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ABSTRACT

Firms with greater financial flexibility should be better able to fund a revenue shortfall resulting from the COVID-19 shock and benefit less from policy responses. We find that firms with high financial flexibility experience a stock price drop lower by 26% or 9.7 percentage points than those with low financial flexibility accounting for a firm's industry. This differential return persists as stock prices rebound. Similar results hold for CDS spreads. The stock price of a firm with an average payout over assets ratio would have dropped 2 percentage points less with no payouts for the last three years.

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1. Introduction.

The COVID-19 crisis in early 2020 is "the textbook example of an exogenous shock."[1] It led to a dramatic temporary decrease in revenues for most firms. Firms differ in how their financial affairs are organized. Some firms hold large amounts of cash to help them cope with unexpected events. They also keep debt capacity and limit their exposure to debt rollover risk. These firms have financial flexibility, so that they can fund more easily their cash flow shortfall. Financial economics tells us that an adverse exogenous shock should affect such firms less. Firms with less financial flexibility might rapidly be in financial distress and forced to take actions that healthy firms would consider detrimental to long-term shareholder wealth.

In this paper, we investigate how a firm's financial flexibility affects its stock price and credit risk reactions to the COVID-19 shock. We first analyze whether financial flexibility is valuable and by how much using firms' stock performance from February 3 to March 23, which we call the collapse period. Second, we ask whether more financially flexible firms benefitted relatively less from the news on policy responses that led to a dramatic positive move of the stock market on March 24, a day we call stimulus day. Lastly, we investigate whether the impact of financial flexibility on firm performance weakens with the stock market recovery. We expect the change in expectations about policies to affect firms with more financial flexibility less because the crisis affects them less and because they also depend less on the financial system working smoothly.

We find evidence supportive of the role of financial flexibility. We assume that the COVID-19 shock affects firm revenue similarly within industries after accounting for firm characteristics, so that our results account for industry differences. When we compare highly financially flexible firms to firms with low flexibility, we find that the stock price of highly flexible firms fell by 26% less than the stock price of firms with low flexibility; we also show that the CDS premiums of highly flexible firms increased by 176 basis points less than the CDS premiums of firms with low flexibility. We find that the worse performance of

[1] "The US is failing the test of the century," Edward Luce, Financial Times, April 16, 2020.

firms with lower financial flexibility compared to their industry persists through the rebound of the stock market.

A way for firms to increase financial flexibility is through greater retention of cash flow (e.g., DeAngelo, Gonçalves, and Stulz, 2018). We find, however, that had firms not had payouts in the last three years, their financial flexibility would not have been very different on average and their average improvement in stock returns would have been smaller than 2%. Eliminating payouts would have had a greater impact on returns for the firms with high payouts over assets ratios.

By its nature, the COVID-19 shock represents a loss of cash flow of indeterminate duration for firms. We define financial flexibility as the ease with which a firm can fund a cash flow shortfall. A firm that has the highest level of financial flexibility has no difficulty in funding a cash flow shortfall. An example of such a firm would be an all-equity firm with ample liquidity. Such a firm can fund a cash flow shortfall from its own liquid assets and does not face risks associated with debt payments or debt rollover. It will not have to raise funds quickly to cope with a momentary decrease in revenues. Less financially flexible firms have to devote resources to raise funds because of the shock, have to pay more for these funds while the financial system is stressed, and if unable to procure such funds, have to find other ways to generate cash flows, such as suboptimal cost reductions and cuts in their investment programs. Therefore, we expect less financially flexible firms to experience a greater loss in the value of their equity than otherwise similar firms that are more financially flexible.

After the Senate voted no on a vote related to the stimulus package on March 22, the status of that package was unclear.[2] On March 22, the Federal Reserve and the Federal Open Market Committee (FOMC) took dramatic actions designed to relieve the stress in the financial system that the Fed communicated in detail on March 23 before the opening of the markets.[3] It stated that it would buy Treasuries "in the amounts needed to support smooth market functioning and effective transmission of monetary policy to broader financial conditions and the economy" and opened new facilities designed to provide credit to employers

[2] "Senate fails to advance covid-19 rescue package," AP, March 22, 2020.
[3] See "Federal Reserve announces extensive new measures to support the economy," press release, March 23, 2020.

and to support the corporate bond market. These steps went beyond what the Fed did in 2008. Yet, on the 23rd, the stock market fell. It is only on the 24th, after the market learned that approval of a stimulus package was now likely, that the stock market responded positively with the best one-day performance since 2008.[4] We expect that the firms with more financial flexibility are affected less by these policy changes.

For our analyses, we construct a sample of US publicly listed non-financial firms. For each firm for which fiscal year-end 2019 accounting information is available, we measure the cumulative return on its stock for the collapse period. We estimate regressions of stock returns on determinants of stock returns and variables that proxy for financial flexibility. We consider a firm more financially flexible if it holds more cash, has less debt due within a year, and has less leverage measured by long-term debt over assets. We then estimate regressions of stock returns on the same variables on stimulus day.

We find strong evidence that firms with more financial flexibility are less affected by the COVID-19 shock during the collapse period. These firms also benefit less on stimulus day. Specifically, controlling for known determinants of stock returns, we find that firms with less short-term debt, more cash, and less long-term debt experience a lower stock price drop in response to the shock. However, among these variables, the ratio of long-term debt to assets is most consistently significant.

Because investment programs tend to be sticky, financial flexibility could be more valuable for firms with high capital expenditures and high R&D expenditures. The relation between stock returns and capital expenditures is sensitive to the specification. We see no evidence that firms with larger R&D expenditures experience a larger stock-price drop. Firms with more variable costs should be affected less by a temporary revenue shortfall because they can scale down their operations more easily. We find some evidence that firms for which, everything else equal, costs of goods sold (COGS), a measure of variable costs, are more important are affected less. In contrast, firms with more selling, general, and administrative (SG&A) expenses, a measure more dependent on fixed costs, are affected more. Corporate diversification could help firms cope better with an adverse shock as internal capital markets can substitute for external capital

[4] On the 24th, the market learned the details of the package that the Senate was going to vote on the next day. See "Factbox: What's in the $2 trillion U.S. Senate coronavirus rescue package," Reuters, March 24, 2020.

markets. Further, everything else equal, diversification ought to increase financial flexibility as it likely reduces cash flow volatility and hence increases debt capacity. We find no evidence that conglomerates performed better during the collapse period.

The CARES Act voted by Congress limits repurchases by corporations. In the public debate on the Act, there was much discussion that corporations would have been more resilient had they had lower payouts in previous years.[5] Many observers have expressed concerns that large payouts have led firms to have balance sheets that provide them with an insufficient cushion against adverse events. As John Plender put it in the Financial Times, "Woe betide anyone who is going into this virus-induced global recession with an efficient balance sheet."[6] Logically, if firms had lower payouts in the past, they would have been more financially flexible. Surprisingly, there is no statistically significant relation between past payouts and stock returns during the collapse whether we control for our financial flexibility proxies or not. We provide a straightforward explanation for this surprising result. If firms had not made payouts in 2019 and had instead increased their cash holdings or decreased long-term debt, the impact for the average firm would have been small. We find similar results when we use the cumulative payouts over the last three years instead of the payouts in 2019. However, the payout policy of firms with high cumulative payouts over assets for the three years ending in 2019 has a substantial impact on their financial flexibility on average. If these firms had not had dividends and repurchases, they could have bought back all their long-term debt.

Many studies explore whether financial constraints have real effects on firms.[7] An obvious question is whether, with our proxies for financial flexibility, we are proxying for whether a firm is free from financial constraints. In principle, a highly financially constrained firm would be one with little flexibility. We investigate whether firms judged to be more financially constrained according to the well-known indexes of Kaplan and Zingales (1997), Whited and Wu (2006) and Hadlock and Pierce (2010) or firms that lack a

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[5] See "Coronavirus stimulus package to include curbs on share buybacks," by Jacob M. Schlesinger, Wall Street Journal, March 25, 2020.

[6] See "Wave of corporate defaults owes much to foolhardy share buybacks," Financial Times, April 29, 2020.

[7] For example, one of the most cited studies of the impact of the GFC on firms investigates how the crisis affected the extent to which they were financially constrained and how these constraints led them to cut back their spending plans (Campello, Graham, and Harvey, 2010).

credit rating have worse stock returns during the collapse period. We find no evidence that they do. Consequently, our financial flexibility proxies are not proxying for being free from financial constraints. A possible explanation is that a firm that cannot access outside finance (and is thus financially constrained) may have accumulated large holdings of cash internally to cope with unexpected shocks (Almeida, Campello, and Weisbach, 2004; Opler et al., 1999). Hence, such a firm may be able to cope with a cash flow shock better than a firm that has access to financial markets but has low cash holdings and is highly levered. Interestingly, a measure developed by Huang and Ritter (2019) of how much a firm would need to access outside funding if it spent as much as in the previous year has explanatory power in our tests. We show that firms that would run out of cash without accessing outside funding are more affected by the shock.

We also investigate how firms' creditworthiness is affected by the COVID-19 crisis using credit default swap (CDS) premiums. CDS premiums are a frequently used measure of creditworthiness as a firm's CDS premium corresponds to the cost of insuring against default losses for that firm (Duffie, 1999). Not surprisingly, CDS premiums increase sharply during the collapse period. We find strong evidence that more levered firms experience stronger increases in CDS premiums, but no evidence that firms with larger cash holdings have lower increases in CDS premiums.

Finally, we investigate whether the greater loss in equity capitalization suffered by less financially flexible firms compared to more financially flexible firms is a temporary phenomenon during the height of the COVID-19 crisis or whether it corresponds to a more permanent impact of the shock. Between March 23 and May 29, the stock market recovered much of its losses. However, we show that there is a striking difference in the recovery of firms when sorted by financial flexibility. Firms that we consider the most financially flexible have stock returns between February 3 and May 29 that are 8.3 percentage points higher than those of other sample firms controlling for industry and for firm characteristics.

Three important caveats for our study are in order. First, we focus on how markets react to news about the COVID-19 crisis and how that reaction differs across firms that differ in financial flexibility. Markets make mistakes. They can be inefficient. They can overreact and underreact. Firm-level idiosyncratic mistakes make it harder for us to find evidence of a role for financial flexibility. Second, there are costs to financial flexibility. For instance, as shown in Jensen (1986) and Stulz (1990), agency costs can be higher for firms with greater financial flexibility. We do not address these costs in our study. Third, we ignore general equilibrium effects. For instance, when we make a statement about how stock returns of firms would have been affected had these firms not made payouts for the last three years, we ignore that the market's stock price drop would have been different as a result.

Our paper contributes to several literatures. First, we add to the literature on the benefits and costs of financial flexibility. As pointed out by Denis (2011, p. 667), this "literature encompasses studies of the determinants and consequences of corporate cash holdings, as well as the impact of flexibility considerations on corporate capital structure and payout policies." Graham and Harvey (2001) find that financial flexibility is the single most important determinant of capital structure for CFOs. DeAngelo and DeAngelo (2007) show that when financial flexibility is valuable, ex ante low leverage is optimal because it gives firms the option to lever up later when they have to do so. Our paper provides evidence on the value of flexibility when a firm is affected by a large and unexpected revenue shock, which is the type of situation for which firms have precautionary cash holdings and keep financial flexibility.

Second, the paper contributes to the literature on how corporate balance sheets affect the transmission of shocks. A vast literature in macroeconomics building on Bernanke and Gertler (1989) shows how the impact of shocks is magnified for firms with weaker balance sheets. The finance literature has shown that firms with weaker balance sheets at the start of the GFC were affected more by the crisis (Kahle and Stulz, 2013) and that firm balance sheets were important in the propagation of the GFC (Giroud and Mueller, 2017). In this literature, it is typically difficult to find shocks that are fully unanticipated. As a result, a firm's finances may be organized in a way that the firm finds optimal to deal with partially anticipated shocks. This issue does not arise here. There is no reason to believe that the balance sheets and income statements of firms at the end of fiscal year 2019 were in any way affected by anticipations of a risk of a COVID-19 crisis. Part of this literature focuses more directly on short-term debt and rollover risks, in particular showing that firms that had to roll over debt early in 2007 fared less well (Almeida et al., 2011).

Third, we contribute to the crisis literature. There is a large literature that examines the impact of the Global Financial Crisis (GFC) on firms (e.g., Almeida et al., 2011; Campello, Graham, and Harvey, 2010; Chodorow-Reich, 2014; Duchin, Ozbas, and Sensoy, 2010; Giroud and Mueller, 2017; Ivashina and Scharfstein, 2010; Kahle and Stulz, 2013). Much of that literature focuses on how the GFC affected firms through its impact on the ability of financial intermediaries to perform their function, but some studies also show that the impact of the GFC is mediated by firms' balance sheet strength. However, the COVID-19 crisis differs in many ways from the GFC and hence studying how balance sheets affect the reaction of stock prices to the COVID-19 shock is helpful to better understand the role of firm balance sheets during crises. Though March 2020 and September 2008 look similar, in that they involve a rapid collapse in stock prices and unprecedented interventions by the Federal Reserve, the most dramatic period of the GFC originated in the financial sector with the collapse of Lehman. In contrast, the COVID-19 crisis starts outside the financial sector. The immediate real effects of the COVID-19 crisis are far more dramatic than the immediate real effects of the GFC as many firms experience a sudden stop in their ability to produce and earn. Typical macroeconomic indicators plunge more in April 2020 than they did in the worst month of the GFC. While the COVID-19 crisis evolves into a period with a dangerously stressed financial system in March, as various financial markets seize up, that period is short-lived compared to the period in the GFC when the financial system was dangerously stressed.

Contemporaneous work on firms and the COVID-19 crisis includes Ramelli and Wagner (2020), who examine stock-price reactions of US firms to the COVID-19 crisis since January 2020, with a focus on their international and China exposure, but they also show a negative relation between stock returns and leverage and a positive relation between cash and stock returns. Albuquerque et al. (2020) use U.S. data to show that firms with high environmental and social ratings had better returns during the first quarter of 2020, even after controlling for cash (positive effect on returns) and leverage (negative effect on returns). De Vito and Gómez (2020) use an international sample and simulations to analyze how much time firms with limited operating flexibility would have before they exhaust cash reserves. Using a large international sample, Ding et al. (2020) examine the connection between stronger pre-2020 finances, less exposure to COVID-19 through global supply chains, more CSR activities, and better corporate governance and the stock price reactions to COVID-19 cases.[8] Pagano, Wagner, and Zechner (2020) show that firms whose operations are more resilient to social distancing experienced a lower drop in their stock price. In contrast to these studies, our focus is on evaluating existing finance theories concerning the role of financial flexibility, in assessing the importance of financial flexibility in mitigating the impact of the shock, and in evaluating how flexibility would have been different had firms had lower payouts. Importantly, our main results use industry fixed-effects, so that they are not sensitive to industry specific factors examined in the literature.

The paper proceeds as follows. In Section 2, we derive the hypotheses we investigate and relate them to the existing literature. We present our sample in Section 3 and compare stock performance and characteristics for firms in directly impacted industries versus other industries. In Section 4, we investigate how stock returns differ across firms with different degrees of financial flexibility. In Section 5, we examine the relation between flexibility, payouts, and stock returns during the collapse period in greater detail. We also provide evidence on the role of corporate diversification during the collapse period. In Section 6, we relate stock returns to measures of financial constraints. In Section 7, we investigate how financial flexibility affects changes in CDS premiums during the collapse period as well as on stimulus day. In Section 8, we examine whether the effect of financial flexibility on stock return is restricted to the height of the crisis. We conclude in Section 9.

