Impact of the COVID-19 pandemic: Evidence from the U.S. restaurant industry

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ARTICLE INFO	ABSTRACT
	The current study examines how the effect of COVID-19 on U.S. restaurant firms' stock returns varies according to the firms' pre-pandemic characteristics by employing three firm-level dimensions (financial conditions, corporate strategies, and ownership structure). Employing 795 firm-year observations obtained from annual reports and other databases, this study found that restaurant firms with past characteristics of larger size, more leverage, more cash flows, less ROA, and more internationalization are more resilient to stock declines reacting to COVID-19 than otherwise similar firms. Whereas, dividend, franchising, institutional ownership, and managerial ownership did not show any significant moderating effect on the relationship between COVID-19 and stock returns. This study sheds light on the research topic by providing insights into drivers of restaurant firm's stock returns during the COVID-19 shock. Future studies can employ the variables and method used in the current study to extend the understanding of the issue.

1. Introduction

In early 2020, a novel and infectious disease known as COVID-19 struck Wuhan, one of the most populous cities in China. Since its start from Wuhan, COVID-19 has caused havoc around the world. Countries including China, Italy, Spain, France, the U.K., and the U.S. have been hit hard so far with severe COVID-19 outbreaks. The local outbreak quickly developed into an emerging public health crisis and eventually, on March 11, the World Health Organization declared COVID-19 as a pandemic (World Health Organization, 2020a).

This pandemic is having a huge impact on real economic activity, but the extent of its actual impact remains unknown because the spread of the disease, its severity and mortality rate, suitable policy responses, and individual behavior are all uncertain (Ramelli and Wagner, 2020). Notably, the spread of COVID-19 has created a sudden, temporary, sharp shortfall in revenue for firms in many industries, one of the most poignant of which has occurred in the hospitality industry. Since more than 100 countries have announced partial or full lockdowns, air and intercity travel is down by 70–90% compared to the previous year in major cities around the world (Dunford et al., 2020). Accordingly, international, regional, and local travel restrictions have greatly jeopardized the hospitality industry, given its reliance on human mobility

(Yang et al., 2020). In the context of the hospitality industry, the restaurant industry is regarded as having a widely embedded, high level of business risk (Singal, 2012) which has been severely exacerbated during the pandemic. In fact, several professional reports have concluded that COVID-19 has significantly affected the restaurant industry, as the pandemic rages on. For example, according to the National Restaurant Association (the industry's main trade association), nationwide sales were down by 47% during the period from March 1 to March 22; 7 in 10 operators have had to lay off employees and reduce the number of hours worked (National Restaurant Association, 2020). In addition, since the end of March 2020, 3% of restaurants have permanently closed as a result of COVID-19, and the restaurant industry has likely lost nearly $120 billion in sales during the first three months of the COVID-19 pandemic (National Restaurant Association, 2020). In light of the fact that COVID-19 is triggering a global economic crisis and causing financial imbalances and risks, the current study examines the effect of COVID-19 focusing on the restaurant context.

Recent studies have posited that the economic crisis caused by COVID-19 is truly different from past crises, with respect to its cause, scope, and severity (Ding et al., 2020; Ramelli and Wagner, 2020). Given the uncertainty of COVID-19 and its potential impact on the restaurant industry, we examine the relationship between various firm

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characteristics and stock price reactions to the COVID-19 pandemic. Specifically, we attempt to investigate how the effect of COVID-19 on U. S. restaurant firms' stock returns varies according to firms' pre-pandemic characteristics, by employing three firm-level dimensions: 1) financial conditions, such as leverage ratio and cash flow; 2) corporate strategies, including franchising and internationalization, and 3) ownership structure, including the extent of institutional and managerial ownership. To the best of our knowledge, no examination exists of the relationship between various firm-level characteristics and stock price reaction to the COVID-19 pandemic in the restaurant context. By examining these characteristics in a comprehensive manner, we can better identify the connection between firm characteristics and stock price reactions to the pandemic. Consequently, this study provides an unfortunate but valuable opportunity to gain insights into drivers of restaurant firms' stock returns and the workings of equity markets during this unprecedented crisis in recent memory.

