Online Appendices for "How to Survive a Pandemic: The Corporate Resiliency of Travel and Leisure Companies to the COVID-19 Outbreak"

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Abstract

This appendix presents additional materials for the article "How to Survive a Pandemic: The Corporate Resiliency of Travel and Leisure Companies to the COVID-19 Outbreak". It consists of two sections: additional tables and detailed model specification.

Appendix A contains additional tables for the study.

Table A1 presents the list of firm-level characteristics and sector affiliations used in the study, along with their names, symbols, and computation details; it includes additional information and the data source. Table A2 shows the same information for the country-level characteristics. Table A3 details the variables representing government policy responses. Table A4 provides descriptive statistics for the characteristics used in the analysis. Finally, Table A5 presents the coefficients calculated with Elastic net and the *p*-values estimated from single-interaction FM regressions for each characteristic.

Appendix B presents the detailed specification for the Fama-MacBeth regressions (Fama & MacBeth, 1973) and the Elastic net.

Appendix A. Additional Tables for the Study

Table A1. *Detailed Firm-Level Characteristics and Sector Affiliation*

The table provides a summary of the firm-level characteristics, including sector affiliations, used to search for determinants that influenced stock price movements in response to the outbreak of the COVID-19 pandemic. The table presents the firm characteristics categorized into six subsections (groups): valuation, investment, profitability, other asset pricing, indebtedness ratios, and sector affiliation. The table consists of four columns. The first column provides the name of each characteristic as well as group name headings in the firm characteristics section. The second column shows the variable name or symbol assigned to the characteristic. The third column provides a description of how the variable is computed/measured. The fourth column indicates the source of the data used in this study for the given characteristic.

	Symbol	Computation details and additional information	Data source
Valuation			
Dividend yield	*DY*	The logarithm of (1 + % of 12-month dividend per share).	Datastream
EBITDA-to-EV ratio	*EBEV*	The logarithm of (1 + quotient of 12-month trailing EBITDA and the enterprise value).	Datastream
Forecasted E/P ratio	*FEP*	The logarithm of (1 + quotient of predicted annual net income and the total market capitalization).	Datastream
Cash flow-to-price ratio	*CP*	The logarithm of (1 + quotient of 12-month trailing operating cash flow and the total market capitalization).	Datastream
Earnings-to-price ratio	*EP*	The logarithm of (1 + quotient of 12-month trailing net income and the total market capitalization of the index portfolio).	Datastream
Book-to-market ratio	*BM*	The logarithm of (1 + quotient of book value and the total market capitalization).	Datastream
Investment			
CAPEX-to-assets ratio	*CA*	The logarithm of (1 + quotient of trailing 12-month capital expenditures and total assets).	Datastream
12-month asset growth	*AG*	Annual asset growth calculated as the logarithm of (change of total assets in the previous 12 months).	Datastream
Profitability			
Return on assets	*ROA*	The logarithm of (1 + quotient of 12-month trailing net income and total assets).	Datastream
Return on equity	*ROE*	The logarithm of (1 + quotient of 12-month trailing net income and common equity).	Datastream
Return on sales	*ROS*	The logarithm of (1 + quotient of 12-month trailing net income and total revenue for the same period).	Datastream
Other asset pricing measures			
Momentum	*MOM*	Total log-return from the previous 12 months.	Datastream

Log-market value	*MV*	The logarithm of total market capitalization.	Datastream
Long-run reversal	*REV*	Total log-return from month t-60 to t-13.	Datastream
Turnover ratio	*TURN*	The ratio of the average daily dollar volume and daily market value over the prior 12 months.	Datastream
Idiosyncratic volatility	*IVOL*	Residual term estimated from the regression of stock excess returns on the excess returns of the country index estimated using daily data over the prior 50 days.	Datastream
Stock market beta	*BETA*	Slope coefficient of stock excess returns on the excess returns of the market portfolio estimated with weekly data over the prior 60 months.	Datastream
Indebtedness			
1/Interest coverage ratio	*INTCOV*	The logarithm of (1 + quotient of 12-month trailing interest expenses and earnings before interest and taxes (EBIT) for the same period).	Datastream
Net debt-to-equity ratio	*LEV*	The logarithm of (1 + net debt over total assets).	Datastream
Sector classification			
Airlines	*AIRLINES*	Dummy variable representing the Travel and Leisure subsector (ICB classification) - Airlines.	Datastream
Casinos and Gambling	*CAS&GAM*	Dummy variable representing the Travel and Leisure subsector (ICB classification) - Casinos and Gambling.	Datastream
Hotels and Motels	*HOT&MOT*	Dummy variable representing the Travel and Leisure subsector (ICB classification) - Hotels and Motels.	Datastream
Recreational Services	*RECRSERV*	Dummy variable representing the Travel and Leisure subsector (ICB classification) - Recreational Services.	Datastream
Restaurants and Bars	*RES&BAR*	Dummy variable representing the Travel and Leisure subsector (ICB classification) - Restaurants and Bars.	Datastream
Travel and Tourism	*TR&TOUR*	Dummy variable representing the Travel and Leisure subsector (ICB classification) - Travel and Tourism.	Datastream

Table A2. *Detailed Country-Level Characteristics*

The table summarizes the country-level characteristics used to search for determinants that influenced stock price movements in response to the outbreak of the COVID-19 pandemic that are categorized into several subsections (groups): economic data, national culture, world governance indicators, legal origin, population data, basic medical care data, and sector composition. The table consists of four columns. The first column provides the name of each characteristic as well as group name headings in the country characteristics section. The second column shows the variable name or symbol assigned to the characteristic. The third column provides a description of how the variable is computed/measured. The fourth column indicates the source of the data used in this study for the given characteristic.

