

Corporate Resilience and Response During COVID-19

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Abstract

During a market collapse, it is strategically important for a company to be evaluated as resilient, thereby maintaining trust among investors. We study whether during the 2020 COVID-19 induced market crash, investors differentiate across companies based on a firm's human capital, supply chain and operating crisis response. Using data derived from natural language processing of news around corporate responses to the coronavirus crisis, we find that companies with more positive sentiment exhibit higher institutional investor money flows and less negative returns than their competitors. This is especially true for companies with more salient responses.

Keywords: human capital; supply chain; crisis management; operations; investor behavior; ESG; COVID-19

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1. Introduction

The coronavirus pandemic of 2020 took the world by storm, impacting economies globally. For the first quarter of 2020, the countries struggled to keep up with the rapid spread and economic impact of the coronavirus. A month after the World Health Organization (WHO) fielded the first reports of pneumonia from an unknown cause in China, the coronavirus was declared a public health emergency by the end of January 2020, with 9,826 confirmed cases in 19 countries.¹ Quickly defined, the novel coronavirus (now referred to as COVID-19) is an acute infectious respiratory disease mainly transmitted through contact with respiratory droplets. By February 19th the WTO reported 2,009 deaths, 75,204 confirmed cases in 25 countries and, noted a startling 1,872 new cases from the previous day.²

To prevent, or at least mitigate, the spread of COVID-19, many governments mandated social distancing and instituted severe travel restrictions including quarantines. This had an immediate impact on the labor force for many industries. The healthcare industry experienced a surge in demand, providing an uptick for scalable solutions like telemedicine, while imposing extreme stress on emergency services' labor and associated materials. In transportation, airlines industries experienced unprecedented shock from a sudden 38% decline in revenues year on year with flights down 70%, putting a strain on the cash strapped industry where many firms do not have three months of cash to cover expenses.³ Various industries, beyond just transportation, were impacted, leading to massive layoffs that only compounded issues for many businesses. The World Trade Organization (WTO) encouraged a rollback of tariffs for the remainder of the year that might hinder the transfer of medical-related equipment, supplies and materials. While this effort helped

¹ "Novel Coronavirus (2019-nCoV) Situation Report – 11," World Health Organization. January 31, 2020.

² "Coronavirus disease 2019 (COVID-19) Situation Report – 20," World Health Organization. February 19, 2020.

³ "COVID-19 Updated Impact Assessment," IATA. March 24, 2020; COVID-19 Wider economic impact from air transport," IATA. April 7, 2020.

healthcare systems fight the pandemic, by mid-February the WTO reported that global trade was well below the baseline and anticipated this trend to continue through early 2020.⁴ After the S&P500 reached record highs on February 19th, the market observed the largest one-week declines since the 2008 financial crisis, followed by the US Federal reserve cutting rates to close to zero. These events led to highly volatile markets in March that coincided with an oil price war between Russia and OPEC, further disrupting sectors across the market.⁵

We study the association between corporate responses we see as plausibly important during this crisis, specifically related to labor practices, supply chain and operations, to determine whether companies with more positive sentiment around their response to the crisis experienced higher institutional money flows and less negative returns during the coronavirus pandemic. We define the analysis period from market high of 3,373 on February 20th compared to market low of 2,447 on March 23rd, where the S&P500 experienced a 27% drawdown. We acknowledge that at the time of this paper, the coronavirus has not yet been contained globally and markets are still in flux. In an effort to quickly understand this market volatility, we scoped our study to shed light on an active and evolving crisis. Given the impact on supply chains and labor, we focus on these characteristics as likely central drivers of investor behavior and stock returns during this period, as well as the idiosyncratic firm response to COVID-19 through changing operations to provide solutions.

We use as measures for how companies responded to the crisis, big data from natural language processing that measures how positive versus negative is public sentiment on those corporate responses (Serafeim 2020). Our hypothesis is that firms with more positive public sentiment for the way they respond to the COVID-19 crisis and their effects on employees,

⁴ “Goods barometer signals further weakening of trade in first quarter of 2020,” World Trade Organization. February 17, 2020.