2. Literature review

A consistent and comprehensive framework that has been widely accepted in the field of strategic management suggests that firms obtain sustained competitive advantages by implementing strategies that use their internal strengths and neutralize external threats (Porter, 1985). Based on the assumption that firms within an industry may be heterogeneous regarding the strategic resources they possess, Barney (1991) suggested firm resources as a source of sustained competitive advantages. Firm resources denote all assets, capabilities, firm characteristics, information, and knowledge that enable firms to implement strategies that improve its efficiency and effectiveness (Daft, 1983). Among various types of firm resources, this study particularly concentrates on firm characteristics that may enable firms to conceive of value-creating strategies and make firms more resilient to a negative shock, namely the COVID-19 pandemic. In specific, this study focuses on the three firm-level dimensions (i.e., financial conditions, corporate strategies, and ownership structure) because shareholders and potential investors are likely to pay attention to liquidity and business risks of a firm when abrupt external changes take place (Fahlenbrach et al., 2020; Bates et al., 2009; Harford, 1999). More specifically, as the severity of the COVID-19 pandemic increases, an adverse impact of COVID-19 on restaurant firms' liquidity and operational risks seems evident, since restaurant firms would experience significant revenue shortfalls caused by a sharp decrease in customer demand and even temporarily-interrupted operations (Ozili and Arun, 2020). Also, under uncertainty as to when COVID-19 damage will be abated, increased operational risks and shortage of liquidity would likely make shareholders consider a possibility of selling stocks they hold, thereby leading to a sharp decline in stock returns of restaurant firms (Ding et al., 2020). In suffering from loss of revenue, restaurant firms' capabilities in coping with the threats of COVID-19 matter, resulting in differing market evaluations, contingent on a firm's relevant characteristics (Ding et al., 2020; Ramelli and Wagner, 2020). In this regard, firm characteristics consisting of financial conditions, corporate strategies, and ownership structure are expected comprehensively to represent endurance and resilience of restaurant firms reacting to COVID-19 shock, as detailed further below.

2.1. Financial conditions

Firstly, a firm's financial characteristics play a salient role in self-funding when its cash flows get deterred by such unexpected external events as a pandemic and a financial crisis (Kahle and Stulz, 2013). Given that investors in a stock market make and adjust their evaluations pertaining to a firm's market value when a firm's financial characteristics (e.g., firm size, leverage, dividend, cash flow, and ROA) are disclosed to the public via annual reports and other earnings announcements (Fama, 1970; Oh and Kim, 2001; Khlifi and Bouri, 2010;

Egbunike and Okerekeoti, 2018; Han et al., 2018), those characteristics function as valid predictors to examine a firm's resilience to unexpected external crisis, such as COVID-19. Specifically, financial flexibility obtained through sufficient cash holdings, reduced debt, high past profitability, and high dividend may serve as good signals that a firm has capacity to endure during a period of market collapse in the U.S. restaurant industry caused by COVID-19 which has drastically reduced revenue production (Ramelli and Wagner, 2020). If a firm's shareholders and investors are relatively optimistic about the firm's future situation thanks to its financial flexibility, the firm's stock returns may fall less, in response to COVID-19 damage, as compared with other firms having poor financial conditions (Kahle and Stulz, 2013; Pinkowitz et al., 2016). The current study examines firm size, leverage, dividend, cash flow, and past profitability as key proxies of a firm's financial conditions, considering that these variables are adopted extensively in the literature examining the effect of firm characteristics on financial performance, particularly during the COVID-19 pandemic (Fahlenbrach et al., 2020; Albuquerque et al., 2020; Gerding et al., 2020). For example, firm size is a factor that influences a firm's financial performance, based on economy of scale and market power advantage (Chauvin and Hirschev, 1993). Leverage, representing a key financial condition indicating liquidity of a firm, is also a factor that influences a firm's financial performance, given the advantage of a tax shield (McConnell and Servaes, 1990). Dividend represents a firm's financial and accounting situation, which influences speculation about a firm's financial performance and current share price (Miller and Modigliani, 1961). In addition, given the adverse impact of the COVID-19 pandemic on cash flows, a firm's cash flow could be a good indicator of the resilience of a firm reacting to COVID-19 shock. In a similar vein, past profitability of a firm (i.e., ROA) may act as a signal that a firm has capacity to endure this shock. That is, given the severely negative impact of the COVID-19 pandemic on firm performance and valuation, a firm's financial characteristics, such as firm size, leverage, dividend, cash flow, and ROA, are likely to influence investors' market valuations of the firm in responding to the pandemic.

2.2. Corporate strategies

Secondly, the corporate strategies of restaurant firms, including franchising and internationalization, are pivotal factors to be considered in terms of operational risks under external uncertainty from COVID-19 (Ding et al., 2020). For example, franchising is well known for providing a firm with a higher level of stability with relatively low operational risk through a stable fee income structure (Koh et al., 2009; Shane et al., 2006). In contrast, internationalization is regarded as a risky strategy, because a firm must handle volatile business environments of multipoint locations where the firm enters and operates its properties (Caves, 1996; Sun and Lee, 2013). Considering that COVID-19 shock is not a local but a global threat, a high degree of exposure to foreign markets through internationalization may increase a firm's risk, thereby adversely affecting market evaluation and stock returns. However, when an event like COVID-19 occurs, the impact may be so universal, regardless of owned or franchised units, and domestic or international units, such that the risk-reduction role of the franchising strategy and the risk-aggravating role of internationalization may diminish or disappear. Considering these contradictory viewpoints, it becomes an interesting empirical question whether franchising and internationalization play a role on resilience of restaurant firms reacting to COVID-19 shock. Therefore, the current study investigates whether the effect of COVID-19 on stock return decline varies, depending on the degree of each of the above two corporate strategies.