Characteristic	Symbol	Computation details and additional information	Data source
Economic data			
GDP growth (annual %) 2018	*GDPG*	The annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. Available for 2018.	World Bank national accounts data and OECD national accounts data files.
Exports of goods and services (% of GDP) 2018	*EXP*	Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. Available for 2018.	World Bank national accounts data and OECD national accounts data files.
Unemployment, total (% of the total labor force) 2019	*UNEM*	Unemployment refers to the share of the labor force that is without work, but available for and seeking employment. Available for 2019.	International Labour Organization, ILOSTAT database.
Inflation, consumer prices (annual %) 2018	*INF18*	Inflation, as measured by the consumer price index, reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used. Available for 2018.	International Monetary Fund, international financial statistics, and data files.
Inflation, consumer prices (annual %) 2019	*INF19*	Inflation from 2019. Detailed description as for inflation in 2018.	International Monetary Fund, international financial statistics, and data files.
International tourism receipts (% of total exports) 2018	*TOUR%*	International tourism receipts are expenditures by international inbound visitors, including payments to national carriers for international transport. These receipts include any other prepayment made for goods or services received in the destination country. They also may include receipts from same-day visitors, except when these are important enough to justify separate classification. For some countries, they do not include receipts for passenger transport items. Their share in exports is calculated as a ratio to exports of goods and services, which comprise all transactions between residents of a country and the rest of the world involving a change of ownership from residents to non-residents of general merchandise, goods sent for processing and repairs, nonmonetary gold, and services. Available for 2018.	World Tourism Organization, Yearbook of Tourism Statistics, Compendium of Tourism Statistics and data files, and IMF and World Bank export estimates.

Trade (% of GDP)	*TRADE*	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product. Available for 2019.	World Bank national accounts data and OECD national accounts data files.
Domestic credit to the private sector (% of GDP) 2018	*CRED*	Domestic credit to the private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, and trade credits, and other account receivables that establish a claim for repayment. For some countries, these claims include credit to public enterprises. The financial corporations include monetary authorities and deposit money banks, as well as other financial corporations where data are available (including corporations that do not accept transferable deposits, but do incur such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies. Available for 2018.	International Monetary Fund, international financial statistics and data files, and World Bank and OECD GDP estimates.
Credit rating	*RTNG*	The credit rating reflects the creditworthiness of the sovereign debt of a given country. The rating can give investors insights into the risk associated with investing in a particular country's debt, including any political risk. The sovereign credit rating indicates the risk level of the investment environment of a country. Standard & Poor's, Moody's, and Fitch ratings are the most common and influential ratings. Available for 2019.	1.Moody's, S&P, and Fitch websites; 2.https://countryeconomy.com/ratings; 3.https://tradingeconomics.com/country-list/rating
Three-month interbank rates	*RF*	The logarithm of (1 + local three-month treasury bill rate).	Datastream
National culture			
Power distance	*POWDIST*	This dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. The fundamental issue here is how a society handles inequalities among people.	https://hi.hofstede-insights.com/national-culture
Individualism	*INDIV*	The high side of this dimension can be defined as a preference for a loosely-knit social framework in which individuals are expected only to take care of themselves and their immediate families.	https://hi.hofstede-insights.com/national-culture
Masculinity	*MASC*	The high side of this dimension represents a preference in a society for achievement, heroism, assertiveness, and material rewards for success. Society at large is more competitive. Its opposite stands for a preference for cooperation, modesty, caring for the weak, and quality of life. Society at large is more consensus-oriented.	https://hi.hofstede-insights.com/national-culture
Uncertainty avoidance	*UNCAV*	This dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen?	https://hi.hofstede-insights.com/national-culture
Long-term orientation	*LTOR*	Every society has to maintain some links with its past while dealing with the challenges of the present and the future. Societies prioritize these two existential goals differently. Societies who score low on this dimension prefer to maintain time-honored traditions and norms while viewing societal change with suspicion. Those with a culture that scores high take a more pragmatic approach: they encourage thrift and efforts in modern education as a way to prepare for the future.	https://hi.hofstede-insights.com/national-culture

