |            |           |            |
|  |            |           |            | (−1.671)   |          |           |           |            |           |            |           |            |
| Government Effectiveness                   |            |           |            |            | 0.001    | 0.001 *   |           |            |           |            |           |            |
|  |            |           |            |            | (1.534)  | (1.859)   |           |            |           |            |           |            |
| COVID-19 × Government Effectiveness        |            |           |            |            |          | −0.004 ** |           |            |           |            |           |            |
|  |            |           |            |            |          | (−1.972)  |           |            |           |            |           |            |
| Regulatory Quality                         |            |           |            |            |          |           | 0.002 *** | 0.002 ***  |           |            |           |            |
|  |            |           |            |            |          |           | (2.996)   | (3.379)    |           |            |           |            |
| COVID-19 × Regulatory Quality              |            |           |            |            |          |           |           | −0.006 **  |           |            |           |            |
|  |            |           |            |            |          |           |           | (−2.565)   |           |            |           |            |
| Rule of Law                                |            |           |            |            |          |           |           |            | 0.001 **  | 0.001 ***  |           |            |
|  |            |           |            |            |          |           |           |            | (2.296)   | (2.696)    |           |            |
| COVID-19 × Rule of Law                     |            |           |            |            |          |           |           |            |           | −0.004 **  |           |            |
|  |            |           |            |            |          |           |           |            |           | (−2.385)   |           |            |
| Control of Corruption                      |            |           |            |            |          |           |           |            |           |            | 0.001 *** | 0.001 ***  |
|  |            |           |            |            |          |           |           |            |           |            | (2.671)   | (3.095)    |
| COVID-19 × Control of Corruption           |            |           |            |            |          |           |           |            |           |            |           | −0.004 *** |
|  |            |           |            |            |          |           |           |            |           |            |           | (−2.648)   |
| Economic freedom index                     | 0.000 ***  | 0.000 *** | 0.000 ***  | 0.000 ***  | 0.000 *  | 0.000 *   | 0.000 *** | 0.000 ***  | 0.000 **  | 0.000 **   | 0.000 *** | 0.000 ***  |
|  | (2.707)    | (2.712)   | (2.622)    | (2.619)    | (1.900)  | (1.880)   | (3.068)   | (3.068)    | (2.454)   | (2.448)    | (2.722)   | (2.711)    |
| Log (GDP)                                  | −0.001 **  | −0.001 ** | −0.001 *** | −0.001 *** | −0.000   | −0.000    | −0.000    | −0.000     | −0.000    | −0.000     | −0.000    | −0.000     |
|  | (−2.009)   | (−2.013)  | (−2.637)   | (−2.657)   | (−1.111) | (−1.094)  | (−1.445)  | (−1.433)   | (−1.315)  | (−1.307)   | (−1.539)  | (−1.538)   |
| Intercept                                  | −0.000     | −0.000    | 0.003      | 0.003      | −0.003   | −0.002    | −0.005    | −0.005     | −0.003    | −0.003     | −0.004    | −0.003     |
|  | (−0.090)   | (−0.056)  | (0.846)    | (0.906)    | (−0.647) | (−0.572)  | (−1.341)  | (−1.251)   | (−0.893)  | (−0.810)   | (−0.991)  | (−0.910)   |
| Number of observations                     | 4819       | 4819      | 4819       | 4819       | 4819     | 4819      | 4819      | 4819       | 4819      | 4819       | 4819      | 4819       |
| R-squared                                  | 0.552      | 0.552     | 0.552      | 0.552      | 0.551    | 0.552     | 0.552     | 0.552      | 0.551     | 0.552      | 0.552     | 0.552      |
| F statistic                                | 3.632 ***  | 3.064 *** | 3.283 ***  | 3.186 ***  | 1.895 ** | 2.294 *** | 3.552 *** | 4.161 ***  | 2.626 *** | 3.240 ***  | 3.092 *** | 3.879 ***  |

Note: Asterisks indicate significance at 10% (\*), 5% (\*\*), and 1% (\*\*\*), respectively.