2.3. Ownership structure

Thirdly and finally, ownership structure needs to be contemplated when examining the stock return changes of restaurant firms following

COVID-19 shock, in that managerial opportunism is likely to occur in a situation where external environments are volatile with high uncertainty and ownership structure is a good indicator for predicting a firm's monitoring ability (Khandani and Lo, 2011). If managerial ownership is low, top executives may seek their own interests at the expense of shareholder interests, using information asymmetries between agents and principals about complicated market situations (Doherty, 1999; Jensen and Meckling, 1976). In contrast, high managerial ownership allows executives' (agents') interests to be aligned with those of owners (principals), which reduces the potential threat of agency costs (Gu and Qian, 1999). In a similar vein, as financial institutions (e.g., hedge funds, investment management firms, and commercial banks) own a large number of shares of restaurant firms, institutions actively monitor executive officers' aberrant activities, thereby reducing agency problems (Jensen and Meckling, 1976; Crutchley et al., 1999). During the COVID-19 crisis with unpredictable and complicated managerial situations, high managerial and institutional ownership may act as trustworthy indicators for shareholders in sustaining their shareholding. Thus, the effect of the COVID-19 crisis on stock returns of restaurant firms could vary, contingent on ownership structure as measured by managerial and institutional ownership. Given the potential importance of corporate ownership structure on corporate behavior and resilience, the current study investigates whether the effect of COVID-19 on stock return decline varies depending on the ownership structure.

3. Methods

3.1. Data

The current study sample consists of all publicly traded U.S. restaurant firms with North American Industry Classification System (NAICS) codes 722511 (full-service restaurants) and 722513 (limited-service restaurants). In order to estimate how firms' pre-pandemic characteristics moderate the impact of COVID-19 shock on stock returns in the U.S. restaurant industry, we set up the sample period from January 3rd to May 15th, 2020. In particular, although COVID-19 was first identified in December 2019 in Wuhan, China, the pandemic has spread out rapidly to other countries since January 2020. Accordingly, COVID-19 was recognized as a Public Health Emergency of International Concern and classified as a pandemic by the World Health Organization (WHO) on January 30th and March 11th, 2020, respectively. As of early June, the total number of confirmed cases all over the world is over 7 million; in particular, the U.S. has the largest number of confirmed cases, at over 2 million (World Health Organization, 2020b). Given that COVID-19 is not a temporary shock, but causes prolonged and continuing damage, this study has attempted to designate the sample period as long as possible. We obtained data on the number of COVID-19 cases in the U.S. from the COVID-19 dashboard of the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU) and the WHO website (covid19.who.int). Although the CSSE database is a web-based dashboard, tracking confirmed cases in real time, and is commonly utilized in the literature and media (e.g., Ding et al., 2020), it provides historical data since January 22nd, 2020. To establish confirmed cases prior to January 22nd, we collected information on the rest of confirmed cases from the WHO website.

To calculate stock returns, our dependent variable, we retrieved restaurant firms' stock price data from Yahoo Finance (finance.yahoo.com) during the sample period. In terms of restaurant firms' pre-pandemic characteristics (i.e., financial conditions, corporate strategies, and ownership structure), 2017–2019 data was obtained from annual reports (10-K) and other definitive proxy statements (DEF 14A). For analyses, this study used firm characteristics as of 2019, which is the latest corporate information shareholders and investors are able to access and utilize in evaluating firms' managerial situations in reaction to COVID-19. However, before making significant decisions under a severe external shock, such as selling stocks and intervening in a firm's

management, it is probable that shareholders and investors may refer to long-term corporate conditions and other characteristics, rather than relying solely on 1-year corporate information. Accordingly, as a sensitivity analysis, this study replaced 2019 firm characteristics as used in our main analyses with 3-year (i.e., 2017–2019) average characteristics, to investigate the moderating effect of pre-pandemic firm characteristics in a more comprehensive manner. After deleting observations with missing values, outliers whose studentized residuals' absolute values are over 3 (Chatterjee and Hadi, 1986), and influential cases whose Cook's distance is larger than 1 (Anderson et al., 2016), this study retrieved 795 firm-week observations for main analyses with firm characteristics as of 2019 and 797 observations for the 3-year average.