2. Financial economics and sudden temporary revenue stops.

In this section, we make predictions about the impact of a sudden temporary revenue stop, using the existing financial economics literature. We investigate our predictions empirically in the subsequent sections. We start with two extreme benchmarks. The first one is the traditional perfect markets benchmark

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[8] Other work includes Loughran and McDonald (2020) who examine risk disclosures of companies and find that 79% of companies had no pandemic risk disclosure in 2018. Hassan et al. (2020) use text-based measures of the costs and benefits associated with the spread of COVID-19 and find that most firms are concerned with a sudden drop in demand and disrupted supply chains but not with financial constraints. Eldar and Wittry (2020) show that a surprising number of firms adopt poison pills during the crisis.

and the second is the case of binding financial constraints. We then address scenarios where a firm's financial situation is between these two extreme benchmarks.

2.a. Perfect markets: All-equity firm.

Consider the simplest case of perfect markets where a firm earns every month revenue R_t and incurs costs C_t, so that its net operating cash flow CF_t is equal to $R_t - C_t$. The total cash flow of the firm is $CF_t - I_t$, where I_t are investment expenses. For now, we assume that the costs are fixed, so that the firm still has to pay them if production stops. To simplify the discussion, we also assume that the firm has no investment expenses. Let S_t be the value of the firm at time *t*. Assume that time *t* cash flows are discounted to today using the discount factor $D(t)$. With these assumptions, we have the following expression for the value S_0 of an all-equity firm:[9]

$$S_0 = \sum_{t=1}^{\infty} D(t) E_0 (R_t - C_t) \tag{1}$$

where E_0 (…) is the expectation operator.

Suppose now that the firm learns that its revenue will fall to zero for *n* months and then will resume at the level expected at time zero. For now, we assume that the discount factors are unchanged. In this case, using a superscript STOP to denote the value of the equity with a sudden temporary stop in revenue, the value of equity becomes:

$$S_0^{\text{STOP}} = \sum_{t=1}^{n} D(t) E_0(-C_t) + \sum_{t=n+1}^{\infty} D(t) E_0 (R_t - C_t) \tag{2}$$

With this scenario, the loss from the sudden stop is the cumulative loss in revenue. If the firm's costs are unaffected, the firm still has to pay its costs for *n* months without receiving any revenue. In this simple setup, the value of the equity falls by the cumulative loss of expected revenue over *n* months. With perfect markets, the firm can borrow against future income to pay its costs as long as the present value of future

(3)

[9] Equation (1) is simply equation 2.20 of Fama and Miller (1972) with the assumptions we have made.

cash flows exceeds the present value of the costs it has to pay during the *n* months. The collateral for its borrowing is the value of the firm after the end of the momentary revenue stop. If the present value of the costs to be paid over *n* months exceeds the present value of the cash flows after the end of the *n* months, the firm has no value and liquidates. Therefore, the loss in equity value assuming the firm has value after the shock is:

$$S_0 - S_0^{\text{STOP}} = \sum_{t=1}^{n} D(t) E_0(R_t)$$

Whether equity is wiped out or not depends on the length of the sudden stop. It also depends on the profitability of the firm. To see this, note that the firm has to finance the costs it still incurs. For given revenue, the lower the costs, the less the firm has to finance. Further, for given revenue, the value of the firm after the end of the sudden shock is negatively related to costs, so that the lower the costs, the greater the collateral against which to borrow.

Note that firm value after the end of the sudden stop could be lower for at least two additional reasons. First, the event that causes the sudden stop could also affect the discount factors. In a crisis period, the risk-free rate can fall as investors become more risk-averse and the firm's risk premium, measured as the difference between the firm's expected stock return and the risk-free rate, can increase. If the risk premium increases sufficiently, the firm experiences an increase in discount rates, and it becomes more likely that the firm will be liquidated as the present value of the cash flows it will receive after the *n* months of no revenue is lower. Second, we assume that the firm's cash flows after *n* months are the same as what they would have been absent the shock. If that is not the case and the cash flows are lower for some period of time, the present value of the firm after the end of the sudden revenue stop is lower and the firm is again more likely to be liquidated.

So far, we have assumed that all the costs are fixed. When its revenue disappears, the firm still has to pay all its costs, so that the cost of the shock is the present value of the disappeared revenue. Obviously, in general, firms have variable costs in addition to their fixed costs. If the firm does not produce for some period of time, it can save the variable costs. Consider the extreme case where all costs are variable, so that if the firm does not produce it does not incur any costs. Such a firm has low operating leverage. In this case, the firm just loses its discounted expected net cash flow over *n* months, and its value with the shock is:

$$S_0^{\mathrm{STOP}} = \sum_{t=n+1}^{\infty} D(t) E_0(R_t - C_t) \tag{4}$$

With only variable costs, the all-equity firm would never go out of business because of a temporary sudden stop. The firm would go to sleep and wake up *n* months from now.

In general, a firm has some costs it has to pay even if it does not produce. In this case, the extent of the loss from the sudden stop depends on the firm's ability to reduce its costs while it is not producing. With decreasing operating leverage, the firm moves from equation (2) towards equation (4). The less operating leverage it has, the less it loses from the sudden shock.

We assume in the analysis that during the sudden stop the revenue falls to zero. We do so for simplicity. Allowing revenue to fall only partially leads to the possibility that revenue falls so little that the firm is still profitable during the stop. In that case, the firm never liquidates. If revenue falls so that the firm is not profitable during the stop, the analysis is the same as if revenue goes to zero.

2.b. Perfect markets: Levered firm.

Suppose now the firm has debt. For simplicity, assume that the firm owes a constant debt payment each month forever. With perfect markets, these debt payments simply correspond to an increase in costs. Equations (1) through (4) are still correct for the value of equity as long as that value is positive. Greater debt payments mean that the loss to equity from the shock is higher because, everything else equal, the firm's fixed costs are higher. Greater debt payments also imply that it is more likely that the firm liquidates because the firm has less collateral (in this case, the value of the firm once the temporary drop in revenue is over) it can use to borrow against to fund its costs. If we compare two identical firms except one has debt and the other does not, the value of the equity of the firm with debt falls proportionately more in response to the shock.

Lastly, we can distinguish between short-term debt and long-term debt. For simplicity, assume that short-term debt is debt with payments only during the sudden stop and long-term debt is debt with payments only after the sudden stop. With our assumption of perfect markets, provided that the present value of the debt payments is the same, it does not matter whether the debt is short-term or long-term as long as the firm is solvent. If the debt is only short-term, the firm has to borrow more to fund the cash flow shortfall, but since it does not have long-term debt the value of the collateral that it can use to borrow against is higher. Alternatively, if the debt is only long-term, the firm borrows less because its costs during the sudden stop are lower but it has less collateral to borrow against because its costs after the sudden stop are higher.

2.c. The case of a financially constrained firm.

Consider now a firm that is financially constrained in that it cannot raise outside finance. Nothing else changes from the earlier discussion in sections 2.a. and 2.b., which makes the existence of financial constraints somewhat arbitrary. In general, financial constraints arise from frictions that make markets imperfect. To keep the analysis simple and to show starkly the implications of a sudden temporary revenue stop for a firm that cannot access outside funding, we do not model the frictions that cause the firm to be financially constrained.

In the financially constrained firm case, a firm that does not have financial resources to fund its costs has to liquidate even if that firm is still highly valuable unless it can sell assets. It is well-known that selling assets can provide firms with funding (e.g., Shleifer and Vishny, 1992), but it is also well-known that during a crisis selling assets may entail fire sale discounts (e.g., Shleifer and Vishny, 2011) and hence is an expensive form of funding. With the simple firm we consider, shareholders could sell a fraction of the firm large enough to fund the cash flow shortfall. With perfect markets, there would be no fire sale discount. With market imperfections, such a discount would be likely, so that the cost to the shareholders would increase by the fire sale discount.

A firm that is financially constrained would not put itself in a position where a revenue shortfall that leaves the firm valuable absent financial constraints either puts it out of business or forces it to sell assets.

Generally, firms that are financially constrained invest in cash holdings so that they have a cash buffer if they face a shortfall in revenues (Almeida, Campello, and Weisbach, 2004). Consider a financially constrained firm with fixed costs and a fixed cash buffer. Further, assume that the firm cannot liquidate to avoid paying fixed costs and cannot sell assets. In this case, if the buffer is large enough to enable the firm to not fail during the *n* months it cannot produce, the firm will use the cash buffer to pay its costs. If the buffer is not large enough and the firm cannot sell assets, the firm has to liquidate during the period without revenue. With any type of uncertainty, the firm would wait to liquidate until it has exhausted its cash buffer as it is always possible that things could improve enough to avoid liquidation. Shareholders would never gain by liquidating early.

It follows from our analysis that, for a financially constrained firm, the size of the cash buffer is crucial. A buffer that is too low forces the firm to sell assets or liquidate. It could also force the firm to attempt to reduce costs in ways that are inefficient. For instance, the firm might stop investments that are worthwhile, or reduce maintenance expenses.

2.d. Between the benchmarks.

The typical firm is one that faces frictions in raising funds, but is not in a situation where it cannot raise funds. As a result, external finance is costly for such a firm and it becomes more costly as it has less collateral to make available to raise outside funds (e.g., Fazzari, Hubbard, and Petersen, 1988). Agency costs and information asymmetries are reasons why outside finance is costly and these costs increase as firms become more highly levered. For such a firm, cash will be a cheaper source of funding than external funding. The firm will also have cheaper funding if it has more collateral available to raise funds. If the firm is diversified, the availability of an internal capital market means that it can fund some activities without having to resort to external funding, so that the internal capital market of a diversified firm can mitigate the impact of the sudden revenue stop.

A typical firm will have access to outside funding, so that it will resort to asset sales only in extreme cases. Such a firm is negatively affected if outside funding becomes more costly and/or difficult. The extent to which it is affected depends in part on how urgent its need for funding is. A firm that is financially flexible has ample cash holdings, so that it can wait to raise funds externally. It can avoid having to raise external finance when markets are stressed. It will also be in a position where it has debt capacity so that it can raise external funds easily and at a low cost.

2.e. Predictions.

We derive the following testable hypotheses from our analysis in sections 2.a. to 2.d.:

Hypothesis 1. Financial flexibility and equity value. Stock prices fall when the market learns about a temporary sudden revenue stop. The greater the financial flexibility of a firm, everything else equal, the smaller the stock price drop. Given financial flexibility, the stock-price drop is less for firms that are better able to cut costs. The value of financial flexibility is higher when the financial system is more stressed. Everything else equal, measures that reduce the stress in the financial system benefit firms with low financial flexibility more.

Easier access to outside finance should make it easier for a firm to finance its cash-flow shortfall if there is a temporary sudden stop of revenue. In this case, the following result holds:

Hypothesis 2. Financial constraints. More financially constrained firms experience worse equity returns in response to a temporary sudden revenue stop.

A simple reason why this hypothesis might not hold is that the existing measures of financial constraints are such that a firm could have large cash holdings and appear to be financially constrained. Yet, such a firm might be in a good position to fund itself when there is a temporary sudden revenue stop**.**

Lastly, we turn to the implications of the analysis for a firm's credit risk. Our analysis so far in this section uses a simple model. Deriving the implications for a firm's credit risk formally would take us beyond the scope of this paper. However, an investigation of credit spreads makes it possible to consider some additional implications of financial flexibility. As we show, the sudden revenue stop decreases firm value. If the firm is levered and if its debt is risky, we expect the debt to lose value because of the decrease in firm value. The implications of the sudden revenue stop for the short-term probability of default of a firm depend on the time schedule of debt payments of the firm. Suppose that a firm is highly levered but the debt is zero-coupon debt that matures in twenty years. Such a firm is not at risk of defaulting in the short-run. In contrast, suppose that a firm has moderate leverage but all of the debt matures in six months when it has to be rolled over. The firm might default in six months because it cannot roll over its debt. It could be that the value of the firm is too low, so that there is not enough collateral to roll over the debt. Alternatively, the financial system could be sufficiently stressed that the firm cannot access outside funding. It follows that:

Hypothesis 3. Financial flexibility and credit spreads. A firm's credit spread increases with a sudden revenue stop if the debt is risky. Everything else equal, it increases more if the debt is short-term and if the firm has less cash, is more highly levered, has more fixed costs, and has less variable costs.

3. Data and sample summary statistics.

In this section, we describe how we construct our sample, the characteristics of sample firms, and the performance of firms during our sample period.

We focus on firms for which 2019 fiscal year-end data is available from Compustat at the time of writing. We drop financial firms, utilities, not for profit and governmental firms, and firms with non-U.S. headquarters.

We obtain stock market data from Compustat's CapitalIQ North America Daily database. We remove stocks with prices of less than $1, and those with a security type not equal to "common, ordinary". After these additional filters, our final sample consists of 1,857 firms. Details on the sample selection process and on how many firms we drop due to each filter are in Appendix A.

Additional data and their source are the one-month treasury rate (St. Louis Federal Reserve) and mid-quotes of five-year maturity Credit Default Swap (CDS) spreads (Standard and Poor's CapitalIQ database). We use the Compustat Segments database to classify firms as conglomerates.

We consider firms to be more financially flexible if they hold more cash, have less short-term debt, and have less long-term debt. Table 1, Panel A, shows that the average firm has cash over assets of 22.4%.

Median cash over assets is 11.2%. The difference between the mean and the median of cash over assets is not surprising as the distribution of cash holdings is skewed. The typical firm has little short-term debt, where short-term debt is defined as debt that matures within 2020, as the median short-term debt over assets is only 1.3%. We compute net short-term debt, which is short-term debt in excess of cash. Both median and mean net short-term debt over assets are negative, so that the median and the average firm hold more cash than short-term debt. Long-term debt is much more substantial as mean long-term debt over assets is 27.9% and median long-term debt over assets is 25.9%. The average payout ratio, defined as dividends plus repurchases over assets, is 0.035. As a comparison, Kahle and Stulz (2020) calculate an average net payout over assets ratio of 0.048 for US firms between 2010 and 2017.

We also consider a subset of firms in industries more directly affected by the COVID-19 shock. We call the industries that are more directly affected the COVID-19 industries. We use the industries described in OECD (2020) as those most affected by the shock and not our own definition, to reduce concerns about data mining. Moody's (2020) classifies some industries as highly exposed and these industries match our COVID-19 industries. Those industries are, using the 49 Fama-French industry definitions, Entertainment, Construction, Automobiles and trucks, Aircraft, Ships, Personal services, Transportation, Wholesale, Retail, and Restaurants, hotels and motels. Panel B of Table 1 shows the characteristics of firms in the COVID-19 industries. The number of firms in COVID-19 industries in our sample is 512. It is noteworthy that these firms have less cash, more short-term debt, and more long-term debt than the sample as a whole at the end of fiscal year 2019. Specifically, median cash over assets for these firms is 5.6%, which is half what it is for the sample as a whole. Median short-term debt over assets is 2.6%, which is twice what it is for the sample as a whole. While median long-term debt over assets is 25.9% for the sample as a whole, it is 33.9% for the COVID-19 industries. The average payout ratio for COVID-19 firms is 0.042.

We want to investigate whether financial constraints measures commonly used in the literature are useful to explain how firm stock returns respond to the shock. We use five different measures. Three of these measures use coefficients from regressions that predict whether a firm is financially constrained. The first of these measures is the Kaplan and Zingales (1997) measure (KZ index). We follow Lamont, Polk, and Saá-Requejo (2001) in the construction of the index. A higher value of this measure means that a firm is more constrained. With that index, a firm is more constrained if it has lower cash flow, a higher Tobin's q, more leverage, less dividends, and less cash. The second measure is the Whited and Wu (2006) index (WW index). With that index, a firm is more financially constrained if its cash flow is lower, if it does not pay dividends, if it has more leverage, if it has less assets, if its industry grows faster, and if it grows more slowly. Note that cash does not enter the index. The last index we consider is the Size-Age (SA) index of Hadlock and Pierce (2010) that depends only on firm size and firm age.[10] With that index, older firms and larger firms are less constrained. For each of these three indexes, we define a firm as financially constrained if it is in the top quartile of the distribution of the relevant index.

