NHH

Norwegian School of Economics
Bergen, Spring 2021

Financial Flexibility and Social Distancing in the Face of Disaster

An empirical study on the US stock market during the COVID-19 pandemic

Ragnhild Elise Garte Nervold and Marius Jensen Øverli

Supervisor: Nils Friewald

Master thesis, Economics and Business Administration

Major in Financial Economics

NORWEGIAN SCHOOL OF ECONOMICS

Acknowledgements

We would like to thank our supervisor, Nils Friewald, for his valuable guidance and constructive feedback throughout the writing process. Further, we wish to express gratitude to friends and family for their patience and continuous encouragement throughout the writing of this thesis, and our studies at the Norwegian School of Economics.

Norwegian School of Economics

Bergen, June 2021

Ragnhild Elise Garte Nervold

Marius Jensen Øverli

Abstract

The objective of our study is to examine the mechanisms of the corporate balance sheet during the exogenous COVID-19 crisis. The Fama-MacBeth methodology is employed on the US stock market, controlling for industry and common market risk factors. We argue that financially flexible firms, i.e. firms with more cash and less debt, should have less risk and be better shaped than their inflexible counterparts to fund a revenue shortfall. We find that financially flexible firms have 12.4% higher returns than inflexible firms when using book leverage, and 20.5% when using market leverage. The higher returns correspond to a 23.2% and 38.4% lower stock price reduction for the flexible firm, dependent on debt metrics. We document that the return gap between financially flexible and inflexible firms remains fairly constant throughout the market recovery, and hence that our results can not be due to the increased elasticity of equity. We argue that market leverage is a better overall measurement of debt capacity and firm risk. When addressing industry exposure to COVID-19, we claim that the importance of financial flexibility should be magnified (reduced) for firms with high (low) fundamental exposure. We do not find that resilient firms benefit less from financial flexibility. Exposed firms gain from higher cash holdings prior to the stock market crash. This effect seems to be reversed after the FEDs market intervention on March 23rd, although the results are ambiguous. Market leverage suggests no magnified effect from debt for exposed firms. However, again our metrics provide conflicting results. Also here we argue that market leverage is more in line with economic rationale.

Keywords – Asset Prices, Stock Returns, NYSE, NASDAQ, AMEX, Leverage, Debt, Cash, FED, COVID-19, Pandemic, Social Distancing.

Contents

List of Figures

List of Tables

1 Introduction

The COVID-19 pandemic is the first major exogenous shock, touching every corner of the world. The world could only watch as the real economic shock caused stock exchanges across the globe to plummet in the early stages of 2020, with the S&P 500 index setting a new record for the fastest 30% crash in history (Li, 2020). The index continued to fall more or less continuously from February 24th until March 23rd, the date the Federal Reserve Board (FED) announced major market interventions (Ramelli and Wagner, 2020). The announcement marked the turning point in the market, setting off an enormous growth period lasting throughout 2020. A uniqueness with COVID-19 is the big skewness in how it has impacted industries, with "disaster-resilient" companies yielding higher returns than non-resilient ones during the stock market crash. For instance, technology giants have outperformed the travelling industry by large, due to their resilient characteristics. Whereas Google had a market-adjusted return of 33% in the first quarter of 2020, United Airlines experienced a loss of -53% (Pagano et al., 2020).

The abrupt and exogenous nature of COVID-19 ensures that research results are not affected by any internal buildup within the financial systems or anticipation of a crisis. In this way, COVID-19 provides a unique opportunity to study the unbiased importance of the corporate balance sheet in times of crisis. A research paper that exploits this opportunity is written by Fahlenbrach et al. (2020). They study the effect of the corporate balance sheet during a sudden revenue stop. We base our study on the work of Fahlenbrach et al. (2020) and follow the same general approach.

The objective of our study is to investigate whether there is a causal relationship between corporate characteristics and stock returns. Using the definitions of Fahlenbrach et al. (2020), financially flexible firms are defined as firms that have cash holdings in the top quartile and leverage in the bottom quartile, while financially inflexible firms are firms that have cash holdings in the bottom quartile and leverage at the top quartile. To address the special trait of COVID-19 regarding industry differences, we investigate whether the effect is magnified (reduced) for firms with high (low) exposure to the pandemic. High exposure (low resilience) means that the industry is strongly affected by social distancing requirements and thus less able to continue business operations. Low exposure (high resilience) means that the industry is weakly affected.

We build on the work of Fahlenbrach et al. (2020) by employing the Fama-MacBeth (FMB) methodology. The advantage of the FMB-approach is that it corrects the estimates for cross-sectional correlation of the error term, yielding more accurate significance levels compared to the regular OLS (Cochrane, 2005). Another novelty is our implementation of market leverage, debt to total liabilities and market value of equity. Compared to book leverage we believe market leverage to be a more accurate representation of the true value of firm assets. Furthermore, we differentiate by implementing more distinct time periods based on specific events and remove small-capitalization stocks. To ensure that the balance sheets are unaffected, we require a stricter cut off for fiscal year-end. Regarding fundamental exposure to COVID-19, unlike Fahlenbrach et al. (2020), we implement indicator variables for both most resilient (low exposure) and exposed firms. This yields us the opportunity to not only analyse exposed, but also resilient firms.

Our empirical analysis reveals that financially flexible firms' stock price falls 23,2% less than inflexible firms within the same industry when using book leverage (metric one), the same measurement as Fahlenbrach et al. (2020). When using our new debt metric, market leverage (metric four), we instead find that the stock price of financially flexible firms fall 38,4% less, which states the greater economical importance of the metric. In line with Fahlenbrach et al. (2020), we find that the return gap appears to remain permanent after the stock market recovery. Similar to Fahlenbrach et al. (2020), we demonstrate that our results can not be explained by the leverage effect.

In line with Fahlenbrach et al. (2020), our results suggests that highly exposed firms gain additional value from cash holdings. However, we see this effect prior to and not during the stock market crash. The same effect detected in different time periods could be due to different definitions of time periods. We get some results suggesting that this effect is reversed after FEDs market intervention on March 23rd, but the results are inconclusive. Furthermore, we do not find a magnified effect between debt and exposed firms. Our new metric has economically intuitive signs, but lack statistical power. When using the original metric by Fahlenbrach et al. (2020), we find the counter-intuitive result that long-term debt is of less importance for exposed firms. We find weak indications that being classified as exposed in itself leads to lower stock returns in the Incubation. Regarding resilient firms, there are no results suggesting that they benefit less from financial flexibility. Furthermore, being classified as resilient in itself does not lead to higher stock returns. We claim that our new metric is a better representation of leverage and risk due to the increased magnitude and consistent economical intuition.

The purpose of our research is not to come up with some investment strategy or other financial advice, but to uncover the mechanisms of the corporate balance sheet during an unexpected economic shock. The relevance of our results is that some firms may choose to alter their composition of cash holdings, leverage, or other important aspects of their business model, to be more robust against future exogenous shocks (Gill, 2020) (DeAngelo and DeAngelo, 2009).

The remainder of the thesis is structured as follows: in Chapter 2 we provide documentation of main events during the pandemic and elaborate on the relevant literature in Chapter 3. Subsequently, we present an asset pricing framework and use it to develop testable hypotheses in Chapter 4. Chapter 5 presents and justifies the data before the methodology is explained in Chapter 6. Our results are presented in Chapter 7, followed by robustness tests in Chapter 8. Chapter 9 consists of limitations and further research. Finally, we provide our concluding remarks in Chapter 10.

2 The Course of COVID-19

"Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus" (WHO, 2020a). The virus started as a local outbreak in a wet market in Wuhan, China, and expanded globally in a matter of months (Ramelli and Wagner, 2020). Businesses all over the world were forced to shut down their operations instantly.

People infected by the virus will primarily have mild to moderate respiratory illness and recover without requiring special treatment. However, high age and/or underlying medical sicknesses such as cardiovascular disease, diabetes, chronic respiratory disease, and cancer are associated with a higher risk of developing serious illness and in the worst case death. The best tools to prevent and slow down transmission are information about the virus, the disease it causes, and how it spreads. The COVID-19 virus expands first and foremost through droplets of saliva or discharge from the nose of an infected individual. Thus washing or disinfecting your hands as well as proper respiratory etiquette are important precautions (WHO, 2020a).

We will now present a timeline of key events and the evolution of investor attention to COVID-19 as the crisis unfolded. On December 31st, 2019, the World Health Organization (WHO) was informed of cases of pneumonia of unknown etiology detected in the city of Wuhan. The following day, Chinese health authorities closed down the Huanan Seafood wholesale market for environmental sanitation and disinfection, as there were indications pointing at the wet market as the source of the virus (WHO, 2020b). Soon news about a potentially new and dangerous virus in Wuhan started to spread also outside of China. For instance, Hong Kong began screening passengers on trains that were passing Wuhuan, and the US Centers for Disease Control and Prevention issued advice for travelers in Wuhan to avoid animals, animal markets, and interaction with ill people. On January 20th, Chinese health authorities reported findings of the first human-to-human transmission. Already the next day, the WHO presented the first situation report on the outbreak of COVID-19 (Ramelli and Wagner, 2020).

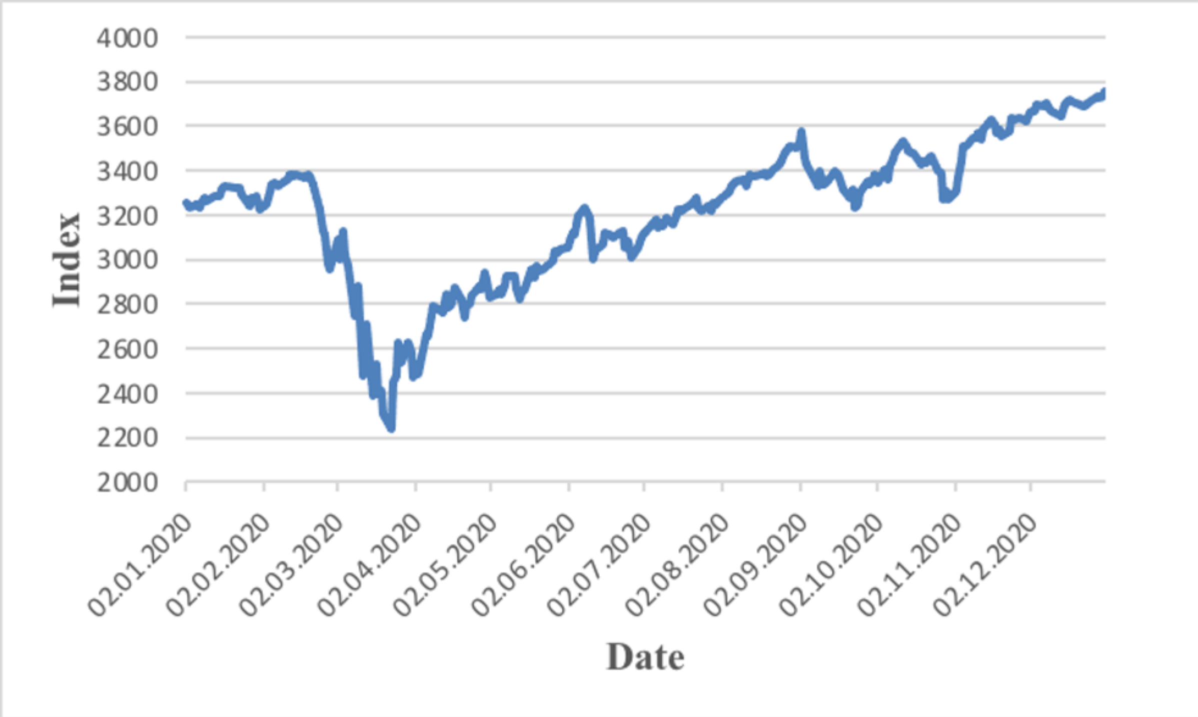
It is no doubt that Corporate managers and analysts started paying attention to the virus already in the first outbreak period. The first conference call in the US that discussed the virus took place on January 22nd. No later than the second week of March, COVID-19 was the main topic of the majority of all conference calls. On February 22nd, the first Italian deaths due to the virus were registered. The next day, Italy‘s Council of Ministers of 2020 placed around 50 000 people in isolation to contain the virus (Ramelli and Wagner, 2020).

The incident in Italy on February 23rd marks the beginning of a series of extraordinary events. Using data from Yahoo Finance we have constructed Figure 2.1, which shows the development in the S&P 500 index from January 2020 to December 2020. The Italian lockdown proved to be a starting point of the biggest financial market crash in history. First, the S&P 500 set an all-time high record on February 19th. Second, the peak was followed by a new record for the fastest 30%-fall in history, only taking 22 trading days. This edges out the 23 days 30%-retraction during the Great Depression by one day (February 6th, 1934) (Li, 2020). The world could only watch as the real economic shock caused the stock exchanges of the world to plummet. Similarly, the second-worst day ever of the Dow Jones Industrial Index happened on March 16th, and three of the 15 worst days ever occurred between March 9th and 16th. On March 11th the WHO announced that COVID-19 can be characterised as a pandemic (WHO, 2021). In response to the WHO's announcement, the President of the United States announced a travel ban on European Union countries the same day and declared the COVID-19 outbreak a national emergency on March 13th. The S&P index and other stock exchanges continued to fall more or less continuously until March 23rd. On this day, the FED announced a major market intervention aimed to provide liquidity in the markets (Ramelli and Wagner, 2020).

The effect of FED‘s intervention can be seen in Figure 2.1. The market starts to recover after March 23rd and continues to grow throughout the year 2020. From the rock bottom of the S&P 500 on March 23rd to the last trading day of the year, the market index experienced a continuously compounded return of approximately 52%[1].

[1]Returns March 23rd to Dec 31st, calculated: $\ln(3756.07/2237.40) = 52\%$

Figure 2.1: S&P 500



The figure shows the development in the S&P 500 Index from January to December 2020. It is constructed by using data collected from Yahoo Finance.

3 Literature Review

Well acknowledged papers on capital structure include the Modigliani and Miller Theorem. They argue that firms' cost of equity is proportional to the level of leverage (Berk and DeMarzo, 2020a). Accordingly, equity risk increases with leverage. This is also illustrated by Merton (1974) with a concept known as the "leverage effect". The leverage effect is explained as the phenomenon where equity value changes proportionally more than asset value when leverage increases. Further, Opler and Titman (1994) examine the connection between corporate performance and leverage when the industry is doing poorly. By comparing the 10th and 90th quantile of firm leverage, they find that the highly levered firms experience a 26% higher loss in sales. DeAngelo and DeAngelo (2009) argue that low leverage prior to a situation where liquidity is needed is optimal because it gives the opportunity to issue debt to raise capital. Implying that firms should opt for a level of leverage that is below what the traditional trade-off theory might suggest. Fresard (2010) finds evidence that larger cash holdings lead to systematic future market share gains at the expense of industry rivals, particularly in times when finances are tight.

The literature on COVID-19, and specifically its effect on the stock markets is ever-growing. Our main inspiration is the work done by Fahlenbrach et al. (2020), a study on the importance of corporate financial flexibility on stock returns in the US. By running Ordinary Least Squares (OLS) regressions on stock cumulative excess returns, they aim to capture the effect of different proxies for financial flexibility, controlling for common market risk factors and industry-fixed effects. They find that the difference between the stock price drops of financially flexible and inflexible firms is 26%. This difference is not closed as the stock market recovers, rejecting a mechanical leverage effect. Next, measurements on exposure to COVID-19 created by Koren and Pető (2020) & Dingel and Neiman (2020) are included. By creating an indicator variable for the most exposed quartile, they find that firms exposed to the pandemic gain more value from cash holdings. Furthermore, they find no magnified effect of debt for exposed firms, although being characterised as exposed yields in itself lower returns.

Pagano et al. (2020) research whether a firm's resilience to social distancing causes different stock returns during the pandemic. They use indexes of exposure to COVID-19 created by Koren and Pető (2020), Dingel and Neiman (2020) & Hensvik et al. (2020), to classify firms as resilient or exposed based on their industry. They find that resilient firms see higher returns than exposed firms, proving that the industry a firm operates in is of utmost importance in determining stock returns during the pandemic. For instance, technology-heavy industries perform fairly well, while food catering, travel and tourism industries are suffering. The difference in returns is statistically significant, and the results hold when using capital asset pricing model- (CAPM) and Fama-French 3-6 factor-adjusted returns. Moreover, they also apply option data and conclude that markets seem to price in a new risk factor, "pandemic risk".