World governance indicators			
Voice and accountability	*ACCOUN*	Perceptions of the extent to which a country's citizens can participate in selecting their government, as well as freedom of expression, freedom of association, and free media. Available for 2018.	https://info.worldbank.org/governance/wgi/
Political stability/no violence	*POLSTAB*	Perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. Available for 2018.	https://info.worldbank.org/governance/wgi/
Government effectiveness	*GOVEFF*	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. Available for 2018.	https://info.worldbank.org/governance/wgi/
Regulatory quality	*REQUAL*	Perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Available for 2018.	https://info.worldbank.org/governance/wgi/
Rule of law	*RULELAW*	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, policing, and the courts, as well as the rate of crime and violence. Available for 2018.	https://info.worldbank.org/governance/wgi/
Control of corruption	*CORRUPT*	Perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Available for 2018.	https://info.worldbank.org/governance/wgi/
Legal system origin			
D_french	*FREN*	Dummy variable representing the origin of the national legal system as coming from French law. Available for 2020.	1. La Porta et al. (2008), 2.https://www.cia.gov/library/publications/the-world-factbook/fields/308.html; 3.https://voxeu.org/article/legal-origins
D_german	*GERM*	Dummy variable representing the origin of the national legal system as coming from German law. Available for 2020.	
D_scandinavian	*SCAN*	Dummy variable representing the origin of the national legal system as coming from Scandinavian law. Available for 2020.	
D_english	*ENGL*	Dummy variable representing the origin of the national legal system as coming from English law. Available for 2020.	
Population data			
Population aged 65 and above (% of the total population) 2018	*POP65*	Population ages 65 and above as a percentage of the total population. The population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. Available for 2018.	World Bank staff estimates based on age/sex distributions of United Nations Population Division's World Population Prospects: 2019 Revision.

Population density (people per sq. km of land area) 2018	*DENS*	Population density is midyear population divided by land area in square kilometers. The population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship except for refugees not permanently settled in the country of asylum, and who are generally considered part of the population of their country of origin. Land area is a country's total area, excluding area under inland water bodies, national claims to continental shelf, and exclusive economic zones. In most cases, the definition of inland water bodies includes major rivers and lakes. Available for 2018.	Food and Agriculture Organization and World Bank population estimates.
Urban population (% of the total population) 2018	*URBAN*	The urban population refers to people living in urban areas as defined by national statistical offices. The data are collected and smoothed by the United Nations Population Division. Available for 2018.	United Nations Population Division. World Urbanization Prospects: 2018 Revision.
Net migration 2017	*MIGR*	Net migration is the net total of migrants during the period, that is, the total number of immigrants less the annual number of emigrants, including both citizens and noncitizens. Data are five-year estimates. Available for 2019.	United Nations Population Division. World Population Prospects: 2019 Revision.
Basic medical care data			
Hospital beds (per 1,000 people)	*BEDS*	Hospital beds include inpatient beds available in public, private, general, and specialized hospitals and rehabilitation centres. In most cases, beds for both acute and chronic care are included.	Data are from the World Health Organization, supplemented by country data.
Current health expenditure (% of GDP) 2017	*HEXP%*	The level of current health expenditure expressed as a percentage of GDP. Estimates of current health expenditures include healthcare goods and services consumed during each year. This indicator does not include capital health expenditures such as buildings, machinery, IT, and stocks of vaccines for emergencies or outbreaks. Available for 2017.	World Health Organization Global Health Expenditure database (apps.who.int/nha/database).
Current health expenditure per capita, PPP	*HEXPC*	Current expenditures on health per capita expressed in international dollars at purchasing power parity (PPP time series based on ICP2011 PPP).	World Health Organization Global Health Expenditure database (apps.who.int/nha/database).
Nurses and midwives (per 1,000 people)	*NURSE*	Nurses and midwives include professional nurses, professional midwives, auxiliary nurses, auxiliary midwives, enrolled nurses, enrolled midwives, and other associated personnel, such as dental nurses and primary care nurses.	World Health Organization's Global Health Workforce Statistics, OECD, supplemented by country data.
Physicians (per 1,000 people)	*PHYS*	Physicians include generalist and specialist medical practitioners.	World Health Organization's Global Health Workforce Statistics, OECD, supplemented by country data.
Life expectancy at birth, total (years)	*LIFE*	Life expectancy at birth indicates the number of years a new-born infant would live if prevailing patterns of mortality at the time of birth were to stay the same throughout its life.	1) United Nations Population Division. World Population Prospects: 2019 Revision, or derived from male and female life expectancy at birth from sources such as:

			2) Census reports and other statistical publications from national statistical offices, 3) Eurostat: Demographic Statistics, 4) United Nations Statistical Division. Population and Vital Statistics Report in various years, 5) U.S. Census Bureau: International Database, 6) Secretariat of the Pacific Community: Statistics and Demography Programme.
Lower respiratory infections	*RESP*	A full description is at: http://ghdx.healthdata.org/record/ihme-data/gbd-2016-healthcare-access-and-quality-index-1990-2016. Available for 2016.	http://www.healthdata.org/results/country-profiles/haq
Healthcare access and quality	*HEALTH*	A full description is at: http://ghdx.healthdata.org/record/ihme-data/gbd-2016-healthcare-access-and-quality-index-1990-2016 Available for 2016.	http://www.healthdata.org/results/country-profiles/haq
UHC service coverage	*UHC*	The UHC SCI is presented on a scale of 0 to 100, since service coverage is typically measured on a scale of 0 to 100%, with higher scores indicating better performance. The UHC is wide coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, new-born and child health, infectious diseases, non-communicable diseases, and service capacity and access, among the general and the most disadvantaged population). The indicator is an index reported on a unitless scale of 0 to 100, which is computed as the geometric mean of 14 tracer indicators of health service coverage. The tracer indicators are as follows, organized by four components of service coverage: 1. Reproductive, maternal, newborn, and child health, 2. Infectious diseases, 3. Noncommunicable diseases, and 4. Service capacity and access.	World Health Organization 2019 Monitoring Report
Sector composition			
Industry concentration in the stock market (Gini coefficient)	*CON*	Industry concentration calculated as a Gini coefficient based on the market share of 11 different industries (classified according to Datastream) in the total market capitalization of a country portfolio.	Datastream
Market share of travel and leisure stocks	*TRAV*	Market share (%) of the travel and leisure sector in the market value of the index portfolio (t-1).	Datastream

Table A3. *Detailed Government Policy Responses*

The table summarizes the variables used in the study to represent the government policy responses to the COVID-19 pandemic that are categorized into four subsections (groups): composite index, containment and closure, health interventions, and economic stimulus. The table consists of four columns. The first column provides the name of each policy response. The second column shows the variable name or symbol assigned to each of the responses. The third column provides a description of how the variable is computed/measured. The fourth column indicates the source of the data used in this study for the given variable.

Variable	Symbol	Computation details and additional information	Data source
Composite index			
Stringency index	*STRIND*	The COVID-19 government response stringency index developed by Hale et al. (2020) aggregates nine non-pharmaceutical government policy interventions listed below (*SCHOOL*, *WORK*, *PUBEVEN*, *GATHER*, *PUBTRANS*, *DOMTRAV*, *STAYATHM*, *INTERTRAV*, and *PUBCAMP*). It is rescaled to create a score between 0 and 100.	Hale et al. (2020)
Containment and closure			
School closing	*SCHOOL*	*SCHOOL*=0: no measures, *SCHOOL*=1: recommended school closing, *SCHOOL*=2: required school closing (only some school levels or categories), *SCHOOL*=3: required school closing for all levels.	Hale et al. (2020)
Workplace closing	*WORK*	*WORK*=0: no measures, *WORK*=1: recommended work closing (or work from home), *WORK*=2: required work closing (or work from home) for some sectors or categories of workers, *WORK*=3: required work closing (or work from) for all-but-essential workplaces (e.g., grocery stores, doctors).	Hale et al. (2020)
Cancellation of public events	*PUBEVEN*	*PUBEVEN*=0: no measures, *PUBEVEN*=1 recommended cancellation of public events, *PUBEVEN*=2 required cancellation of public events.	Hale et al. (2020)
Restrictions on gatherings	*GATHER*	*GATHER*=0: no restrictions, *GATHER*=1: restrictions on large gatherings (more than 1000 people), *GATHER*=2: restrictions on average size gatherings (100-1000 people), *GATHER*=3: restrictions on small gatherings (with 10-100 people), *GATHER*=4: restrictions on all gatherings, even less than 10 people.	Hale et al. (2020)
Public transport closed	*PUBTRANS*	*PUBTRANS*=0: no restrictions, *PUBTRANS*=1: recommended closing or significantly reduced service (volume/route/means of transport available), *PUBTRANS*=2: required closing (or prohibit most citizens from using public transport).	Hale et al. (2020)
Domestic travel ban	*DOMTRAV*	*DOMTRAV*=0: no restrictions, *DOMTRAV*=1: recommended not to move internally (or significantly reduced volume/route/means of transport), *DOMTRAV*=2: required not to move internally (or prohibit most people from doing so).	Hale et al. (2020)
Stay-at-home requirements	*STAYATHM*	*STAYATHM*=0: no restrictions, *STAYATHM*=1: recommended to stay at home, *STAYATHM*=2: required to stay at home with exceptions for daily exercise, grocery shopping, and "essential" trips, *STAYATHM*=3: required to stay at home with minimal exceptions (e.g., allowed to leave only once every few days, or only one person can leave at a time, etc.).	Hale et al. (2020)
International travel restrictions	*INTERTRAV*	*INTERTRAV*=0: no measures, *INTERTRAV*=1: screening in place, *INTERTRAV*=2: quarantine on high-risk regions, *INTERTRAV*=3: traveling to high-risk regions is banned.	Hale et al. (2020)