3.2. Models and estimation methods

To investigate the moderating role of firms' pre-pandemic characteristics on the relationship between COVID-19 and stock returns in the restaurant industry, we proposed a research model as follows:

$$\text{RETURNS}_{it} = \alpha_0 + \alpha_1 \text{COVID-19}_t + \alpha_2 X'_{i,\text{pre-2020}} + \alpha_3 \text{COVID-19}_t \times X'_{i,\text{pre2020}} + \varepsilon_{it},$$

where RETURNS represents weekly stock returns (in percentage) of each firm within a week; COVID19 represents the weekly growth rate of the number of confirmed U.S. COVID-19 cases; $X'_{\text{pre-2020}}$ represents pre-pandemic firm characteristics, consisting of three dimensions (i.e., financial conditions, corporate strategies, and ownership structure) along with nine variables; COVID-19$_t \times X'_{\text{pre2020}}$ represents an interaction term of COVID-19 and $X'_{\text{pre-2020}}$; ε represents an error term, and t and i represent time (i.e., week) and firm, respectively.

This study adopted generalized estimating equations (GEE) for coefficients estimation, which has frequently been used in the strategic management literature, particularly on organizational performance, with panel data (Liang and Zeger, 1986; Hilbe and Hardin, 2008; Henderson et al., 2006). Specifically, GEE enables us to derive maximum likelihood estimates, addressing non-independent observations which generate high correlations among repeated measures within panel data (Ghisletta and Spini, 2004). Considering that many explanatory variables, particularly pre-pandemic firm characteristics, are invariant within a firm over the sample period, the use of GEE for coefficients estimation seems plausible for the current data set. In addition, this study employed Newey-West standard errors, recognized as autocorrelation – and heteroscedasticity-consistent standard errors for coefficient estimation (Gujarati, 2009).

3.3. Stock returns measure

After obtaining stock price data of the U.S. restaurant firms from Yahoo Finance, we calculated weekly stock returns (in percentage). Specifically, during the sample period from January 3rd to May 15th, 2020, we collected dividend-adjusted closing prices of each firm on the last trading day of a week. The difference between the closing price on week$_t$ and that on week$_{t-1}$ was divided by the price on week$_{t-1}$ to compute weekly stock returns (Ramelli and Wagner, 2020).

3.4. COVID-19 cases measure

The CSSE's dashboard and WHO provide the number of daily COVID-19 confirmed cases, the number of recoveries, and the number of deaths. By focusing on weekly cumulative confirmed cases in the U.S. within the sample period, we calculated the growth rates of COVID-19. And, to match COVID-19 weekly growth rates with weekly stock returns of sampled restaurant firms, we set up a week from Saturday to Friday, consistent with stock market trading days, given that the last trading day of a week is normally Friday (Ding et al., 2020). The equation for calculating the weekly growth rate of COVID-19 cases is as follows:

COVID-19 = log $(1 + \#\text{confirmed cases in week}_t) - \log (1 + \#\text{confirmed cases in week}_{t-1})$.

3.5. Pre-pandemic firm characteristics measure

Regarding financial conditions, this study measured five factors: SIZE, LEV, DIV, CASH, and ROA. Following the previous literature that firm size affects a firm's market power advantage, economies of scale, and financial performance in the end, a firm's size (SIZE) was measured by the log of total assets (Chauvin and Hirschev, 1993). Next, a firm's leverage (LEV) was considered as a key financial condition which represents liquidity of a firm, measured by a debt-to-equity ratio (Brealey and Myers, 2003). Dividend (DIV) acts as a useful sign of a firm's financial and accounting situations, which influences speculation about a firm's financial performance. DIV was measured by the sum of common and preferred dividends (Lang and Stulz, 1994). Since cash flows (CASH) of a firm is a good predictor of a firm's capacity to react to COVID-19, CASH measured by the sum of income before extraordinary items and depreciation and amortization divided by total assets was included in our model (Bates et al., 2009; Giroud and Mueller, 2017). Finally, past profitability of a firm was measured by ROA (net income divided by total assets) (Ding et al., 2020).

To measure restaurant firms' corporate strategies, this study included two variables in our model: franchising and internationalization. Franchising (FR) was measured by the number of franchised properties divided by the number of total properties of a restaurant firm (Koh et al., 2009). The degree of internationalization (INT) was measured by the number of foreign properties divided by the number of total properties (Sullivan, 1994; Sun and Lee, 2013).

As the last dimension of pre-pandemic firm characteristics, institutional ownership and managerial ownership were included to represent the ownership structure of sampled restaurant firms. Institutional ownership (INST) was measured by the percentage of common stocks held by financial institutions (e.g., hedge funds, investment banks, and commercial banks) (Tsai and Gu, 2007), while managerial ownership (MNG) was measured by the percentage of common stocks held by insiders, including executive officers and a board of directors (Gu and Qian, 1999).

4. Results

4.1. Descriptive statistics

Table 1 summarizes the descriptive statistics of variables in our research model. RETURNS, a dependent variable, has a mean of −0.391 with a standard deviation of 12.143, ranging from −50.601 to 46.429. The weekly growth rate of COIVD-19, our key explanatory variable, ranges from 0 to 2.488 along with a mean of 0.703. It means that during the sample period, on average, the weekly growth rate of COVID-19 was more than 70% while the maximum growth rate was 248.8%.