Huang and Ritter (2019) construct a measure, $cash_{ex\ ante}$, which predicts the end-of-year cash position of a firm if the firm does not access external financing during the year. It is defined as the cash position at the end of the last fiscal year, plus the net cash flow of last year, used as a projection for the current year's net cash flow.[11] Huang and Ritter (2019) show that 27.9% of all firms are projected to have a financing deficit without raising additional financing that year. We use the projected cash-deficit based on Huang and Ritter's (2019) $cash_{ex\ ante}$ measure as a fourth index of whether a firm is financially constrained. In our sample, 20.1% of all firms and 23.7% of firms in COVID-19 industries are projected to have negative cash absent external financing, on average. Our final measure of financial constraints is an indicator variable equal to one if the firm does not have a Standard and Poor's (S&P) domestic long-term issuer credit rating at the end of February 2017. The lack of a rating has often been used as a proxy for financial constraints, e.g., by Almeida, Campello, and Weisbach (2004).

Table 1 also shows the stock returns of the firms in our sample for the collapse period from February 2 to March 23. We compute daily excess returns, which we define as the log of one plus the total return on a

[10] We construct two versions of the SA index of Hadlock and Pierce (2010). With their index, they cap firm age at 37 years and firm asset size at $4.5 billion. We create an index using their original thresholds but also create a modified version of the index where we update the size and age threshold over time to adjust size for inflation and age for the passage of time.

[11] More precisely, net cash flow is defined as the difference between the internal cash flow and the sum of investment, change in non-cash net working capital, and dividends.

stock minus the risk-free rate defined as the one-month daily Treasury bill rate. We cumulate these returns over the collapse period. It is not surprising that the cumulative returns are negative and large in absolute value. For the sample as a whole, we have an average cumulative daily log return of -37.8% and a median cumulative daily log return of -38.7%. As a comparison, the log return to the S&P 500 from February 3 to March 23 is -37.3% (ln (2237.40/3248.92)). Almost all stocks have a negative cumulative log return, as the 95th percentile of the distribution is -5.5%. However, the range of the cumulative excess returns is broad as the 5th percentile is -71.2% and the standard deviation of the cumulative excess return is 26.0%. Not surprisingly, the firms in the COVID-19 industries perform worse during the collapse period, as their average cumulative return is -44.0% and the median is -45.8%. Figure 1 plots the cumulative average return during the collapse period for the whole sample and for the firms in the COVID-19 industries. The figure also plots the cumulative return on the average of all stocks listed on the main exchanges in the US. Although we exclude financials and utilities, the average return of our sample firms is close to the overall return on the equal-weighted market index.

We turn next to the stock performance of our sample firms on stimulus day, March 24. On that day, the average sample firm experiences an excess stock return of 9.2%. The median stock return is 8.7%. Most firms have a positive excess return on that day, as the 5th percentile is only a small negative return of -1.9%. Turning to the firms in COVID-19 industries, their returns on that day are larger than for the sample as a whole. The mean excess return is 10.6% and the median excess return is 9.8%.

For a subset of 239 sample firms, we obtain daily mid-price quotes on CDS contracts with a five-year maturity from CapitalIQ. We focus on the CDS contract with a maturity of five years, because the five-year CDS is by far the most liquid in the credit derivative market, and the one most used in the literature. Figure 2 shows the evolution of CDS spreads for all sample firms and for the 93 COVID-19 industries firms. The figure shows that CDS spreads quickly started to widen during the collapse period, and more so for COVID-19 industries firms. In some of our regressions, we use the cumulative change in CDS spreads between February 3rd and March 23 as dependent variable. Panel A of Table 1 shows that, for all sample firms, the average CDS spread increases by 212 basis points, and the median CDS spread increases by 60 basis points.

Panel B demonstrates that for firms in COVID-19 industries, the average CDS spread increases by 301 basis points, and the median spread by 169 basis points. On stimulus day, the average (median) CDS spread decreases by 15 (5) basis points for the whole sample and by 25 (8) basis points for firms in COVID-19 industries.

In Table 2, we show correlations among the variables we use in our regressions. Panel A reports correlations estimated using the full sample. The correlations among the variables we use as proxies for financial flexibility are low. The highest are between long-term debt measures and cash. Firms that have high levels of long-term debt over assets have lower cash holdings. Not surprisingly, in light of the literature on cash holdings (e.g., Opler et al., 1999), we find that cash holdings have high correlations with R&D expenses and SG&A expenses. Short-term debt and long-term debt do not have noticeably high correlations with any firm characteristic. The correlations between the various financial constraints indexes show that there is little overlap between the firms classified as financially constrained with the KZ index and the ones classified with the other indexes. The correlations are larger between the WW index and the SA index. All indexes have very low correlations with the HR measure. In Panel B, we report the same correlations for firms in the COVID-19 industries. The correlations are generally lower. Noticeably large correlations in absolute value are for long-term debt over assets and COGS and book-to-market (BM), which are both 0.29.

4. Financial flexibility and the cross-section of stock returns.

In this section, we investigate whether the cross-sectional variation in stock returns during the collapse period and on stimulus day can be partially explained by our financial flexibility hypothesis for equity (hypothesis 1 of section 2). Further, we attempt to measure the value of financial flexibility during the collapse period, defined as the difference in cumulative excess returns between firms with high financial flexibility and firms with low financial flexibility.

Our three main variables that together proxy for financial flexibility are cash over assets, short-term debt over assets, and long-term debt over assets. In Table 3, we estimate regressions of returns on each variable separately, and then the financial flexibility variables together. We report results for the collapse period in odd-numbered columns and results for the stimulus day in even-numbered columns. Panel A has estimates for the whole sample. Columns (1) and (2) show coefficient estimates for cash over assets. We find that the coefficient on cash is positive and significant for the collapse period, and negative and significant for the stimulus day. We assess the economic significance as follows. A firm that has cash over assets greater by one standard deviation of the distribution of cash over assets than another firm has a higher cumulative excess return during the collapse of 5.14 percentage points.[12] The difference in returns due to cash holdings is much smaller on stimulus day, because the standard deviation of excess returns on stimulus day is much smaller. On that day, a one standard deviation difference in cash holdings corresponds to a 0.70 percentage point difference in returns. Panel B shows results for the COVID-19 industries. The coefficient estimate for the collapse period is similar to the coefficient for the whole sample. However, the economic effect is less because the standard deviation of cash holdings for firms in COVID-19 industries is much smaller. The coefficient on cash holdings for the stimulus day is not significant.

We now consider the coefficients on debt metrics. In columns (3) and (4) we show estimates for the coefficient on short-term debt. For the whole sample, the coefficient is negative and significant for the collapse period but positive and insignificant for the stimulus day. The standard deviation of short-term debt is only 5.4%, so that the difference in cumulative excess return for a one standard deviation difference in short-term debt is only 1.4 percentage points. With the firms from COVID-19 industries, the coefficient on short-term debt is -0.209, but it is insignificant. Turning to long-term debt in columns (5) and (6), the coefficient for the whole sample is -0.215 for the collapse period and 0.048 for the stimulus day. Both coefficients are significant at the 1% level. The coefficients are similar for the COVID-19 industries sample. For the collapse period, a one standard deviation difference in long-term debt over assets corresponds to a 4.9 percentage point difference in cumulative excess return for the entire sample, and a 5.1 percentage points for the COVID-19 industries sample. We use the net short-term debt measure in columns (7) and

[12] Calculated as the coefficient estimate of 0.197 times the standard deviation of cash over assets of 0.261.

(8). The coefficient on net short-term debt is -0.185 for the whole sample and -0.187 for the COVID-19 industries sample. The coefficients are significant at least at the 5% level. The economic significance of a one standard deviation difference in net short-term debt is 5.1 percentage points for the whole sample, but only 2.4 percentage points for the COVID-19 industries sample because the standard deviation of net short-term debt is approximately half for the COVID-19 industries sample than for the whole sample.

In columns (9) and (10), we present estimates of regressions where we include all three variables that proxy for financial flexibility. For the whole sample, all coefficients fall in absolute value. The coefficients on cash holdings and long-term debt remain significant for the collapse period, but the coefficient on short-term debt is not significant. For stimulus day, only the coefficient on long-term debt is significant. Turning to the COVID-19 industries, only the coefficients for long-term debt are significant.

Several commentators have voiced particular concern about the large share repurchase programs and dividend payments of companies during recent years (see Kahle and Stulz, 2020, for data on payouts and repurchases in the 2000s) and argued that, had companies only given less money back to shareholders, they would have more financial reserves to face the COVID-19 crisis now. In columns (11) and (12) of Table 3, we show results when we include the payout ratio in the regressions. The coefficient on the payout ratio is indistinguishable from zero in the collapse period. The payout ratio is statistically significant and positive on stimulus day. For the COVID-19 industries, the payout ratio is insignificant during both the collapse period and on stimulus day. Though we include the payout ratio in regressions in this section, we postpone a more detailed assessment of the role of payouts in the performance of firms during the collapse period until the next section.

Overall, Table 3 shows that the excess returns of firms during the collapse period as well as during stimulus day depend on measures of financial flexibility. However, it seems that long-term debt is a more important determinant of excess returns both for the whole sample and for the COVID-19 industries sample. These results are supportive of the financial flexibility hypothesis, but they raise a number of questions that we address next.

It is clear from Table 1 that there are important cross-sectional differences in characteristics between firms. It could be that the firms with more cash perform better not because of their cash holdings but because they are in an industry where firms typically hold more cash. Another related consideration is that it is well-known that firm capital structures differ across industries. Hence, if a firm has a low level of debt, it might just mean that it is in an industry where that attribute is valuable. If we use industry fixed effects, we account for industry effects in cash holdings and leverage, so that a firm that has more cash and less debt relative to its industry is one that is likely to be more financially flexible. It is also well-known that stock returns differ because of different exposures of firms to priced risks. For instance, with the capital asset pricing model, when the market falls, high beta firms will see their stock fall more. These exposures are related to firm characteristics.

In Table 4, we present estimates of the regressions in Table 3 that account for industry differences and for known determinants of asset returns from the asset pricing literature. Further, we also control for proxies for fixed and variable costs to investigate the prediction from the analysis of Section 2 that firms with more variable costs should fare better when there is a momentary revenue drop. To control for industry differences, we add industry fixed effects, based on the Fama-French 49 industry definitions. To account for variation in asset returns explained by the asset pricing literature, we control for firm characteristics known to be related to stock returns.[13] Specifically, we control for characteristics that correspond to the risk factors used in several well-known studies. We control for beta, book-to-market, and firm size (e.g., Fama and French, 1993), momentum (e.g., Carhart, 1997), and profitability (e.g., Fama and French, 2015; Novy-Marx, 2013). To account for the ease with which a firm can cut costs, we control for capital expenditures, R&D, COGS, and SG&A. We expect firms that have more capital expenditures, more R&D, or more SG&A to find it more difficult to cut spending. From our discussion in Section 2, these firms should be affected more by the shock. To the extent that cost of goods sold (COGS) measures variable costs, firms with higher COGS, everything else constant, should have a lower stock-price drop. Finally, we expect firms with an

[13] We adapt the approach of Fahlenbrach, Prilmeier, and Stulz (2012) who examine the determinants of bank stock returns during the GFC.

investment grade rating to be more financially flexible than other firms as these firms are in a good position to raise funds through debt. In contrast, firms with a high-yield debt rating should be less financially flexible in distressed times and should perform relatively better on stimulus day. We also include the payout ratio in all regressions.

The regression reported in column (1) of Panel A of Table 4 includes our three proxies for financial flexibility as well as the additional variables just discussed. We find that each proxy for flexibility has a significant coefficient with the expected sign for the collapse period. The economic effects remain meaningful. A one standard deviation lower cash, higher short-term debt and higher long-term debt is associated with collapse period returns that are 3.5%, 1.3%, and 3.7% lower, respectively. Having an investment grade rating adds no information. Neither capital expenditures nor R&D expenditures have a significant coefficient. However, as expected, SG&A has a negative significant coefficient and COGS over sales has a positive significant coefficient. As before in Table 3, the payout ratio does not have a significant coefficient. In column (2), we report the same regression but for stimulus day. Of the flexibility variables, only long-term debt has a significant positive coefficient. Among the other variables (other than the characteristics from the asset pricing literature), only SG&A has a significant coefficient.

When we consider the coefficients on the characteristics, we find that the coefficient on beta is significantly negative during the collapse period and significantly positive during the stimulus day. Larger firms perform better during the collapse period and on stimulus day. High book-to-market firms perform better during the collapse period, but book-to-market does not explain variation in returns on stimulus day. Neither profitability nor performance help explain the cross-sectional variation in returns during the collapse period. Of profitability and momentum, only momentum is significant with a positive coefficient on stimulus day.

In columns (3) and (4) of Panel A of Table 4, we replace cash over assets and short-term debt over assets with net short-term debt over assets and add an indicator variable that takes a value of 1 if a firm has a high-yield rating. The coefficient on net short-term debt is negative and significant as expected. The high-yield debt rating indicator variable has a negative statistically significant coefficient. The coefficient is also economically significant. Companies that have a non-investment grade rating have 5.7 percentage point lower returns during the collapse period even though we control for our flexibility proxies. The magnitude of the coefficient on long-term debt in column (3) is weaker than in the other comparable regressions. Column (4) reports estimates for stimulus day. In column (4), the coefficient on long-term debt is not significant but the coefficient on the high-yield indicator variable is positive and significant. The stock price of non-investment grade rated companies increases by an additional 1.6 percentage points on stimulus day. No other changes are noticeable. Finally, columns (5) and (6) use total book debt over assets instead of short-term debt over assets and long-term debt over assets. The coefficients on total book debt are significant and of the expected sign. Nothing else changes.

We conduct four robustness tests that we do not report in a table. First, we use the average payout ratio over three years ending in 2019 instead of the payout ratio in 2019. Our results for the financial flexibility variables are unchanged and the coefficient on the average payout ratio stays indistinguishable from zero. Second, instead of calculating the payout ratio as payouts over assets, we calculate it as payouts over net income minus extraordinary items. With this definition, the payout ratio is not meaningful if the denominator is negative. We therefore drop observations with negative net income minus extraordinary items. Using this definition does not change our conclusion about the value of financial flexibility or the relation between payouts and returns. Third, we also estimate the regressions in columns (1) and (2) replacing capital expenditure with plant, property, and equipment (PPE) over assets. The coefficient on PPE is not significant and our conclusions are unchanged. Finally, we also include unused credit lines over total assets at the end of fiscal year 2019 as an additional measure of financial flexibility in the regressions. Acharya and Steffen (2020) show that especially BBB rated companies quickly drew down their credit lines in March and April 2020 to secure financing. We obtain the size of unused credit lines from CapitalIQ. The data are available for about 2/3rd of our sample. The coefficient on unused credit lines is statistically indistinguishable from zero in regressions similar to those of columns (1) and (2), and the results on our financial flexibility measure remain quantitatively and qualitatively the same.[14]

What can we say about the value of financial flexibility during the COVID-19 crisis? One way to assess that value is to compare a firm that has low financial flexibility versus one that has high financial flexibility. Suppose that the low financial flexibility firm is at the 25th percentile of cash holdings, at the 75th percentile of short-term debt, and at the 75th percentile of long-term debt. Compare that firm to a firm with high financial flexibility that is at the 75th percentile of cash holdings, at the 25th percentile of short-term debt, and at the 25th percentile of long-term debt. The difference in cumulative excess returns between these two firms using the regression in column (1) of Table 4 is 9.7 percentage points during the collapse period when the mean decrease in the value of common stock across firms is 37 percentage points. Another way to put this is that a firm with high financial flexibility experienced a drop in its stock price 26% smaller than the average firm. Similar calculations for column (3) (net short-term debt instead of cash and short-term debt) yield an 8.1 percentage point difference (22% smaller drop than the average). For column (5), where we have cash and total debt, the calculations yield a 9.5 percentage point difference (26% smaller drop).