⁵ Removing from our analysis companies from the energy sector leaves all our results unchanged.

suppliers and broader society will experience higher institutional money flows and outperform their counterparts during the market collapse. Our study is the first to provide evidence on the relation of corporate responses during the COVID-19 crisis, but it builds on a limited but growing literature that examines corporate actions during sharp market declines, such as during the financial crisis (Flammer and Ioannou 2018).

Accounting for other factors, such as firm size, profitability, dividend yield, valuation ratios and the industry that a firm operates, our results suggest that, during the market collapse, firms with more positive sentiment of their labor, supply chain and operating response to COVID-19 crisis had higher institutional money flows and less negative returns. These effects were stronger for firms that received more coverage from news outlets (media, blogs, industry publications etc.) consistent with more attention on these responses being associated with more significant investor and market response. We note that we lack a natural experiment which would allow us to attribute causality to our results. However, we view these associations as instructive of which types of organizations were likely evaluated as more resilient during the market collapse. Moreover, the contingent effect of those corporate responses based on their salience increases confidence in the robustness of the results.

2. Background and Motivation

The spread of COVID-19 and the associated health and economic pain saw governments take unprecedented measures to stabilize the economy. At the same time, company practices and efforts came into the spotlight. Significant emphasis was placed on labor practices, such as paid sick leave, lay-offs or hiring of workers, in large corporate employers such as Walmart, Home Depot and UPS. Another issue that was emphasized was repurposing operations and skills to create much needed products (e.g. masks and ventilators) by companies, such as General Motors, Ford, GE and

3M. A third topic of wide discussion became the exposure to global supply chains that were disrupted as economies were closing down and workers were at risk of getting infected because of lack of protective equipment and appropriate distancing policies leading to production halts and shortages.⁶

Our hypothesis is that more positive public sentiment around corporate responses to the COVID-19 crisis will mitigate investor distrust during the market collapse. During a period of volatility and crisis, how a company responds could increase investor confidence and make the company more resilient to the market shock. Of course, not all responses are likely to be important within the context of COVID-19. As we discussed above, employment and supply chain practices are likely to be focal areas. In addition, the way that companies are repositioning their operations and products will likely be important considerations.

We posit that firms with more positive sentiment around their employment practices might experience higher flows and less negative returns during the market collapse. Avoiding lay-offs, providing flexible work schedule and paid sick leave could all allow the firm to be more resilient in the face of adversity as they might be able to maintain high employee productivity while mitigating costs by avoiding employee churn (Eccles, Ioannou and Serafeim 2014). Similarly, those companies with well managed logistics, procurement and significant transparency into their supply chain, might be able to respond more quickly adapting their supply chain to avoid costly production halts (Freeman 2010). Finally, companies that divert their research and development (R&D) or production efforts to create vaccines or shift manufacturing to produce test kits, ventilators, sanitizer, or other crisis-specific services or products might signal an ability to be agile and innovative thereby finding new ways to satisfy emerging demands. For the above reasons, we

⁶ Just Capital has been tracking corporate responses of the largest corporate employers [here](#).

expect firms that exhibit more positive sentiment around their human capital, supply chain and operational crisis response might earn investor confidence, thereby experiencing higher institutional money flows and less negative returns during the market crisis.⁷

However, this hypothesis entails significant tension. In a time of crisis, the usual managerial response is to implement practices that are likely to cut as many costs as possible. In turn, this leads to significant costs for suppliers, customers and the broader society (Flammer and Ioannou 2018). Therefore, it could be that investors might see responses that harm stakeholders as necessary for corporate survival and the absence of these efforts as detrimental to the long-term success of the organization in a competitive market (Shleifer 2004). In this scenario, firms with more positive sentiment around their response might see lower institutional money flows and more negative returns.

We view flows and returns as two complementary measures. The first directly measures investor behavior and preferences collectively among institutional investors. The second measures investor preferences as reflected in returns and therefore market prices. We do not assume that flows might be necessarily influencing returns, although they could (Froot, O'Connell and Seasholes, 2001). In other words, returns might be associated with these responses even in the absence of any relation to flows, and vice versa. Analyzing both variables allow us to derive a more holistic understanding of investor and market behavior. Therefore, our goal is to provide novel insight on how investors react during the market collapse and whether they differentiate their response across companies based on their supply chain, human capital and operational crisis response. We acknowledge that at the time of this paper, the coronavirus has not yet been contained

⁷ In another market collapse, during the 2008-2009 financial crisis, firms with high social capital, measured as corporate social responsibility (CSR) intensity, experienced better returns (Lins, Servaes and Tamayo 2017).

globally and markets are still in flux. In an effort to quickly understand this market volatility, we scoped our study to shed light on an active and evolving crisis.