Another noteworthy paper on COVID-19 and US stock returns is written by Ramelli and Wagner (2020). They focus on firm exposure to China, but include leverage and cash. Using an OLS-approach, they find a positive and negative relationship between stock returns for cash and leverage, respectively. Research outside of the US includes Gerding et al. (2020), who studies the role of sovereign debt for equity returns during the pandemic. The analysis is based on data from more than 25 000 firms in over 80 countries, grouped after industries and geographic locations. Their findings suggest an elevated equity risk, in the face of disaster, for firms with headquarters in countries with high debt-to-GDP ratios. Variations in debt-to-GDP explain around 23% of the average stock price decline in the first months of COVID-19. Their result implies that investors value governments' opportunity to intervene and help keep firms solvent when the market experiences revenue shortfalls.

Many studies evaluate the connection between corporate characteristics and stock price reactions to COVID-19 infection cases. Ding et al. (2020) study international cross-firm stock price reactions, as functions of pre-shock corporate characteristics. They find a milder drop in stock prices among firms that have stronger pre-2020 finances (more cash, less debt, and larger profits), and less exposure to the pandemic through global supply chains and customer locations. Alfaro et al. (2020) show that unexpected changes in the trajectory of COVID-19 infections predict US stock returns in real-time. Further, they find that COVID-19 related losses in market value at the firm level rise with capital intensity and leverage, and are more substantial in industries that are more conducive to disease transmission.

Our study contributes to the literature on corporate characteristics and COVID-19. We contribute by enhancing the understanding of corporate balance sheets and the importance of financial flexibility. Further, we build on the crisis literature by studying the effects of the corporate balance sheet on equity prices for firms with varying degrees of exposure to the exogenous shock. To the best of our knowledge, we differ from previous research by employing another methodology and a new measure of corporate debt.

4 Theory and Hypothesis Development

In this chapter, we present a framework to establish hypotheses for how firm equity value should be affected by the COVID-19 pandemic. In Subchapter 4.1 we analyse the effects of a sudden revenue stop on firm cash flow and equity risk. Subsequently, we derive testable hypotheses from this analysis in Subchapter 4.2.

4.1 Cash Flow and Risk When Revenue Stops

To analyze the effects of a sudden revenue stop, we use the Free Cash Flow to Equity (FCFE) model. The model states that the stock price today is equal to the discounted future free cash flows to equity. Equation 4.1 calculates the free cash flow available to shareholders. (Berk and DeMarzo, 2020b)

$$FCFE = EBIT * (1-t) + Dep. - Capex - \Delta NWC - Interest * (1-t) + \Delta Debt \tag{4.1}$$

To make the analysis more intuitive and easier to grasp, we make several assumptions. First, we assume no depreciation, capital expenditures or changes in net working capital. Second, all free cash flow to equity can be predicted. Third, debt payments correspond to an increase in costs. Last, there is no interest and tax. These assumptions make it possible to present a simplified FCFE model (Equation 4.2) that consists of revenue (R), costs (C), and the discount factor (re).

$$P_0 = \sum_{t=1}^{\infty} \frac{R_t - C_t}{(1+r_e)^t} \tag{4.2}$$

When disaster strikes and revenue stops, firms experience financial difficulties and some face the risk of insolvency. The model is altered to Equation 4.3. For the "T" periods revenue is missing and firms will experience a negative cash flow. To mitigate the issue, cost-cutting is imperative. The greater extent to which a firm is able to cut costs reduces the risk and lowers the negative impact the revenue shortfall has on the stock price.

$$P_0^{COVID-19} = \sum_{t=1}^{T} \frac{-C_t}{(1+r_e)^t} + \sum_{t=T+1}^{\infty} \frac{R_t - C_t}{(1+r_e)^t} \tag{4.3}$$

Capital structure and cash holdings prove important in how well firms tackle the new disconcerting situation. To fund the running expenses firms normally need to access external fundings. Higher levels of leverage limit the available financing options because of less collateral to borrow against, and the increasing uncertainty on liquidity may force expensive financing. Naturally, a higher level of leverage means higher firm-specific risk. In this regard, we expect levered firms to perform worse in bad times. Investors require higher compensation for higher risk and the required rate of return on equity, re, rises. This in turn leads to greater stock price reductions compared to unlevered firms, which have a lower required rate of return on equity. Furthermore, when disaster strikes, equity acts as a cushion that absorbs losses. Higher levels of leverage reduce this cushion and amplify the risk associated with leverage.

In contrast to leverage, high levels of cash reduce financial constraints and the risk of insolvency. It gives the firm more flexibility as it helps avoid expensive financing options, for instance, fire selling assets. Since firms with high cash holdings are considered less risky, investors require a relatively lower return on equity, re, and these firms should trade at a higher stock price. Additionally, it is worth mentioning that firms with large asset-specific risk typically choose to have higher cash holdings. These firms carry higher risk and it is harder for them to access external funding. In a shortfall of revenue, precautionary cash savings may be their only financing option. Ample cash holdings are crucial for these firms to survive a crisis and reduces their risk. Further testimony to the positive association of cash on stock prices.

To investigate the risks associated with cash and leverage during COVID-19, we compare financially flexible and inflexible firms in the analysis. Given the lower risk faced by financially flexible firms, we expect a higher trading price compared to inflexible firms. Firms highly exposed to COVID-19 have higher risk due to greater uncertainty around future revenue prospects. Exposed firms lose a greater share of their revenue compared to resilient firms, as resilient industries are more able to continue with their operations. They have more negative cash flow to fund. Additionally, we expect it to be even harder for exposed firms to access outside finances due to their increased pandemic risk. In that sense, the value of being "financially flexible" should be magnified for exposed firms. High levels of cash and low levels of leverage are particularly desirable for these firms.

4.2 Hypotheses

All of the aforementioned lead us to two hypotheses:

1. *Cash is a positive determinant of stock return while leverage is a negative determinant of stock return during the stock market crash.*

Higher cash holdings reduce the financial strain and insolvency risk and help the firm avoid expensive financing options when revenue stops. Higher holdings of debt increase insolvency risk, as firms' ability to absorb asset price losses worsens. In addition, it increases negative cash flows and reduces collateral to borrow against. The risk associated with cash and leverage suggests that flexible firms should experience higher returns than inflexible firms during the market crash.

2. *Effects of cash and leverage are magnified (reduced) for firms highly exposed (resilient) to the pandemic.*

Firms with higher fundamental exposure to the pandemic have higher risk and experience a greater reduction in revenue. In this regard, they have to acquire more liquidity and are expected to benefit more from higher cash holdings and lower debt. Oppositely, resilient firms have less risk and experience less of a fall in revenue. Hence, the importance of cash and debt should be reduced for resilient firms.

To test the effects of cash and leverage we run regressions prior to, during, and after the stock market crash. As investors are unaware of the severeness of the crisis to come, we should not find that cash and leverage are determinants of return in advance of the market crash. If the leverage effect of Merton (1974) holds true, levered firms should see higher returns when the market recovers. If this is the case, the effect during the stock market crash is due to the elasticity of equity, and the relative importance of our findings during the crash decreases. As the findings of Fahlenbrach et al. (2020) suggest, we should not see any significance during the stock market recovery, speaking to the novelty of the exogenous shock that is COVID-19.

5 Data

In this chapter, we present and justify the choice of data used in the study. First, we start by presenting the data sources and give an in-depth description of data filterings. Followed by an explanation of our dependent and independent variables, as well as the time period. Variable definitions using Compustat items are presented in brackets. Last, a presentation of the main summary statistics and correlations is given.

5.1 Data Source and Filtering

The data sample is obtained from the Wharton Research Data Services database, Compustat Capital IQ North America Daily, and Kenneth French's website[2]. First, we retrieve stock price information for 2019 and 2020 on the stock exchanges AMEX, NYSE, NASDAQ. In total, they make up the majority of the US stock market. Second, we retrieve information on capital structure and other key financial information for firms on the relevant stock exchanges. Third, the market return and risk-free rate are downloaded from Kenneth French website.

To begin with, we remove firms with Standard Classification Code (SIC) between 6000-6999, 4900-4949, and above 8000, which are financial firms, utilities, and not-for-profit and governmental firms. These firms are filtered out as we need to make an apples-to-apples comparison to avoid biased estimates. Financial firms distinguish from operational firms as they usually have a capital structure based heavily on leverage. While operational firms' optimal leverage ratio is approximately 50% equity, financial firms such as banks usually hold no more than what is required by law, around 10%. This is not a sign of financial distress, but rather the nature and role of the firms as financial intermediaries and asset transformers. The same applies for utility firms, such as water or gas firms. These industries are capital intensive and invest heavily in infrastructure financed with debt. Non-profit firms may have illogical information as they often are not organized and govern with the aim to maximize profits. Governmental firms are likely to have less risk, as they have a higher likelihood of getting support from the authorities when disaster strikes.

[2]Kenneth French website: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Next, we drop stocks that do not have security issue types equal to common ordinary. Security issue types like preferred, warranted stocks, etc. play by other rules than common ordinary stocks. These stocks can come with perks such as collateral in case of default, priority over dividends, or extraordinary voting rights. As they differ in dynamics, they are not comparable to common ordinary stocks. Furthermore, firms that do not have headquarters in the US are dropped. They may be under other countries' legislation and in that sense bias the comparison.

In accordance with Fahlenbrach et al. (2020), firms with an average stock price during 2019 below $1 are dropped. Penny stocks are highly volatile and react drastically to news. In extreme cases, they can multiply in value intraday (Oseberg, 2016). To further prevent overvaluation of small-capitalization stocks in our regressions, we use the definition of French (2021) and drop small-capitalization firms. He defines small-capitalization firms in developed markets as the bottom 10% sorted by market value (French, 2021).

To further ensure the validity of our results and analysis we have decided to exclude companies that publish their Annual Report later than January 31st. There is a reoccurring problem regarding empirical research relying on fiscal information during times of crisis. Namely that the capital structure is not completely unaffected by the upcoming crisis. One would expect firms to make some adjustments in capital structure or cash holdings before a major crisis because of market disruptions and increased uncertainty. However, the COVID-19 crisis is an exogenous shock. Thus, we can rest assured that our data is not affected by the anticipation of revenue short-fall, as long as their fiscal year ends prior to the outbreak of the crisis. Last, we remove firms that are missing relevant fiscal information needed for the analysis, as well as duplicate data.

5.2 Dependent Variable

The dependent variable is calculated by first adjusting the daily close price (PRCCD) by the daily total return factor (TRFD) and the daily adjustment factor (AJEXDI). The variations in stock price are now adjusted for stock splits, corporate dividends, share repurchases, and reinvestment of dividends. Stocks that lack adjustment factors in Compustat are dropped. The adjusted stock price is then used to calculate daily simple returns. Finally, to create the logarithmic return function, we take the natural logarithm of one plus the simple return minus the daily risk-free rate. We use the 1-month daily treasury-bill rate as the risk-free rate. From this point on, the terms “return” or “stock returns” are used for logarithmic stock returns.

5.3 The Independent Variables

5.3.1 Main Independent Variables

To proxy for financial flexibility, we include several metrics. The first three are equivalent to Fahlenbrach et al. (2020) and use book leverage. The first metric, “metric one”, is cash, short- and long-term debt scaled by total liabilities and book value of equity. Cash is defined as currency and short-term investments (CHE/AT). Short-term debt is long-term debt due in one year plus notes payable (DLC/AT). Long-term debt is long-term debt due in over 1 year (DLTT/AT).

In addition to the natural three-way split of cash and leverage (metric one), we construct two additional metrics of leverage: net short-term debt ((DLC-CHE)/AT) and long-term debt to book assets (“metric two”), and cash and total book debt to book assets ((DLTT+DLC)/AT) (“metric three”). Net short-term debt is constructed by subtracting cash from short-term debt, and book debt is the sum of short- and long-term debt. Metric two is useful in determining whether the relative amount of short-term debt and cash carry some explanatory power that the variables individually are not able to capture. The same goes for metric three, we want to be certain that total book debt does not explain any of the variations in stock returns that cannot be explained by short- and long-term debt individually. Thus, metrics two and three function as controls for metric one.

We also include a new metric, “metric four”, which is cash to assets and short- and long-term debt to total liabilities plus market value of equity at fiscal year-end ((DLC/(DLC+DLTT+PRCCF*CSHO)) and (DLTT/(DLC+DLTT+PRCCF*CSHO))). Market leverage can be argued to be a better measurement than book leverage because it directly reflects investor beliefs of asset value. Different accounting practices can overvalue or undervalue the true value of assets and bias the debt capacity and risk of a firm. In the analysis, we consider metrics one and four as our main metrics.

5.3.2 Corporate and Industry Control Variables

To reduce omitted variable bias several different control variables on both firm and industry levels are implemented. We control for corporate payouts as there is a trade-off between cash and corporate payouts (Berk and DeMarzo, 2020c). Payout is defined as the total dividends and share repurchase to common and preferred shareholders scaled by assets ((DVC+DVP+PRSTKC)/AT). Missing values are set to zero.

To ensure that our results are not due to the relative risk associated with individual firm debt, we control for firm credit rating. We use the Standard & Poor's issuer credit rating (SPLTICRM). The rating system gives an indication of the firm's overall creditworthiness, besides the capability to pay individual obligations. Firms with a rating equal or above BBB- are classified as "investment grade", while firms with a rating between BB+ and C are classified as "high yield". The firms that are missing ratings are classified as no debt rating. These are implemented in the regressions as indicator variables.

In Chapter 4 we discussed the importance of cost-structure. Firms with higher variable costs find it easier to cut costs when revenue halts. To account for the degree of variable and fixed cost, we control for the ratio of cost of goods sold (COGS/SALE) and the ratio of selling, general and administrative costs (XSGA/SALE), both scaled by sales.

It is commonly known that investment programs tend to be somewhat sticky. We construct two variables to account for investment programs. Firms with high investment expenses often have investments as an integral part of their business model. Investment programs can as such be argued to behave in the same manner as fixed costs in times of crisis. We differentiate investment programs that aim at developing new products or services, and those that aim at expanding current operations. The first variable generated is resource and development (XRD/AT), and the second variable is capital expenditures (CAPX/AT), both scaled by assets. Missing values of resource and development are set to zero.

We control for industries as cash and leverage typically vary between industries. Otherwise, our regressions would likely display the difference between industries, rather than the true effect of cash and leverage. We group all firms by their SIC codes according to the Fama-French 49 industry classification, available from Kenneth French website[3]. These

[3]Kenneth French website: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

industries are then implemented in our regression as indicator variables.

5.3.3 Market Risk Factors

It is generally accepted in the financial literature that certain market risk factors have high explanatory power over asset returns, and we need to control for these. Three factors that are particularly acknowledged, are defined in the Fama-French three-factor model. The first of these factors is the exposure to market risk, Beta. Beta measures the extent to which asset returns correspond to market return and assumes there is a linear relationship between risk and returns (Fama and French, 1993). Beta is calculated, in Equation 5.1, as the coefficient of a regression of daily log returns on daily log market premium from January 2nd to December 31st, 2019. To ensure the precision of our estimates, we require at least 200 observations.

$$r_{i,t} = \beta_i * r_{m,t} + \varepsilon_{it} \tag{5.1}$$

The second and third market risk factors proposed in the Fama-French three-factor model are book-to-market ratio (CEQ/(PRCC_F*CSHO)) and market value (ln(PRCC_C*CSHO)) (Fama and French, 1993). We implement both of these as control variables. The book-to-market factor is calculated as the book value of equity divided by the market value of equity at fiscal year-end. To implement market value, we take the logarithmic function of the market value of equity at year-end 2019.

Later supplementations to the Fama-French three-factor model are Carhart (1997), Novy-Marx (2013) and Fama and French (2015). Carhart (1997) implements a momentum factor. We calculate the momentum factor as the sum of logarithmic returns during 2019. Novy-Marx (2013), and Fama and French (2015) add a profitability factor. We have calculated the profitability factor as gross profits scaled by assets (GP/AT).

5.3.4 Measures of COVID-19 Exposure

Koren and Pető (2020) present a classification of industry exposure to COVID-19 in the US. The proxy provides a measure of resilience to social distancing based on human interaction and geographical locations. Their aim is to identify industries that are highly limited by governmental restrictions and quantify the economic costs of enforced social distancing. The information is gathered using the Occupational Information Network (O*NET) surveys. Industries are sorted after the 3-digit North American Industry Classification System (NAICS), and the industry classes are given a score on a scale from 0-100. A high score indicates that the industry is highly reliable on face-to-face interactions, and thus has low resilience (high exposure). Koren and Pető (2020) present three focus areas of face-to-face interactions: teamwork, customer, and presence. Teamwork share measures how reliant the industries are on direct communication with coworkers, while customer share measures how reliant the industries are on direct communication with customers. Presence share, on the other hand, measures how dependent the industry is on physical accessibility to each other, disregarding the need for communication. Koren and Pető (2020) aggregate their indexes of teamwork- and customer share to create an overall measure of communication, communication share. Last, they aggregate the three measures of face-to-face interactions into one measure of total exposure, affected share.