In Panel B of Table 4, we show estimates of the same regressions as in Panel A for the sample of firms in COVID-19 industries. We find that the coefficient on cash holdings is not significant even though its value is similar to its value in Panel A. However, the coefficient on long-term debt for the collapse period is significant. When we turn to the regressions using net short-term debt, we find that net short-term debt has a significant negative coefficient for the collapse period. As in Panel A, the coefficients on the high-yield indicator variable are significant and economically large. Firms in COVID-19 industries that have a high-yield rating exhibit 10.9% lower returns during the collapse period. The coefficients on SG&A are not significant, but the coefficients on COGS for the collapse period are significant and more than three times larger than in Panel A. Overall, the results for the COVID-19 industry firms are quite similar to the overall sample, with lower statistical significance. The result is somewhat surprising, as we would expect the value

[14] We decided not to include unused credit lines as one of our main measures of financial flexibility in the entire analysis because we lose approximately 1/3 of our sample due to the unavailability of credit line usage data.

of financial flexibility to be higher for these firms than for the entire sample. We believe that two facts can explain the results. The Fama-French (49) industry classification may be too coarse for our purpose. For example, the list of particularly affected firms includes firms that sell medical equipment. Second, the classification cannot distinguish between whether the business model is mostly online or brick-and-mortar, and online sales decreased less or even, in some cases, increased during the crisis. Hence, from now on, to conserve space, we will only report results for the overall sample.[15]

It is well-known that theoretically a firm's equity beta increases with leverage. A concern with our results is that long-term debt over assets is related to returns not because firms with more long-term debt have less financial flexibility but because such firms have a higher beta. In Table 5, we modify the regressions of Table 4 by splitting beta into two parts: unlevered beta and the beta due to leverage. The definitions of the two betas are given in Appendix A. When we do that, we allow the coefficient on the two components of beta to differ. An important caveat with this decomposition is that, as shown in Table 2, the beta due to leverage is highly correlated with long-term debt to assets. We find that the coefficient on unlevered beta is quite small compared to the coefficient on the beta due to leverage. This decomposition does not change our conclusions concerning the role of cash and long-term debt as proxies for financial flexibility, but short-term debt ceases to be significant. Another way to put this is that if one attempts to capture the impact of leverage on beta more precisely, the coefficients on cash and long-term debt remain significant. However, the coefficients on the proxies understate the whole impact of financial flexibility as a lack of financial flexibility means that the firm's equity co-moves more with the market, so that the value of equity is more affected by an economic downturn. COGS and SG&A continue to have significant coefficients in the predicted direction.

[15] These shortcomings could be overcome by our own assessment of the potential impact of the crisis on each sample firm, but doing so would considerably increase the subjectivity of the classifications.

5. The value of financial flexibility, payouts, and corporate diversification.

In Section 4, we find no evidence of a relation between stock returns during the collapse period and corporate payouts in 2019 even when we do not control for our financial flexibility proxies. Since greater corporate payouts, everything else equal, reduce financial flexibility, such a result is puzzling. We investigate this result further and attempt to better understand the relation between payouts and stock return performance in the first part of this section. A diversified corporation can use its internal capital market to substitute in part for external finance. Hence, we would expect corporate diversification to be an advantage in the presence of a shock like the COVID-19 shock. We investigate whether this is the case in the second part of this section.

5.a. Payouts and financial flexibility.

The insignificant coefficients on the payout ratio in Tables 3 and 4 could make sense if the impact of payouts on financial flexibility is small on average. To assess this impact across firms, in Table 6 we present statistics for our financial flexibility measures and payout ratios for the entire sample and for subsamples based on payout ratio quartiles to assess the extent to which payouts affect our financial flexibility proxies. We implement a pro forma approach of the type introduced by DeAngelo, DeAngelo, and Stulz (2006) where we estimate what the cash over assets ratio or the long-term debt over assets ratio would have been at the end of 2019 had the firm had no payouts. We do not take into account the second-order effect that the firm would have to pay less interest on debt since it would have less debt. Columns (1) to (3) show these statistics if we use the 2019 payouts over assets ratio as the main sorting variable. With this approach, we see that the average cash over assets ratio would have only increased from 0.224 to 0.251 had the firm not paid out in 2019. The reductions in long-term debt would have been similarly small; the average long-term debt ratio would have only decreased from 0.279 to 0.244. Using the coefficients of Table 4, Panel A, column (1), the stock return would have been higher by 0.36 percentage points (0.134 x (0.251 – 0.224)) had the firm retained payouts to increase cash or by 0.57 percentage points had the firm retained payouts to reduce long-term debt (0.163 x (0.279 – 0.244)).

The next five rows show results for the firms that were in the top quartile for the payout ratio in 2019. For them, the average payout over assets ratio increases to 0.111. But even for those high payout firms, the average cash over assets ratio would have only increased from 0.15 to 0.233, and the average long-term-debt ratio would have only decreased from 0.316 to 0.204. The corresponding increases in returns are 1.11 and 1.83 percentage points.

These numbers suggest that total payouts in 2019 were not large relative to the cash balances and debt of companies, not even for top quartile payers. However, sample firms not only paid out significant amounts in 2019, but also in earlier years. Columns (4) to (6) repeat the analysis but now use the cumulative payouts from 2017 to 2019 over assets in 2019 as the sorting variable.[16]

Column (6) shows that the importance of payouts increases. Cumulative payouts are on average 11.4% of assets. The average cash balance would have increased from 0.199 to 0.272, while the average long-term debt would have decreased from 0.288 to 0.174. As a result, the stock return would have been higher by 0.98 percentage points or 1.86 percentage points had the payouts been used to increase cash reserves or reduce debt, respectively.

The mean payout rate for firms in the top quartile of the cumulative payout ratio distribution is much higher as it is almost six times larger than the mean payout rate for firms in the middle quartiles (33.7% versus 5.9%). Consequently, if firms in the middle quartiles had not had payouts for the three years ending in 2019, the impact on their financial flexibility proxies would be limited. Looking at long-term debt, the long-term debt over assets for the average firm in the middle quartiles would fall from 0.285 to 0.226. In contrast, for the firms in the top quartile of payout rates, long-term debt over assets would fall from 0.313 to -0.019, so that on average firms could have paid back their long-term debt and would have had cash left over had they had no payouts for the last three years. Using the coefficient on long-term debt of -0.163 from the regression in column (1) of Table 4 to assess the economic impact, firms in the middle quartiles would have had higher returns by 0.96 percentage points had they not had payouts and instead paid down long-

[16] The number of observations decreases as not all firms have a three-year history in Compustat.

term debt while firms in the top quartile would have had higher returns by 5.1 percentage points (0.163 x (0.313 – 0)).

Given the large difference in payout rates between firms with average payout rates and firms in the top quartile of cumulative payout rates, we now consider regressions that allow a nonlinear relation between payout rates and stock returns. We define an indicator variable that takes the value one if a firm is in the top quartile of payout rates defined as cumulative three-year payouts from 2017 to 2019 divided by assets in 2019. We show the estimates in Table 7 and find that the indicator variable is never significant. Adding the indicator variable has little impact on the coefficients for cash over assets, short-term debt over assets, and long-term debt over assets.

It is useful to understand which companies tend to have high payout rates when payouts are computed as a percentage of assets. For that purpose, we looked at the 50 firms that have the highest payout rate in 2019. Most firms in that list have assets of less than $10 billion. The largest firm in that list is Apple. Apple has $339 billion in assets; the next largest firm is Cisco with $98 billion in assets, and the third largest firm is Biogen that has $27 billion in assets. Apple and Cisco have more cash than long-term debt. Biogen Inc. has slightly less cash than long-term debt. But the list also has firms with almost no cash and much long-term debt. An example is Denny's Corp that paid out 21.2% of assets, had cash over assets of 1.5%, and had long-term debt equal to 88.5% of assets. The list suggests that the firms with high payout ratios are two different groups of firms: some firms have a very strong balance sheet and are very profitable, and they can have high payouts without weakening their balance sheet. Other firms are extremely highly levered and may have acquired this leverage to finance their payouts. In our regressions, we do not distinguish between types of payers. Further work exploring whether the payout coefficients depend on firm characteristics would be helpful in understanding the relation between payouts and stock returns during the collapse phase better.

A concern with our approach is that we control for industry. Our approach effectively measures whether stock returns differ because of payout rates within industries. It turns out that the results would not be much different if we did not control for industries. Though we do not tabulate the results, we re-estimate Table 7 without industry fixed effects. The payout coefficients remain insignificant. This result may be due to the fact that many firms in computer-related industries have high payout rates, so that these firms are more likely to be in the top quartile, but firms in that industry generally performed better during the collapse.

5.b. Conglomerates and stock returns during the collapse period and on stimulus day.

There is a considerable literature in finance that investigates the costs and benefits of corporate diversification (see Maksimovic and Phillips, 2013, for a review of the literature). Though there are recognized costs to the conglomerate form of organization, one obvious benefit is that it may make it possible to fund projects that the financial markets may not fund if they are under stress. Hence, conglomerates may be in a better position to fund valuable activities during periods of financial stress than specialized firms that undertake the same type of activities. Empirical evidence by Matvos and Seru (2014) and Kuppuswamy and Villalonga (2016) supports the view that conglomerates had some advantages in coping with the stressed financial markets of the GFC. With the COVID-19 crisis, it is unclear how much the conglomerate form is useful. Suppose that all activities of a conglomerate face a sudden stop. In this case, the situation of a conglomerate might be similar to the situation of a specialized firm except that the conglomerate can sell subsidiaries outside of its core activities if there is a functioning market for these subsidiaries. In this section, we investigate whether conglomerates performed better for a given level of proxies of financial flexibility. The maintained hypothesis is that a conglomerate has more financial flexibility than a specialized firm for a given level of the financial flexibility proxies because it has an internal capital market.

We investigate whether diversified firms performed differently by constructing a sample of firms for which we can identify whether the firm is diversified or specialized. We follow the approach of Kuppuswamy and Villalonga (2016). We use the Compustat Segments database. For each firm in that database that is also in our main sample, we identify each of the Fama-French 49 (FF49) industries in which it is active. A firm that is active in only one FF49 industry is designated as a specialized firm. The other firms are diversified firms or conglomerates. We assume that firms that are not in the Compustat Segments database are specialized firms. With our definition, 375 (20.2%) sample firms are diversified firms. In Table 8, columns (1) and (2), we re-estimate the regressions of Table 4, columns (1) and (2), and include an indicator variable that takes the value of one if a firm is diversified. We drop the industry fixed effects to make sure that these fixed effects do not prevent us from assessing correctly the effect of corporate diversification since the conglomerate firms are in multiple industries. However, the results are similar if we use industry fixed effects and assign each conglomerate to the industry of its largest segment. We find that the conglomerate indicator variable is not significant. In columns (3) and (4), we interact the indicator variable with the proxies for financial flexibility. The only change in column (3) is that the interaction of cash with the indicator variable is positive and significant, suggesting that cash is more valuable for a conglomerate. This would be consistent with a conglomerate being able to direct cash to segments that can make the most use of it given the stress in financial markets. However, conglomerates are also often acquisitive, so that we cannot exclude that an alternative explanation is that there are distressed acquisition prospects that a conglomerate with cash might be able to acquire. In column (4), the only change is that the interaction of the indicator variable with short-term debt is positive.

It follows from the evidence presented in Table 8 that there is little evidence that the conglomerate form was especially valuable during the collapse period in the COVID-19 crisis.

6. Financial constraints and the cross-section of stock returns.

In this section, we address the issue of whether the firms we identify as financially inflexible are firms that the literature would have identified as financially constrained, so that our proxies for financial flexibility are negatively related to the extent that a firm is financially constrained. To address this issue, we investigate whether the various indexes of financial constraints help explain the cross-section of excess returns during the collapse period as well as during stimulus day.

We estimate the regressions of Table 3 with the addition of industry fixed effects and the firm characteristics known to be related to asset returns from the asset pricing literature, but instead of having variables that proxy for financial flexibility, we include indicator variables for firms with a financial constraint index in the top quartile of the distribution of the index (KZ, WW, SA indexes), for firms without a rating, or for firms with a projected cash deficit (HR measure). In other words, the table answers the question of whether the most financially constrained firms perform worse during the collapse period and better on stimulus day than other firms. For the traditional three financial constraints indexes, Table 9 shows that there is no evidence that the most constrained firms exhibit worse returns when we control for firm characteristics and industry fixed effects. Surprisingly, the firms that are highly constrained according to the Whited-Wu index actually performed better during the collapse period.

We conjectured when developing hypothesis 2 that we may not find evidence for a negative effect of financial constraints on stock prices during the collapse period because these firms could have large precautionary cash holdings. Specifically, a firm might be unable to access capital markets, but if its precautionary cash holdings are large enough, it can fund itself for the period of the sudden revenue stop. In contrast to the traditional measures of financial constraints, the Huang-Ritter measure is explicitly focused on the ability of firms to fund themselves out of their existing cash holdings. We find that it is significant and has the expected sign, namely firms that would run out of cash absent outside finance are firms that perform worse during the collapse period. The effect is economically large. Firms with a projected cash deficit have returns lower by 3.5 percentage points during the collapse period. The indicator variable for firms without a credit rating is positive. This is surprising in that if these firms are more financially constrained, we would expect them to perform worse. However, more firms have a non-investment grade rating than have an investment grade rating in the sample. As a result, the indicator variable *no debt rating* corresponds to an indicator variable for “not a highly levered firm”.

7. Financial flexibility and the cross-section of CDS spread changes.

In this section, we investigate whether firms with greater financial flexibility experience a smaller increase in credit spreads than other firms in response to the COVID-19 shock. We would expect firms with greater financial flexibility to be less likely to default during the period of the sudden stop as they have greater ability to fund their cash flow shortfall. On stimulus day in turn, we would expect that the default probability of those firms drops less as a result of the news on policy responses. For our analysis, we estimate the regressions of Table 3, columns (9) and (10) with industry fixed effects and firm characteristics from asset pricing models added, as well as Table 4, columns (1) and (2), but instead of using cumulative excess stock returns as the dependent variable, we use the change in the CDS premium. CDS premiums provide a proxy for a firm's creditworthiness that is often used in the literature. Unfortunately, CDS premiums are available only for 239 sample firms and 93 firms in COVID-19 industries.

We show the regression estimates in Table 10. We divide the CDS premium by one hundred for better readability of the table. The coefficients on cash over assets are not statistically significant. However, the coefficients on both short-term debt and long-term debt are significantly positive for the collapse period and significantly negative on stimulus day. The economic magnitude can be gauged as follows. In column (3), the coefficient on long-term debt (short-term debt) is 5.989 (7.945). For firms with available CDS data, the standard deviation of long-term debt (short-term debt) over assets is 0.178 (0.043). A one-standard deviation higher ratio of long-term debt over assets therefore increases the CDS premium by 5.989 x 0.178 x 100 = 107 basis points more. Such a change is large given that the mean change in CDS premiums is 211.9 basis points and the median change is only 59.8 basis points. The economic magnitude of a one standard deviation increase in short-term debt is 34 basis points.

We carry out a similar calculation for the value of financial flexibility during the COVID-19 crisis as for the stock return regressions. We compare a firm that has low financial flexibility, i.e., one that is at the 25th percentile of cash holdings, at the 75th percentile of short-term debt, and at the 75th percentile of long-term debt with a firm with high financial flexibility that is at the 75th percentile of cash holdings, at the 25th percentile of short-term debt, and at the 25th percentile of long-term debt. We calculate the interquartile range for the financial flexibility measures for only those firms that have CDS traded.[17] A firm with low financial flexibility experiences an increase in the CDS premium that is 176 basis points higher than the increase for a highly financially flexible firm.