Public information campaigns	*PUBCAMP*	*PUBCAMP*=0: no COVID-19 public information campaign in place, *PUBCAMP*=1: public officials urging caution about COVID-19, *PUBCAMP*=2: coordinated public information campaign (e.g., across traditional and social media) in place.	Hale et al. (2020)
Health interventions			
Testing policy	*TESTPOLI*	*TESTPOLI*=0: no testing policy, *TESTPOLI*=1: testing only for those who both (a) have symptoms and (b) meet specific criteria (e.g., key workers, admitted to hospital, came into contact with a known case, returned from overseas), *TESTPOLI*=2: testing of anyone showing COVID-19 symptoms, *TESTPOLI*=3: open public testing policy (e.g., drive-through; testing available to asymptomatic people).	Hale et al. (2020)
Contact tracing	*CONTTRAC*	*CONTTRAC*=0: no contact tracing, *CONTTRAC*=1: contact tracing limited (not done for all cases), *CONTTRAC*=3: comprehensive contact tracing done for all cases.	Hale et al. (2020)
Economic stimulus			
Economic stimulus - income support	*INCOMSUP*	Measures whether the government is covering the salaries of or providing direct cash payments to people who lose their jobs or cannot work, e.g., universal basic income, or similar (includes payments to firms if explicitly linked to payroll/salaries). *INCOMSUP*=0: there is no income support, *INCOMSUP*=1: government replaces <50% of lost salary (or if a flat sum, <50% of median salary), and *INCOMSUP*=2: government replaces >50% of lost salary (or if a flat sum, >50% of median salary).	Hale et al. (2020)
Economic stimulus - debt relief	*DEBTREL*	*DEBTREL* records if government freezes financial obligations (e.g., stops loan repayments, prevents cutting off services like water, or bans evictions). *DEBTREL*=0: no such policy, *DEBTREL*=1: narrow relief, specific to one kind of contract, *DEBTREL*=2: broad debt/contract relief policy.	Hale et al. (2020)

Table A4. *Descriptive Statistics of the Examined Characteristics*

This table presents the descriptive statistics for each of the studied characteristics based on the weekly data between January 6 and March 23, 2020 for 1,201 tourism companies from 52 countries: number of observations (*Count*), mean (*Mean*), standard deviation (*Std*), minimum value (*Min*), first quartile value (*25%*), median value (*50%*), third quartile value (*75%*), and maximum value (*Max*). Row (0) presents the statistics for the weekly stock returns over the study period. Row (1) presents them for the *ΔCOVID-19* variable described in Section 4.1 (the weekly growth rate of the cumulative number of confirmed cases). The remaining rows are organized by panels. Panel A presents data on returns and COVID-19 infections discussed in Section 3.2 of the main article. Panel B concerns firm characteristics along with sector affiliations described in Section 3.3. Panel C presents country characteristics described in Section 3.4. Panel D presents government policy responses described in Section 3.5. Descriptions of the variables and how they are calculated are provided in Tables A1, A2, and A3.