Dingel and Neiman (2020) follow the same general method as Koren and Pető (2020). They use O*NET surveys to measure the feasibility of working at home for different occupations. They classify resilience by looking at the percentage of jobs that can be done from home, classified by the 3-digit NAICS industry. A higher percentage indicates higher resilience (lower exposure). They provide two different estimates. First, they use the data to give a measure of the percentage of jobs within each industry that can be performed from home, teleworkable employment. Next, the measure is weighted by each jobs corresponding wage, to get teleworkable wage. Dingel and Neiman (2020) do a further inspection of these indexes and their industry-level estimates. They use their judgment, and manually alter values where they do not think the estimate from the data reflects the real world to create teleworkable manual employment (TME) and teleworkable manual wage (TMW). These manually adjusted indexes are highly correlated with the raw-data indexes. Of Dingel and Neiman (2020) classifications, we only include the manually adjusted indexes. To implement the indexes by Koren Peto (KP) and Dingel Neiman (DN), we create indicator variables for the top and bottom quartile. By using two different measures of fundamental exposure, we are able to verify the robustness of our results.

5.4 Time Periods

From The Course of COVID-19 (Chapter 2), we identify three time periods with distinct characteristics. The time period prior to the stock market crash, the stock market crash, and the stock market recovery. The first period starts on January 2nd, the first trading day after WHO is informed about the first cases of the virus on December 31st, 2019. The period lasts until February 21st, which is the last trading day before the major lockdown in Italy. During this time period, the market is experiencing increasing uncertainty and no clear trend, with the virus gaining growing attention. We call this period the "Incubation", as it marks the buildup of the most violent stock market crash of all time.

The second time period starts on February 24th, in conjunction with the lockdown in Italy. Governments all over the world impose lockdown and enforce temporary closure of businesses. Relating to our hypotheses and the FCFE model, this is the period where "revenue stops", and in which the S&P 500 displays a clear negative trend. The period lasts until FED announces major market interventions in the evening of March 23rd. We call this time period the "Collapse".

The third time period begins on March 24th. This day proves to be the turning point in the stock markets as FED provides liquidity, and insolvency is no longer as great of a concern. The stock market more or less grows continuously until September, with the S&P 500 surpassing the previous high prior to the collapse on February 19th. Consequently, the end of the third time period is set to August 31st. We call this time period "Recovery". To summarize, the time periods Incubation, Collapse and Recovery start in succeeding manner and have 35, 21, and 112 trading days respectively.

5.5 Summary Statistics

To give a clear illustration of the dataset we present the Summary Statistics in Table 5.1. We use cumulative returns to better demonstrate the magnitude of the returns. The sample consists of 900 firms in the Incubation and decreases to 899 and 895 in the Collapse and Recovery, respectively. The median firm return in the Incubation is -3%. More interesting is what happens in the subsequent period, the Collapse. The median firm now yields returns of -53.35%, with more than 95% of all firms having negative returns. The firm with the greatest stock price reduction has a reported return of -2.105. Converted to simple returns, this is approximately -87.8%, which unveils the powerful nature of the stock market crash. The market turns and the median return in the Recovery is 43.98%, with over 95% of firms having positive returns. By August 31st our sample had almost regained most of its lost value.

We need to gain a deeper insight of the distribution and size of cash and leverage. Not surprisingly, cash holdings are skewed with a median of 6.42%. As suggested by Sánchez and Yurdagul (2013), firms with high research and development (R&D) costs have a tendency to hold larger cash holdings as the investment prospects are risky. Furthermore, it is not surprising that firms also hold substantially more long-term than short-term debt. The median long-term debt is about 20 times greater than short-term debt for both metric one (29.68% and 1.5%) and four (20.83% and 1.09%). Interestingly, net short-term debt tells us that 75% of firms have more cash than short-term debt.

Looking at investment programs, it is hardly surprising that R&D is strongly left-skewed, with over 25% of firms investing zero. Firms either do or do not invest heavily in the development of new products or series. Noteworthy, half of our sample is missing credit rating. Reassuringly, equal amounts of firms have high yield (HY) and investment grade (IG) ratings. We do also give attention to payouts as the distribution is very left-skewed, suggesting that firms offering payouts typically have this as an integral part of their business model. The market risk factor, Beta, has a median value of 1,0664, implying that our sample is slightly more exposed to systematic risk. The increased risk likely stems from our data filtering, where we drop entire industries. Furthermore, 99% of our sample is profitable.

Koren and Pető (2020) indexes of resilience all have a common denominator. They are all heavily left-skewed with little variation in the first 75% of the sample. This essentially means that there is little difference between highly resilient firms and medium resilient firms, but firms with low resilience stand out as they are extremely exposed. Thus, we expect that the indicator variable for highly resilient firms (bottom quartile) is not statistically different from the reference category (middle quartiles). The highly exposed firms (the top quartile) however, are expected to be statistically different from the reference category, as the indexes are highly left-skewed.

Dingel and Neiman (2020) indexes of resilience differ from the KP measures in two ways. First, they are opposite, meaning that a high score indicates high resilience to social distancing. Second, the indexes are much more normally distributed, with variation in all quartiles. The span in the indexes of DN greatly increases the possibility that both highly resilient firms (top quartile) and highly exposed firms (bottom quartile) perform differently from the reference category.

Table 5.1: Summary Statistics

	N	min	1st Perc.	p5	p25	Mean	Median	p75	p95	99th Perc.	max	Std. Dev.
Cumulative return Incubation	900	-.7765	-.4801	-.3008	-.122	-.0363	-.03	.0545	.1894	.3657	.7346	.1544
Cumulative return Collapse	899	-2.105	-1.8026	-1.3151	-.7881	-.6035	-.5335	-.366	-.1206	.048	.1876	.3616
Cumulative return Recovery	895	-.6489	-.2565	.0181	.2615	.4702	.4398	.6308	1.0696	1.4445	2.3649	.3258
Cash/Assets	900	0	.0011	.0043	.0261	.1103	.0642	.1465	.3826	.608	.8068	.1265
St Debt /Assets	900	0	0	0	.0057	.0312	.015	.0382	.1042	.3022	.4585	.0507
Net St Debt / Assets	900	-.8034	-.6025	-.3579	-.1244	-.0791	-.0371	-.0024	.051	.2639	.3991	.1401
St Debt / (Market + Liabilities)	900	0	0	0	.0033	.0253	.0109	.027	.0895	.2912	.5804	.0499
Lt Debt /(Market + Liabilities)	900	0	0	.0025	.0913	.2514	.2083	.3746	.6671	.8149	.9014	.2035
Lt Debt / Assets	900	0	0	.0067	.165	.3192	.2968	.4254	.7006	1.0727	3.0923	.2465
Book Debt / Assets	900	0	0	.0125	.1973	.3504	.3331	.4629	.7427	1.1296	3.1478	.2536
Payout / Assets	900	0	0	0	.0098	.052	.0289	.0633	.1834	.3702	.7581	.0741
R&D / Assets	900	0	0	0	0	.0215	.0006	.023	.1061	.2221	.3745	.0443
SGA / Sale	900	.0056	.0113	.033	.0954	.2394	.1684	.2788	.5461	.9832	9.6384	.4713
CAPEX / Assets	900	0	.0019	.0058	.0159	.0428	.0298	.0524	.1256	.2065	.4377	.0444
Book / Market	900	-1.8813	-.6568	-.0399	.1736	.4579	.3543	.6352	1.323	2.2169	6.7386	.5419
Ln (Market value)	900	4.3844	4.5026	5.1242	6.7303	8.0337	7.9495	9.2374	11.1468	12.4504	14.0815	1.8296
Profitability	900	-.3486	.0231	.0901	.1741	.2995	.2592	.3711	.6436	1.0473	2.777	.2045
COGS / Sale	900	.0603	.112	.2176	.4606	.6065	.6321	.7687	.8828	.9733	1.9736	.216
Beta	900	-.7118	.1018	.3873	.7756	1.0868	1.0664	1.3868	1.8846	2.242	2.6309	.4625
Momentum	900	-2.1738	-.853	-.3814	.0065	.1604	.1817	.3552	.6054	.7971	1.4707	.3225
IG	900	0	0	0	0	.2522	0	1	1	1	1	.4345
HY	900	0	0	0	0	.2511	0	1	1	1	1	.4339
No Credit Rating	900	0	0	0	0	.4967	0	1	1	1	1	.5003
Affected Share	891	8	8	9	15	26.4265	20	32	70	72	90	17.0123
Communication Share	891	4	6	6	9	15.624	10	16	48	64	90	13.1162
Presence Share	891	0	0	0	3	12.11	10	13	41	63	66	13.6119
Customer Share	891	1	2	2	4	11.0359	5	10	45	62	90	13.8939
Teamwork Share	891	4	4	5	5	8.6936	8	9	17	31	31	4.6434
TMW	897	.0426	.0426	.1407	.2646	.44	.4317	.5409	.8736	.9257	.9257	.2179
TME	897	.0187	.0187	.0834	.1718	.3345	.292	.4363	.792	.8804	.8804	.2051

The table presents Summary Statistics for dependent and independent variables in our sample. Daily log returns are presented in the form of cumulative returns for each time period.

5.6 Correlations

Table A.7 in the Appendix displays the correlations among our variables. In line with the summary statistics and our expectations, the correlation between the Incubation and the other periods are weak. The correlation between the Collapse and Recovery is moderately negative at -0.505. This is economically intuitive given that the majority of stocks lose value during the Collapse, and gain value during the Recovery.

Short-term debt correlates weakly with cumulative returns for all time periods. This is surprising, we would expect short-term debt to have a stronger negative correlation with cumulative returns during the Collapse. Long-term debt, on the other hand, has a moderately negative correlation with cumulative returns during the collapse period. Interestingly, the correlation is almost double in metric four. The correlation weakens for both measures and turns positive during the Recovery. Cash follows the same pattern as long-term debt, but with opposite signs.

There should be a trade-off between cash holdings and corporate payouts (Berk and DeMarzo, 2020c). Despite this, we find a positive correlation, although weak. Identifying the origin of the positive coefficient has its difficulties. Corporate payouts can be funded either by internal or external capital. Our measure is, however, not capable of distinguishing between these two funding sources. On one hand, firms may have high payouts because they are highly profitable with solid balance sheets. On the other hand, they can have weak balance sheets, and their payouts are financed through the issuance of debt (Fahlenbrach et al., 2020). We also give notice to the moderately positive correlation between cash and R&D, further supporting the claims of Sánchez and Yurdagul (2013). Regarding the fundamental exposure to COVID-19, KP and DN have a moderately negative correlation. The negative correlation is expected because their scales are reversed. This gives a good indication that the indexes capture some of the same effects.

6 Methodology

To test our hypotheses we use the Fama-MacBeth (FMB) procedure from 1973. The method is a variant of cross-sectional regression that was developed in order to empirically test the CAPM. The FMB-method is a two-stage procedure. In the first stage the betas, i.e. the risk factor loadings, are generated. This can be accomplished by performing an OLS-regression for each asset, i, for the time period (shown in Equation 5.1).

The FMB proceeds in stage two by running a cross-sectional regression using the generated betas from stage one for each time period, t, to get the risk premia lambda in Equation 6.1. (Cochrane, 2005)

$$r_{i,t} = \beta_i * \lambda_t + \alpha_{i,t} \tag{6.1}$$

Suppose the dataset consists of 100 data points in time, the FMB will run 100 separate cross-sectional regressions. Next, the estimated risk premia (lambda) and errors from each cross-sectional regression is averaged in order to get the final estimates in Equation 6.2 (Cochrane, 2005).

$$\hat{\lambda} = \frac{1}{T}\sum_{t=1}^{T}\hat{\lambda}_t \qquad \widehat{\alpha_i} = \frac{1}{T}\sum_{t=1}^{T}\hat{\alpha}_{i,t} \tag{6.2}$$

Given that our paper focuses on the impact of corporate balance sheets during COVID-19, the majority of our key variables are book values collected from annual reports. These variables are constant and fixed in time, hence they do not need to be estimated through FMB stage one (Cochrane, 2005). Since we use firm characteristics (x) instead of estimated coefficients (betas) in the second stage, the coefficients generated for these characteristics can not be interpreted as risk premia (lambda). They need to be interpreted as coefficients. The only variable that needs to be estimated through FMB stage one is the exposure to market risk factor during 2019 (Beta). The coefficient of Beta can be interpreted as a risk premium.

The reason why the FMB is so famous is that it is useful not only for asset pricing, but for pooled-regressions in general. A common problem with OLS is that it does not account for the fact that the error terms are not independent of each other. If one stock price rises, neighboring firms' stock prices are likely to rise as well, because of cross-sectional correlations. Thus, OLS gets the correct coefficient, but the standard errors will be wrong, and the statistical significance overemphasized. This brings us to the brilliance of FMB. The method exploits the different estimates at each time period to find the standard error of the coefficients. The FMB-standard errors are calculated by taking the standard deviation of the coefficients across time (t), divided by the root of total time periods (T). The standard errors are thus adjusted for cross-sectional dependence and yield more correct significance levels. (Cochrane, 2005)

The statistical significance is expressed by a t-statistic. The t-statistic is calculated by dividing the coefficients or estimate of lambda by the FMB-standard error (Equation 6.3 and 6.4).

$$SE = \sigma\left(\hat{\lambda}\right) = \frac{\sigma\ (\hat{\lambda}_t)}{\sqrt{T}} \tag{6.3}$$

$$t - stat = \frac{\hat{\lambda}}{SE} \tag{6.4}$$

To verify that the coefficients are significant at the 5% level, we need a t-statistic greater than the absolute value of 1.96. The FMB relies heavily on the time series length when generating its t-statistics. A short time period will cause the FMB-standard errors to increase, which in turn causes the model to lose its statistical power. Our shortest time period, the Collapse, has 21 time periods (T). While the length of the Collapse could raise some concerns, it should be within a threshold that gives reasonable standard errors. What's more, the alternative unclustered OLS could cause too small standard errors if error terms are cross-sectionally correlated. (Cochrane, 2005)

There are two further common concerns related to the FMB. One concern is that the FMB does not adjust for time-series correlations. Another concern is the errors-in-variable problem. The FMB does not correct its standard errors for the fact that the betas are estimated variables (Cochrane, 2005). However, these issues should not pose any difficulties to us. It is commonly known in academia that asset prices follow a random walk. None of our main independent variables, and only one of the control variables, are estimated.

7 Results

To investigate our hypotheses we execute regressions in our three time periods: Incubation, Collapse, and Recovery. In Subchapter 7.1 we present our findings regarding cash and leverage, controlled for corporate characteristics, market risk factors, and industry-fixed effects. In Subchapter 7.2 we implement measurements of fundamental exposure to the pandemic and interact these with our main independent variables.

7.1 Financial Flexibility and Stock Returns

In this chapter, we study the transmission effects of financial flexibility. The first hypothesis states that cash and leverage should be positive and negative determinants of stock returns during the market crash. To ensure the validity of our measurements of cash and leverage we use all of our four metrics. For each time period, we perform one regression for each metric. In total, this gives us four regressions for each time period. The first column presents "metric one", with the subsequent column number presenting the corresponding metric.

7.1.1 Incubation

The Incubation period starts January 2nd and ends on February 21st, which is 35 trading days. Table 7.1 shows the regression results for the Incubation. Overall, the results are consistent and similar for all variables, regardless of the debt metric. Expectedly, we find no significant results from cash and leverage. Investors have not yet realized the severeness of the situation that is to come. Interestingly, short-term debt to assets is significant at the 10% level, however, this is not enough to claim any explanatory power. Consistent with our hypothesis, cash and leverage are not determinants of stock return prior to the revenue shortfall.

Inspecting corporate characteristics, we find that the higher the level of corporate payouts in 2019, the lower the stock return the firm experiences. Similarly, there is also a negative relationship between capital expenditures (CAPEX) and returns in metrics two and three. Interestingly, none of the market risk factors help explain any of the variations in stock returns. This is surprising as one, in general, would expect Beta to be significant. Thus, the 2019 exposure to market risk is seemingly of no importance. However, Beta has economically intuitive signs and reflects the slightly negative return during the period. The positive signs of the logarithm of market value can be an indication that investors begin to seek "safe havens" as uncertainty starts to rise.