3. Data and Sample

We use sentiment data, market data and State Street's proprietary flows data to understand drivers of returns during an extreme period in the COVID-19 crisis. Due to the data collection, construction and coverage, these datasets allow us to shed light on key characteristics during a volatile market period.

3.1 ESG Sentiment Data

We use Truvalue Labs environmental, social and governance (ESG) data, which applies machine learning and natural language processing in eleven languages to assess sentiment across thousands of news sources, such as traditional media, blogs and industry publications. Truvalue Labs sources big data from a series of vetted outlets to improve the credibility and accuracy of processed information. For a longer discussion of the Truvalue Labs data we refer the interested reader to prior literature (Serafeim 2020).

For the purposes of this study, we focus on the sentiment scores that specifically identify when COVID-19 is being discussed in relation to companies within unstructured text.⁸ Truvalue Labs scores how positive or negative the COVID-19 content tone is within each article and provides sentiment measures for each week starting beginning of January 2020. For example, news that speak about layoffs or absence of sick paid are usually accompanied by negative commentary thereby receiving negative sentiment scores. In contrast, news that pertain to avoiding layoffs or

⁸ For more information on Truvalue Labs COVID-19 dataset see [here](#).

keeping workers safe tend to receive positive commentary and thereby positive sentiment scores.⁹ Because of the lack of relevant data in the first few weeks, we use data for the period between February 12th and March 24th, when COVID-19 became an important topic of conversation. We construct a firm-level measure over the period of study by calculating separately the median value of Human Capital, Supply Chain and Operations sentiment for a given firm across the six weeks.¹⁰

3.2 Institutional Flows Data

We observe stock level active flows and holdings from a large group of institutional investors represented in the anonymized custodial data provided by State Street Corporation. State Street Corporation is one of the largest custodians in the world with more than \$34 trillion in assets under custody, as of February 2020. Total institutional flows are composed of benchmark flows by investors, who add or remove cash from funds, and active flows by portfolio managers, who purchase or sell individual securities with fund deposits. We define benchmark inflows and outflows, following industry practice, as shares that would have been purchased if the portfolio manager had used those flows to purchase the fund's benchmark. Active flows represent the difference between observed and benchmark flows and can be thought of as conviction bets driven by portfolio manager decisions to deviate from benchmarks. We focus on active flows based on evidence of impact on price, persistence of institutional flows and, their relationship with future returns found in previous studies (Froot, O'Connell and Seasholes, 2001; Froot and Teo 2008;

⁹ Sentiment scores are scaled to vary from -20 to +20.

¹⁰ Truvalue Labs provides two more measures labeled Economy and Social Impact. We have not included those metrics in our analysis because they are less tightly defined and therefore it is not clear what they are measuring exactly when it comes to how companies respond. We find a marginally significant positive association between Economy and flows. The interaction term with News Saliency is not significant. Both the base and interaction terms are not significant for Social Impact when the dependent variable is flows. Both Economy and Social Impact are significantly associated with stock returns. The interaction term with News Saliency is significant for Economy but not for Social Impact.

Froot et al. 2014). Stock-level active flows are measured as a percentage of total equity assets under management.

3.3 Market Data

We use prices, security features, and (free-float) market capitalizations from the MSCI's ACWI IMI universe, and classify industries and sectors in line with the Global Industry Classification Standard (GICS). Returns are calculated in USD.

3.4 Sample

Our sample covers US listed equities with a market capitalization of at least \$1 billion USD as of January 1, 2020. The sample includes the intersection of the datasets provided by Truvalue Labs, MSCI and State Street Corporation. We use twenty-day lagged flows, lagged returns and lagged holdings before and including February 19th, 2020 to study the period from February 20th, 2020 through March 23rd, 2020. On average, the 1,005 firms in our sample had a market cap of \$29 billion dollars on February 19th, ROE at 15.1%, price-to-earnings of 26.8, book-to-market of 0.46, and dividend yield at 1.6%. The sample represented \$29 trillion USD in market value, suggesting that our analysis represents a sample representative of the US listed firm universe.