No.	Characteristic Symbol	Count	Mean	Std	Min	25%	50%	75%	Max
	Panel A: Returns and COVID-19 Infections								
0	*r(i.t)*	13193	-5.359	12.746	-93.367	-8.232	-1.001	0.545	96.493
1	*ΔCOVID-19*	13193	0.387	0.686	0	0	0	0.693	3.02
	Panel B: Firm Characteristics								
2	*DY*	13193	0.024	0.031	0	0	0.015	0.033	0.224
3	*EBEV*	13193	0.106	0.064	0.006	0.066	0.092	0.127	0.381
4	*FEP*	13193	0.068	0.043	0.004	0.045	0.062	0.074	0.41
5	*CP*	13193	0.121	0.102	-0.156	0.107	0.107	0.107	0.921
6	*EP*	13193	0.067	0.054	0.003	0.036	0.058	0.078	0.394
7	*BM*	13193	0.087	0.151	0	0.01	0.036	0.084	0.97
8	*CA*	13193	0.055	0.045	0	0.023	0.045	0.074	0.26
9	*AG*	13193	0.208	0.291	-0.293	0.034	0.118	0.299	1.964
10	*ROA*	13193	0.038	0.068	-0.336	0.014	0.035	0.061	0.271
11	*ROE*	13193	0.1	0.197	-1.008	0.053	0.094	0.154	1.175
12	*ROS*	13193	0.064	0.119	-0.498	0.022	0.058	0.105	0.565
13	*MOM*	13193	-0.065	0.397	-1.746	-0.209	-0.022	0.157	1.066
14	*MV*	13193	8.4	2.256	4.025	6.727	8.215	9.846	15.45
15	*REV*	13193	0.219	0.464	-1.486	0.046	0.202	0.394	2.1
16	*TURN*	13193	0.661	1.405	0	0.001	0.03	0.641	10.056
17	*IVOL*	13193	0.044	0.03	0	0.024	0.039	0.06	0.183
18	*BETA*	13193	0.773	0.666	-1.067	0.325	0.744	1.155	3.493
19	*INTCOV*	13193	0.167	0.284	-1.394	0.048	0.129	0.257	1.721
20	*LEV*	13193	0.157	0.302	-1.06	0.029	0.196	0.346	1.116
21	*HEALTH*	13193	0.157	0.363	0	0	0	0	1
22	*UHC*	13193	0.173	0.378	0	0	0	0	1
23	*HOT&MOT*	13193	0.15	0.357	0	0	0	0	1
24	*RECRSERV*	13193	0.092	0.29	0	0	0	0	1
25	*RES&BAR*	13193	0.259	0.438	0	0	0	1	1
26	*TR&TOUR*	13193	0.169	0.375	0	0	0	0	1
	Panel C: Country Characteristics								
27	*CON*	13193	0.169	0.059	0.122	0.134	0.141	0.173	0.364
28	*TRAV*	13193	0.029	0.035	0.001	0.021	0.025	0.028	0.291
29	*GDPG*	13193	2.702	1.604	0.774	1.527	2.927	2.94	8.17
30	*EXP*	13193	42.404	48.57	8.793	12.219	28.126	43.522	188.282
31	*UNEM*	13193	4.622	3.275	0.714	3.629	3.682	4.581	28.181
32	*INF18*	13193	2.095	1.206	0.439	1.675	2.268	2.443	16.332
33	*INF19*	13193	1.779	1.348	-1.931	0.939	1.812	1.812	15.177
34	*TOUR%*	13193	7.8	5.254	1.079	4.872	6.132	10.24	41.326
35	*TRADE*	13193	83.985	94.731	27.544	28.542	56.4	83.004	376.503
36	*CRED*	13193	147.263	39.839	18.829	134.724	161.138	168.821	187.222
37	*RTNG*	13193	3.561	2.873	1	1.333	3	5.333	16
38	*RF*	13193	0.019	0.047	-0.008	0	0.011	0.016	0.313
39	*POWDIST*	13193	50.371	16.957	11	39	40	67	104
40	*INDIV*	13193	62.406	27.174	13	38	70	90	91
41	*MASC*	13193	61.007	18.601	5	57	62	66	110
42	*UNCAV*	13193	54.623	22.778	8	35	46	75	112
43	*LTOR*	13193	51.954	25.065	6.801	25.693	51.134	76.574	100
44	*ACCOUN*	13193	0.823	0.798	-1.644	0.724	1.039	1.384	1.733
45	*POLSTAB*	13193	0.489	0.544	-2.267	0.109	0.477	0.977	1.541
46	*GOVEFF*	13193	1.376	0.544	-0.634	1.342	1.577	1.676	2.231
47	*REQUAL*	13193	1.349	0.672	-0.867	1.247	1.578	1.762	2.206
48	*RULELAW*	13193	1.277	0.663	-0.815	1.44	1.453	1.639	2.046

49	*CORRUPT*	13193	1.234	0.745	-0.863	1.317	1.323	1.806	2.212
50	*FREN*	13193	0.112	0.316	0	0	0	0	1
51	*GERM*	13193	0.353	0.478	0	0	0	1	1
52	*SCAN*	13193	0.039	0.194	0	0	0	0	1
53	*ENGL*	13193	0.496	0.5	0	0	0	1	1
54	*POP65*	13193	17.305	5.214	1.085	15.808	16.875	19.626	27.576
55	*DENS*	13193	768.678	2007.572	3.249	35.766	122.338	347.073	7952.998
56	*URBAN*	13193	81.006	12.576	34.03	80.444	82.256	87.431	100
57	*MIGR*	13193	2.483	2.523	-4.5	0	2.5	3.9	13.1
58	*BEDS*	13193	4.924	3.602	0.6	2.8	2.9	4.891	13.4
59	*HEXP%*	13193	11.084	4.028	2.899	9.17	10.936	12.346	17.061
60	*HEXPC*	13193	5475.147	3126.457	160.558	4269.958	4563.457	8216.958	10246.14
61	*NURSE*	13193	8.684	3.238	0.24	8.288	8.55	11.518	18.125
62	*PHYS*	13193	2.65	0.93	0.727	2.4	2.595	2.806	5.4
63	*LIFE*	13193	80.524	3.445	63.857	78.539	81.356	82.812	84.934
64	*RESP*	13193	71.03	15.61	17.3	58.4	70.8	81.5	100
65	*HEALTH*	13193	87.837	9.468	37.6	88.7	89.5	93.8	96.6
66	*UHC*	13193	82.51	5.103	45	83	84	84	89
	Panel D: Government Policy Responses								
67	*STRIND*	13193	18.675	21.281	0	1.589	11.11	32.357	90.756
68	*SCHOOL*	13193	0.741	1.211	0	0	0	1	3
69	*WORK*	13193	0.384	0.843	0	0	0	0	3
70	*PUBEVEN*	13193	0.515	0.795	0	0	0	1	2
71	*GATHER*	13193	0.242	0.876	0	0	0	0	4
72	*PUBTRANS*	13193	0.137	0.457	0	0	0	0	2
74	*DOMTRAV*	13193	0.247	0.559	0	0	0	0	2
73	*STAYATHM*	13193	0.171	0.495	0	0	0	0	2.571
75	*INTERTRAV*	13193	1.208	1.197	0	0	1	2	4
76	*PUBCAMP*	13193	0.932	0.945	0	0	0.571	2	2
77	*TESTPOLI*	13193	0.836	0.797	0	0	1	1	3
78	*CONTTRAC*	13193	0.964	0.734	0	0	1	1.714	2
79	*INCOMSUP*	13193	0.069	0.284	0	0	0	0	2
80	*DEBTREL*	13193	0.101	0.403	0	0	0	0	2