Table 7.1: Stock Returns: Incubation

	(1) Metric One	(2) Metric Two	(3) Metric Three	(4) Metric Four
St Debt/Assets	.0047*			
	(.0028)			
Net St Debt / Assets		.0009		
		(.001)		
St Debt / (Market + Liabilities)				.0043
				(.003)
Lt Debt / Assets	.0005	.0004		
	(.001)	(.0009)		
Lt Debt / (Market + Liabilities)				.0008
				(.0013)
Book Debt / Assets			.0007	
			(.001)	
Cash / Assets	0		0	.0001
	(.0011)		(.0011)	(.0013)
Payout / Assets	-.0063***	-.006***	-.0065***	-.0059***
	(.0021)	(.002)	(.0021)	(.0019)
CAPEX / Assets	-.0089*	-.0093**	-.0091**	-.0088*
	(.0045)	(.0044)	(.0045)	(.0045)
SGA / Sale	.0008	.0008	.0008	.0009
	(.0006)	(.0006)	(.0006)	(.0006)
COGS / Sale	.0002	.0002	.0003	.0002
	(.0009)	(.0009)	(.0009)	(.001)
R&D / Assets	.0012	.0019	.0017	.0016
	(.0046)	(.0047)	(.0046)	(.0046)
IG	-.0001	-.0001	-.0001	-.0002
	(.0004)	(.0004)	(.0004)	(.0004)
HY	-.0002	-.0002	-.0002	-.0003
	(.0003)	(.0003)	(.0003)	(.0003)
Beta	-.0021	-.0021	-.0021	-.0022*
	(.0013)	(.0013)	(.0013)	(.0012)
Book / Market	-.0005	-.0005	-.0005	-.0006
	(.0007)	(.0007)	(.0007)	(.0006)
Ln (Market value)	.0003*	.0003*	.0003*	.0004*
	(.0002)	(.0002)	(.0002)	(.0002)
Profitability	.0005	.0005	.0005	.0006
	(.0008)	(.0008)	(.0008)	(.0009)
Momentum	.0006	.0006	.0006	.0007
	(.0012)	(.0012)	(.0012)	(.0012)
_cons	.0008	.0009	.0007	.0006
	(.0027)	(.0027)	(.0028)	(.0029)
Observations	31470	31470	31470	31470
R-squared	.1765	.1755	.1756	.177
Industry Fixed Effect	YES	YES	YES	YES

Standard errors are in parentheses
****p<.01, **p<.05, *p<.1*

The table shows results from FMB-regressions of daily log returns on corporate characteristics and market risk factors in the Incubation. The first column presents "metric one", with the subsequent column presenting the corresponding metric. The sample includes common stocks with fiscal year-end prior to January 31st. listed on the NYSE, NASDAQ, and AMEX. Financial, utility, and not-for-profit firms are removed, in addition to penny and small-capitalization stocks. Regressions are controlled for industry-fixed effects after the Fama-French 49 industry definition.

7.1.2 Collapse

The Collapse period starts February 24th and ends on March 23rd, which is 21 trading days. Table 7.2 shows the regression results for the Collapse. All main independent variables are significant with economically intuitive signs, which is in line with Fahlenbrach et al. (2020). Supporting our first hypothesis, short- and long-term debt is significant at the 5% level. The increased risk associated with debt causes lower stock returns. Although short-term debt has a greater coefficient, long-term debt is of greater economical magnitude. This is simply because firms hold 20 times more long-term than short-term debt. To illustrate the magnitude, a one standard deviation increase in short- and long-term debt would amount to lower returns, for the period as a whole, of 3.1%[4] and 5.6% for metric one, 3.4% and 11.5% for metric four. Further, it is worth noting that while short-term debt is of similar magnitude in both metrics, long-term debt is of greater importance in metric four. Differences in accounting practices can overvalue or undervalue value assets on the balance sheet. Thus, long-term market leverage may be a more reliable measurement of available collateral, and hence risk.

The coefficient for cash is highly significant at the 1% level. A one standard deviation increase in cash gives higher returns of 4.6% and 3%, in metrics one and four. Together this demonstrates the importance of cash in times when liquidity is of high demand. This is in line with economic rationale, considering the fact that higher cash holdings would relieve the economic pressure of insolvency. Last, we give notice that the magnitude of cash decreases slightly when using metric four. Furthermore, we find that our result for metric one is robust to the different control proxies of metrics two and three. A further proof that cash and debt are positive and negative determinants of stock returns when revenue stops.

Regarding control variables, we find it surprising that corporate payouts have positive signs. The reason can be linked to the financing of payouts, as discussed in Subchapter 5.6. Metric four is consistent for all cost controls and yields significant results for selling, general and administrative costs (SGA). Firms that do not manage to cut costs will experience a greater fall in stock price when revenue stops. Surprisingly, we find no

[4]Daily returns are calculated as (-0.0288*0.0507)*100%. Multiplied by 21 days to get the return for the whole period (3.1%).

evidence of this using the other metrics. In addition, only metric four yields intuitive signs for the investment programs. Interestingly, we find a negative coefficient for IG. This is however only statistically significant in metrics two and three.

Similar to Incubation the market risk factor controls are all insignificant. Beta has a negative coefficient simply because the market is falling. Investors tend to seek "safe havens" in high market capitalization- and value stocks, as these are less prone to default. Naturally, the book-to-market ratio and market value have positive coefficients.

To summarize the findings during the Collapse, we present a numerical example and compare our results with Fahlenbrach et al. (2020). Consider two firms, one financially flexible the other financially inflexible. The financially flexible firm has low debt (first quartile, 25%) and high cash holdings (third quartile, 75%). The financially inflexible firm has high debt (third quartile, 75%) and low cash holdings (first quartile, 25%). According to our first hypothesis, the flexible firm should experience higher returns than the inflexible, all other things equal. Using metric one, the flexible firm experiences a return of 12.4% higher than the inflexible[5]. Using metric four the difference amounts to 20.5%. To illustrate the magnitude of these numbers: The median cumulative firm return in our sample is -53.4%. This means that the stock price for the flexible firm decreases 23.2%[6] and 38.4% less than the inflexible. In comparison, Fahlenbrach et al. (2020) find that the difference between the stock price drops of financially flexible and inflexible firms is 26%, for their equivalent metric (our metric one). The magnitude is similar, and the small difference to our metric one may stem from the different definitions of the Collapse.

The difference between our metric one and four is substantial. Metric four is also more consistent with control variables for investment. This speaks to the greater economical importance of metric four, and may suggest that the metric likely is a better measurement of collateral and risk. In addition, metric two and three yield consistent results with metric one, with the flexible firm seeing lower stock price reductions of 20.4% and 21% respectively. Hence, the robustness of our results across debt metrics strengthens the internal validity, as the choice of metric does not influence our conclusion, but only the magnitude of our results.

[5]Return gap, calculated: 100%*21* (-0.0288*(0.0057-0.0382)-0,0109 *(0.165-0.4254)+0.0175*(0.1465-0.0261))=12.4%

[6]Percentage of total return, calculated: 20.5% / 53.4%

Table 7.2: Stock Returns: Collapse

	(1) Metric One	(2) Metric Two	(3) Metric Three	(4) Metric Four
St Debt/Assets	-.0288**			
	(.0127)			
Net St Debt / Assets		-.0197***		
		(.0058)		
St Debt / (Market + Liabilities)				-.0324**
				(.0141)
Lt Debt / Assets	-.0109**	-.0107**		
	(.0049)	(.0049)		
Lt Debt / (Market + Liabilities)				-.0269**
				(.011)
Book Debt / Assets			-.012**	
			(.0051)	
Cash / Assets	.0175***		.0177***	.0114**
	(.0055)		(.0055)	(.004)
Payout / Assets	.0122	.0115	.013	.0041
	(.0077)	(.0074)	(.0079)	(.0074)
CAPEX / Assets	.004	.0049	.0048	-.0015
	(.0261)	(.0263)	(.0262)	(.0274)
SGA / Sale	-.0021	-.0022	-.0021	-.003**
	(.0014)	(.0014)	(.0014)	(.0014)
COGS / Sale	.002	.002	.0015	.0006
	(.0067)	(.0067)	(.0067)	(.0064)
R&D / Assets	.0044	.0026	.0022	-.0032
	(.017)	(.0173)	(.017)	(.0172)
IG	-.0032*	-.0033**	-.0033**	-.0007
	(.0016)	(.0015)	(.0015)	(.002)
HY	-.0037*	-.0037*	-.0036	-.0011
	(.0021)	(.0021)	(.0021)	(.0016)
Beta	-.0056	-.0057	-.0056	-.0031
	(.0045)	(.0045)	(.0045)	(.004)
Book / Market	.0003	.0004	.0004	.0021
	(.0021)	(.0021)	(.0021)	(.0019)
Ln (Market value)	.0017	.0018	.0017	.0008
	(.0012)	(.0012)	(.0012)	(.001)
Profitability	.007	.007	.007	.0025
	(.0061)	(.0061)	(.0061)	(.0049)
Momentum	.001	.001	.001	-.0007
	(.0038)	(.0038)	(.0038)	(.0042)
_cons	-.0204	-.0207	-.0199	-.012
	(.0166)	(.0166)	(.0165)	(.0143)
Observations	18852	18852	18852	18852
R-squared	.2185	.2176	.2175	.2251
Industry Fixed Effect	YES	YES	YES	YES

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

The table shows results from FMB-regressions of daily log returns on corporate characteristics and market risk factors in the Collapse. The first column presents "metric one", with the subsequent column presenting the corresponding metric. The sample includes common stocks with fiscal year-end prior to January 31st. listed on the NYSE, NASDAQ, and AMEX. Financial, utility, and not-for-profit firms are removed, in addition to penny and small-capitalization stocks. Regressions are controlled for industry-fixed effects after the Fama-French 49 industry definition.

7.1.3 Recovery

The Recovery period starts March 24th and ends August 31st, which is 112 trading days. Table 7.3 shows the regression results for the Recovery. We find that cash and leverage have consistent signs across different leverage metrics. All measurements related to short-term debt and cash are insignificant. Long-term debt is significant in metrics one, two, and three.

Remember the flexible and inflexible firms from the Collapse (Subchapter 7.1.2). Using metric one, the flexible firm experiences returns of 12.4% higher than the inflexible firm, creating a return gap. About 2% of the return gap was attributed to the lower short-term debt, 6% to the lower long-term debt, and 4.4% to the higher cash holdings. During the following 112 trading days the inflexible firm experiences 5.2% higher returns than the flexible, all of which is attributed to the higher holdings of long-term debt. At the end of the market growth period on August 31st, the inflexible firm has not closed the whole return gap. It has almost closed the isolated return gap from long-term debt, but the differences between short-term debt and cash remain constant due to a lack of statistical significance. A novelty with our study arises when using metric four. Long-term debt is no longer significant and the financially inflexible firm does not recuperate any of the value lost in Collapse. Regardless of debt metrics, the majority of the return gap between financially flexible and inflexible firms remains constant. Our results thus speak in disfavour of the leverage effect by Merton (1974), and support the initial claim made by Fahlenbrach et al. (2020).

The corporate characteristic and issue rating control variables are similar in magnitude and significance across all columns. Corporate payouts are now negative and significant in metrics one and three, indicating that firms with higher payouts in 2019 get lower returns during the Recovery. One explanation can be related to expected future dividend payments. Firms giving out payouts typically have this as an integral part of their business model. If COVID-19 unexpectedly causes payouts to decrease or cease for a period in time, their stock price would decrease.

The coefficient of profitability is positive and significant, which means that efficient firms outperform less efficient firms in periods of growth. Interestingly, Beta is insignificant.

As the market is in a growth phase, higher systematic risk should lead to higher returns. However, firms with higher or lower systematic risk in 2019 do not perform significantly different. This indicates that market exposure in 2019 is not necessarily the best measure of systematic risk during the pandemic. An explanation could lie in the nature of the novel coronavirus. For instance, a firm with a low market exposure in a highly exposed industry would have high risk, whereas a firm with high market exposure in a resilient industry would perhaps be associated with low risk. Furthermore, the significant independent variables only stand for a small fraction of the period growth of 44% (Table 5.1). Consequently, the majority of growth has to be driven by other factors or characteristics. Unreported in the table are the Fama-French 49 industry dummies. When studying these, it becomes clear that industry is an important driver for stock return during Recovery. For instance, in metric one, The Fama-French industry number 18 "Construction" is significant with a p-value of 3.1%. For the entire period they see higher returns of 53.76%, compared to the reference category (FF49 number 1) "Agriculture".

Table 7.3: Stock Returns: Recovery

	(1) Metric One	(2) Metric Two	(3) Metric Three	(4) Metric Four
St Debt/Assets	.0071*			
	(.0036)			
Net St Debt / Assets		.0019		
		(.0018)		
St Debt / (Market + Liabilities)				.0078*
				(.0041)
Lt Debt / Assets	.0018**	.0017**		
	(.0008)	(.0008)		
Lt Debt / (Market + Liabilities)				.004*
				(.0022)
Book Debt / Assets			.0021**	
			(.0009)	
Cash / Assets	-.0006		-.0006	.0003
	(.0018)		(.0018)	(.0015)
Payout / Assets	-.0041**	-.0037*	-.0043**	-.0027
	(.0019)	(.0019)	(.002)	(.0019)
CAPEX / Assets	.0033	.0028	.0031	.0041
	(.0052)	(.0052)	(.0052)	(.0053)
SGA / Sale	.0001	.0001	.0001	.0003
	(.0004)	(.0004)	(.0004)	(.0004)
COGS / Sale	-.0004	-.0004	-.0003	-.0003
	(.0012)	(.0012)	(.0012)	(.0012)
R&D / Assets	-.0021	-.001	-.0014	-.0008
	(.0058)	(.0058)	(.0057)	(.0054)
IG	.0001	.0002	.0002	-.0002
	(.0004)	(.0004)	(.0004)	(.0004)
HY	.0003	.0003	.0003	0
	(.0005)	(.0005)	(.0005)	(.0003)
Beta	.0009	.0009	.0009	.0005
	(.0012)	(.0012)	(.0012)	(.0011)
Book / Market	.0002	.0001	.0002	-.0001
	(.0005)	(.0005)	(.0005)	(.0005)
Ln (Market value)	0	0	0	.0002
	(.0002)	(.0002)	(.0002)	(.0002)
Profitability	.0023**	.0023**	.0023***	.003***
	(.0009)	(.0009)	(.0009)	(.0009)
Momentum	-.0001	-.0001	-.0001	.0002
	(.0008)	(.0008)	(.0008)	(.0007)
_cons	-.0003	-.0001	-.0005	-.0015
	(.0028)	(.0028)	(.0028)	(.0026)
Observations	99488	99488	99488	99488
R-squared	.2059	.2042	.204	.2095
Industry Fixed Effect	YES	YES	YES	YES

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

The table shows results from FMB-regressions of daily log returns on corporate characteristics and market risk factors in the Recovery. The first column presents "metric one", with the subsequent column presenting the corresponding metric. The sample includes common stocks with fiscal year-end prior to January 31st. listed on the NYSE, NASDAQ, and AMEX. Financial, utility, and not-for-profit firms are removed, in addition to penny and small-capitalization stocks. Regressions are controlled for industry-fixed effects after the Fama-French 49 industry definition.

7.2 Fundamental Exposure and Stock Returns

In this chapter, we discuss fundamental exposure to COVID-19. The second hypothesis states that the importance of cash and leverage should be magnified (reduced) for firms with high (low) fundamental COVID-19 exposure. To test this we integrate indicator variables for high and low fundamental COVID-19 exposure, and interact these with cash and leverage. The inclusion of indicator variables and interaction terms allows firms with different exposure to social distancing to have different effects of capital structure and cash. We use metric four in the discussion, while metric one is included in the Appendix.

7.2.1 Incubation

Consistent with the results in Subchapter 7.1.1, we find that cash, short- and long-term debt are not determinants of stock return in the Incubation. We find that the majority of interaction terms between cash and firms with high fundamental exposure to COVID-19 are positive and significant. This is the case for both metric four (Table 7.4) and one (Table A.1 in Appendix). Interestingly, Fahlenbrach et al. (2020) find the same effect, but in the Collapse. The same effect detected in time periods could be due to different definitions of time periods.

The significant interaction terms for exposed firms indicate that they experience higher stock returns from their cash holdings. Since cash in and of itself is not a determinant of stock returns, cash holdings are only beneficial for highly exposed firms in the Incubation. When uncertainty about future cash flow rises, firms want to hold more cash to relieve financial stress. The fact that cash is beneficial for exposed firms indicates growing disturbance. Exposed firms, like the travel industry, will likely be the first to notice the effects of the upcoming crisis. Even though there yet are no travelling restrictions, consumers might travel less due to recommendations. Uncertainty of future prospects are thus greater for this industry, and they would probably gain from higher cash holdings.