4. Research Design

Given that the corporate response measures (Supply Chain "SC", Human Capital "HC" and Operations "OP"), as well as, the flows and return variables could systematically vary across industries, we first industry-demean scores within the observations pertaining to each of the variables using a six-digit GICS industry code. Therefore, estimates are derived from within industry, rather than across industry, differences. To allow the reader to more easily interpret the coefficients we z-score each variable. We then measure the relationship between these response measures and both crisis flows and returns, which are cumulated from at the market peak on February 20th through the

trough March 23rd, to determine if institutional flows or realized returns bear a systematic relationship to corporate responses.

Each cross-sectional ordinary least squares regression (where the dependent variables are crisis flows and crisis returns, respectively) is conducted with a set of control variables including: dividend yield, earnings-to-price ratio, book-to-market, market capitalization and return on equity alongside lagged flows, lagged returns, and lagged holdings.¹¹ We control for lagged returns, holdings and momentum as they have been found to correlate with future flows (Froot, O’Connell and Seasholes, 2001). We expect larger, more profitable and higher dividend yield stocks to have higher flows and returns during a market collapse as investors might view them as less risky. The two valuation ratios, earnings-to-price ratio and book-to-market, control for differences in the growth potential and risk of different firms as investors might shift towards ‘value’ stocks during a crisis.

Stock Level Flows (or Returns) _i

$$\begin{aligned}
 &= \alpha + \beta_1 \text{ESG Characteristic}(\text{HC}, \text{SC or OP})_i + \beta_2 \text{Lagged Flows}_i \\
 &+ \beta_3 \text{Lagged Returns}_i + \beta_4 \text{Lagged Holdings}_i + \beta_5 \text{ROE}_i + \beta_6 \text{E/P}_i + \beta_7 \text{BTM}_i \\
 &+ \beta_8 \text{Momentum}_i + \beta_9 \text{Dividend Yield}_i + \beta_{10} \text{Market Cap}_i + \varepsilon_i
 \end{aligned}$$

We also estimate models where we interact the response measures with a measure of the salience of the news, as more salient news on these topics might be more important for the focal organization. We measure News Salience, as the natural logarithm of one plus the ratio of COVID-19 specific documents that have been tagged over the company’s market capitalization in February 19th (the day before we start measuring our dependent variables). We divide number of documents by market capitalization, as larger firms have more documents and receive more attention. We log

¹¹ Standard errors are robust to heteroscedasticity. Clustering standard errors at the industry level leaves all inferences around statistical significance unchanged.

transform the variable to mitigate skewness. Then we z-score this variable, as with all other variables.

$$\begin{aligned}
 & \text{Stock Level Flows (or Returns)}_i \\
 & = \alpha + \beta_1 \text{ESG Characteristic(HC, SC or OP)}_i \\
 & \quad + \beta_2 \text{ESG Characteristic(HC, SC or OP)}_i \times \text{News Saliency}_i \\
 & \quad + \beta_3 \text{News Saliency}_i + \beta_4 \text{Lagged Flows}_i + \beta_5 \text{Lagged Returns}_i \\
 & \quad + \beta_6 \text{Lagged Holdings}_i + \beta_7 \text{ROE}_i + \beta_8 E/P_i + \beta_9 \text{BTM}_i + \beta_{10} \text{Momentum}_i \\
 & \quad + \beta_{11} \text{Dividend Yield}_i + \beta_{12} \text{Market Cap}_i + \varepsilon_i
 \end{aligned}$$

5. Results

Table 1 presents univariate correlations across all variables. Of note, we observe significant positive correlations between Crisis Flows and Lagged Flows (35.7%), consistent with flows exhibiting persistence over time (Froot, O’Connell and Seasholes, 2001). There is also significant positive correlation between Supply Chain and Human Capital (32.5%) indicating that companies with positive public sentiment on supply chain issues have positive public sentiment on employee treatment (paid sick leave, commitments to no or limited layoffs, etc.). Operations also exhibits significant positive correlations with Supply Chain (23.4%) and Human Capital (29.6%). We observe significant negative correlation between both Supply Chain and Human Capital to our News Saliency measure, -20.5% and -20.4% respectively, as well as with Operations (-14.5%). This suggests that news articles on firms’ supply chain, human capital and operational crisis response issues generally had a negative tone and garnered more attention during this period. All three response measures exhibit a negative correlation with market capitalization ranging from -12.1% to -7.4%.