[17] The interquartile ranges are 0.083 for cash over assets, 0.040 for short-term debt over assets, and 0.223 for long-term debt over assets.

The coefficient on the indicator variable for investment grade debt is negative and significant for the collapse period. The coefficient on the investment grade indicator variable is equal to -1.40, which means that firms with an investment grade rating have an increase in CDS premiums that is on average 140 basis points lower than for non-investment grade firms during the collapse period. We demonstrate that the change in the CDS premiums is affected by firm variables that proxy for fixed costs. We report positive coefficients on Capex and SG&A for the collapse period and a significantly negative coefficient on Capex on stimulus day. Surprisingly, the coefficient on COGS is positive and significant as well. The payout ratio has no effect on CDS premiums.

Overall, the results of Table 10 mirror those of the stock return regressions for the collapse period. Firms with more financial flexibility fare relatively better. This result is consistent with hypothesis 3 of section 2.

8. Is the value loss due to lack of financial flexibility temporary?

The stock market quickly rebounded during April and May 2020 and the period where the financial system was highly stressed was over quickly as well. On May 29, 2020, the S&P 500 closed at 3044.31 points, a return of 36.1% from the bottom value of 2237.40 attained on March 23. We examine now whether the greater loss experienced by firms with less financial flexibility was attenuated or disappeared during the recovery of the stock market, so that the gap in firm performance between highly flexible firms and low flexibility firms closed somewhat or completely. The analysis of Section 2 suggests that some of the loss experienced by firms due to lack of financial flexibility cannot be avoided by firms even with well-functioning financial markets. A firm that is financially inflexible will have to make costly changes to its activities to be able to fund its temporary loss of revenue. However, some of that loss will likely be smaller if financial markets are functioning normally.

Figure 3 provides stark evidence that the greater loss experienced by firms with low financial flexibility does not disappear. It shows the evolution of cumulative daily log excess returns from February 3 to May 29, 2020 for two groups of stocks. The blue dotted line shows returns for a portfolio of 257 sample firms with high financial flexibility, and the green dashed line shows returns for a portfolio of 184 sample firms with low financial flexibility. We classify a firm as having high financial flexibility if it is in the top quartile of the cash over assets distribution and the bottom quartile of the long-term debt over assets distribution at the end of fiscal year 2019. A firm has low financial flexibility if it is in the bottom quartile of the cash over assets distribution and the top quartile of the long-term debt over assets distribution at the end of fiscal year 2019. The figure shows that the cumulative difference in log returns continues to widen after March 24. By the end of May, the difference between the two groups is almost 30 percentage points, and the difference between the group of highly financially flexible firms and the overall sample firms is approximately 20 percentage points.

Figure 3 shows a univariate comparison. It does not account for differential performance of industries. Table 11 controls for the stock, industry, and firm characteristics we examined before. Column (1) of Table 11 shows that the difference between highly financially flexible firms and all other sample firms is 21.7%, but once we control for industry affiliation in column (2), the difference is reduced to 8.4%. Column (3) has a full set of firm and stock characteristics; the difference between firms with high financial flexibility and all other sample firms remains a strongly economically and statistically significant 8.5%. In column (4), we again show results for each of our three measures of financial flexibility; all three measures retain their economic significance, and cash over assets and long-term debt over assets also remain statistically significant. This evidence shows that lack of financial flexibility is costly to firms when they are faced with a temporary shock to their revenue.

9. Conclusion.

We examine the value of financial flexibility in the unique situation of a sudden and unexpected revenue shortfall. We find that, everything else equal, the revenue shortfall affects a firm's stock and its CDS premiums less if the firm is more financially flexible. Firms with less flexible costs are affected more. These results are strongest for a firm's ratio of long-term debt to assets. We also investigate how firms' stock prices and CDS premiums react to news of macroeconomic measures designed to attenuate the shock. We expect that firms with more financial flexibility benefit less from these measures. We find that this is the case, but again more so for long-term debt over assets than for cash holdings. Though one would expect that payouts reduce financial flexibility, we find that once we control for firm characteristics and proxies for financial flexibility, there is no evidence that firms with higher payouts are affected more adversely by the COVID-19 crisis in our regressions. However, at the same time, using our estimates of the relation between stock returns and financial flexibility, we find that firms with payout rates above the 75th percentile would, on average, have been able to pay off their long-term debt had they not had payouts over the last three years and their stock returns would have been by 5.1 percentage points higher.

What can we say about the value of financial flexibility during the COVID-19 crisis? One way to assess that value is to compare the cumulative excess stock return of a firm that has low financial flexibility versus the cumulative excess return of a firm that has high financial flexibility, keeping everything else the same. Suppose that the low financial flexibility is at the 25th percentile of cash holdings, at the 75th percentile of short-term debt, and at the 75th percentile of long-term debt. Compare that firm to a firm with high financial flexibility that is at the 75th percentile of cash holdings, at the 25th percentile of short-term debt, and at the 25th percentile of long-term debt. The difference in cumulative excess returns between these two firms is 9.7 percentage points during the collapse period when the mean decrease in the value of common stock across firms is 37 percentage points. Another way to put this is that the difference between the stock price drop of a firm with high financial flexibility and the stock price drop of a firm with low financial flexibility is equal to 26% of the stock price drop of the average firm. Even though the stock market recovered rapidly, we show that the valuation gap between firms with high financial flexibility and firms with low financial flexibility resulting from the COVID-19 shock does not disappear as the stock market recovers. Our comparable estimate for CDS spreads is that a firm with low financial flexibility experiences an increase in the CDS spread that is 176 basis point higher than a firm with high financial flexibility during the collapse period when on average CDS spreads increase by 212 basis points.

Though financial economists have argued that financial flexibility might be used to hurt shareholders (Jensen, 1986), investor activists have campaigned to force firms to decrease cash holdings and increase leverage, and the private equity industry has made the reduction of financial flexibility intrinsic to its business model, these results should remind us that financial flexibility is also a key risk management tool. However, this tool does not come for free. Future research should help us understand better how to value the downside of financial flexibility to help shareholders and managers to trade off the benefits and costs of financial flexibility more effectively.

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Appendix A: Sample selection procedure

Compustat North America Daily – Fundamentals Annual	
Number of firms with fiscal year 2019 data available	3859
Drop firms with:	
Duplicate data	- 48
SIC 6000 – 6999 (financial firms)	- 1230
SIC 4900 – 4949 (utility firms)	- 97
SIC 8000s and 9000s (not for profit and governmental firms)	- 116
Non – U.S. headquarters	- 410
Missing cash and short-term investments	- 2
Missing stock price data in Compustat North America Daily – Security Daily	-9
An average share price < $1	- 88
Security type not equal to "common, ordinary"	- 2
Number of firms after all screens	1857
Number of firms belonging to COVID-19 industries after all screens	512

Appendix B: Variable definitions

This appendix contains the definitions of all dependent and independent variables. Compustat data item mnemonics are in capitalized letters.

Variable name	Description
Dependent variables:	
Daily exc. return	The natural logarithm of $(1 + r - r_f)$, where r equals the daily simple return based on the daily close price (PRCCD in Compustat Security Daily) adjusted for the daily total return factor (TRFD) and the daily adjustment factor (AJEXDI) and r_f is the one month daily treasury bill rate.
CDS mid-quote change	The mid-quote change (in basis points) of the CDS premium (five year maturity)
Independent and other variables :	
Assets ($m)	The book value of total assets; AT.
Cash / assets	The ratio of cash to total assets; CHE / AT.
St-debt / assets	The ratio of debt in current liabilities to total assets; DLC / AT.
nSt-debt / assets	Short-term debt scaled by total assets – cash scaled by total assets.
Lt-debt / assets	The ratio of total long-term debt to total assets; DLTT / AT.
Book debt / assets	The ratio of total book debt to total assets; (DLC + DLTT) / AT.
Payout / assets	The ratio of total dividends and share repurchases to total assets; (DVC + DVP + PRSTKC) / AT. We set missing or negative DVC, DVP, and PRSTKC to zero.
Ind: 3y cum. payout / assets top quartile	An indicator variable set to one if the sum of the firm's total payouts in year 2017, 2018, and 2019 scaled by the firm's total assets in 2019 is in the top quartile of the distribution and set to zero otherwise.
Ind: Conglomerate	An indicator variable set to one if the firm generates sales from two or more business segments belonging to different FF49 industries and if the sum of sales of these segments lies within an interval of one percentage point from the firm's aggregate sales and set to zero otherwise. We retrieve the segments data from the Compustat Segments (Non-Historical) database.
Ind: IG-debt rating	An indicator variable set to one if the firm's S&P domestic long-term issuer credit rating (SPLTICRM in the Compustat ratings file) at the end of February 2017 is at or above BBB- and set to zero otherwise.
Ind: HY-debt rating	An indicator variable set to one if the firm's S&P domestic long-term issuer credit rating (SPLTICRM in the Compustat ratings file) at the end of February 2017 is between BB+ and C and set to zero otherwise.
RD / assets	The ratio of research and development expense to total assets; XRD / AT. We set missing XRD to zero.
SGA / sales	The ratio of selling, general and administrative expense to total sales; XSGA / SALE.
Capex / lagged assets	The ratio of capital expenditures to total assets lagged by one year; CAPX / AT.
COGS / sales	The ratio of cost of goods sold to total sales capped at 100%; COGS / SALE.
Equity beta	The slope parameter of a regression of daily log excess returns on daily market log excess returns from January 2nd to December 31st, 2019.
Asset beta	The unlevered equity beta using market leverage at year end 2019 to unlever; Equity beta × (1 – (DLC + DLTT) / (DLC + DLTT + $PRCCD_{EoY2019}$ × CSHOC).

Beta due to leverage	The beta due to leverage calculated by deducting the asset beta from the equity beta.
BM at EoY 2019	The ratio of book value of equity (CEQ) to market value of equity at year end 2019, which equals the last observation of daily close price (PRCCD) at year end 2019 multiplied with the number of shares outstanding (CSHOC).
Ln(MVE) at EoY 2019	The natural logarithm of the firm's last observation of daily close price (PRCCD) at year end 2019 multiplied with its number of shares outstanding (CSHOC).
Momentum 2019	The exponent of the sum of daily log excess returns from January 2nd, 2019 to the last observation of daily log excess returns at year end 2019.
Profitability	The ratio of gross profit to total assets; GP / AT.
CDS spread	The average of the bid and the ask CDS premium (five year maturity), in basis points.
Financial constraints indexes:	
KZ-index	The Kaplan and Zingales (KZ) index, which we construct following Lamont, Polk, and Saá-Requejo (2001).
FC (KZ-index)	An indicator variable set to one if the firm's KZ-index is in the top quartile of the distribution and set to zero otherwise.
WW-index	The Whited and Wu (WW) index, which we construct following Whited and Wu (2006).
FC (WW -index)	An indicator variable set to one if the firm's WW-index is in the top quartile of the distribution and set to zero otherwise.
SA-index	The Size-Age index of Hadlock and Pierce (2010).
FC (SA-index)	An indicator variable set to one if the firm's SA-index is in the top quartile of the distribution and set to zero otherwise.
HR cash ex-ante	The cash ex-ante variable, which we construct as in Huang and Ritter (2019); 2 × CHE2019 − CHE2018 − (DLTIS2019 − DLTR2019 + DLCCH2019) – (SSTK2019 – PRSTKC2019). We set missing SSTK, PRSTKC, DLTIS, and DLTR to zero. We set missing DLCCH2019 to DLC2019 – DLC2018.
FC (HR cash ex-ante)	An indicator variable set to one if the firm's HR-cash ex-ante variable is in the top quartile of the distribution and set to zero otherwise.
Ind: No debt rating	An indicator variable set to one if the firm has no S&P domestic long-term issuer credit rating (SPLTICRM) at the end of February 2017 and set to zero otherwise.

Table 1: Summary statistics

The table presents summary statistics for the dependent and independent variables we use. The sample for Panel A consists of all non-financial and non-utility firms with available fiscal-year 2019 data in Compustat. Appendix A shows the sample selection procedure. The sample for panel B consists of firms in industries that are particularly affected by the measures designed to fight the COVID-19 outbreak. COVID-19 industries are defined as Fama-French 49 industries Entertainment, Construction, Automobiles and trucks, Aircraft, Ships, Personal services, Business services, Transportation, Wholesale, Retail, and Restaurants, hotels and motels. All variables are defined in Appendix B.

Panel A	N	Min	P1	P5	P25	Median	Mean	P75	P95	P99	Max	SD
Dependent variables:												
Feb 2 to March 23, 2020:												
Cum. daily exc. returns	1,858	-0.905	-0.826	-0.712	-0.523	-0.387	-0.378	-0.261	-0.055	0.248	3.503	0.260
CDS mid-quote changes	239	-10.478	-3.220	6.121	19.892	59.820	211.896	286.964	800.622	1347.244	3257.992	344.456
on March 24, 2020:												
Daily exc. returns	1,857	-0.655	-0.107	-0.019	0.046	0.087	0.092	0.132	0.229	0.326	0.520	0.079
CDS mid-quote changes	239	-278.900	-171.772	-75.096	-16.675	-5.085	-14.537	-2.302	10.079	37.569	140.953	34.415
Independent and other variables:												
Assets ($m)	1,857	7.783	10.113	37.700	362.359	1415.693	7350.789	4843.531	3.7e+04	1.4e+05	1.4e+05	1.9e+04
Cash / assets	1,857	0.001	0.001	0.005	0.038	0.112	0.224	0.324	0.844	0.961	0.961	0.261
St-debt / assets	1,847	0.000	0.000	0.000	0.005	0.013	0.032	0.036	0.122	0.331	0.381	0.054
nSt-debt / assets	1,847	-0.959	-0.959	-0.832	-0.289	-0.082	-0.192	-0.009	0.055	0.251	0.299	0.273
Lt-debt / assets	1,841	0.000	0.000	0.000	0.089	0.259	0.279	0.409	0.684	1.068	1.106	0.226
Book debt / assets	1,835	0.000	0.000	0.001	0.115	0.296	0.312	0.451	0.730	1.132	1.174	0.238
Payout / assets	1,857	0.000	0.000	0.000	0.000	0.011	0.035	0.042	0.160	0.347	0.347	0.059
Ind: 3y cum. payout / assets top quartile	1,679	0.000	0.000	0.000	0.000	0.000	0.250	1.000	1.000	1.000	1.000	0.433
Ind: Conglomerate	1,857	0.000	0.000	0.000	0.000	0.000	0.202	0.000	1.000	1.000	1.000	0.402
Ind: IG-debt rating	1,857	0.000	0.000	0.000	0.000	0.000	0.146	0.000	1.000	1.000	1.000	0.353
Ind: HY-debt rating	1,857	0.000	0.000	0.000	0.000	0.000	0.190	0.000	1.000	1.000	1.000	0.392
RD / assets	1,857	0.000	0.000	0.000	0.000	0.012	0.079	0.089	0.391	0.819	0.886	0.151
SGA / sales	1,626	0.019	0.019	0.043	0.117	0.229	0.386	0.430	1.073	3.679	5.251	0.604
Capex / lagged assets	1,690	0.000	0.000	0.003	0.015	0.030	0.045	0.058	0.149	0.242	0.242	0.047
COGS / sales	1,857	0.000	0.056	0.162	0.416	0.629	0.607	0.800	1.000	1.000	1.000	0.254
KZ-index	1,572	-481.155	-229.066	-50.300	-3.734	0.689	-6.342	2.791	12.266	76.518	319.574	42.702
FC (KZ-index)	1,572	0.000	0.000	0.000	0.000	0.000	0.249	0.000	1.000	1.000	1.000	0.433
WW-index	1,657	-0.598	-0.572	-0.518	-0.418	-0.345	-0.327	-0.266	-0.050	0.079	0.253	0.136
FC (WW-index)	1,657	0.000	0.000	0.000	0.000	0.000	0.249	0.000	1.000	1.000	1.000	0.433
SA-index	1,857	-4.637	-4.633	-4.576	-4.014	-3.405	-3.435	-3.009	-2.137	-1.247	-0.410	0.741
FC (SA-index)	1,857	0.000	0.000	0.000	0.000	0.000	0.249	0.000	1.000	1.000	1.000	0.433
HR cash ex-ante	1,768	-5.3e+03	-1.6e+03	-278.293	9.949	127.104	722.119	496.376	3960.000	1.3e+04	1.9e+04	2168.189
FC (HR-cash ex-ante)	1,768	0.000	0.000	0.000	0.000	0.000	0.201	0.000	1.000	1.000	1.000	0.401
Ind: No debt rating	1,857	0.000	0.000	0.000	0.000	1.000	0.664	1.000	1.000	1.000	1.000	0.472
Equity beta	1,828	-0.198	-0.053	0.344	0.853	1.182	1.194	1.539	2.066	2.474	2.535	0.516
Asset beta	1,801	-0.044	0.005	0.182	0.539	0.878	0.893	1.204	1.715	2.121	2.121	0.464
Beta due to leverage	1,801	0.000	0.000	0.000	0.051	0.182	0.303	0.398	1.106	1.746	1.835	0.360
BM at EoY 2019	1,848	-1.147	-0.886	-0.036	0.150	0.316	0.462	0.636	1.526	3.017	3.247	0.573
Ln(MVE) at EoY 2019	1,851	2.038	2.262	4.003	6.023	7.396	7.342	8.663	10.832	12.223	12.223	2.034
Momentum 2019	1,851	-0.979	-0.972	-0.937	-0.882	-0.848	-0.832	-0.812	-0.676	-0.241	-0.241	0.102
Profitability	1,857	-0.854	-0.711	-0.262	0.156	0.258	0.264	0.395	0.696	1.082	1.082	0.277
Daily CDS spread [bps]	8,843	8.699	17.267	26.363	50.504	85.485	161.470	164.417	583.489	1123.828	4092.901	237.532