Highly exposed firms measured by affected-share have higher returns from their long-term debt in both metrics. However, the majority of other interactions with long-term debt are insignificant. In addition, high fundamental exposure to COVID-19 measured by affected share and TMW yields lower return for firms in metric four and one respectively. All interaction terms for resilient firms are insignificant. Resilient firms do not experience any additional effect from cash and leverage.

Table 7.4: Incubation: Fundamental Exposure and Stock Return: metric four

	(1) Affected Share	(2) Communication Share	(3) Presence Share	(4) Customer Share	(5) Teamwork share	(6) TMW	(7) TME
Cash/Assets * resilient	-.0008	.0005	-.0002	.0025	-.0005	.0008	-.0001
	(.0028)	(.0031)	(.0025)	(.0026)	(.0029)	(.0027)	(.0028)
Cash/Assets * exposed	.0109***	.0016	.0133***	.0056	.0039	.0089**	.0083**
	(.004)	(.0046)	(.0041)	(.0036)	(.0039)	(.0039)	(.0037)
St Debt/ (Market + Liabilities) * resilient	-.0013	.0061	.0023	-.0028	-.0029	-.0053	-.0006
	(.0095)	(.0089)	(.0093)	(.0093)	(.0104)	(.0103)	(.0105)
St Debt/ (Market + Liabilities) * exposed	.0011	.0144*	.0019	-.0004	.0047	.0016	.0026
	(.0087)	(.0075)	(.008)	(.0078)	(.0084)	(.0078)	(.0076)
Lt Debt/ (Market + Liabilities) * resilient	.002	-.0013	-.0016	.0012	.0002	.002	.0004
	(.0025)	(.0028)	(.0028)	(.0023)	(.0025)	(.002)	(.0027)
Lt Debt/ (Market + Liabilities) * exposed	.0062**	-.0027	.003	.0044	.0007	0	-.0002
	(.0025)	(.0023)	(.0022)	(.0029)	(.002)	(.0024)	(.0026)
Resilient	-.0001	0	.0008	.0002	.0013	.0011	.001
	(.0009)	(.0011)	(.001)	(.0011)	(.001)	(.0008)	(.0011)
Exposed	-.0025**	-.0011	-.0016	-.0002	.0004	-.0016*	-.0015*
	(.001)	(.001)	(.001)	(.001)	(.0012)	(.0008)	(.0008)
St Debt/ (Market + Liabilities)	.0039	-.0034	.004	.0051	.0027	.0056	.0044
	(.0043)	(.0058)	(.0036)	(.0066)	(.0047)	(.0043)	(.0042)
Lt Debt/ (Market + Liabilities)	-.0006	.0022	.001	-.0005	.0009	.0003	.0007
	(.0014)	(.0018)	(.0018)	(.002)	(.0017)	(.0016)	(.0018)
Cash/Assets	-.0005	-.0001	-.0012	-.0016	0	-.0011	-.0007
	(.0021)	(.0018)	(.0019)	(.002)	(.0021)	(.0019)	(.0019)
Observations	31155	31155	31155	31155	31155	31365	31365
R-squared	.1886	.1904	.1896	.1896	.1876	.188	.1881
Industry Fixed Effect	YES	YES	YES	YES	YES	YES	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

The table shows results from FMB-regressions of daily log returns on fundamental exposure to COVID-19 interacted with cash, short- and long-term market leverage in the Incubation. Each column represents a different measure of Fundamental exposure. The sample includes common stocks with fiscal year-end prior to January 31st. listed on the NYSE, NASDAQ and AMEX. Financial, utility and not-for-profit firms are removed, in addition to penny and small-capitalization stocks. Regressions are controlled for industry-fixed effects after the Fama-French 49 industry definition, as well as market risk factors and corporate characteristics.

7.2.2 Collapse

In Subchapter 7.1.2 we claim that cash and leverage are positive and negative determinants of stock returns. Thus, it is quite surprising that the majority of the interaction terms with cash are insignificant in metric four (Table 7.5) and metric one (Table A.2, Appendix) when the stock market crashes. We expected the signs to be positive for highly exposed firms, and negative (or close to zero) for highly resilient firms. This is not the case as the signs of the interaction terms are contradicting across the indexes and level of resilience. The same applies for short-term debt. The conflicting signs and lack of statistical significance lead us to believe that firms do not gain or lose any additional value from cash holdings or short-term debt.

While it is surprising that the coefficients are insignificant, some explanation can be given for the interaction terms with cash. The magnified effect exposed firms experience from cash is found prior to the stock market crash. As mentioned in Subchapter 5.5 there is little span in the bottom 75% of KP indexes, meaning that resilient firms do not differ vastly in resilience level from the reference category. However, this is not an explanation for the insignificant results in the DN interaction terms.

The interaction term for long-term debt provides more intriguing results. Metric four yields no significance, although the signs are economically intuitive. The signs are logical for both exposed and resilient firms in four out of seven indexes. Exposed firms are presumed to have a greater percentage of revenue shortfall compared to the median 50%, while the opposite is assumed for resilient firms. Thus, the risks associated with exposed and resilient firms are higher and lower, respectively. For that reason, the interaction term signs should be negative and positive for exposed and resilient firms. In contrast to metric four, metric one (Table A.2, Appendix) yields some significance for highly exposed firms. These interactions are positive, indicating that long-term debt is of less importance for highly exposed firms. This finding is counter-intuitive and speaks in disfavour of our second hypothesis. Moreover, this finding is extra robust as affected share and TMW are the main measurements from KP and DN. Fahlenbrach et al. (2020) find similar results, although they are not significant at the 5% level.

Given that metric one and four yielded similar results in Subchapter 7.1.2, it is puzzling that the results differ vastly when including measures of social distancing. Although metric one yields statistically significant interaction terms they lack economical intuition. It is counter-intuitive that highly exposed firms supposedly are affected less by their holdings of long-term debt. Our reasoning is supported by the findings in metric four. The interaction terms in metric four have opposite signs of those in metric one, although the results are not significant. We have gone over our estimation procedure and have not discovered any errors in the creation of the variables. While it can be difficult to state why metric one suggests that highly exposed firms experience lower stock price reductions from long-term debt, the culprit could be an omitted variable. For instance, it could be that high exposure firms may have book values of assets lower than market value of assets, which can underestimate their collateral and hence make it seem that debt is of less importance.

Last, we find that the majority of fundamental exposure indicator variables are insignificant. This is surprising given that Fahlenbrach et al. (2020) finds that exposed firms see lower returns. An explanation of the weaker significance levels may be the robust standard errors of the FMB compared to OLS. Based on the work of Pagano et al. (2020), we would expect a statistically difference in returns between resilient and exposed industries for all indexes. However, remember that we control our regressions for industry-fixed effects. Therefore, it is likely that some of the effect found by Pagano et al. (2020) is captured by our industry controls.

Table 7.5: Collapse: Fundamental Exposure and Stock Return: metric four

	(1) Affected Share	(2) Communication Share	(3) Presence Share	(4) Customer Share	(5) Teamwork share	(6) TMW	(7) TME
Cash/Assets * resilient	.0073	.012	.0006	.0019	.0034	-.0017	.0005
	(.0095)	(.008)	(.0104)	(.0066)	(.0101)	(.0127)	(.0104)
Cash/Assets * exposed	.0035	.0219	-.0007	-.001	.0023	-.0199	-.0272
	(.0096)	(.0161)	(.0143)	(.0093)	(.0157)	(.0155)	(.0166)
St Debt/ (Market + Liabilities) * resilient	-.0083	-.0225	.0188	-.0648*	.0091	-.0228	-.0126
	(.0302)	(.0295)	(.0233)	(.034)	(.0263)	(.0305)	(.0314)
St Debt/ (Market + Liabilities) * exposed	.014	-.029	.0077	-.0768**	-.0078	-.024	-.0407*
	(.027)	(.0332)	(.0293)	(.0337)	(.0281)	(.0181)	(.0208)
Lt Debt/ (Market + Liabilities) * resilient	.0065	.0046	-.0019	-.0065	.0069	.0127	.0042
	(.0088)	(.0092)	(.0077)	(.01)	(.007)	(.008)	(.0088)
Lt Debt/ (Market + Liabilities) * exposed	-.0012	-.0121	0	.0014	-.0149	.0026	-.0073
	(.009)	(.0119)	(.012)	(.0078)	(.0137)	(.0083)	(.0087)
Resilient	-.0025	-.0001	.0041	.0002	.0009	-.0021	-.0025
	(.0025)	(.0025)	(.0041)	(.0034)	(.003)	(.0037)	(.0028)
Exposed	.0051	-.003	.0057	-.0004	.002	.0049	.0074*
	(.0052)	(.005)	(.0043)	(.004)	(.0072)	(.004)	(.0041)
St Debt/ (Market + Liabilities)	-.0352**	-.012	-.0388***	.0263	-.0306*	-.0222**	-.0178*
	(.0159)	(.0266)	(.0135)	(.0195)	(.0154)	(.0104)	(.0098)
Lt Debt/ (Market + Liabilities)	-.0281**	-.0255**	-.0267**	-.0252*	-.0247**	-.0302**	-.0263**
	(.0109)	(.0115)	(.0101)	(.0134)	(.0093)	(.0119)	(.0113)
Cash/Assets	.0084	.0042	.0115*	.0111*	.01	.0151*	.0143*
	(.0057)	(.0057)	(.0063)	(.0058)	(.0061)	(.0082)	(.0072)
Observations	18663	18663	18663	18663	18663	18789	18789
R-squared	.234	.2369	.2353	.2357	.2383	.2351	.2339
Industry Fixed Effect	YES	YES	YES	YES	YES	YES	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

The table shows results from FMB-regressions of daily log returns on fundamental exposure to COVID-19 interacted with cash, short- and long-term market leverage in the Collapse. Each column represents a different measure of Fundamental exposure. The sample includes common stocks with fiscal year-end prior to January 31st. listed on the NYSE, NASDAQ and AMEX. Financial, utility and not-for-profit firms are removed, in addition to penny and small-capitalization stocks. Regressions are controlled for industry-fixed effects after the Fama-French 49 industry definition, as well as market risk factors and corporate characteristics.

7.2.3 Recovery

When FED announces their market intervention cash is no longer as big of a concern. The advantage of initially having high cash holdings disappears as liquidity is easy to access. FED eases market frictions and supplies funds to firms in need. The interaction terms with cash all have negative coefficients. Metric one (Table A.3, Appendix) yields significant results for the interaction terms with the KP indexes for high exposure. Interpreted this means that highly exposed firms have lower returns because of their cash holdings. For metric four (Table 7.6), only one of the KP indexes for highly exposed firms yields significance. Although significance is weaker for metric four, all negative coefficients indicate that exposed firms lose from higher cash holdings. The initial value highly exposed firms gained in the Incubation from cash holdings thus seems to be lost during the Recovery. It is worth mentioning that the results are weaker for metric four, which appears to be a more robust metric. Further supported by the insignificance of DN interaction terms.

The short- and long-term debt interaction terms are all insignificant, indicating that exposure to the pandemic does not alter the effect of leverage. The same results are found from the fundamental exposure variables themselves, with the majority yielding insignificant results.

Table 7.6: Recovery: Fundamental Exposure and Stock Return: metric four

	(1) Affected Share	(2) Communication Share	(3) Presence Share	(4) Customer Share	(5) Teamwork share	(6) TMW	(7) TME
Cash/Assets * resilient	-.002	-.0034*	-.0028	-.0019	-.0036	-.002	-.0032
	(.0023)	(.0021)	(.0023)	(.002)	(.0023)	(.0022)	(.0022)
Cash/Assets * exposed	-.0033	-.007**	-.0029	-.0035	-.0025	-.0015	-.0011
	(.0031)	(.0033)	(.0034)	(.0025)	(.0033)	(.0033)	(.0033)
St Debt/ (Market + Liabilities) * resilient	.0017	.0072	-.0068	.0014	-.0021	-.0005	.0028
	(.0101)	(.0085)	(.0087)	(.0086)	(.0109)	(.011)	(.0103)
St Debt/ (Market + Liabilities) * exposed	.0036	.0106	.0047	.0041	.0055	.0105	.0122
	(.0089)	(.0089)	(.0088)	(.0104)	(.0097)	(.0092)	(.0094)
Lt Debt/ (Market + Liabilities) * resilient	-.0033	-.0012	-.0003	.0026	-.0037*	-.0009	-.0024
	(.0025)	(.0021)	(.0024)	(.0019)	(.0022)	(.002)	(.0021)
Lt Debt/ (Market + Liabilities) * exposed	.0015	.0007	.0007	.0007	.0021	.0023	.0028
	(.0023)	(.0025)	(.0022)	(.0023)	(.0022)	(.0021)	(.0018)
Resilient	.0009	.0011*	-.0003	.0018*	.0002	.0001	.0004
	(.0008)	(.0006)	(.0009)	(.0009)	(.001)	(.0008)	(.0009)
Exposed	-.0008	.0004	-.0001	.0003	-.0008	-.0009	-.0009
	(.001)	(.0012)	(.0009)	(.0009)	(.0014)	(.0008)	(.0008)
St Debt/ (Market + Liabilities)	.0055	.0004	.0062	.0049	.0057	.0035	.0025
	(.0053)	(.0063)	(.0054)	(.0066)	(.006)	(.0053)	(.0054)
Lt Debt/ (Market + Liabilities)	.0043*	.0043*	.0041*	.0028	.0044*	.0039	.0042*
	(.0026)	(.0023)	(.0023)	(.0026)	(.0023)	(.0026)	(.0023)
Cash/Assets	.0013	.0024	.0018	.0016	.0019	.0012	.0016
	(.0016)	(.0015)	(.0017)	(.0017)	(.0018)	(.0018)	(.0018)
Observations	98480	98480	98480	98480	98480	99152	99152
R-squared	.2219	.2235	.2225	.2235	.2224	.2211	.2205
Industry Fixed Effect	YES	YES	YES	YES	YES	YES	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

The table shows results from FMB-regressions of daily log returns on fundamental exposure to COVID-19 interacted with cash, short- and long-term market leverage in the Recovery. Each column represents a different measure of Fundamental exposure. The sample includes common stocks with fiscal year-end prior to January 31st. listed on the NYSE, NASDAQ and AMEX. Financial, utility and not-for-profit firms are removed, in addition to penny and small-capitalization stocks. Regressions are controlled for industry-fixed effects after the Fama-French 49 industry definition, as well as market risk factors and corporate characteristics.

7.3 Summary of Results

When revenue stops, firms with less leverage and more cash perform significantly better than firms with more leverage and less cash. During the Collapse the difference between financially flexible and inflexible firms amounts to 12.3% using metric one, and 20.5% using metric four. With a median return in our sample of -53.4%, this entails that the stock price decreases 23.2% and 38.4% less for flexible firms respectively. The majority of the difference in returns is not regained during the next 112 trading days.

Including social distancing measurements, we find that exposed firms gain from higher cash holdings during the Incubation. Metric one suggests that long-term debt is of less importance for firms exposed to the pandemic during the Collapse, which is not economically intuitive. We argue that an omitted variable could be the culprit. Our argumentation is further supported by more reasonable findings in metric four. Furthermore, metric one gives clear indications that the effect of cash for exposed firms during the Incubation is reversed in the Recovery. This is only partially supported by metric four, yielding some ambiguity about the results. Last, we do not find that resilient firms benefit less from high cash holdings and low leverage. We find weak indications that being classified as exposed in itself leads to lower stock returns in the Incubation. Being classified as resilient in itself does not lead to higher stock returns.

8 Validity and Robustness

In this chapter, we analyse the validity and robustness of our results. We investigate whether our results are due to a mechanical leverage effect in Subchapter 8.1, followed by further robustness tests in Subchapter 8.2.

8.1 The Mechanical Leverage Effect

Inspired by the approach of Fahlenbrach et al. (2020), we want to validate that our findings are not simply documentation of the leverage effect. The difference in returns between financially flexible and inflexible firms in the Collapse is not regained in the Recovery. If the lower equity returns had been a result of the elasticity of equity, firms with higher leverage should have regained all of their lost value (Merton, 1974). No evidence of a leverage effect when the market recovers, makes us believe that the return difference in the Collapse can not be entirely explained by the leverage effect either.