Table 1: Correlation Across All Variables

	Crisis Flows	Crisis Returns	Supply Chain	Human Capital	Operations	Lagged Flows	Lagged Returns	Lagged Holdings	Market Cap	ROE	E/P	BTM	Momentum	Dividend Yield
Crisis Returns	4.2%													
Supply Chain	-1.0%	7.4%												
Human Capital	1.6%	7.5%	32.5%											
Operations	3.8%	1.0%	23.4%	29.6%										
Lagged Flows	35.7%	3.3%	0.9%	4.1%	2.3%									
Lagged Returns	6.3%	7.0%	-3.0%	6.8%	-2.8%	3.2%								
Lagged Holdings	2.6%	4.4%	-0.3%	2.7%	9.0%	6.6%	20.5%							
Market Cap	-1.9%	10.2%	-12.1%	-7.9%	-7.4%	-0.3%	6.3%	7.4%						
ROE	0.1%	8.0%	0.2%	1.2%	-0.7%	-8.2%	0.0%	-1.7%	6.9%					
E/P	-0.6%	10.1%	-1.7%	1.7%	1.8%	-1.6%	-5.1%	4.9%	2.8%	18.1%				
BTM	-0.3%	-2.6%	6.0%	3.8%	2.0%	0.9%	-8.3%	-23.0%	-9.1%	-10.3%	-23.6%			
Momentum	-0.5%	1.7%	-2.7%	-1.9%	-0.1%	-1.7%	15.0%	30.4%	10.9%	4.9%	-2.7%	-24.5%		
Dividend Yield	-6.0%	1.0%	-1.6%	-3.8%	1.0%	-1.4%	-12.0%	-8.2%	4.1%	2.4%	10.2%	-1.6%	-13.7%	
News Saliency	-0.5%	-3.8%	-20.5%	-20.4%	-14.8%	1.5%	-4.9%	-5.8%	1.0%	-1.9%	-0.4%	16.5%	-11.3%	3.6%

Table 1 presents the univariate correlations across all variables. Statistically significant correlations at a 5% level are indicated in bold. All variables are defined in the Appendix. Source: State Street Global Markets, Truvalue Labs and MSCI fundamentals.

The firm level regression results for crisis flows are presented in Table 2. For the model without the interaction term of News Saliency, Human Capital, Supply Chain and Operations response measures do not exhibit significant relations with flows. Consistent with prior research, both past flows and returns are significantly and positively associated with flows. We test if the relation between each of the response variables and flows, conditional on the saliency of the news. It could be that the relation might be much stronger when the news is much more salient. In those cases, investors might be more likely to trade in line with the observed sentiment, as the saliency of the news might reflect their importance for the company.

The coefficients on the interaction term with both Human Capital and Supply Chain are positive and significant. Companies with more positive sentiment around Human Capital and Supply Chain practices, especially when those receive significant attention, experience higher flows during the market collapse. A firm's operating response is still not significantly related with flows.