In terms of pre-pandemic firm characteristics, Table 1 presents firm characteristics as of 2019, which was used for main analyses. Firm size (SIZE) had a mean of 6.772 with a standard deviation of 1.844, having a maximum (minimum) value of 10.769 (1.860). The leverage ratio (LEV) showed a mean value of 0.684, ranging from 0 to 3.148. That is, the sampled U.S. restaurant firms, on average, have debts accounting for 68.4% relative to total equity. Total dividend had a mean of $213.943 (million) with a standard deviation of $632.741 (million). Cash flows of restaurant firms (CASH) ranged from 0.001 to 0.498 with a mean of 0.079. Past profitability in 2019 as measured by ROA had a mean value of 0.05, ranging from −0.148 to 0.29. Regarding corporate strategies, the degree of franchising (FR) indicates that the portion of franchised properties of U.S. restaurant firms was 0.307, on average, ranging from 0 to 0.996. The degree of internationalization (INT) had a mean of 0.095 with a standard deviation of 0.169, having a maximum value of 0.64. Lastly, concerning ownership type, institutional ownership (INST) showed a range from 0 to 81.800, having a mean of 32.909; managerial ownership (MNG) had a mean of 15.2 with a standard deviation of 17.546, ranging from 0.24–55.6.

Table 2 shows the results of Pearson's correlation analyses among variables. As expected, there was a negative and significant correlation between COVID-19 and RETURNS. Although other pre-pandemic firm characteristics showed insignificant correlations with RETURNS, it should be noted that these insignificant bivariate relationships were estimated, without considering other potential influencing factors. Moreover, all pre-pandemic firm characteristics were not significantly correlated with COVID-19. Among pre-pandemic firm characteristics overall, all variables are either positively or negatively correlated with each other, excepting a few bivariate relationships (e.g., SIZE & CASH and INST & LEV).

4.2. Main analyses

Tables 3–5 report results of the main analyses employing GEE, contingent on different dimensions of moderators. Firstly, Table 3 presents the results of the moderating role of financial conditions, consisting of five factors: SIZE, LEV, DIV, CASH, and ROA. In the first column without interaction terms, COVID-19 shows a negative impact on RETURNS. Specifically, a unit increase in COVID-19, on average, results in −5.028% decrease in RETURNS (p-value less than 0.001). For the moderating effect of the five financial conditions, we found that while SIZE, LEV, and CASH have a positive moderating effect on the relationship between COVID-19 and RETURNS, ROA shows a negative and significant moderating effect. That is, restaurant firms with larger size, more leverage, and more cash were less likely to be affected by declines in stock returns reacting to COVID-19. On the other hand, higher ROA worsened the negative impact of COVID-19 on stock returns in the U.S. restaurant industry. The interaction between COVID-19 and DIV showed an insignificant effect on RETURNS. Although we utilized firm characteristics as of 2019 in the main analyses, to check the robustness of our main results, we additionally estimated coefficients using values of 2017–2019 3-year-average firm characteristics. In column 4 in Table 3, we found a positive moderating effect of SIZE, LEV, and CASH and a negative moderating effect of ROA, consistent with the results in column 2, although the values of coefficients between the two estimations differ

Table 1
Summary of descriptive statistics.

Variables	N	Mean	Std. Dev	Min	Max
RETURNS	795	−0.391	12.143	−50.601	46.429
COVID-19	795	0.703	0.656	0.000	2.488
SIZE	795	6.772	1.844	1.860	10.769
LEV	795	0.684	0.580	0.000	3.148
DIV	795	213.943	632.741	0.000	3581.900
CASH	795	0.079	0.096	0.001	0.498
ROA	795	0.050	0.093	−0.148	0.290
FR	795	0.307	0.366	0.000	0.996
INT	795	0.095	0.169	0.000	0.640
INST	795	32.909	18.026	0.000	81.800
MGN	795	15.200	17.546	0.240	55.600

Notes: RETURNS represents weekly stock returns (percentage) of each firm within a week; COVID19 represents the weekly growth rate of the number of confirmed U.S. COVID-19 cases; SIZE represents firm size; LEV represents debt-to-equity ratio of each firm; DIV represents total dividends of common and preferred stocks; ROA represents a firm's past accounting performance; FR represents the degree of franchising; INT represents the degree of internationalization; INST represents institutional ownership; MNG represents managerial ownership.