Merton (1974) developed a framework where he describes the firm's equity as a call option on the underlying assets, Equations 8.1, 8.2, and 8.3. This model is useful in determining the effect of leverage when asset prices change. The value of equity (S) is described as a function of the value of assets (V) subtracting the face value of debt (F). The remaining terms in the equations are the risk-free rate (r), asset volatility (sigma), the normal distribution (N), Euler's number (e), time today (t), and time to maturity of debt (T).

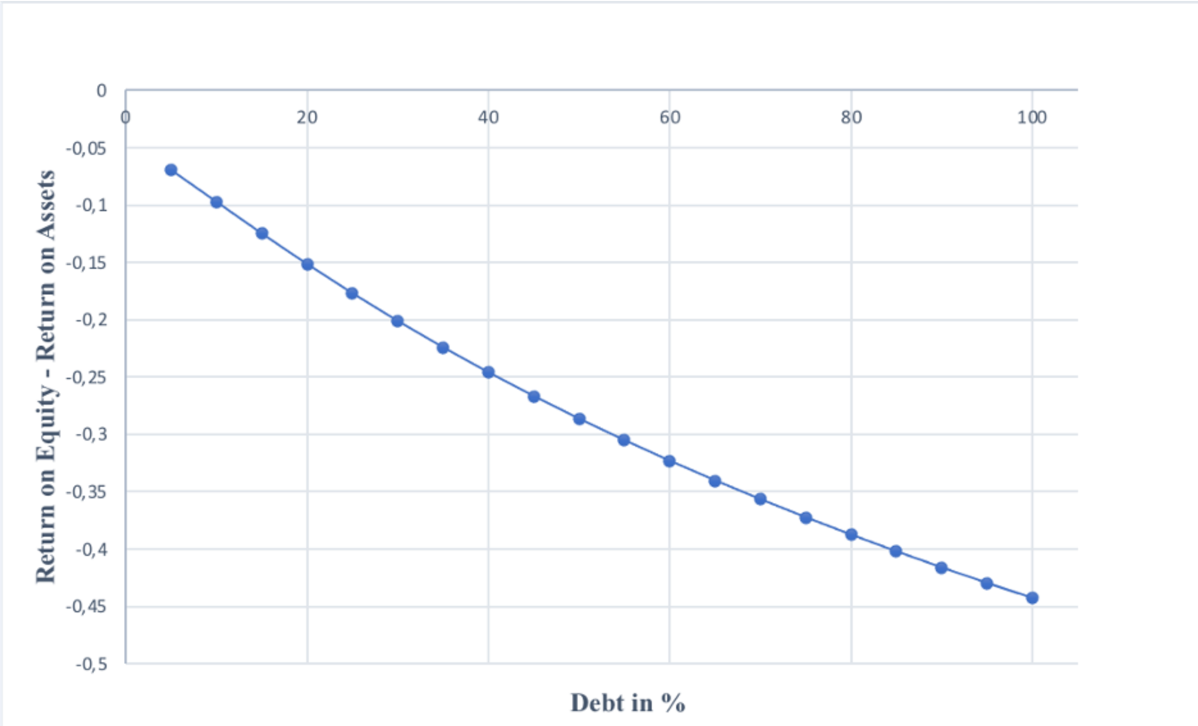
$$S\left(t\right) = V\left(t\right) * N\left(d_1\right) - F * e^{-r(T-t)} * N\left(d_2\right) \tag{8.1}$$

$$d_1 = \frac{\ln\left(\frac{V}{F}\right) + \left(r + \frac{\sigma^2}{2}\right) * (T-t)}{\sigma * \sqrt{(T-t)}} \tag{8.2}$$

$$d_2 = d_1 - \sigma * \sqrt{(T-t)} \tag{8.3}$$

To illustrate the leverage effect, we present a simple mathematical example. In the Collapse the median firm with a net debt ratio of less than 1% saw equity losses of 40% continuously compounded, exhibiting that asset prices fell from 100 to 67. The risk free-rate is set to 0%. To give the numerical example we need to make assumptions regarding asset volatility and debt maturity. The time to maturity of debt is set to 10 years, and volatility to 30%. Since equity and assets are almost identical for these firms, the difference between equity and asset returns equals zero. If no leverage effect is observed, increasing leverage should not cause equity returns to be lower than asset returns.

Figure 8.1: The Leverage Effect with Constant Volatility



The figure illustrates the Merton (1974) leverage effect with constant volatility. We assume asset value reduction from 100 to 67, a risk-free rate of 0%, time of maturity of 10 years, and volatility of 30%.

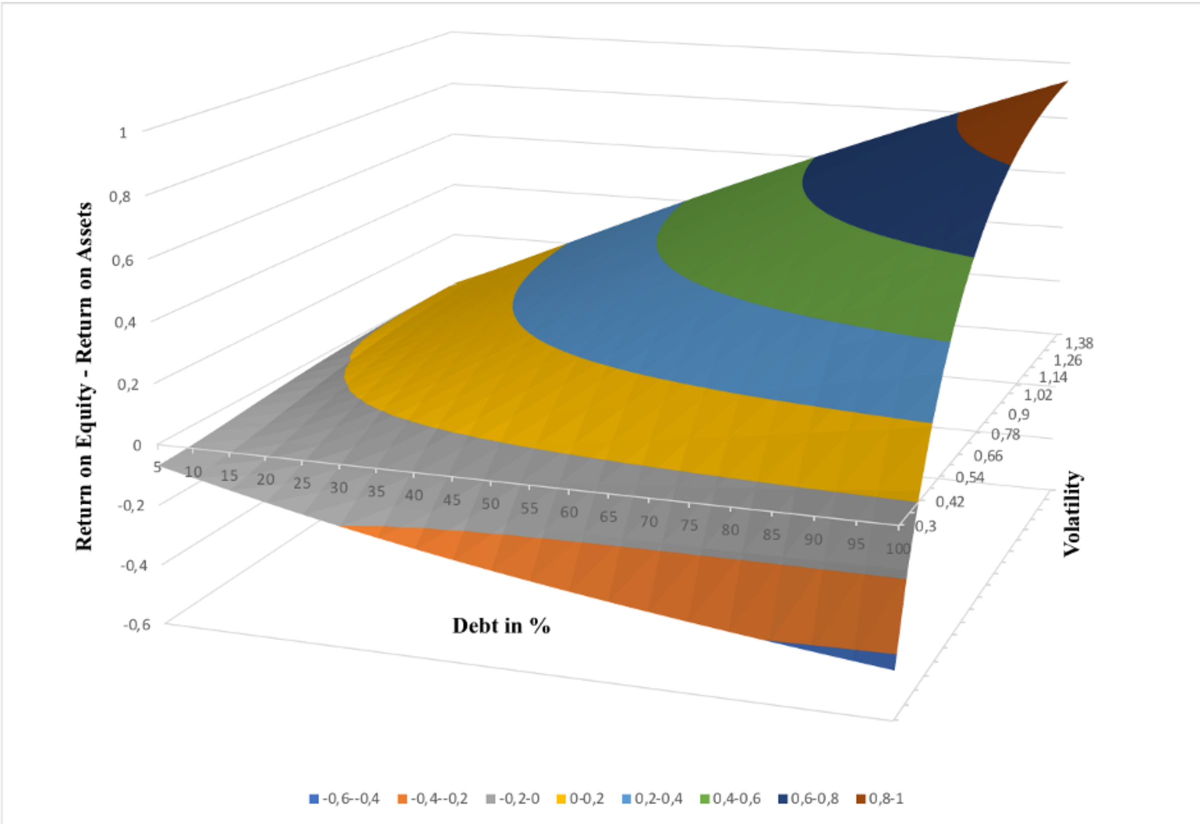
Figure 8.1 illustrates the leverage effect. Similar to Fahlenbrach et al. (2020) we find that the elasticity of equity increases when leverage (in percentage) increases, causing lower equity returns. In other words, the greater the debt, the lower the equity returns. The leverage effect is symmetrical and the similar effect, although opposite, would be the case when asset prices rise. Arguing that our findings in the Collapse are nothing more than a testament to the increased elasticity of equity with increasing levels of debt.

Figure 8.2: CBOE Volatility Index (VIX)

The figure shows the development in the CBOE Volatility Index (VIX) from January to December 2020. It is constructed by using data collected from Yahoo Finance.

However, one of the main assumptions concerning the Merton framework is that the underlying volatility is constant (Merton, 1974). This assumption is violated, as volatility skyrocketed when the pandemic hit with full force. Figure 8.2 displays that the volatility index, VIX, went from approximately 15 at the start of the year to over 80 at its peak in March. The assumption of constant volatility is invalid, as future volatility increased over 5 times and stabilized at a greater level. From Equations 8.1, 8.2, and 8.3 we see that an increase in volatility will lead to increased equity values. Allowing for varying levels of debt and volatility gives us Figure 8.3.

Figure 8.3: The Leverage Effect with Variable Volatility



The figure illustrates the Merton (1974) leverage effect. We assume asset value reduction from 100 to 67, a risk-free rate of 0%, and a time to maturity of 10 years.

Increasing volatility causes equity returns to be vastly greater than asset returns. The volatility effect is astounding, a leverage of 80% with a volatility of 30% would give negative equity returns of 38.8%. If volatility doubled to 60%, the effect would be positive 31.7%. The same applies for lower levels of debt, with the effect of 25% leverage going from negative to positive for a doubling in volatility. The increasing volatility speaks against the leverage effect, which is in line with the findings of Fahlenbrach et al. (2020).

8.2 Robustness Tests

By employing the FMB-methodology we have in one way already performed a robustness test. The FMB-regressions are robust for cross-sectional correlations of the error terms and the statistical power is less likely to be overemphasized. Additionally, the results are robust for different implementations of cash and leverage (metrics two and three).

In order to validate our results further, it is constructive to conduct robustness tests for our main metrics (one and four). To control for outliers in the data, we both truncate and winsorize cash and leverage at the 1st and 99th percentile. Winsorizing implies replacing the variable value with a less extreme value, while truncating is removing extreme values from the sample. The purpose is to make sure that outliers varying drastically from the true population are not overvalued (Ghosh and Vogt, 2012). When winsorizing, the magnitude and sign of all coefficients and their significance levels remain identical with our earlier findings (Table A.4, Appendix). The same applies when truncating (Table A.5, Appendix). The only exceptions are found when truncating the Collapse. In metric one, both long- and short-term debt lose some significance, despite remaining significant at the 10% level. Similarly, short-term debt has a p-value of 10.6% in metric four.

A third control is to execute the regressions without controlling for industry-fixed effects (Table A.6, Appendix). Initially we controlled for industry because we wanted to find the true effect of cash and leverage, and not figure out whether industries with different leverage performed differently. Removing the industry-fixed effects and running the regressions again, yields the same results as the truncated regression during the Collapse. This further strengthens our findings.

Overall we find that long-term debt in metric four and cash for both metrics are robust for both winsorizing, truncating, and excluding industry-fixed effects. Long-term debt in metric one and short-term debt in both metrics are robust to winsorizing, but loses the statistical power when truncating and excluding industry-fixed effects.

The potential danger of robustness tests such as truncating and winsorizing is that they bias the results. They may undervalue the importance of the outlier (a valid datapoint) and lead to results that differ from the true population (Ghosh and Vogt, 2012). This entails that we do not discard the validity of our results using metric one, but rather recognize that they change significance levels when truncating. For metric four it entails that long-term debt is robust, and hence solidifies our initial results.

9 Limitations and Further Research

Limitations in respect to our research are mainly concerning our data. First, there is a trade-off between having the most up-to-date financial statements and correcting for accounting lag. We disregard accounting lag, as updated information about cash and leverage is of particular interest in times of crisis. As long as financial statements are unaffected by the upcoming crisis, accounting lag will not influence the firm's liquidity and available collateral. Unfortunately, accounting lag can cause stock price reactions when financial statements are made public, and not considering accounting lags can slightly bias our results. Second, we use outdated long-term issuer credit ratings. Compustat has not updated the ratings since February 2017. This can be the reason behind our insignificant results in Subchapter 7.1.2. Third, to prevent the overvaluation of small firms, we exclude firms with a market capitalization below the 10th percentile. Another way of solving this problem could be to value-weight the regressions. Fourth, it is worth mentioning that our sample is fairly small compared to Fahlenbrach et al. (2020), due to all filtering requirements.

The choice of method limits our opportunities to capture the isolated effect of the FEDs market intervention. The first trading day after the announcement the S&P 500 grew by 9%[7], and growth from intervention day to August 31st was 45%[8]. The growth on the first trading day after FEDs announcement amounts to 20% of the total growth from intervention to August 31st[9]. The financially inflexible firms likely regained some lost value on this day, but FMB is unable to verify this. With a too short time period the FMB t-statistics would not be able to yield any meaningful results, as they rely on the length of the time series.

Limitations regarding our measures of social distancing are twofold. First, firms must be classified into one industry. Fundamental exposure for conglomerates is thus likely to be skewed. Second, the indexes on fundamental exposure do not account for the exposures of the firm's suppliers and customers. A firm that is categorised as resilient, should perhaps be categorised as exposed if its suppliers or customers are exposed. More inclusive

[7]Returns March 23rd to 24th, calculated: $\ln(2447.33/2237.4) = 9\%$
[8]Returns March 23rd to August 31st, calculated: $\ln(3500.31/2237.4) = 44.75 = 45\%$
[9]Returns on Intervention day in percentage of period returns, calculated: $9/45 = 20\%$

measurements of pandemic exposure would perhaps have a greater span than the KP indexes, and reveal that the median firms in our sample actually are more exposed than suggested in the summary statistics. This in turn could make the importance of resilience more prominent.

For further research we have two main suggestions: one related to social distancing, the other to financial flexibility. The first suggestion is to go in-depth on different types of social distancing measurements, including both exposure of suppliers and customers. Could other more inclusive measurements regarding fundamental exposure alter our conclusion? To maximize shareholder wealth, a firm must be more resilient to different exogenous shocks, in particular pandemics. In the case of sudden social distancing requirements, it is hard to change the fundamental exposure of the industry the firm operates within. Some industries are dependent on physical interactions to survive. To be more robust against future exogenous shocks, firms may consider increasing their cash holdings and lowering their leverage. The second suggestion is to investigate whether levels of cash and leverage have changed in the aftermath of the world's first major exogenous shock. If so, is the change permanent?

10 Conclusion

There are two main objectives of our master thesis. First, we study whether cash and leverage are positive and negative determinants of equity returns in the stock market crash under the COVID-19 pandemic, respectively. Second, we investigate whether the effects of financial flexibility are magnified (reduced) for firms highly exposed (resilient) to the pandemic. The purpose of our study is not to come up with some investment strategy or other financial advice, but to uncover the mechanisms of the corporate balance sheet during an unexpected economic shock.

To answer our hypotheses, we perform FMB-regressions for firms with fiscal year-end prior to February 2020. Based on our analysis, we are able to verify our first hypothesis. When using book leverage we find that financially flexible firms' stock price falls 23.2% less than financially inflexible firms. When using market leverage this difference amounts to 38.4%. We argue that the increased magnitude of market leverage is due to its more robust measurement of collateral and risk, as it directly reflects investor beliefs of asset values. Different accounting practices can bias the value of assets, and hence misjudge the collateral available to borrow against. The lower magnitude of stock returns when using book leverage can be an indication that assets are undervalued on the balance sheet.

Running regressions after FEDs market intervention on March 23rd, display that the difference between financially flexible and inflexible firms appears to be constant. This argues against a mechanical leverage effect, which would advocate that financially inflexible firms would regain all lost value. A numerical example is presented, where we demonstrate that the increased firm volatility offsets the mechanical leverage effect.

The second hypothesis is partially validated. Exposed firms appear to be gaining from higher cash holdings prior to the lockdown in Italy on February 21st. We get some results suggesting that this effect is reversed after FEDs market intervention on March 23rd, but the results are inconclusive. Furthermore, we do not find a significant magnified effect between debt and exposed firms. Market leverage has economically intuitive signs, but lack statistical power. Counter-intuitively, book leverage suggests that long-term debt is of less importance for exposed firms. We find weak indications that being classified as exposed in itself leads to lower stock returns in the Incubation. Regarding resilient firms, we get no results suggesting that they benefit less from financial flexibility. Furthermore, being classified as resilient in itself does not lead to higher stock returns.

A novelty with our study is the implementation of market leverage. Based on our analysis we believe that market leverage is a more reliable measurement of leverage. We argue that market leverage yields economically intuitive results, which is not always the case for book leverage. Furthermore, market leverage is more robust to both removals of industry-fixed effects, winsorizing, and truncating. By implementing this measure we do not only validate the results of Fahlenbrach et al. (2020), but show that the value of financial flexibility is even greater than initially suggested. The robustness of our results across different debt metrics strengthens the internal validity, as the choice of metric does not influence our conclusion, but only the magnitude of our results.