Table 2: Flows Regression: Dependent Variable Industry-Demeaned Flows

Model	Supply Chain		Human Capital		Operations		
	Without interaction	With interaction	Without interaction	With interaction	Without interaction	With interaction	
ESG Characteristic	Coefficient	-0.02	-0.01	-0.01	0.00	0.03	0.03
	t-stat	-0.55	-0.33	-0.23	-0.18	1.26	0.95
ESG Characteristic *							
News Salienc	Coefficient		0.10		0.05		0.04
	t-stat		2.82		2.07		1.37
News Salienc	Coefficient		0.00		0.00		0.00
	t-stat		0.14		-0.01		0.05
Lagged Flows	Coefficient	0.36	0.36	0.36	0.36	0.36	0.36
	t-stat	3.42	3.39	3.42	3.40	3.42	3.44
Lagged Returns	Coefficient	0.05	0.05	0.05	0.05	0.05	0.05
	t-stat	2.09	2.09	2.11	2.03	2.17	2.19
Lagged Holdings	Coefficient	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	t-stat	-0.34	-0.28	-0.35	-0.35	-0.52	-0.48
Market Cap	Coefficient	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02
	t-stat	-0.21	-0.21	-0.20	-0.22	-0.17	-0.18
ROE	Coefficient	0.03	0.03	0.03	0.03	0.03	0.03
	t-stat	1.14	1.01	1.14	1.09	1.14	1.15
E/P	Coefficient	0.00	0.00	0.00	0.00	0.00	0.00
	t-stat	0.05	0.32	0.07	0.07	0.02	-0.04
BTM	Coefficient	0.00	-0.01	-0.01	-0.01	-0.01	-0.01
	t-stat	-0.29	-0.41	-0.32	-0.36	-0.41	-0.33
Momentum	Coefficient	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	t-stat	-0.61	-0.59	-0.61	-0.60	-0.59	-0.55
Dividend Yield	Coefficient	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05
	t-stat	-2.01	-1.76	-2.02	-1.99	-2.04	-1.96
N		1005	1005	1005	1005	1005	1005
Adjusted R-squared		12.6%	13.0%	12.5%	12.6%	12.6%	12.6%

Table 2 presents estimates from OLS specifications. Dependent variable is the industry demeaned by GICS six-digit code institutional investor money flows between February 20th 2020 and March 23rd 2020. All variables are defined in the Appendix. Source: State Street Global Markets, Truvalue Labs and MSCI fundamentals.

Table 3 presents the results of similar models but now the dependent variable is stock returns instead of flows. For the model without the interaction term of News Salienc, we observe

that the coefficients on Human Capital and Supply Chain are both positive and significant. Again, the coefficient on Operations is not significant. Larger and more profitable firms had less negative returns, as reflected in the positive and significant coefficients on market capitalization and ROE. Given all coefficients can be interpreted as the increase in standard deviation of the dependent variable for a one standard deviation increase in an independent variable, the magnitude of the coefficients on Human Capital and Supply Chain are in the range of those on firm size and profitability. One standard deviation increase in the Supply Chain or Human Capital measures would translate in about 2% or 1.5%, respectively, higher stock returns during the sample period.

When we add the interaction terms between News Salience and the response measures, as hypothesized, all three interaction terms are positive and significant. The strongest one, in terms of statistical significance, is on Human Capital, followed by Operations and then Supply Chain. The economic effects when the News Salience measure increases by one standard deviation roughly double the economic effect of Supply Chain and Human Capital. For companies where their crises responses receive significant attention, one standard deviation increase in the Supply Chain or Human Capital measures would translate in about 3.6%, respectively, higher stock returns during the sample period.

The asymmetry between the insignificant results for flows but the presence of significant results for returns for the specifications without interaction terms is interesting. It appears that although markets evaluate as value relevant these responses, institutional money are not moving in the same direction. This raises the possibility that institutional investors were collectively responsive when the corporate actions were salient and in the absence of those responses being salient there was more disagreement across institutional investors on the meaning of such responses.

Table 3: Returns Regressions: Dependent Variable Industry-Demeaned Returns

	Model	Supply Chain		Human Capital		Operations	
		Without Interaction	With Interaction	Without Interaction	With Interaction	Without Interaction	With Interaction
ESG Characteristic	Coefficient	0.09	0.09	0.07	0.07	0.01	0.00
	t-stat	2.70	2.57	2.23	2.24	0.48	-0.05
ESG Characteristic *							
News Salience	Coefficient		0.07		0.09		0.07
	t-stat		1.66		2.76		1.99
News Salience	Coefficient		-0.01		-0.01		-0.03
	t-stat		-0.25		-0.28		-0.94
Lagged Flows	Coefficient	0.04	0.03	0.03	0.03	0.04	0.04
	t-stat	1.43	1.37	1.34	1.27	1.45	1.54
Lagged Returns	Coefficient	0.07	0.07	0.06	0.06	0.07	0.07
	t-stat	1.63	1.63	1.46	1.41	1.59	1.59
Lagged Holdings	Coefficient	0.02	0.02	0.02	0.02	0.02	0.02
	t-stat	0.55	0.57	0.56	0.57	0.57	0.63
Market Cap	Coefficient	0.10	0.10	0.10	0.09	0.09	0.09
	t-stat	3.31	3.36	3.12	3.08	3.08	3.10
ROE	Coefficient	0.06	0.06	0.06	0.06	0.06	0.06
	t-stat	2.20	2.02	2.20	2.19	2.19	2.18
E/P	Coefficient	0.09	0.10	0.09	0.09	0.09	0.09
	t-stat	1.39	1.46	1.32	1.34	1.36	1.36
BTM	Coefficient	0.02	0.02	0.02	0.02	0.02	0.03
	t-stat	0.21	0.21	0.23	0.23	0.26	0.36
Momentum	Coefficient	0.00	0.00	0.00	0.00	0.00	0.00
	t-stat	-0.09	-0.10	-0.06	-0.08	-0.10	-0.12
Dividend Yield	Coefficient	0.01	0.01	0.01	0.01	0.01	0.01
	t-stat	0.17	0.28	0.19	0.23	0.13	0.22
N		1005	1005	1005	1005	1005	1005
Adjusted R-squared		2.8%	3.0%	2.6%	3.2%	2.1%	2.3%