**Table 7.** The moderating effect of national governance quality on the relationship between COVID-19 and stock returns: Further robustness analysis including the lagged effect of national governance and further country-level control variables.

| DV: Stock Market Returns          | (1)        | (2)        | (3)        | (4)        | (5)        | (6)        | (7)        | (8)        | (9)        | (10)       | (11)       | (12)       |
|-----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|                                   | b/(t)      | b/(t)      | b/(t)      | b/(t)      | b/(t)      | b/(t)      | b/(t)      | b/(t)      | b/(t)      | b/(t)      | b/(t)      | b/(t)      |
| COVID-19                          | −0.002 *   | −0.008 *** | −0.002 *   | −0.010 *** | −0.002 *   | −0.003 **  | −0.002 *   | −0.004 **  | −0.002 *   | −0.009 *** | −0.002 *   | −0.012 *** |
| NGI <sub>t-1</sub>                | (−1.826)   | (−2.809)   | (−1.804)   | (−2.829)   | (−1.834)   | (−2.277)   | (−1.814)   | (−2.523)   | (−1.835)   | (−2.942)   | (−1.814)   | (−2.927)   |
| COVID-19 × NGI <sub>t-1</sub>     | 0.001 **   | 0.001 ***  |            |            |            |            |            |            |            |            |            |            |
|                                   | (2.240)    | (2.601)    |            |            |            |            |            |            |            |            |            |            |
| NGI <sub>t-2</sub>                |            | −0.004 **  |            |            |            |            |            |            |            |            |            |            |
|                                   |            | (−2.246)   |            |            |            |            |            |            |            |            |            |            |
| COVID-19 × NGI <sub>t-2</sub>     |            |            | 0.002 ***  | 0.003 ***  |            |            |            |            |            |            |            |            |
|                                   |            |            | (3.076)    | (3.454)    |            |            |            |            |            |            |            |            |
| NGI (a) <sub>t-1</sub>            |            |            |            | −0.005 **  |            |            |            |            |            |            |            |            |
|                                   |            |            |            | (−2.314)   |            |            |            |            |            |            |            |            |
| COVID-19 × NGI (a) <sub>t-1</sub> |            |            |            |            | 0.000 **   | 0.000 ***  |            |            |            |            |            |            |
|                                   |            |            |            |            | (2.255)    | (2.640)    |            |            |            |            |            |            |
| NGI (a) <sub>t-2</sub>            |            |            |            |            |            | −0.001 **  |            |            |            |            |            |            |
|                                   |            |            |            |            |            | (−2.434)   |            |            |            |            |            |            |
| COVID-19 × NGI (a) <sub>t-2</sub> |            |            |            |            |            |            | 0.001 ***  | 0.001 ***  |            |            |            |            |
|                                   |            |            |            |            |            |            | (2.989)    | (3.391)    |            |            |            |            |
| NGI (b) <sub>t-1</sub>            |            |            |            |            |            |            |            | −0.002 **  |            |            |            |            |
|                                   |            |            |            |            |            |            |            | (−2.467)   |            |            |            |            |
| COVID-19 × NGI (b) <sub>t-1</sub> |            |            |            |            |            |            |            |            | 0.000 **   | 0.001 ***  |            |            |
|                                   |            |            |            |            |            |            |            |            | (2.251)    | (2.636)    |            |            |
| NGI (b) <sub>t-2</sub>            |            |            |            |            |            |            |            |            |            | −0.002 **  |            |            |
|                                   |            |            |            |            |            |            |            |            |            | (−2.426)   |            |            |
| COVID-19 × NGI (b) <sub>t-2</sub> |            |            |            |            |            |            |            |            |            |            | 0.001 ***  | 0.001 ***  |
|                                   |            |            |            |            |            |            |            |            |            |            | (2.982)    | (3.383)    |
| Economic Freedom Index            | 0.000 ***  | 0.000 ***  | 0.000 ***  | 0.000 ***  | 0.000 ***  | 0.000 ***  | 0.000 ***  | 0.000 ***  | 0.000 ***  | 0.000 ***  | 0.000 ***  | 0.000 ***  |
|                                   | (3.831)    | (3.861)    | (4.028)    | (4.078)    | (3.831)    | (3.855)    | (4.038)    | (4.082)    | (3.828)    | (3.853)    | (4.033)    | (4.077)    |
| Log (GDP)                         | −0.001 *** | −0.001 *** | −0.001 *** | −0.001 *** | −0.001 *** | −0.001 *** | −0.001 *** | −0.001 *** | −0.001 *** | −0.001 *** | −0.001 *** | −0.001 *** |
|                                   | (−3.542)   | (−3.577)   | (−2.960)   | (−3.003)   | (−3.461)   | (−3.493)   | (−2.840)   | (−2.878)   | (−3.470)   | (−3.502)   | (−2.851)   | (−2.890)   |
| Interest rate                     | −0.000     | −0.000     | −0.000     | −0.000     | −0.000     | −0.000     | −0.000     | −0.000     | −0.000     | −0.000     | −0.000     | −0.000     |
|                                   | (−0.692)   | (−0.754)   | (−0.991)   | (−1.071)   | (−0.748)   | (−0.804)   | (−1.067)   | (−1.142)   | (−0.744)   | (−0.800)   | (−1.062)   | (−1.137)   |
| Inflation                         | −0.000 *** | −0.000 *** | −0.000 **  | −0.000 **  | −0.000 *** | −0.000 *** | −0.000 *** | −0.000 *** | −0.000 *** | −0.000 *** | −0.000 *** | −0.000 *** |
|                                   | (−2.755)   | (−2.769)   | (−2.424)   | (−2.447)   | (−3.088)   | (−3.111)   | (−2.872)   | (−2.903)   | (−3.105)   | (−3.129)   | (−2.895)   | (−2.927)   |
| Intercept                         | 0.026 ***  | 0.026 ***  | 0.027 **   | 0.028 **   | 0.025 **   | 0.026 **   | 0.026 **   | 0.027 **   | 0.027 **   | 0.028 **   | 0.029 **   | 0.031 **   |
|                                   | (2.637)    | (2.711)    | (2.172)    | (2.261)    | (2.569)    | (2.620)    | (2.118)    | (2.180)    | (2.823)    | (2.907)    | (2.427)    | (2.526)    |
| Number of observations            | 4819       | 4819       | 3116       | 3116       | 4819       | 4819       | 3116       | 3116       | 4819       | 4819       | 3116       | 3116       |
| R-squared                         | 0.553      | 0.553      | 0.572      | 0.572      | 0.553      | 0.553      | 0.571      | 0.572      | 0.553      | 0.553      | 0.571      | 0.572      |
| F statistic                       | 3.876 ***  | 4.046 ***  | 4.232 ***  | 4.398 ***  | 3.887 ***  | 4.182 ***  | 4.144 ***  | 4.427 ***  | 3.884 ***  | 4.173 ***  | 4.137 ***  | 4.413 ***  |