Table 2

Summary of Pearson's correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) RETURNS	1.000										
(2) COVID-19	−0.222***	1.000									
(3) SIZE	0.017	0.000	1.000								
(4) LEV	0.033	0.000	0.133***	1.000							
(5) DIV	−0.010	0.000	0.579***	0.110***	1.000						
(6) CASH	−0.009	0.000	−0.066	0.178***	−0.036	1.000					
(7) ROA	0.001	0.000	0.386***	0.586***	0.292***	0.271***	1.000				
(8) FR	0.022	0.000	0.397***	0.449***	0.387***	−0.018	0.418***	1.000			
(9) INT	0.034	0.000	0.267***	0.678***	0.237***	0.208***	0.603***	0.423***	1.000		
(10) INST	0.045	0.000	0.059	0.039	−0.154***	−0.450***	−0.171***	−0.023	−0.165***	1.000	
(11) MNG	−0.005	0.000	−0.506***	−0.261***	−0.246***	−0.116***	−0.330***	−0.094***	−0.112***	−0.209***	1.000

Notes: *** $p < 0.01$, ** $p < 0.05$.

Table 3

The moderating role of financial characteristics.

	2019 only		2017–19	
VARIABLES	(1) RETURNS	(2) RETURNS	(1) RETURNS	(2) RETURNS
COVID-19	−5.028***	−11.05***	−4.832***	−10.194***
	(0.534)	(1.568)	(0.563)	(2.111)
SIZE	0.473***	0.0202	1.508	1.109
	(0.156)	(0.193)	(1.051)	(1.136)
LEV	0.684	−0.852	6.534	4.774
	(0.469)	(0.610)	(4.766)	(4.919)
DIV	−0.0005	−0.0007	−0.001	−0.002
	(0.0003)	(0.0004)	(0.002)	(0.002)
CASH	6.119***	−1.994	43.790	31.323
	(2.010)	(3.111)	(26.813)	(27.803)
ROA	−5.200**	6.742	−1.423	13.591
	(2.339)	(3.754)	(18.334)	(19.942)
COVIDXSIZE		0.645***		0.570**
		(0.223)		(0.290)
COVIDXLEV		2.189***		2.514**
		(0.763)		(1.034)
COVIDXDIV		0.0004		0.0004
		(0.0006)		(0.0005)
COVIDXCASH		11.555**		17.755***
		(5.022)		(5.756)
COVIDXROA		−17.028***		−21.516**
		(5.709)		(10.530)
FR	0.775	0.780	6.730	6.721
	(0.687)	(0.689)	(5.372)	(5.366)
INT	1.557	1.531	−48.236	−48.210
	(1.510)	(1.518)	(35.852)	(35.820)
INST	0.060***	0.060***	0.060	0.059
	(0.012)	(0.012)	(0.056)	(0.056)
MNG	0.022	0.022	−0.024	−0.024
	(0.013)	(0.013)	(0.046)	(0.046)
Constant	−3.312*	0.911	−14.532	−10.783
	(1.333)	(1.671)	(10.961)	(11.634)
Wald Chi^2	204.72***	333.27***	115.74***	277.69***
Observations	795	795	797	797

Newey-West standard errors in parentheses.

*** $p < 0.01$.

** $p < 0.05$.

Table 4

The moderating role of corporate strategies.

	2019 only		2017–19	
VARIABLES	(1) RETURNS	(2) RETURNS	(1) RETURNS	(2) RETURNS
COVID-19	−5.028***	−5.649***	−4.832***	−5.422***
	(0.534)	(0.589)	(0.563)	(0.630)
FR	0.775	0.579	6.730	6.926
	(0.687)	(1.039)	(5.372)	(5.510)
INT	1.557	−2.406	−48.236	−53.213
	(1.510)	(2.034)	(35.852)	(36.137)
COVIDXFR		0.277		−0.266
		(1.345)		(1.310)
COVIDXINT		5.631**		6.987***
		(2.802)		(2.284)
SIZE	0.473***	0.473***	1.508	1.508
	(0.156)	(0.156)	(1.051)	(1.052)
LEV	0.684	0.680	6.534	6.538
	(0.469)	(0.469)	(4.766)	(4.771)
DIV	−0.0005	−0.0005	−0.001	−0.001
	(0.0003)	(0.0003)	(0.002)	(0.002)
CASH	6.119***	6.115***	43.790	43.829
	(2.010)	(2.008)	(26.813)	(26.844)
ROA	−5.200**	−5.183**	−1.423	−1.416
	(2.339)	(2.346)	(18.334)	(18.352)
INST	0.060***	0.0597***	0.059	0.059
	(0.012)	(0.012)	(0.056)	(0.056)
MNG	0.022	0.022	−0.024	−0.024
	(0.013)	(0.013)	(0.046)	(0.047)
Constant	−3.312**	−2.872**	−14.532	−14.129
	(1.333)	(1.437)	(10.961)	(10.944)
Wald Chi^2	204.72***	258.17***	115.74***	133.14***
Observations	795	795	797	797

Newey-West standard errors in parentheses.

*** $p < 0.01$.

** $p < 0.05$.

slightly.