Table 3 presents estimates from OLS specifications. Dependent variable is the industry demeaned by GICS six-digit code stock returns between February 20th 2020 and March 23rd 2020. All variables are defined in the Appendix. Source: State Street Global Markets, Truvalue Labs and MSCI fundamentals.

6. Conclusion

During a market crisis, investors are looking for evidence that a company can be resilient. In this paper we ask the question if during the COVID-19 market collapse investors exhibit more trust in companies and management teams that were likely to respond protecting its labor force, supply chain and repurposing operations to provide solutions to the crisis. To do so, we analyzed both institutional money flows and stock returns during the market collapse.

Our evidence indicates that companies with labor and supply chain practices that were seen as protecting employees and taking action to secure their supply chain experienced higher institutional money flows and less negative returns, especially when those practices were salient. A firm's operating crisis response had a less significant impact on investor behavior and stock market performance and, was only significant for stock returns in the presence of significant attention. The relatively weaker results for operating response could be explained by investors seeing such responses as idiosyncratic and not reflective of a company's resilience.

Collectively, our evidence provides the first evidence on investor behavior and market response during the COVID-19 induced market collapse, as a function of corporate crisis responses. We conclude with three key insights. First, the evidence challenges the notion that companies need adopt practices that hurt their employees because investors want them to do so. If that was the case one would expect exactly the opposite results. Second, the contingent relation of corporate responses with flows and returns based on the salience of the news suggests that both firm disclosure practices and news outlets have a significant role in how corporate responses could influence investor behavior and prices. Finally, the application of machine learning to big data of unstructured text represents a promising technology to measure corporate responses and associated crisis management efforts.

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Appendix

Human Capital (HC) = sentiment measure capturing a company's action (inaction) regarding layoffs, working from home, unemployment and related topics between February 12th and March 24th, 2020.

Supply Chain (SC) = sentiment measure capturing a company's action (inaction) regarding operational stoppages, production issues, supply of goods, etc. between February 12th and March 24th, 2020.

Operations (OP) = sentiment measure capturing a company's action (inaction) regarding any shift in a company's operations to produce in-demand products, materials and other crisis-specific products or services between February 12th and March 24th, 2020.

News Saliency = natural logarithm of one plus the number of COVID-19-specific documents tagged to a company relative to the company's market capitalization between February 12th and March 24th, 2020.

Dividend Yield = dividend per share over stock price as of February 19th, 2020.

Earnings-to-Price Ratio = earnings per share over stock price as of February 19th, 2020.

Book-to-Market = book over market value of equity as of February 19th, 2020.

Market Capitalization = market capitalization as of February 19th, 2020.

Return on Equity = net income over shareholder's equity as of February 19th, 2020.

Momentum = 12-month minus 1-month stock returns as of February 19th, 2020.

Crisis Flows = cumulated active institutional investor money flows between February 20th and March 23rd, 2020.

Crisis Returns = cumulated stock returns between February 20th and March 23rd, 2020.

Lagged Returns = cumulative 20-day lagged stock returns as of February 19th, 2020.

Lagged Flows = cumulative 20-day lagged active institutional investor money flows as of February 19th, 2020.

Lagged Holdings = excess institutional investor money holdings over market capitalization as of February 19th, 2020.