Panel B	N	Min	P1	P5	P25	Median	Mean	P75	P95	P99	Max	SD
Dependent variables:												
Feb 2 to March 23, 2020:												
Cum. daily exc. returns	512	-0.887	-0.821	-0.733	-0.593	-0.458	-0.440	-0.327	-0.101	0.162	2.171	0.234
CDS mid-quote changes	93	-10.478	-10.478	3.540	29.050	169.346	300.730	424.233	1008.822	1874.653	1874.653	347.915
on March 24, 2020:												
Daily exc. returns	512	-0.280	-0.132	-0.030	0.043	0.098	0.106	0.156	0.280	0.358	0.468	0.095
CDS mid-quote changes	93	-278.900	-278.900	-107.683	-23.280	-8.493	-25.493	-4.102	10.079	25.925	25.925	46.866
Independent and other variables:												
Assets ($m)	512	19.908	24.419	105.653	835.419	2305.878	8585.745	6658.614	4.1e+04	1.4e+05	1.4e+05	1.9e+04
Cash / assets	512	0.001	0.001	0.004	0.019	0.056	0.091	0.126	0.310	0.498	0.814	0.104
St-debt / assets	511	0.000	0.000	0.000	0.008	0.026	0.047	0.055	0.199	0.381	0.381	0.070
nSt-debt / assets	511	-0.810	-0.484	-0.291	-0.089	-0.023	-0.045	0.011	0.120	0.299	0.299	0.126
Lt-debt / assets	511	0.000	0.000	0.016	0.206	0.339	0.361	0.478	0.794	1.106	1.106	0.233
Book debt / assets	510	0.000	0.000	0.033	0.240	0.398	0.411	0.547	0.853	1.174	1.174	0.245
Payout / assets	512	0.000	0.000	0.000	0.002	0.019	0.042	0.052	0.171	0.347	0.347	0.062
Ind: 3y cum. payout / assets top quartile	489	0.000	0.000	0.000	0.000	0.000	0.301	1.000	1.000	1.000	1.000	0.459
Ind: Conglomerate	512	0.000	0.000	0.000	0.000	0.000	0.240	0.000	1.000	1.000	1.000	0.428
Ind: IG-debt rating	512	0.000	0.000	0.000	0.000	0.000	0.152	0.000	1.000	1.000	1.000	0.360
Ind: HY-debt rating	512	0.000	0.000	0.000	0.000	0.000	0.279	1.000	1.000	1.000	1.000	0.449
RD / assets	512	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.035	0.162	0.265	0.028
SGA / sales	481	0.019	0.019	0.038	0.091	0.146	0.192	0.241	0.436	0.697	5.251	0.266
Capex / lagged assets	481	0.000	0.001	0.006	0.019	0.038	0.055	0.074	0.163	0.242	0.242	0.051
COGS / sales	512	0.035	0.122	0.328	0.597	0.730	0.689	0.819	0.919	1.000	1.000	0.182
KZ-index	464	-79.671	-69.059	-25.315	-1.837	1.164	-1.553	2.728	6.486	31.381	116.130	14.787
FC (KZ-index)	464	0.000	0.000	0.000	0.000	0.000	0.237	0.000	1.000	1.000	1.000	0.426
WW-index	494	-0.586	-0.578	-0.524	-0.435	-0.374	-0.371	-0.309	-0.220	-0.145	0.017	0.092
FC (WW-index)	494	0.000	0.000	0.000	0.000	0.000	0.117	0.000	1.000	1.000	1.000	0.322
SA-index	512	-4.633	-4.632	-4.584	-4.086	-3.567	-3.590	-3.210	-2.504	-1.522	-1.224	0.652
FC (SA-index)	512	0.000	0.000	0.000	0.000	0.000	0.148	0.000	1.000	1.000	1.000	0.356
HR cash ex-ante	502	-3.1e+03	-1.7e+03	-301.602	4.646	115.001	700.179	538.918	4404.000	1.1e+04	1.7e+04	1954.013
FC (HR-cash ex-ante)	502	0.000	0.000	0.000	0.000	0.000	0.237	0.000	1.000	1.000	1.000	0.426
Ind: No debt rating	512	0.000	0.000	0.000	0.000	1.000	0.568	1.000	1.000	1.000	1.000	0.496
Equity beta	508	-0.198	0.091	0.334	0.757	1.061	1.078	1.373	1.889	2.267	2.535	0.472
Asset beta	505	-0.044	0.054	0.149	0.394	0.656	0.669	0.918	1.261	1.539	2.121	0.358
Beta due to leverage	505	-0.000	0.000	0.015	0.133	0.287	0.408	0.542	1.204	1.835	1.835	0.390
BM at EoY 2019	510	-1.147	-1.147	-0.195	0.164	0.427	0.522	0.760	1.693	2.714	3.247	0.631
Ln(MVE) at EoY 2019	511	2.038	2.893	4.062	6.101	7.527	7.442	8.717	10.840	11.862	12.223	1.991
Momentum 2019	511	-0.979	-0.965	-0.928	-0.877	-0.852	-0.844	-0.821	-0.765	-0.545	-0.241	0.075
Profitability	512	-0.648	-0.026	0.090	0.175	0.262	0.323	0.429	0.733	1.082	1.082	0.220
Daily CDS spread [bps]	3,441	8.699	16.698	24.714	56.971	111.603	209.582	239.192	751.458	1239.756	2203.556	260.644

Table 2: Correlation matrices

The table presents the correlation matrix for all dependent and independent variables we use. The sample for Panel A consists of all non-financial and non-utility firms with available fiscal-year 2019 data in Compustat. The sample for panel B consists of firms in industries that are particularly affected by the measures designed to fight the COVID-19 outbreak. COVID-19 industries are defined as Fama–French 49 industries Entertainment, Construction, Automobiles and trucks, Aircraft, Ships, Personal services, Business services, Transportation, Wholesale, Retail, and Restaurants, hotels and motels. All variables are defined in Appendix B.

Panel A

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Collapse period (CP) return	1															
(2) Stimulus day (SD) return	-0.37	1														
(3) CP CDS mid-quote change	-0.48	0.41	1													
(4) SD CDS mid-quote change	0.2	-0.27	-0.56	1												
(5) Assets ($m)	0.01	0.05	-0.09	0.02	1											
(6) Cash / assets	0.2	-0.09	-0.12	0.06	-0.18	1										
(7) St-debt / assets	-0.05	0.03	0.02	-0.17	0.07	-0.14	1									
(8) nSt-debt / assets	-0.2	0.09	0.11	-0.13	0.18	-0.98	0.33	1								
(9) Lt-debt / assets	-0.19	0.14	0.22	-0.19	0.07	-0.35	0.07	0.35	1							
(10) Book debt / assets	-0.19	0.14	0.22	-0.22	0.08	-0.37	0.32	0.41	0.96	1						
(11) Payout / assets	0.03	0.05	-0.24	0.16	0.13	-0.13	0.05	0.14	0.15	0.16	1					
(12) Ind: 3y cum. payouts / at	0.04	0.03	-0.29	0.17	0.15	-0.08	0.03	0.08	0.06	0.07	0.68	1				
(13) Ind: Conglomerate	-0.05	0.02	-0.09	0.04	0.13	-0.22	0	0.21	0.05	0.04	0.04	0.06	1			
(14) Ind: IG-debt rating	0.01	0.07	-0.36	0.29	0.53	-0.2	0.05	0.2	0.05	0.06	0.24	0.27	0.15	1		
(15) Ind: HY-debt rating	-0.18	0.11	0.36	-0.31	0	-0.27	0.03	0.26	0.35	0.34	-0.07	-0.11	0.05	-0.2	1	
(16) RD / assets	0.16	-0.11	-0.17	0.07	-0.13	0.69	-0.03	-0.67	-0.23	-0.23	-0.15	-0.1	-0.19	-0.16	-0.22	1
(17) SGA / sales	0.09	-0.01	-0.23	0.16	-0.11	0.59	-0.02	-0.56	-0.1	-0.11	-0.11	-0.09	-0.17	-0.13	-0.17	0.63
(18) Capex / lagged assets	-0.14	0.08	0.32	-0.23	0.04	-0.27	-0.02	0.25	0.11	0.1	0.01	0	-0.01	0.01	0.06	-0.23
(19) GOGS / sales	-0.02	-0.04	0.14	-0.1	-0.07	0.09	0.05	-0.08	-0.1	-0.08	-0.18	-0.12	0.08	-0.05	0.05	0.19
(20) FC (KZ-index)	0.02	0.02	0.2	-0.29	-0.11	0.04	0.03	-0.03	0.19	0.19	-0.12	-0.13	-0.09	-0.18	0.07	0.19
(21) FC (WW-index)	0.16	-0.16	.	.	-0.22	0.54	0	-0.51	-0.23	-0.21	-0.21	-0.2	-0.15	-0.25	-0.25	0.51
(22) FC (SA-index)	0.11	-0.08	0.02	-0.06	0.3	0.41	0.03	-0.39	-0.17	-0.15	-0.1	-0.03	-0.09	0.04	-0.17	0.41
(23) FC (HR-cash ex-ante)	-0.09	-0.05	0.24	-0.08	-0.07	-0.22	0.11	0.23	0.16	0.18	-0.09	-0.08	0.03	-0.07	0.04	0
(24) Ind: No debt rating	0.15	-0.15	0.04	0.01	-0.39	0.38	-0.06	-0.37	-0.33	-0.33	-0.12	-0.12	-0.15	-0.58	-0.68	0.3
(25) Equity beta	-0.1	0.13	0.36	-0.2	-0.07	0.1	-0.07	-0.11	0.04	0.01	-0.12	-0.18	-0.04	-0.08	0.11	0.06
(26) Asset beta	0.13	0.06	-0.12	0.11	-0.1	0.4	-0.2	-0.42	-0.35	-0.39	-0.02	-0.04	-0.09	-0.05	-0.21	0.28
(27) Beta due to leverage	-0.29	0.1	0.54	-0.34	0.03	-0.38	0.16	0.39	0.51	0.52	-0.15	-0.2	0.06	-0.05	0.42	-0.26
(28) BM at EoY 2019	-0.08	-0.07	0.34	-0.13	-0.03	-0.22	-0.05	0.2	-0.15	-0.16	-0.2	-0.22	0.07	-0.08	0.08	-0.18
(29) Ln(MVE) at EoY 2019	0.04	0.19	-0.34	0.17	0.56	-0.21	-0.07	0.19	0.16	0.13	0.33	0.32	0.11	0.54	0.07	-0.26
(30) Momentum 2019	0.07	0.03	-0.18	-0.03	-0.04	0.26	-0.05	-0.26	-0.11	-0.12	-0.03	-0.02	-0.06	-0.04	-0.07	0.09
(31) Profitability	-0.01	0.04	-0.26	0.13	-0.01	-0.34	0.06	0.34	0.04	0.05	0.3	0.22	0.01	0.05	-0.01	-0.44

Variables	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
(1) Collapse period (CP) return															
(2) Stimulus day (SD) return															
(3) CP CDS mid-quote change															
(4) SD CDS mid-quote change															
(5) Assets ($m)															
(6) Cash / assets															
(7) St-debt / assets															
(8) nSt-debt / assets															
(9) Lt-debt / assets															
(10) Book debt / assets															
(11) Payout / assets															
(12) Ind: 3y cum. payouts / at															
(13) Ind: Conglomerate															
(14) Ind: IG-debt rating															
(15) Ind: HY-debt rating															
(16) RD / assets															
(17) SGA / sales	1														
(18) Capex / lagged assets	-0.15	1													
(19) GOGS / sales	-0.36	-0.05	1												
(20) FC (KZ-index)	0.17	-0.13	-0.09	1											
(21) FC (WW-index)	0.39	-0.14	0.02	0.14	1										
(22) FC (SA-index)	0.29	-0.08	0.07	0.04	0.35	1									
(23) FC (HR-cash ex-ante)	0	0.23	0.07	0.07	0.02	0.02	1								
(24) Ind: No debt rating	0.24	-0.06	0	0.07	0.41	0.11	0.02	1							
(25) Equity beta	0.03	0.1	-0.01	0.05	-0.09	-0.11	-0.05	-0.03	1						
(26) Asset beta	0.18	-0.04	-0.07	0.01	0.09	0.02	-0.19	0.22	0.73	1					
(27) Beta due to leverage	-0.18	0.2	0.08	0.06	-0.23	-0.19	0.18	-0.32	0.46	-0.27	1				
(28) BM at EoY 2019	-0.15	0.12	0.15	-0.2	-0.01	-0.11	0.13	0	0.06	-0.22	0.37	1			
(29) Ln(MVE) at EoY 2019	-0.16	0.06	-0.25	-0.06	-0.53	-0.13	-0.18	-0.46	0.14	0.22	-0.1	-0.3	1		
(30) Momentum 2019	0.13	-0.05	0	0.06	-0.06	0.15	-0.15	0.09	0	0.18	-0.23	-0.24	0.1	1	
(31) Profitability	0	0.07	-0.54	0.01	-0.15	-0.2	-0.13	-0.03	-0.11	-0.08	-0.05	-0.08	0.11	-0.04	1