Table 4 provides results of the moderating role of corporate strategies, FR and INT. While an interaction term (FR × COVID-19) showed an insignificant impact on RETURNS, the other interaction term (INT × COVID-19) has a positive and significant effect. In other words, firms with a higher degree of internationalization mitigate stock declines as a result of COVID-19 shock. In contrast, the degree of franchising did not significantly affect the relationship between COVID-19 and stock returns in the restaurant industry. From an analysis using 3-year average firm characteristics in column 4, we checked consistent results that INT demonstrates a positive moderating impact on the

relationship between COVID-19 and stock returns, whereas FR shows an insignificant moderating effect.

Table 5 reports the results of the moderating role of ownership type on the effect of COVID-19 on stock returns of restaurant firms. Surprisingly, both institutional and managerial ownership showed an insignificant moderating effect at the 5% significance level. That is, ownership type, composed of institutional and managerial ownership, does not appear to be a critical factor for shareholders to consider in their equity evaluation of the firm under COVID-19 shock. Likewise, results in column 4 utilizing 3-year-average firm characteristics provide qualitatively the same results of an insignificant moderating effect of both institutional and managerial ownership.

5. Discussion and implications

COVID-19 has triggered unprecedented challenges for firms,

Table 5
The moderating role of ownership structure.

VARIABLES	2019 only		2017–19	
	(1) RETURNS	(2) RETURNS	(1) RETURNS	(2) RETURNS
COVID-19	−5.028***	−5.668***	−4.832***	−5.546***
	(0.534)	(1.120)	(0.563)	(1.221)
INST	0.0596***	0.042**	0.059	0.042
	(0.012)	(0.019)	(0.056)	(0.061)
MNG	0.022	0.031	−0.024	−0.020
	(0.013)	(0.022)	(0.047)	(0.053)
COVIDXINST		0.025		0.024
		(0.022)		(0.022)
COVIDXMNG		−0.013		−0.006
		(0.030)		(0.026)
SIZE	0.473***	0.473***	1.508	1.508
	(0.156)	(0.156)	(1.051)	(1.050)
LEV	0.684	0.684	6.534	6.534
	(0.469)	(0.469)	(4.766)	(4.765)
DIV	−0.0004	−0.0004	−0.001	−0.001
	(0.0002)	(0.0002)	(0.002)	(0.002)
CASH	6.119***	6.122***	43.790	43.800
	(2.010)	(2.012)	(26.813)	(26.807)
ROA	−5.200**	−5.219**	−1.423	−1.447
	(2.339)	(2.340)	(18.334)	(18.332)
FR	0.775	0.777	6.730	6.732
	(0.687)	(0.687)	(5.372)	(5.370)
INT	1.557	1.559	−48.236	−48.225
	(1.510)	(1.511)	(35.852)	(35.847)
Constant	−3.312**	−2.862	−14.532	−14.032
	(1.333)	(1.489)	(10.961)	(11.090)
Wald Chi^2	204.72***	258.88***	115.74***	136.62***
Observations	795	795	797	797

Newey-West standard errors in parentheses.
*** $p < 0.01$.
** $p < 0.05$.

shareholders, investors, and policymakers. Particularly, since COVID-19 threats directly affect revenue production and future values of restaurant firms, the impact of COVID-19 shock on stock returns of restaurant firms seems conspicuous. By assessing which pre-pandemic firm characteristics formulate durability to COVID-19 in terms of stock returns in the U.S. restaurant industry, this study attempts to shed light on the research topic by providing comprehensive empirical evidence with three firm-level dimensions (i.e., financial conditions, corporate strategies, and ownership structure) relevant to a firm's liquidity and operational risks. Findings of the current study suggest that idiosyncratic pre-pandemic characteristics of restaurant firms act as significant conditions that either alleviate or aggravate the negative effect of COVID-19 on stock returns.

Firstly, regarding financial conditions, this study found that firm size and cash flows positively moderate the relationship between COVID-19 and stock returns, consistent with previous findings which employed various industry samples (e.g., Ding et al., 2020). These results suggest that firms with larger size and more cash, on average, are prone to tolerate the demanding period more effectively by funding themselves, which derives investors' positive market valuation, compared to otherwise similar firms (Ramelli and Wagner, 2020).

However, we showed intriguing findings of a positive and negative moderating effect of leverage and ROA, respectively. Specifically, previous findings confirmed a negative moderating role of leverage, in that more leverage of a firm under external shock signals a potential increase in business risks, thereby evoking investor anxiety and leading to stock declines (Ding et al., 2020). In contrast, a positive moderating effect of leverage in the current study offers contradictory evidence that restaurant firms with more leverage are more resilient in the face of stock reactions to COVID-19 shock. A possible explanation is that, notwithstanding the cost of financial distress according to high leverage ratio (Jang and Tang, 2009), when the magnitude of the crisis is

unprecedentedly overwhelming like COVID-19, the degree of overall financial distress may have become greatly severe for every restaurant company, and thus the financial distress caused by a firm's leverage becomes proportionally very marginalized. Meanwhile, the tax benefit from leverage still clearly exists, possibly creating an interesting situation where investors may see some extra value in a restaurant firm with high leverage due to this tax benefit. In this regard, under COVID-19 shock, a firm with higher leverage may be regarded more optimistically by shareholders and investors; thus, leverage of restaurant firms may alleviate stock declines.