References

Alfaro, L., Chari, A., Greenland, A., and Schott, P. (2020). Aggregate and firm-level stock returns during pandemics, in real time. *National Bureau of Economic Research.* https://www.nber.org/papers/w26950.

Berk, J. H. and DeMarzo, P. (2020a). *Corporate finance: Global edition*, volume 5th. Harlow Pearson Education. Pages 523-546.

Berk, J. H. and DeMarzo, P. (2020b). *Corporate finance: Global edition*, volume 5th. Harlow Pearson Education. 690-693.

Berk, J. H. and DeMarzo, P. (2020c). *Corporate finance: Global edition*, volume 5th. Harlow Pearson Education. Page 658.

Carhart, M. (1997). On persistence in mutual fund performance. *The Journal of Finance.* https://onlinelibrary.wiley.com/doi/full/10.1111/j.1540-6261.1997.tb03808.x.

Cochrane, J. H. (2005). *Asset Pricing: Revised Edition.* Princeton University Press. Pages 245-252.

DeAngelo, H. and DeAngelo, L. (2009). Capital structure, payout policy, and financial flexibility. *Working Paper.* https://papers.ssrn.com/sol3/papers.cfm?abstract$_id = 916093.

Ding, W., Levine, R., Lin, C., and Xie, W. (2020). Corporate immunity to the covid-19 pandemic. journal of financial economics. *Journal of Financial Economics.* https://www.sciencedirect.com/science/article/pii/S0304405X21000957.

Dingel, J. and Neiman, B. (2020). How many jobs can be done at home? *Journal of Public Economics.* https://www.sciencedirect.com/science/article/pii/S0047272720300992?

Fahlenbrach, R., Rageth, K., and Stulz, R. M. (2020). How valuable is financial flexibility when revenue stops? evidence from the covid-19 crisis. *The Review of Financial Studies.* https://academic.oup.com/rfs/advance-article/doi/10.1093/rfs/hhaa134/6046943.

Fama, E. F. and French, K. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Finance.* https://rady.ucsd.edu/faculty/directory/valkanov/pub/classes/mfe/docs/fama$_f rench_j f e_1 993.pdf$.

Fama, E. F. and French, K. (2015). A five-factor asset pricing model. *Journal of Finance.* https://www.sciencedirect.com/science/article/pii/S0304405X14002323.

French, K. R. (2021). Description of fama/french factors. *Ken French Data Library.* http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data$_L ibrary/f - f_3 developed.html$.

Fresard, L. (2010). Financial strength and product market behavior: The real effects of corporate cash holdings. *The Journal of Finance.* https://onlinelibrary.wiley.com/doi/full/10.1111/j.1540-6261.2010.01562.x.

Gerding, F., Martin, T., and Nagler, F. (2020). Sovereign debt and equity returns in the face of disaster. *Working Paper.* https://papers.ssrn.com/sol3/papers.cfm?abstract$_i d = 3572839$.

Ghosh, D. and Vogt, A. (2012). Outliers: An evaluation of methodologies. *JSM.* http://www.asasrms.org/Proceedings/y2012/Files/304068$_{7}$2402.pdf.

Gill, V. (2020). Coronavirus: This is not the last pandemic. *BBC.* https://www.bbc.com/news/science-environment-52775386.

Hensvik, L., Le Barbanchon, T., and Rathelot, R. (2020). Job search during the covid-19 crisis. *Working Paper.* https://papers.ssrn.com/sol3/papers.cfm?abstract$_{i}d = 3598126fbclid = IwAR01BVaOK1EDua_{E}m6JXP1EBkJ6tWm17oDbyumghS1JFFOmcEqrrTZdyges$.

Koren, M. and Pető, R. (2020). Business disruptions from social distancing. *Plos One.* https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0239113.

Li, Y. (2020). This was the fastest 30 % sell-off ever, exceeding the pace of declines during the great depression. *CNBC.* https://www.cnbc.com/2020/03/23/this-was-the-fastest-30percent-stock-market-decline-ever.html.

Merton, R. C. (1974). On the pricing of corporate debt: The risk structure of interest rates. *The Journal of Finance.* https://www.jstor.org/stable/2978814?casa$_{t}oken = o2ZZecQ5QPAAAAAA$.

Novy-Marx, R. (2013). The other side of value: The gross profitability premium. *Journal of Financial Economics.* https://www.sciencedirect.com/science/article/pii/S0304405X13000044.

Opler, T. C. and Titman, S. (1994). Financial distress and corporate performance. *The Journal of Finance.* https://www.jstor.org/stable/2329214?seq=1metadata$_{i}nfo_{t}ab_{c}ontents$.

Oseberg, H. (2016). Penny stocks = muligheter. *Nordnet.* https://www.nordnet.no/blogg/penny-stocks-muligheter/.

Pagano, M., Wagner, C., and Zechner, J. (2020). Disaster resilience and asset prices. *Working Paper.* https://papers.ssrn.com/sol3/papers.cfm?abstract$_{i}d = 3603666$.

Ramelli, S. and Wagner, A. F. (2020). Feverish stock price reactions to covid-19. *Oxford Academic.* https://academic.oup.com/rcfs/article/9/3/622/5868420.

Sánchez, J. M. and Yurdagul, E. (2013). Why are corporations holding so much cash? *Federal Reserve Bank of St. Louis.* https://www.stlouisfed.org/publications/regional-economist/january-2013/why-are-corporations-holding-so-much-cash.

WHO (2020a). Coronavirus. *World Health Organization.* https://www.who.int/health-topics/coronavirus.

WHO (2020b). Pneumonia of unknown cause – china. *World Health Organization.* https://www.who.int/csr/don/05-january-2020-pneumonia-of-unkown-cause-china/en/.

WHO (2021). Timeline of who's covid-19 response. *World Health Organization.* https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline.

Appendix

Table A.1: Incubation, Fundamental Exposure and Stock Returns: metric one

	(1) Affected Share	(2) Communication Share	(3) Presence Share	(4) Customer Share	(5) Teamwork Share	(6) TMW	(7) TME
Cash/Assets * resilient	-.0012	.0018	.0006	.0027	-.001	.0003	-.0006
	(.0028)	(.0029)	(.0025)	(.0024)	(.0029)	(.0026)	(.0027)
Cash/Assets * exposed	.0056	.0025	.0123***	.0023	.0037	.0093**	.0084**
	(.0041)	(.0039)	(.004)	(.0033)	(.0037)	(.004)	(.0041)
St Debt /Assets* resilient	-.0024	.0072	-.0038	.0008	-.0051	-.0028	-.0028
	(.0072)	(.0083)	(.0077)	(.0085)	(.0072)	(.0069)	(.0071)
St Debt /Assets* exposed	-.0029	.0068	.0008	-.0039	.0004	.0024	.0025
	(.0088)	(.0065)	(.0074)	(.0067)	(.0085)	(.0071)	(.0067)
Lt Debt /Assets* resilient	.002	.0006	.0006	.0013	-.001	.001	-.0007
	(.0019)	(.0021)	(.0013)	(.0019)	(.0022)	(.0018)	(.0023)
Lt Debt/Assets* exposed	.0035**	-.0001	.0037**	.0021	.0015	.0008	.0004
	(.0014)	(.0016)	(.0018)	(.0021)	(.0019)	(.0014)	(.0014)
Resilient	-.0001	-.0008	.0003	-.0001	.0018*	.0014	.0015
	(.0009)	(.0011)	(.001)	(.0012)	(.0011)	(.0008)	(.0012)
Exposed	-.0011	-.0018	-.0019*	.0007	.0001	-.0019**	-.0017*
	(.0009)	(.0012)	(.0011)	(.001)	(.0015)	(.0008)	(.0008)
St Debt/Assets	.0063	-.0003	.006*	.0058	.0057	.0054	.0053
	(.0041)	(.005)	(.0032)	(.0055)	(.0043)	(.0037)	(.0037)
Lt Debt/Assets	-.0016	.0004	-.0002	-.0006	.0006	0	.0004
	(.0013)	(.0014)	(.0014)	(.0017)	(.0013)	(.0015)	(.0015)
Cash/Assets	-.0002	-.0008	-.0014	-.0013	0	-.0011	-.0008
	(.0022)	(.0018)	(.0019)	(.0019)	(.002)	(.0019)	(.0019)
Observations	31155	31155	31155	31155	31155	31365	31365
R-squared	.1871	.189	.1874	.1882	.1868	.1862	.1864
Industry Fixed Effect	YES	YES	YES	YES	YES	YES	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

The table shows results from FMB-regressions of daily log returns on fundamental exposure to COVID-19 interacted with cash and book leverage in the Incubation. Each column represents a different measure of Fundamental exposure. The sample includes common stocks with fiscal year end prior to January 31st. listed on the NYSE, NASDAQ and AMEX. Financial, utility and not-for-profit firms are removed, in addition to penny and small-capitalization stocks. Regressions are controlled for industry-fixed effects after the Fama-French 49 industry definition, as well as market risk factors and corporate characteristics.

Table A.2: Collapse, Fundamental Exposure and Stock Returns: metric one

	(1) Affected Share	(2) Communication Share	(3) Presence Share	(4) Customer Share	(5) Teamwork Share	(6) TMW	(7) TME
Cash/Assets * resilient	.0032	.0097	.0044	.0038	-.0015	-.0088	-.0008
	(.0097)	(.0082)	(.01)	(.0083)	(.0108)	(.0125)	(.0097)
Cash/Assets * exposed	.0203	.0446**	.0072	.0117	.0124	-.0166	-.0138
	(.015)	(.0198)	(.0128)	(.0098)	(.0156)	(.0127)	(.0121)
St Debt /Assets* resilient	-.0016	-.0326	.0198	-.0656**	.0071	-.0249	-.0056
	(.028)	(.0228)	(.023)	(.0249)	(.0236)	(.0298)	(.0284)
St Debt /Assets* exposed	.0208	-.0235	.004	-.0602**	-.0096	-.0327*	-.0368*
	(.0247)	(.0225)	(.0263)	(.0228)	(.0085)	(.0185)	(.0197)
Lt Debt /Assets* resilient	.0004	.0113*	.0056	.0067	-.0041	.0014	.0021
	(.0052)	(.0062)	(.004)	(.0067)	(.0049)	(.0037)	(.0062)
Lt Debt/Assets* exposed	.0093**	.014*	-.0008	.0177*	-.0135	.012**	.0121*
	(.0037)	(.007)	(.0105)	(.0093)	(.012)	(.0055)	(.006)
Resilient	-.0009	-.0017	.0007	-.0021	.0032	.0017	-.0026
	(.0028)	(.0029)	(.0035)	(.0042)	(.0034)	(.0034)	(.0027)
Exposed	.0003	-.0137**	.0062	-.007*	.0015	.0029	.0015
	(.0035)	(.006)	(.0043)	(.0037)	(.0056)	(.0025)	(.0032)
St Debt/Assets	-.0348**	-.0082	-.0367***	.0209	-.0272**	-.0146	-.0172*
	(.015)	(.0199)	(.0121)	(.0139)	(.0125)	(.0095)	(.0099)
Lt Debt/Assets	-.0161**	-.0202**	-.0141**	-.0216**	-.0079**	-.0161**	-.0163**
	(.0062)	(.0087)	(.0058)	(.0102)	(.0033)	(.0073)	(.0077)
Cash/Assets	.0125*	.0083	.0151**	.0131*	.0155**	.0217**	.0182**
	(.0069)	(.0054)	(.0072)	(.007)	(.0074)	(.0099)	(.0081)
Observations	18663	18663	18663	18663	18663	18789	18789
R-squared	.2274	.2282	.2279	.2291	.2306	.2275	.2265
Industry Fixed Effect	YES	YES	YES	YES	YES	YES	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

The table shows results from FMB-regressions of daily log returns on fundamental exposure to COVID-19 interacted with cash and book leverage in the Collapse. Each column represents a different measure of Fundamental exposure. The sample includes common stocks with fiscal year end prior to January 31st. listed on the NYSE, NASDAQ and AMEX. Financial, utility and not-for-profit firms are removed, in addition to penny and small-capitalization stocks. Regressions are controlled for industry-fixed effects after the Fama-French 49 industry definition, as well as market risk factors and corporate characteristics.

Table A.3: Recovery, Fundamental Exposure and Stock Returns: metric one

	(1) Affected Share	(2) Communication Share	(3) Presence Share	(4) Customer Share	(5) Teamwork Share	(6) TMW	(7) TME
Cash/Assets * resilient	-.0014	-.0027	-.0031	-.0021	-.0019	-.0012	-.0024
	(.0024)	(.0021)	(.0023)	(.0021)	(.0023)	(.0023)	(.0023)
Cash/Assets * exposed	-.0076**	-.0098**	-.0042	-.0056**	-.0039	-.0038	-.0045
	(.0034)	(.0038)	(.0032)	(.0028)	(.0032)	(.0032)	(.0033)
St Debt /Assets* resilient	.0007	.0083	-.0053	.0039	-.0009	.0031	.0022
	(.0076)	(.0065)	(.0071)	(.0072)	(.0089)	(.0088)	(.0085)
St Debt /Assets* exposed	.0028	.0078	.0066	.0033	.0059	.0129	.0124
	(.0077)	(.0075)	(.0083)	(.0087)	(.0089)	(.0085)	(.0084)
Lt Debt /Assets* resilient	-.0025	-.0016	-.001	.0006	-.0006	.0002	-.0013
	(.0018)	(.0016)	(.0013)	(.0017)	(.0016)	(.0016)	(.0016)
Lt Debt/Assets* exposed	-.0019	-.002	.0007	-.0019	.0024	-.0006	-.0011
	(.0019)	(.0016)	(.0016)	(.0019)	(.002)	(.0018)	(.0017)
Resilient	.0008	.0011*	.0001	.002**	-.0006	-.0004	.0002
	(.0009)	(.0007)	(.0009)	(.001)	(.0012)	(.0008)	(.0009)
Exposed	.0007	.0016	-.0002	.0012	-.0009	-.0002	.0003
	(.0009)	(.0014)	(.0009)	(.001)	(.0016)	(.0007)	(.0007)
St Debt/Assets	.0054	.0008	.0053	.0039	.0049	.0014	.0019
	(.0051)	(.005)	(.0049)	(.0054)	(.0053)	(.0049)	(.0051)
Lt Debt/Assets	.0033**	.0032**	.0023	.0027	.0015*	.002	.0025*
	(.0016)	(.0015)	(.0014)	(.0016)	(.0008)	(.0015)	(.0015)
Cash/Assets	.001	.0017	.0013	.0016	.0009	.0004	.0009
	(.0019)	(.0017)	(.0018)	(.0018)	(.0022)	(.0021)	(.002)
Observations	98480	98480	98480	98480	98480	99152	99152
R-squared	.2181	.2181	.2171	.2188	.2178	.2172	.2167
Industry Fixed Effect	YES	YES	YES	YES	YES	YES	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES

Standard errors are in parentheses
*** $p<.01$, ** $p<.05$, * $p<.1$

The table shows results from FMB-regressions of daily log returns on fundamental exposure to COVID-19 interacted with cash and book leverage in the Recovery. Each column represents a different measure of Fundamental exposure. The sample includes common stocks with fiscal year end prior to January 31st. listed on the NYSE, NASDAQ and AMEX. Financial, utility and not-for-profit firms are removed, in addition to penny and small capitalization-stocks. Regressions are controlled for industry-fixed effects after the Fama-French 49 industry definition, as well as market risk factors and corporate characteristics.