Panel B

Variables	(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)	(31)
(1) Collapse period (CP) return	1																														
(2) Stimulus day (SD) return	-0.49	1																													
(3) CP CDS mid-quote change	-0.54	0.53	1																												
(4) SD CDS mid-quote change	0.24	-0.32	-0.77	1																											
(5) Assets ($m)	0.06	0.08	0.01	-0.06	1																										
(6) Cash / assets	0.08	0.04	-0.04	-0.01	-0.06	1																									
(7) St-debt / assets	-0.06	0.06	0.18	-0.23	0.04	-0.06	1																								
(8) nSt-debt / assets	-0.1	0	0.16	-0.16	0.07	-0.85	0.57	1																							
(9) Lt-debt / assets	-0.22	0.14	0.27	-0.23	-0.02	-0.19	-0.03	0.14	1																						
(10) Book debt / assets	-0.23	0.16	0.32	-0.28	-0.01	-0.2	0.29	0.32	0.94	1																					
(11) Payout / assets	0.07	0.05	-0.29	0.19	0.01	0.08	-0.08	-0.11	0.16	0.16	1																				
(12) Ind: 3y cum. payouts / at	0.06	0.03	-0.3	0.22	0.04	0.08	-0.06	-0.1	0.15	0.13	0.68	1																			
(13) Ind: Conglomerate	0	-0.03	-0.02	-0.03	0.05	-0.03	-0.03	0.01	-0.04	-0.05	0.01	0.03	1																		
(14) Ind: IG-debt rating	0.11	0.02	-0.43	0.26	0.55	-0.08	-0.03	0.05	-0.06	-0.07	0.14	0.2	-0.02	1																	
(15) Ind: HY-debt rating	-0.23	0.17	0.43	-0.28	-0.02	-0.11	0	0.09	0.28	0.26	-0.17	-0.14	-0.04	-0.26	1																
(16) RD / assets	0.03	0	-0.01	-0.06	0.09	0.41	0.04	-0.31	-0.14	-0.12	-0.03	0.03	0.04	-0.02	-0.05	1															
(17) SGA / sales	0.02	0.01	-0.08	0.09	-0.04	0.27	0.07	-0.18	0.09	0.1	-0.05	-0.03	-0.09	-0.04	-0.06	0.37	1														
(18) Capex / lagged assets	-0.02	0.1	0.32	-0.4	-0.01	-0.07	0	0.06	0.13	0.12	0	-0.01	-0.02	0.02	-0.04	-0.06	-0.02	1													
(19) GOGS / sales	0.09	-0.1	-0.03	0.06	-0.04	0.02	0.14	0.06	-0.29	-0.24	-0.18	-0.17	0.06	-0.07	-0.03	0.08	-0.23	-0.12	1												
(20) FC (KZ-index)	-0.05	0.06	0.31	-0.3	-0.06	-0.08	0.02	0.07	0.21	0.21	-0.11	-0.14	-0.07	-0.15	0.18	0.05	0.07	-0.15	0.02	1											
(21) FC (WW-index)	0.08	-0.17	.	.	-0.16	0.15	0.05	-0.09	-0.14	-0.13	-0.12	-0.12	-0.02	-0.16	-0.21	0.11	0.16	-0.03	0.1	0.1	1										
(22) FC (SA-index)	0.08	0	0.21	-0.13	0.5	0.15	0.06	-0.09	-0.02	0.01	0.04	0.02	0.02	0.22	-0.09	0.19	0.12	0.01	-0.07	0.07	0.15	1									
(23) FC (HR-cash ex-ante)	-0.08	-0.09	0.15	-0.13	-0.1	-0.29	0.12	0.3	0.16	0.2	-0.04	-0.04	0.03	-0.07	-0.07	-0.06	-0.05	0.19	0	0.05	0.06	0.02	1								
(24) Ind: No debt rating	0.13	-0.17	0.03	0.03	-0.38	0.16	0.02	-0.12	-0.21	-0.19	0.05	-0.02	0.06	-0.49	-0.71	0.06	0.09	0.03	0.08	-0.05	0.3	-0.08	0.11	1							
(25) Equity beta	-0.09	0.09	0.35	-0.34	0.02	-0.04	0.05	0.06	0	0	-0.19	-0.24	-0.03	-0.03	0.17	0.1	0	0.08	0.02	0.04	-0.26	-0.08	-0.02	-0.13	1						
(26) Asset beta	0.09	0.02	-0.24	0.17	0.04	0.2	-0.2	-0.27	-0.39	-0.44	0.06	0.01	0.01	0.08	-0.11	0.21	0.03	0.01	-0.01	-0.12	-0.25	-0.01	-0.2	0.04	0.57	1					
(27) Beta due to leverage	-0.19	0.09	0.5	-0.45	-0.01	-0.23	0.25	0.33	0.35	0.39	-0.29	-0.3	-0.04	-0.11	0.29	-0.07	-0.03	0.09	0.04	0.15	-0.08	-0.09	0.14	-0.19	0.67	-0.23	1				
(28) BM at EoY 2019	0.06	-0.09	0.09	-0.12	-0.08	-0.11	0	0.09	-0.29	-0.28	-0.29	-0.31	0.04	-0.08	-0.09	-0.07	-0.05	-0.03	0.17	-0.11	0.2	-0.11	0.04	0.14	0.15	-0.14	0.31	1			
(29) Ln(MVE) at EoY 2019	0.05	0.2	-0.25	0.16	0.58	-0.06	-0.13	-0.02	0.09	0.04	0.28	0.29	0.02	0.53	0.09	0	-0.07	0.04	-0.22	-0.1	-0.57	0.17	-0.18	-0.46	0.1	0.39	-0.23	-0.37	1		
(30) Momentum 2019	-0.01	0.1	-0.06	-0.03	-0.01	0.24	-0.01	-0.2	-0.01	-0.01	0.05	-0.04	-0.04	0.01	-0.03	0.14	0.31	0.02	0.03	-0.06	-0.17	0.21	-0.16	0.02	-0.08	0.19	-0.26	-0.21	0.15	1	
(31) Profitability	0.19	-0.09	-0.24	0.15	-0.11	0.03	-0.06	-0.06	-0.02	-0.04	0.21	0.2	-0.13	-0.03	-0.12	-0.13	0.16	-0.05	-0.27	0.02	0.1	-0.05	-0.14	0.13	-0.01	0.11	-0.12	-0.09	-0.05	-0.08	1

Table 3: Stock returns and financial flexibility measures

The table shows results from cross-sectional regressions of stock returns in excess of the risk-free interest rate on firm characteristics. All odd-numbered columns (Collapse period) show results for cumulative stock returns for sample firms from February 3, 2020 to March 23, 2020, and all even-numbered columns (Stimulus day) show results for the return from March 23 to March 24, 2020. Variable definitions are provided in Appendix B. Panel A shows results for all non-financial and non-utility firms with available fiscal-year 2019 data in Compustat. Panel B shows results for industries that are particularly affected by the measures designed to fight the COVID-19 outbreak. COVID-19 industries are defined as Fama–French 49 industries Entertainment, Construction, Automobiles and trucks, Aircraft, Ships, Personal services, Business services, Transportation, Wholesale, Retail, and Restaurants, hotels and motels. Numbers in parentheses are t-statistics, and ∗∗∗, ∗∗, and ∗ indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A	(1) Collapse period	(2) Stimulus day	(3) Collapse period	(4) Stimulus day	(5) Collapse period	(6) Stimulus day	(7) Collapse period	(8) Stimulus day	(9) Collapse period	(10) Stimulus day	(11) Collapse period	(12) Stimulus day
Cash / assets	0.197***	-0.027***							0.142***	-0.011		
	(8.70)	(-3.79)							(5.87)	(-1.52)		
St-debt / assets			-0.257**	0.050					-0.114	0.029		
			(-2.33)	(1.49)					(-1.04)	(0.85)		
Lt-debt / assets					-0.215***	0.048***			-0.154***	0.044***		
					(-8.15)	(5.95)			(-5.53)	(5.12)		
nSt-debt / assets							-0.185***	0.025***				
							(-8.56)	(3.76)				
Payout / assets											0.112	0.070**
											(1.10)	(2.26)
Observations	1858	1857	1848	1847	1842	1841	1848	1847	1836	1835	1858	1857
Adjusted R^2	0.039	0.007	0.002	0.001	0.034	0.018	0.038	0.007	0.052	0.020	0.000	0.002

Panel B	(1) Collapse period	(2) Stimulus day	(3) Collapse period	(4) Stimulus day	(5) Collapse period	(6) Stimulus day	(7) Collapse period	(8) Stimulus day	(9) Collapse period	(10) Stimulus day	(11) Collapse period	(12) Stimulus day
Cash / assets	0.183*	0.034							0.081	0.066		
	(1.83)	(0.83)							(0.81)	(1.61)		
St-debt / assets			-0.209	0.083					-0.220	0.094		
			(-1.42)	(1.38)					(-1.52)	(1.58)		
Lt-debt / assets					-0.218***	0.059***			-0.213***	0.065***		
					(-5.00)	(3.26)			(-4.82)	(3.56)		
nSt-debt / assets							-0.187**	0.001				
							(-2.29)	(0.04)				
Payout / assets											0.250	0.074
											(1.51)	(1.10)
Observations	512	512	511	511	511	511	511	511	510	510	512	512
Adjusted R^2	0.005	-0.001	0.002	0.002	0.045	0.019	0.008	-0.002	0.047	0.024	0.003	0.000

Table 4: Stock returns, financial flexibility measures, and stock and firm characteristics

The table shows results from cross-sectional regressions of stock returns in excess of the risk-free interest rate on firm characteristics. All odd-numbered columns (Collapse period) show results for cumulative stock returns for sample firms from February 3, 2020 to March 23, 2020, and all even-numbered columns (Stimulus day) show results for the return from March 23 to March 24, 2020. Variable definitions are provided in Appendix B. Characteristics from the asset pricing literature include the firm's equity beta, the stock return in calendar year 2019, the book-to-market ratio, the natural log of the market value of the firm's equity, and gross profitability scaled by assets. Panel A shows results for all non-financial and non-utility firms with available fiscal-year 2019 data in Compustat. Panel B shows results for industries that are particularly affected by the measures designed to fight the COVID-19 outbreak. COVID-19 industries are defined as Fama-French 49 industries Entertainment, Construction, Automobiles and trucks, Aircraft, Ships, Personal services, Business services, Transportation, Wholesale, Retail, and Restaurants, hotels and motels. All regressions include industry-fixed effects. Numbers in parentheses are t-statistics, and ∗∗∗, ∗∗, and ∗ indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A	(1) Collapse period	(2) Stimulus day	(3) Collapse period	(4) Stimulus day	(5) Collapse period	(6) Stimulus day
Cash / assets	0.134***	0.017			0.134***	0.017
	(2.81)	(1.03)			(2.82)	(1.03)
St-debt / assets	-0.232**	0.051				
	(-2.03)	(1.29)				
nSt-debt / assets			-0.142***	-0.009		
			(-3.41)	(-0.60)		
Lt-debt / assets	-0.163***	0.025**	-0.127***	0.014		
	(-5.28)	(2.32)	(-3.96)	(1.22)		
Book debt / assets					-0.168***	0.028***
					(-5.66)	(2.70)
Ind: IG-debt rating	-0.005	-0.007	-0.030	0.001	-0.006	-0.006
	(-0.28)	(-1.01)	(-1.51)	(0.12)	(-0.33)	(-0.96)
Ind: HY-debt rating			-0.057***	0.016***		
			(-3.56)	(2.93)		
Capex / lagged assets	-0.071	0.034	-0.095	0.038	-0.073	0.034
	(-0.51)	(0.70)	(-0.68)	(0.80)	(-0.52)	(0.70)
SGA / sales	-0.027*	0.011**	-0.029*	0.012**	-0.027*	0.011**
	(-1.76)	(2.09)	(-1.94)	(2.27)	(-1.77)	(2.08)
COGS / sales	0.067*	0.003	0.077**	-0.000	0.064*	0.004
	(1.76)	(0.20)	(2.03)	(-0.02)	(1.68)	(0.29)
RD / assets	-0.008	-0.002	-0.025	0.006	-0.014	-0.000
	(-0.07)	(-0.06)	(-0.22)	(0.16)	(-0.12)	(-0.01)
Payout / assets	0.162	-0.026	0.117	-0.009	0.164	-0.026
	(1.45)	(-0.68)	(1.06)	(-0.25)	(1.48)	(-0.68)
Equity beta	-0.064***	0.018***	-0.061***	0.018***	-0.064***	0.018***
	(-4.73)	(3.98)	(-4.56)	(3.87)	(-4.75)	(3.96)
BM at EoY 2019	0.024*	-0.007	0.027**	-0.008*	0.023*	-0.006
	(1.84)	(-1.51)	(2.12)	(-1.86)	(1.77)	(-1.44)
Ln(MVE) at EoY 2019	0.013***	0.007***	0.016***	0.006***	0.013***	0.007***
	(2.99)	(4.62)	(3.75)	(3.85)	(2.98)	(4.62)
Momentum 2019	-0.129	0.090**	-0.137	0.093***	-0.131	0.091**
	(-1.25)	(2.54)	(-1.34)	(2.63)	(-1.27)	(2.57)
Profitability	0.062	0.003	0.060	0.003	0.061	0.003
	(1.56)	(0.21)	(1.51)	(0.19)	(1.53)	(0.23)
Observations	1489	1488	1489	1488	1489	1488
Adjusted R^2	0.197	0.098	0.203	0.102	0.198	0.099

Panel B	(1) Collapse period	(2) Stimulus day	(3) Collapse period	(4) Stimulus day	(5) Collapse period	(6) Stimulus day
Cash / assets	0.143	0.081			0.144	0.082
	(1.16)	(1.57)			(1.17)	(1.60)
St-debt / assets	-0.192	0.135**				
	(-1.17)	(1.97)				
nSt-debt / assets			-0.161*	-0.007		
			(-1.71)	(-0.17)		
Lt-debt / assets	-0.129**	0.036	-0.058	0.007		
	(-2.24)	(1.52)	(-1.00)	(0.26)		
Book debt / assets					-0.130**	0.054**
					(-2.39)	(2.35)
Ind: IG-debt rating	0.047	-0.034**	-0.009	-0.016	0.047	-0.033**
	(1.31)	(-2.25)	(-0.23)	(-1.01)	(1.31)	(-2.21)
Ind: HY-debt rating			-0.109***	0.036***		
			(-4.06)	(3.19)		
Capex / lagged assets	-0.091	0.133	-0.161	0.154	-0.097	0.133
	(-0.38)	(1.33)	(-0.68)	(1.53)	(-0.40)	(1.32)
SGA / sales	0.148	0.077	0.147	0.090	0.138	0.092
	(0.80)	(1.00)	(0.82)	(1.18)	(0.75)	(1.20)
COGS / sales	0.240**	0.009	0.259**	0.013	0.230**	0.027
	(2.10)	(0.18)	(2.32)	(0.28)	(2.03)	(0.58)
RD / assets	0.747	-0.395	0.739	-0.337	0.750	-0.377
	(1.27)	(-1.62)	(1.29)	(-1.39)	(1.28)	(-1.55)
Payout / assets	0.140	0.026	-0.045	0.114	0.147	0.027
	(0.62)	(0.28)	(-0.20)	(1.22)	(0.66)	(0.29)
Equity beta	-0.064**	0.012	-0.060**	0.013	-0.065**	0.012
	(-2.45)	(1.15)	(-2.35)	(1.17)	(-2.49)	(1.13)
BM at EoY 2019	0.037*	0.002	0.037*	-0.001	0.038*	0.003
	(1.74)	(0.24)	(1.77)	(-0.09)	(1.77)	(0.34)
Ln(MVE) at EoY 2019	0.015*	0.013***	0.024***	0.009***	0.015*	0.013***
	(1.92)	(3.84)	(2.99)	(2.63)	(1.93)	(3.80)
Momentum 2019	-0.269	0.162	-0.282	0.168	-0.274	0.177*
	(-1.09)	(1.57)	(-1.16)	(1.64)	(-1.11)	(1.73)
Profitability	0.204***	-0.041	0.187**	-0.044	0.209***	-0.046
	(2.69)	(-1.29)	(2.53)	(-1.43)	(2.79)	(-1.49)
Observations	449	449	449	449	449	449
Adjusted R^2	0.133	0.102	0.165	0.111	0.134	0.103