The negative moderating effect of ROA may be posited as follows. From the perspective of shareholders and investors, the impact of COVID-19 shock on future financial performance of a firm may be greater for a firm that was more profitable than its competitors prior to COIVD-19. A profitable firm's stock price is likely to be formulated higher than a less-profitable firm, based on a positive assessment of expected future returns (Novy-Marx, 2013; Akbas et al., 2017). However, in the situation where unprecedented revenue shortfalls caused by COVID-19 is ongoing, all restaurant firms' businesses will stay stagnant. In that case, the gap between pre-pandemic and post-pandemic profitability can be greater for a firm that used to be profitable right before the pandemic. As shareholders and investors may anticipate a greater extent of declines in profitability in a post-pandemic period, past profitability may aggravate stock declines due to the COVID-19 shock. Additionally, dividend showed an insignificant impact on the COVID-19 impact on stock returns. The evidence reveals that past dividend did not function as an important factor in adjusting COVID-19 damage to stock returns of restaurant firms.

Among corporate strategies of restaurant firms, only internationalization positively moderates the relationship between COVID-19 and stock returns. This indicates that the degree of internationalization mitigates stock declines of restaurant firms, in response to COVID-19. While internationalization has been regarded as a strategy increasing a firm's operational risks in a generic managerial situation, under a critical external crisis such as COVID-19, investors and shareholders may consider the strategy as spreading out the risks of a firm. In particular, the number of the U.S. confirmed cases has shown the highest record during the sample period. Active foreign exposures and operations may have acted as a positive signal that severe market loss from the U.S. domestic market can be alleviated by other foreign markets' recoveries and re-opening of commercial businesses. However, franchising did not show any significant moderating effect on COVID-19 damage to stock returns of restaurant firms. That is, a risk-reduction role of franchising may be marginalized in COVID-19 shock where damages from COVID-19 are omnipresent.

Regarding ownership structure of restaurant firms, both institutional and managerial ownership insignificantly moderate the relationship between COVID-19 and stock returns. Although the previous literature argues that a high portion of institutional and managerial ownership works as an effective monitoring tool which prevents executive mangers from entrenching themselves in uncertain situations (Khandani and Lo, 2011; Gu and Qian, 1999), the results of this study did not show evidence of a significant role of ownership structure in COVID-19 threats and stock reactions in the U.S. restaurant industry.

In conclusion, to our best knowledge, this study is the first attempt to investigate whether stock returns reacting to COVID-19 differ, contingent on pre-pandemic firm characteristics in the restaurant industry context. Given that the restaurant industry is one of the most damaged industries from the impact of COVID-19, the results of this study can be expected to contribute to the hospitality literature by elucidating economic and financial consequences of COVID-19. Further, by examining the role of firm characteristics in mitigating the effect of COVID-19 – a wide-ranging and unprecedented external crisis – on stock returns, the results of the current study contribute to the finance and strategic management literature, providing empirical evidence in a special external situation. As a practical implication, the results of this study

will be conducive to decisions of shareholders and potential investors not only in the case of COVID-19 threats but also in unexpected situations of future crises. Also, owners and executive managers of a restaurant firm can refer to this study's results in developing their financial and strategic planning specifically for becoming or staying resilient against stock drops in light of an unexpected crisis such as COVID-19 shock.

This study is not free from limitations. Firstly, since this study investigated the moderating role of pre-pandemic characteristics on the effect of COVID-19 shock on stock returns, using the sample of publicly traded U.S. restaurant firms, the results of this study cannot be generalized to other country or industry contexts. Secondly, due to data availability and our key interest in changes in stock reaction to COVID-19, this study did not consider the impact of COVID-19 shock on private restaurant firms' economic and financial performance. Thirdly, although this study tried to use as long an extended sample period as possible, in order to illustrate the average impact of COVID-19 on the restaurant industry, the effect of COVID-19 may differ depending on its stages, in terms of number of confirmed cases in the U.S. For future studies, division into sub-periods is encouraged to examine the impact of COVID-19 on economic and financial outcomes of restaurant firms more concretely. Lastly, this study measured the impact of COVID-19 using the growth rate of all confirmed cases. However, other measures, such as the net growth rate (i.e., numbers subtracting recovered cases from confirmed cases), may capture net declines in active confirmed cases which may help avoid unnecessarily inflating the negative impact of global pandemic. However, it should be also noted that there is much uncertainty in calculating recovered cases due to questionable data source reporting recovered cases in many countries, including U.S. (Al Jazeera, 2020). Regardless, it would be worthwhile to utilize other measures of COVID-19 to comprehensively examine its impact.

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