Table A.4: Robustness Test: Winsorizing

	(1) Incubation	(2) Incubation	(3) Collapse	(4) Collapse	(5) Recovery	(6) Recovery
St Debt / Assets	.00499		-.02835**		.00736*	
	(.003)		(.01247)		(.00383)	
St Debt / (Market + Liabilities)		.00381		-.03041**		.00852*
		(.00339)		(.01438)		(.00471)
Lt Debt / Assets	.00014		-.01683**		.00281**	
	(.00096)		(.00768)		(.00122)	
Lt Debt / (Market + Liabilities)		.00064		-.02672**		.00399*
		(.0013)		(.01116)		(.00216)
Cash / Assets	.00002	.00014	.01583***	.01229***	-.00027	.00013
	(.00118)	(.00125)	(.00473)	(.00407)	(.00176)	(.0015)
Payout / Assets	-.00607***	-.0059***	.01304	.00411	-.00423**	-.00266
	(.00201)	(.00185)	(.008)	(.00729)	(.00199)	(.00184)
CAPEX / Assets	-.00896*	-.00891*	.0029	-.00073	.00347	.00397
	(.0045)	(.00447)	(.02641)	(.02732)	(.00523)	(.00528)
SGA / Sale	.00083	.00085	-.00196	-.00288*	.00011	.00025
	(.00063)	(.00062)	(.00141)	(.00142)	(.00038)	(.00039)
COGS / Sale	.0001	.00017	.00043	.00061	-.00018	-.00031
	(.00089)	(.00095)	(.00629)	(.00637)	(.00119)	(.0012)
R&D / Assets	.00083	.00139	.0008	-.00347	-.00148	-.00083
	(.00458)	(.00457)	(.0175)	(.01704)	(.00564)	(.00543)
Beta	-.00208	-.00215*	-.00534	-.00326	.00082	.00049
	(.00126)	(.00122)	(.00447)	(.00404)	(.00119)	(.00109)
Book / Market	-.00052	-.00058	-.00038	.00218	.00033	-.00012
	(.00068)	(.00063)	(.00228)	(.00195)	(.00047)	(.00046)
Ln (Market value)	.00033*	.00036*	.00162	.00082	.00004	.00016
	(.00018)	(.00019)	(.00121)	(.00104)	(.00023)	(.0002)
Profitability	.00042	.00057	.00517	.00255	.00262***	.00299***
	(.00077)	(.00085)	(.00556)	(.0049)	(.00089)	(.00095)
Momentum	.00061	.00065	.00069	-.00061	-.00004	.00015
	(.00121)	(.00117)	(.00386)	(.0042)	(.00076)	(.0007)
IG	-.00011	-.00016	-.00267	-.00081	.00004	-.00023
	(.00039)	(.00037)	(.00161)	(.00193)	(.00043)	(.00037)
HY	-.00014	-.00022	-.00274	-.0011	.00017	-.00004
	(.00031)	(.00033)	(.00182)	(.00157)	(.00042)	(.00032)
_cons	.00098	.00073	-.01644	-.01241	-.00098	-.00137
	(.00276)	(.00287)	(.01536)	(.01426)	(.00271)	(.00258)
Observations	31470	31470	18852	18852	99488	99488
R-squared	.17625	.17681	.22055	.22492	.20653	.20942
Industry Fixed Effect	YES	YES	YES	YES	YES	YES

Standard errors are in parentheses
**** $p<.01$, ** $p<.05$, * $p<.1$*

The table shows results from FMB-regressions of daily log returns on corporate characteristics and market risk factors during COVID-19, winsorized at the 1st and 99th percentile. The odd numbered columns present "metric one", and even numbered columns present "metric four". The sample includes common stocks with fiscal year end prior to January 31st. listed on the NYSE, NASDAQ and AMEX. Financial, utility and not-for-profit firms are removed, in addition to penny and small capitalization stocks. Regressions are controlled for industry-fixed effects after the Fama-French 49 industry definition.

Table A.5: Robustness Test: Truncating

	(1) Incubation	(2) Incubation	(3) Collapse	(4) Collapse	(5) Recovery	(6) Recovery
St Debt / Assets	.00566*		-.01964*		.0062*	
	(.00331)		(.01067)		(.00364)	
St Debt / (Market + Liabilities)		.00278		-.01248		.00797*
		(.00393)		(.01607)		(.0047)
Lt Debt / Assets	.00047		-.01933*		.00315**	
	(.00092)		(.01018)		(.00152)	
Lt Debt / (Market + Liabilities)		.00077		-.02736**		.00409*
		(.00141)		(.01202)		(.00216)
Cash / Assets	.00027	.00048	.01436***	.01311***	-.00043	-.00042
	(.00128)	(.00122)	(.00432)	(.00404)	(.00174)	(.00161)
Payout / Assets	-.00668***	-.00595***	.01494*	.00727	-.00406*	-.00271
	(.00235)	(.00193)	(.00781)	(.00737)	(.00214)	(.00202)
CAPEX / Assets	-.00955**	-.00939**	-.00207	-.0023	.00408	.00401
	(.0044)	(.00448)	(.02854)	(.02751)	(.00525)	(.0052)
SGA / Sale	.00135	.00142	-.00165	-.00184	.00005	.00005
	(.00103)	(.00103)	(.00221)	(.0022)	(.00048)	(.00047)
COGS / Sale	.00038	.00073	-.00204	-.00135	-.00002	-.0003
	(.00093)	(.00103)	(.00542)	(.00561)	(.00124)	(.00122)
R&D / Assets	.00275	.00244	.00392	-.00361	-.00104	.00028
	(.00505)	(.00495)	(.01535)	(.01551)	(.00609)	(.00567)
Beta	-.00218	-.00211*	-.0052	-.00298	.00085	.00048
	(.00129)	(.00124)	(.0044)	(.00396)	(.00119)	(.00109)
Book / Market	-.00035	-.00095	-.00124	.00185	.00043	-.00006
	(.0007)	(.00068)	(.00255)	(.00192)	(.00051)	(.00052)
Ln (Market value)	.00034*	.00037*	.00121	.00061	.0001	.00018
	(.00019)	(.00019)	(.00108)	(.00095)	(.00023)	(.0002)
Profitability	.00035	.00056	.00187	.00158	.00336***	.00325***
	(.00077)	(.00086)	(.00494)	(.00483)	(.00097)	(.00098)
Momentum	.00088	.001	.00117	.00023	-.00021	.00002
	(.00124)	(.00117)	(.00374)	(.00413)	(.0008)	(.00076)
IG	-.00014	-.00023	-.00232	-.00083	0	-.00025
	(.0004)	(.00038)	(.00166)	(.00185)	(.00041)	(.00037)
HY	-.00014	-.00045	-.00288	-.00114	.00023	-.00008
	(.0003)	(.00036)	(.00186)	(.00158)	(.00042)	(.00033)
_cons	.00051	.00039	-.01076	-.00994	-.00166	-.00147
	(.00282)	(.00285)	(.01264)	(.01198)	(.0027)	(.00266)
Observations	30315	30350	18159	18180	95792	95904
R-squared	.18245	.18525	.22504	.22805	.21296	.21713
Industry Fixed Effect	YES	YES	YES	YES	YES	YES

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

The table shows results from FMB-regressions of daily log returns on corporate characteristics and market risk factors during COVID-19, truncated at the 1st and 99th percentile. The odd numbered columns present "metric one", and even numbered columns present "metric four". The sample includes common stocks with fiscal year end prior to January 31st. listed on the NYSE, NASDAQ and AMEX. Financial, utility and not-for-profit firms are removed, in addition to penny and small-capitalization stocks. Regressions are controlled for industry-fixed effects after the Fama-French 49 industry definition.

Table A.6: Financial Flexibility and Stock Returns: No Industry-fixed Effects

	(1) Incubation	(2) Incubation	(3) Collapse	(4) Collapse	(5) Recovery	(6) Recovery
St Debt / Assets	.00331		-.01955*		.00689**	
	(.00255)		(.01124)		(.00311)	
St Debt / (Market + Liabilities)		.00273		-.01991		.00716**
		(.0028)		(.01172)		(.00337)
Lt Debt / Assets	.00125		-.01293*		.00196*	
	(.00088)		(.0069)		(.00101)	
Lt Debt / (Market + Liabilities)		.00142		-.02472**		.0032
		(.00119)		(.01115)		(.00218)
Cash / Assets	.0011	.0011	.01998***	.01556**	-.00082	-.0004
	(.00112)	(.00123)	(.007)	(.006)	(.00194)	(.00165)
Payout / Assets	-.00532**	-.0042**	.00179	-.0094	-.00312	-.0013
	(.00209)	(.00196)	(.00784)	(.01014)	(.00199)	(.00201)
CAPEX / Assets	-.01761**	-.01743**	-.04588	-.04996	.00439	.00491
	(.00679)	(.00679)	(.04924)	(.0505)	(.00836)	(.00846)
SGA / Sale	.00058	.00065	-.00094	-.00176	0	.00012
	(.00066)	(.00064)	(.0014)	(.00142)	(.00037)	(.00037)
COGS / Sale	-.00064	-.00071	.00162	.00094	.00029	.00027
	(.00103)	(.00103)	(.00519)	(.00505)	(.00125)	(.00126)
R&D / Assets	.00645	.00632	.02771	.02277	-.00087	-.0003
	(.00508)	(.00505)	(.01667)	(.01518)	(.00731)	(.00688)
Beta	-.00062	-.00071*	-.00277	-.00092	.00017	-.00007
	(.00041)	(.0004)	(.00225)	(.00265)	(.00047)	(.00044)
Book / Market	-.00018	-.00022	-.00281*	-.00066	.00038	.00014
	(.00035)	(.00035)	(.00163)	(.00133)	(.00043)	(.00033)
Ln (Market value)	-.00198	-.00208	-.00703	-.00555	.00097	.00076
	(.00133)	(.00131)	(.00458)	(.0043)	(.00124)	(.00118)
Profitability	-.00078	-.00099	.00001	.00215	.00013	-.00023
	(.00069)	(.00066)	(.0024)	(.00223)	(.00049)	(.00048)
Momentum	.00033*	.00036**	.002	.00126	-.00002	.00008
	(.00017)	(.00018)	(.00125)	(.00109)	(.00025)	(.00021)
IG	-.00057	-.00048	.01271*	.00983	.00212**	.00248**
	(.00083)	(.00084)	(.00726)	(.00638)	(.00106)	(.00098)
HY	.00131	.00135	.00083	-.0007	.00044	.00063
	(.00128)	(.00125)	(.00399)	(.00431)	(.00087)	(.0008)
_cons	-.00046	-.00053	-.03668*	-.02932*	.00149	.00074
	(.00211)	(.00222)	(.01862)	(.01652)	(.00292)	(.00247)
Observations	31470	31470	18852	18852	99488	99488
R-squared	.09026	.09075	.1209	.12553	.10929	.11308
Industry Fixed Effect	NO	NO	NO	NO	NO	NO

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

The table shows results from FMB-regressions of daily log returns on corporate characteristics and market risk factors during COVID-19. The odd numbered columns present "metric one", and even numbered columns present "metric four". The sample includes common stocks with fiscal year end prior to January 31st. listed on the NYSE, NASDAQ and AMEX. Financial, utility and not-for- profit firms are removed, in addition to penny and small-capitalization stocks. Regressions are not controlled for industry-fixed effects.

Table A.7: Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
(1) Cumulative return Incubation	1																													
(2) Cumulative return Collapse	0.112	1																												
(3) Cumulative return Recovery	0.0423	-0.505	1																											
(4) Cash / Assets	0.0901	0.272	-0.0793	1																										
(5) St Debt / Assets	0.0699	-0.0483	0.126	-0.0825	1																									
(6) Net St Debt / Assets	-0.0561	-0.263	0.117	-0.933	0.435	1																								
(7) Lt Debt / Assets	0.0544	-0.25	0.16	-0.221	0.0407	0.215	1																							
(8) Book Debt / Assets	0.0668	-0.253	0.18	-0.231	0.239	0.295	0.98	1																						
(9) St Debt / (Market + Liabilities)	0.0029	-0.13	0.144	-0.128	0.915	0.446	-0.0044	0.178	1																					
(10) Lt Debt/(Market + Liabilities)	-0.123	-0.451	0.19	-0.411	0.0207	0.378	0.58	0.568	0.154	1																				
(11) Payout / Assets	0.0243	0.167	-0.0379	0.222	-0.0192	-0.207	0.171	0.162	-0.136	-0.261	1																			
(12) CAPEX / Assets	-0.253	-0.211	0.0735	-0.168	-0.0694	0.126	0.0618	0.0463	-0.0302	0.128	-0.0249	1																		
(13) SGA / Sale	0.125	0.0688	-0.0256	0.294	-0.0223	-0.274	-0.0429	-0.0461	-0.0566	-0.166	-0.0189	-0.128	1																	
(14) COGS / Sale	-0.143	-0.161	0.0218	-0.299	0.0754	0.297	-0.0721	-0.055	0.184	0.194	-0.219	0.0701	-0.333	1																
(15) R&D / Assets	0.122	0.208	-0.0556	0.469	-0.015	-0.429	-0.224	-0.221	-0.0886	-0.339	0.072	-0.158	0.422	-0.365	1															
(16) IG	0.0454	0.0916	-0.0289	-0.0745	0.0957	0.102	-0.0354	-0.0153	0.0267	-0.12	0.149	-0.0094	-0.0618	-0.051	-0.0088	1														
(17) HY	-0.0348	-0.209	0.119	-0.147	0.0166	0.139	0.3	0.295	0.0704	0.433	-0.148	0.0472	-0.101	0.119	-0.157	-0.338	1													
(18) No Rating	-0.0095	0.101	-0.0783	0.192	-0.0978	-0.209	-0.229	-0.242	-0.0843	-0.27	-0.0014	-0.0327	0.141	-0.0585	0.143	-0.579	-0.572	1												
(19) Beta	-0.224	-0.192	0.145	0.0919	-0.0393	-0.0972	-0.052	-0.0584	0.0392	0.171	-0.135	0.0743	0.0498	0.0429	0.136	-0.0717	0.137	-0.056	1											
(20) Book / Market	-0.239	-0.151	-0.0124	-0.182	-0.0968	0.130	-0.202	-0.215	0.0599	0.305	-0.249	0.126	-0.0833	0.23	-0.162	-0.101	0.0489	0.0461	0.16	1										
(21) Ln (Market value)	0.159	0.181	-0.0221	-0.0395	0.0736	0.0623	0.0602	0.0732	-0.0524	-0.246	0.284	-0.0654	-0.0766	-0.218	-0.0023	0.628	-0.0913	-0.469	-0.0513	-0.291	1									
(22) Profitability	0.0637	0.265	0.0509	0.263	0.0224	-0.23	-0.0582	-0.0521	-0.0907	-0.357	0.404	-0.115	0.0958	-0.354	0.206	-0.0695	-0.163	0.202	-0.115	-0.297	-0.029	1								
(23) Momentum	0.226	0.155	0.0044	0.14	0.0227	-0.118	-0.0485	-0.0426	-0.065	-0.315	0.0607	-0.182	0.0323	-0.0844	0.14	0.0628	0.0109	-0.0641	-0.0793	-0.417	0.258	0.1	1							
(24) Affected Share	-0.114	-0.128	0.0326	-0.236	0.14	0.263	0.188	0.211	0.189	0.228	-0.0217	0.284	-0.149	0.258	-0.356	-0.0604	0.08	-0.0167	-0.178	0.183	-0.0899	-0.112	-0.148	1						
(25) Communication Share	0.0096	-0.168	0.104	-0.159	0.144	0.196	0.269	0.29	0.16	0.19	0.0406	0.16	-0.0726	0.112	-0.261	-0.0821	0.0793	0.00283	-0.194	0.0258	-0.0395	0.0361	-0.0885	0.678	1					
(26) Presence Share	-0.207	-0.0621	-0.0464	-0.174	0.0224	0.165	-0.029	-0.0237	0.0791	0.128	-0.0779	0.277	-0.137	0.237	-0.229	0.0126	0.023	-0.0309	-0.0136	0.258	-0.0867	-0.215	-0.143	0.659	-0.0863	1				
(27) Teamwork Share	-0.215	-0.306	0.111	-0.188	-0.0173	0.164	0.0308	0.0265	0.0257	0.146	-0.0374	0.269	-0.109	0.173	-0.285	0.013	0.0102	-0.0202	-0.0028	0.226	-0.0728	-0.129	-0.189	0.444	0.458	0.269	1			
(28) Customer Share	0.0845	-0.0739	0.0758	-0.105	0.171	0.157	0.274	0.301	0.172	0.154	0.0533	0.0674	-0.0395	0.0572	-0.195	-0.096	0.0702	0.0229	-0.213	-0.052	-0.0218	0.0917	-0.0286	0.599	0.961	-0.202	0.24	1		
(29) TMW	0.136	0.133	-0.072	0.275	-0.0411	-0.264	-0.183	-0.186	-0.0669	-0.156	0.0057	-0.147	0.146	-0.371	0.409	-0.0075	-0.0645	0.0624	0.155	-0.142	0.0807	0.106	0.0873	-0.63	-0.42	-0.42	-0.397	-0.321	1	
(30) TME	0.156	0.123	-0.0765	0.257	-0.0401	-0.246	-0.148	-0.152	-0.0643	-0.125	0.0149	-0.134	0.14	-0.38	0.384	-0.0225	-0.0536	0.0661	0.115	-0.133	0.0743	0.0955	0.0658	-0.555	-0.368	-0.374	-0.373	-0.271	0.982	1

The table displays definitions for the variables used in our regressions.