Table A5. *Results from the Elastic Net and Single-Interaction FM Regression*

This table presents the results of two preliminary steps used to preselect important variables: the Elastic net machine learning tool and single-interaction FM regression. Both methods use weekly data from January 6 to March 23, 2020 for 1,201 tourism companies from 52 countries. Each input variable is multiplied by the *ΔCOVID-19* variable. Calculations for both Elastic net and single-interaction FM regressions include six additional control variables: book-to-market ratio (*BM*), 12-month asset growth (*AG*), return on equity *(ROE*), log-market value (*MV*), stock market beta (*BETA*), and momentum (*MOM*). Coefficients calculated with Elastic net are presented in column 3, and *p*-values for the regression coefficients computed with the single-interaction FM regression are in column 4. Panel A presents firm characteristics and corresponds to the FM regression discussed in Section 5.2 and visualized in Table 1. Panel B presents country characteristics and corresponds to the FM regression described in Section 5.3 and visualized in Table 2. Panel C presents government policy responses and corresponds to the FM regression described in Section 5.4 and visualized in Table 3. Descriptions of the variables and how they are calculated are provided in Tables A1, A2, and A3. Variables marked with a grey background are used in multiple-interaction FM regressions in Sections 5.2 – 5.5.

No.	Characteristic Symbol	Elastic Net coefficients	FM regression coefficient *p*-values
	Panel A: Firm Characteristics		
1	*DY x ΔCOVID-19*	-19.065	0.319
2	*EBEV x ΔCOVID-19*	7.935	0.007
3	*FEP x ΔCOVID-19*	37.756	0.061
4	*CP x ΔCOVID-19*	0.912	0.097
5	*EP x ΔCOVID-19*	-28.334	0.751
6	*BM x ΔCOVID-19*	0.340	0.134
7	*CA x ΔCOVID-19*	-1.724	0.677
8	*AG x ΔCOVID-19*	-1.461	0.026
9	*ROA x ΔCOVID-19*	8.226	0.228
10	*ROE x ΔCOVID-19*	1.106	0.243
11	*ROS x ΔCOVID-19*	-3.402	0.189
12	*MOM x ΔCOVID-19*	1.075	0.401
13	*MV x ΔCOVID-19*	0.307	0.497
14	*REV x ΔCOVID-19*	-0.703	0.059
15	*TURN x ΔCOVID-19*	0.312	0.483
16	*IVOL x ΔCOVID-19*	-49.941	0.93
17	*BETA x ΔCOVID-19*	-1.397	0.091
18	*INTCOV x ΔCOVID-19*	0.026	0.976
19	*LEV x ΔCOVID-19*	-1.521	0.008
20	*AIRLINES x ΔCOVID-19*	-0.070	0.089
21	*CAS&GAM x ΔCOVID-19*	-1.213	0.091
22	*HOT&MOT x ΔCOVID-19*	0.000	0.148
23	*RECRSERV x ΔCOVID-19*	0.368	0.385
24	*RES&BAR x ΔCOVID-19*	-0.166	0.528
25	*TR&TOUR x ΔCOVID-19*	0.202	0.723
	Panel B: Country Characteristics		
26	*CON x ΔCOVID-19*	-23.391	0.036
27	*TRAV x ΔCOVID-19*	5.564	0.007
28	*GDPG x ΔCOVID-19*	-0.221	0.156
29	*EXP x ΔCOVID-19*	0.000	0.152
30	*UNEM x ΔCOVID-19*	0.000	0.060
31	*INF18 x ΔCOVID-19*	0.000	0.589
32	*INF19 x ΔCOVID-19*	-0.595	0.108
33	*TOUR% x ΔCOVID-19*	0.000	0.009
34	*TRADE x ΔCOVID-19*	0.000	0.091
35	*CRED x ΔCOVID-19*	0.000	0.121
36	*RTNG x ΔCOVID-19*	0.435	0.270
37	*RF x ΔCOVID-19*	-22.222	0.228
38	*POWDIST x ΔCOVID-19*	-0.084	0.079
39	*INDIV x ΔCOVID-19*	0.003	0.002
40	*MASC x ΔCOVID-19*	-0.156	0.140
41	*UNCAV x ΔCOVID-19*	-0.036	0.091
42	*LTOR x ΔCOVID-19*	0.097	0.460
43	*ACCOUN x ΔCOVID-19*	-11.240	0.023
44	*POLSTAB x ΔCOVID-19*	0.162	0.122
45	*GOVEFF x ΔCOVID-19*	0.000	0.568
46	*REQUAL x ΔCOVID-19*	0.000	0.004
47	*RULELAW x ΔCOVID-19*	0.000	0.908
48	*CORRUPT x ΔCOVID-19*	3.131	0.991