Note: This table reports the results of the fixed effect regression of further robustness tests regarding the effect of the lagged national governance variables on the relationship between COVID-19 and stock index returns of the OECD markets and includes further explanatory variables (interest rate and inflation). The country's interest rates and inflation data were obtained from the World Bank database. The lag specification was based on the initial results obtained, which suggest that only two lags are significant determinants of this relationship. Asterisks indicate significance at 10% (\*), 5% (\*\*), and 1% (\*\*\*), respectively.

## 5. Concluding Remarks

This research analyzes whether national governance quality moderates COVID-19 stock market reaction. Using daily COVID-19 confirmed cases and stock market returns from 29 OECD markets, we confirmed that stock markets responded to the growth in confirmed cases with large negative returns. These findings are in line with our first hypothesis that COVID-19 has significant impact on stock returns. Moreover, these results are in line with a wide range of prior findings (e.g., [Verma et al. 2021](#); [Takyi and Bentum-Ennin 2020](#); [Mazur et al. 2021](#); [Narayan et al. 2021](#); among others).

Second, we provide important empirical evidence that the higher the national governance quality, the weaker COVID-19's effect on stock index returns. Our findings are in line with the conjecture that national governance quality boosts equity demand and maximizes stock returns by reducing transaction and agency costs ([Hooper et al. 2009](#)). These findings are in line with conjecture that the quality of institutions is a significant factor in attracting investment and has played an important role protecting the markets from crises ([Eslamloueyan and Jafari 2019](#)).

Our results have several implications for policy makers by suggesting that the country's national governance quality plays an important role in protecting markets from such a devastating effect of the COVID-19 crisis. The findings of this study also provide insight into the choice of the national governance factor that government and policy makers should pay attention to. Results in Table 6 suggest that among the six national governance factors (government effectiveness, regulatory quality, rule of law, and control of corruption) are the most determinants of the relationship between COVID-19 and stock returns in the OECD markets. The contribution of this study is to show that the effect of COVID-19 on the stock index returns is dependent on the institutional characteristics of the country. The results of this study demonstrate the importance of national governance for market returns and investment profitability and growth. As a result, we conclude that policy makers and regulators may consider improvements in a country's institutional environment, which may provide capital markets with a shield against external shocks.

One limitation of our research is that it looks only at this issue within the OECD markets. Future research may extend the sample to include other emerging and/or developed countries from other regions. Furthermore, while our investigation is limited to governance issues at the country level, scholars may consider this issue within the firm-level governance framework. Another avenue for future research could be to examine the association between national governance quality and the stock market returns using other proxies (i.e., firm-level stock returns rather than national-level market index returns) and to see if the results are robust after using alternative measure of stock return.

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