49	*FREN x ΔCOVID-19*	0.000	0.533
50	*GERM x ΔCOVID-19*	3.558	0.142
51	*SCAN x ΔCOVID-19*	-5.407	0.263
52	*ENGL x ΔCOVID-19*	-2.357	0.148
53	*POP65 x ΔCOVID-19*	0.816	0.882
54	*DENS x ΔCOVID-19*	0.000	0.314
55	*URBAN x ΔCOVID-19*	0.000	0.334
56	*MIGR x ΔCOVID-19*	-0.588	0.549
57	*BEDS x ΔCOVID-19*	-1.398	0.651
58	*HEXP% x ΔCOVID-19*	0.000	0.636
59	*HEXPC x ΔCOVID-19*	0.001	0.754
60	*NURSE x ΔCOVID-19*	0.000	0.503
61	*PHYS x ΔCOVID-19*	0.000	0.044
62	*LIFE x ΔCOVID-19*	0.000	0.772
63	*RESP x ΔCOVID-19*	-0.030	0.109
64	*HEALTH x ΔCOVID-19*	0.000	0.084
65	*UHC x ΔCOVID-19*	0.000	0.025
	Panel C: Government Policy Responses		
66	*STRIND x ΔCOVID-19*	0.000	0.749
67	*SCHOOL x ΔCOVID-19*	1.079	0.038
68	*WORK x ΔCOVID-19*	0.902	0.032
69	*PUBEVEN x ΔCOVID-19*	-3.226	0.044
70	*GATHER x ΔCOVID-19*	1.422	0.005
71	*PUBTRANS x ΔCOVID-19*	-1.153	0.099
72	*DOMTRAV x ΔCOVID-19*	1.099	0.015
74	*STAYATHM x ΔCOVID-19*	-4.234	0.017
73	*INTERTRAV x ΔCOVID-19*	1.416	0.056
75	*PUBCAMP x ΔCOVID-19*	2.943	0.286
76	*TESTPOLI x ΔCOVID-19*	0.510	0.724
77	*CONTTRAC x ΔCOVID-19*	0.556	0.126
78	*INCOMSUP x ΔCOVID-19*	1.139	0.076
79	*DEBTREL x ΔCOVID-19*	4.325	0.163

Appendix B. Detailed Model Specification

We implement Elastic net with the following objective function:

$$\min_{\delta_0 \beta} \left[\frac{1}{2it} \sum_{i=1}^{N} \sum_{t=1}^{T} \left(r_{i,t} - \delta_0 - \delta_1 \Delta COVID19_{c,t} - \gamma_1 CAR_{i,t-1}^{T} \times \Delta COVID19_{c,t} - \gamma_2 CAR_{c,t-1}^{T} \times \Delta COVID19_{c,t} - \gamma_3 CON_{i,t-1}^{T} \right)^2 + \lambda P_\alpha(\beta) \right] \quad (1)$$

where

$$P_\alpha(\beta) = \sum_{j=1}^{p} \left[\frac{1}{2} (1-\alpha) \beta_j^2 + \alpha \left| \beta_j \right| \right] \quad (2)$$

is the Elastic net penalty (Zou & Hastie, 2005). In equations (2) and (3), β is the vector of all regression coefficients from equation (1) and P_α is a compromise between the penalty for ridge-regression ($\alpha = 0$) and the penalty for the lasso ($\alpha = 1$). The Elastic net requires two parameters for its regularization: α and λ. We tune these parameters with cross validation using the out-of-the-sample approach (Friedman et al., 2010).

The first step in the two-step FM regression (Fama & MacBeth, 1973) is to run a cross-sectional regression of the dependent variable $r_{i,t}$ on all predictor variables $X_{i,t}$ in every week t:

$$r_{i,t} = \delta_{0,t} + \delta_{1,t} \Delta COVID19_{c,t} + \gamma_{1,t}\, CAR_{i,t-1}^{T} \times \Delta COVID19_{c,t} + \gamma_{2,t} CAR_{c,t-1}^{T} \times \Delta COVID19_{c,t} + \gamma_{3,t} CON_{i,t-1}^{T} + \epsilon_{i,t} \quad (3)$$

The result is a time series of intercept $\delta_{0,t}$ and slope coefficients $\delta_{1,t}, \delta_{2,t}$, etc.

The second step is to compute the time-series averages of the periodic cross-sectional regression coefficients and other regression results (adjusted R-squared and number of firms). When calculating averages, we verify if the coefficients are statistically different than zero. We calculate standard errors with adjustment following Newey and West (1987). Instead of using a simple *t*-test to examine whether the mean of the coefficients is equal to zero, we regress the coefficients' time series on a unit constant. Regression residuals capture the time-series variation of coefficients and thus coefficients' autocorrelation and heteroscedasticity. Finally, we calculate the adjusted regression standard errors.

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