Table 5: Stock returns, financial flexibility measures, and asset beta and beta due to leverage

The table shows results from cross-sectional regressions of stock returns in excess of the risk-free interest rate on firm characteristics. All odd-numbered columns (Collapse period) show results for cumulative stock returns for sample firms from February 3, 2020 to March 23, 2020, and all even-numbered columns (Stimulus day) show results for the return from March 23 to March 24, 2020. Variable definitions are provided in Appendix B. All regressions include industry-fixed effects. Numbers in parentheses are t-statistics, and ∗∗∗, ∗∗, and ∗ indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) Collapse period	(2) Stimulus day	(3) Collapse period	(4) Stimulus day
Cash / assets	0.114**	0.019	0.115**	0.019
	(2.40)	(1.15)	(2.41)	(1.15)
St-debt / assets	-0.138	0.039		
	(-1.17)	(0.95)		
Lt-debt / assets	-0.085**	0.018		
	(-2.15)	(1.34)		
Book debt / assets			-0.092**	0.022
			(-2.39)	(1.64)
Capex / lagged assets	-0.089	0.037	-0.089	0.037
	(-0.64)	(0.76)	(-0.64)	(0.76)
SGA / sales	-0.030**	0.011**	-0.030**	0.011**
	(-1.97)	(2.08)	(-1.97)	(2.07)
COGS / sales	0.070*	0.001	0.067*	0.002
	(1.84)	(0.11)	(1.77)	(0.19)
RD / assets	-0.025	-0.001	-0.029	0.001
	(-0.21)	(-0.03)	(-0.25)	(0.01)
Payout / assets	0.124	-0.024	0.126	-0.025
	(1.11)	(-0.63)	(1.13)	(-0.64)
Asset beta	-0.025	0.016***	-0.025	0.017***
	(-1.39)	(2.62)	(-1.41)	(2.67)
Beta due to leverage	-0.124***	0.025***	-0.122***	0.024***
	(-5.27)	(3.05)	(-5.25)	(2.97)
BM at EoY 2019	0.040***	-0.008*	0.038***	-0.008*
	(2.87)	(-1.78)	(2.80)	(-1.67)
Ln(MVE) at EoY 2019	0.009**	0.006***	0.009**	0.006***
	(2.47)	(4.88)	(2.47)	(4.88)
Momentum 2019	-0.167	0.097***	-0.168	0.097***
	(-1.62)	(2.73)	(-1.63)	(2.74)
Profitability	0.054	0.003	0.053	0.003
	(1.35)	(0.23)	(1.33)	(0.25)
Observations	1489	1488	1489	1488
Adjusted R^2	0.202	0.098	0.203	0.099

Table 6: Payout ratios by quartile and financial flexibility measures

The table presents summary statistics for financial flexibility and payout ratios for the entire sample, as well as for sample splits by payout ratio quartiles. Columns (1) to (3) present numbers if we use the 2019 payout / assets ratio to split the sample into quartiles, and columns (4) to (6) present the numbers if we use the cumulative payouts from 2017 to 2019 divided by 2019 assets to split the sample into quartiles and to calculate the ratios. Columns (1) and (4) show the number of observations with complete data, columns (2) and (5) show medians, and columns (3) and (6) show means. The variable (cash + payout) / (assets + payout) shows what the cash over assets ratio of a company would have been if the company had retained all 2019 payouts (columns (2) and (3)) or all cumulative payouts between 2017 and 2019 (columns (5) and (6)). The variable (Lt-debt – payout) / assets shows what the long-term debt / assets ratio of a company would have been had the firm used all 2019 payouts (columns (2) and (3)) or all cumulative payouts between 2017 and 2019 (columns (5) and (6)) to pay down its long-term debt. The sample consists of all non-financial and non-utility firms with available fiscal-year 2019 data in Compustat. Appendix A shows the sample selection procedure. All variables are defined in Appendix B.

	2019 payouts / 2019 assets			**(2017+2018+2019 payouts) / 2019 assets**		
	N	Median	Mean	N	Median	Mean
All firms						
Cash / assets	1,857	0.112	0.224	1,679	0.101	0.199
(Cash + payout) / (assets + payout)	1,857	0.150	0.251	1,679	0.202	0.272
Lt-debt / assets	1,841	0.259	0.279	1,664	0.270	0.288
(Lt-debt – payout) / assets	1,841	0.222	0.244	1,664	0.164	0.174
Payout / assets	1,857	0.011	0.035	1,679	0.052	0.114
Top quartile payout ratio						
Cash / assets	464	0.100	0.150	420	0.107	0.164
(Cash + payout) / (assets + payout)	464	0.180	0.233	420	0.321	0.362
Lt-debt / assets	461	0.280	0.316	418	0.277	0.313
(Lt-debt – payout) / assets	461	0.183	0.204	418	-0.014	-0.019
Payout / assets	464	0.080	0.111	420	0.261	0.337
Bottom quartile payout ratio						
Cash / assets	465	0.420	0.436	420	0.233	0.350
(Cash + payout) / (assets + payout)	465	0.420	0.436	420	0.235	0.350
Lt-debt / assets	458	0.134	0.222	413	0.220	0.268
(Lt-debt – payouts) / assets	458	0.134	0.221	413	0.216	0.266
Payout / assets	465	0.000	0.000	420	0.000	0.001
Middle quartiles payout ratios						
Cash / assets	928	0.076	0.156	839	0.073	0.141
(Cash + payout) / (assets + payout)	928	0.093	0.168	839	0.135	0.188
Lt-debt / assets	922	0.286	0.289	833	0.282	0.285
(Lt-debt – payout) / assets	922	0.269	0.275	833	0.217	0.226
Payout / assets	928	0.011	0.014	839	0.052	0.059

Table 7: Stock returns, financial flexibility measures, and a top quartile payout ratio indicator variable

The table shows results from cross-sectional regressions of stock returns in excess of the risk-free interest rate on firm characteristics, and an indicator variable equal to one if the cumulative payouts over 2017 to 2019 over 2019 assets were in the top quartile of the distribution, and zero otherwise. All odd-numbered columns (Collapse period) show results for cumulative stock returns for sample firms from February 3, 2020 to March 23, 2020, and all even-numbered columns (Stimulus day) show results for the return from March 23 to March 24, 2020. Variable definitions are provided in Appendix B. All regressions include industry-fixed effects. Numbers in parentheses are t-statistics, and ∗∗∗, ∗∗, and ∗ indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) Collapse period	(2) Stimulus day	(3) Collapse period	(4) Stimulus day
Ind: 3y cum. payout /	0.018	-0.002	0.016	-0.003
assets top quartile	(1.28)	(-0.38)	(1.07)	(-0.66)
Cash / assets			0.155***	0.023
			(3.25)	(1.33)
St-debt / assets			-0.215*	0.051
			(-1.93)	(1.29)
Lt-debt / assets			-0.147***	0.023**
			(-4.82)	(2.10)
Ind: IG-debt rating			-0.011	-0.007
			(-0.61)	(-0.99)
Capex / lagged assets			-0.082	0.033
			(-0.59)	(0.66)
SGA / sales			-0.041**	0.011*
			(-2.57)	(1.87)
COGS / sales			0.082**	0.006
			(2.17)	(0.45)
RD / assets			0.104	0.005
			(0.87)	(0.11)
Equity beta	-0.056***	0.022***	-0.072***	0.019***
	(-4.73)	(5.51)	(-5.39)	(3.99)
BM at EoY 2019	0.035***	-0.011***	0.030**	-0.007
	(3.19)	(-2.82)	(2.35)	(-1.47)
Ln(MVE) at EoY 2019	0.013***	0.005***	0.016***	0.007***
	(4.16)	(4.36)	(3.72)	(4.72)
Momentum 2019	-0.073	0.079***	-0.148	0.091**
	(-0.91)	(2.90)	(-1.37)	(2.37)
Profitability	0.038	-0.001	0.078**	0.004
	(1.62)	(-0.14)	(2.04)	(0.26)
Observations	1671	1670	1423	1422
Adjusted R^2	0.154	0.097	0.213	0.105

Table 8: Stock returns, financial flexibility measures, and a conglomerate indicator variable

The table shows results from cross-sectional regressions of stock returns in excess of the risk-free interest rate on firm characteristics, and a conglomerate indicator variable equal to one if the firm reports sales in two or more different Fama-French 49 industries in the Compustat Segments database, and zero otherwise. All odd-numbered columns (Collapse period) show results for cumulative stock returns for sample firms from February 3, 2020 to March 23, 2020, and all even-numbered columns (Stimulus day) show results for the return from March 23 to March 24, 2020. Variable definitions are provided in Appendix B. Numbers in parentheses are t-statistics, and ∗∗∗, ∗∗, and ∗ indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) Collapse period	(2) Stimulus day	(3) Collapse period	(4) Stimulus day
Cash / assets	0.186***	0.013	0.151***	0.012
	(3.86)	(0.78)	(2.94)	(0.68)
St-debt / assets	-0.148	0.044	-0.202	-0.010
	(-1.31)	(1.17)	(-1.52)	(-0.23)
Lt-debt / assets	-0.188***	0.040***	-0.184***	0.044***
	(-6.36)	(3.99)	(-5.71)	(4.05)
Cash / assets ×			0.222*	-0.012
Ind: Conglomerate			(1.87)	(-0.29)
St-debt / assets ×			0.176	0.199**
Ind: Conglomerate			(0.69)	(2.33)
Lt-debt / assets ×			-0.009	-0.021
Ind: Conglomerate			(-0.12)	(-0.85)
Ind: Conglomerate	-0.011	0.001	-0.038	0.002
	(-0.76)	(0.18)	(-1.15)	(0.16)
Ind: IG-debt rating	-0.008	-0.008	-0.009	-0.007
	(-0.41)	(-1.22)	(-0.44)	(-1.13)
Capex / lagged assets	-0.499***	0.094**	-0.508***	0.094**
	(-3.86)	(2.16)	(-3.92)	(2.16)
SGA / sales	-0.009	0.007	-0.005	0.007
	(-0.61)	(1.47)	(-0.32)	(1.44)
COGS / sales	0.001	0.024**	0.002	0.024**
	(0.04)	(2.13)	(0.05)	(2.16)
RD / assets	0.136	-0.036	0.146	-0.035
	(1.20)	(-0.95)	(1.29)	(-0.93)
Payout / assets	-0.003	-0.010	-0.005	-0.010
	(-0.03)	(-0.26)	(-0.05)	(-0.27)
Equity beta	-0.078***	0.016***	-0.077***	0.016***
	(-6.29)	(3.80)	(-6.19)	(3.78)
BM at EoY 2019	0.011	-0.005	0.011	-0.005
	(0.89)	(-1.14)	(0.89)	(-1.23)
Ln(MVE) at EoY 2019	0.016***	0.007***	0.016***	0.006***
	(3.65)	(4.47)	(3.74)	(4.30)
Momentum 2019	-0.130	0.111***	-0.132	0.113***
	(-1.25)	(3.16)	(-1.27)	(3.23)
Profitability	0.109***	0.001	0.111***	0.003
	(3.09)	(0.11)	(3.13)	(0.21)
Observations	1489	1488	1489	1488
Adjusted R^2	0.127	0.066	0.127	0.068

Table 9: Stock returns and measures of financial constraints

The table shows results from cross-sectional regressions of stock returns in excess of the risk-free interest rate on measures of financial constraints. All odd-numbered columns (Collapse period) show results for cumulative stock returns for sample firms from February 3, 2020 to March 23, 2020 and all even-numbered columns (Stimulus day) show results for the return from March 23 to March 24, 2020. Variable definitions are provided in Appendix B. Characteristics from the asset pricing literature include the firm's equity beta, the stock return in calendar year 2019, the book-to-market ratio, the natural log of the market value of the firm's equity, and gross profitability scaled by assets. All regressions include industry-fixed effects. Numbers in parentheses are t-statistics, and ∗∗∗, ∗∗, and ∗ indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) Collapse period	(2) Stimulus day	(3) Collapse period	(4) Stimulus day	(5) Collapse period	(6) Stimulus day	(7) Collapse period	(8) Stimulus day	(9) Collapse period	(10) Stimulus day
FC (WW-index)	0.045**	0.001								
	(2.26)	(0.09)								
FC (KZ-index)			-0.016	0.006						
			(-1.12)	(1.28)						
FC (SA-index)					0.011	0.003				
					(0.78)	(0.56)				
FC (HR-cash ex-ante)							-0.035**	-0.003		
							(-2.43)	(-0.66)		
Ind: No debt rating									0.069***	-0.011**
									(5.05)	(-2.55)
Equity beta	-0.055***	0.024***	-0.049***	0.021***	-0.045***	0.021***	-0.051***	0.022***	-0.047***	0.021***
	(-4.51)	(5.75)	(-3.85)	(5.07)	(-3.86)	(5.67)	(-4.35)	(5.68)	(-4.14)	(5.71)
BM at EoY 2019	0.035***	-0.011***	0.033***	-0.010**	0.032***	-0.010***	0.033***	-0.011***	0.033***	-0.010***
	(3.12)	(-2.86)	(2.63)	(-2.45)	(2.87)	(-2.70)	(3.00)	(-2.97)	(3.06)	(-2.85)
Ln(MVE) at EoY 2019	0.017***	0.005***	0.011***	0.005***	0.013***	0.005***	0.012***	0.004***	0.020***	0.004***
	(4.64)	(3.76)	(3.34)	(4.54)	(4.39)	(5.02)	(3.91)	(4.42)	(6.18)	(3.30)
Momentum 2019	-0.065	0.065**	-0.073	0.084***	-0.011	0.048**	-0.037	0.061**	-0.041	0.054**
	(-0.69)	(2.06)	(-0.79)	(2.82)	(-0.15)	(2.10)	(-0.48)	(2.42)	(-0.59)	(2.36)
Profitability	0.033	-0.001	0.034	-0.002	0.050**	-0.003	0.037	-0.003	0.038*	-0.001
	(1.34)	(-0.18)	(1.34)	(-0.19)	(2.12)	(-0.34)	(1.55)	(-0.36)	(1.65)	(-0.17)
Observations	1650	1649	1566	1566	1820	1819	1761	1760	1820	1819
Adjusted R^2	0.158	0.092	0.142	0.097	0.142	0.094	0.146	0.093	0.154	0.097

Table 10: CDS mid-quote changes and financial flexibility measures

The table shows results from cross-sectional regressions of CDS mid-quote changes [in basis points / 100] on firm characteristics. All odd-numbered columns (Collapse period) show results for CDS midquote changes from February 3, 2020 to March 23, 2020, and all even-numbered columns (Stimulus day) show results for CDS midquote changes from March 23 to March 24, 2020. Variable definitions are provided in Appendix B. All regressions include industry-fixed effects based on the ten Fama-French industry classifications. Numbers in parentheses are t-statistics, and ∗∗∗, ∗∗, and ∗ indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) Collapse period	(2) Stimulus day	(3) Collapse period	(4) Stimulus day
Cash / assets	1.492	-0.065	1.228	-0.111
	(0.62)	(-0.24)	(0.48)	(-0.39)
St-debt / assets	8.585*	-1.214**	7.945*	-1.149**
	(1.96)	(-2.48)	(1.83)	(-2.36)
Lt-debt / assets	6.131***	-0.430***	5.989***	-0.332**
	(5.30)	(-3.32)	(4.47)	(-2.21)
Ind: IG-debt rating			-1.399***	0.161***
			(-2.74)	(2.82)
Capex / lagged assets			13.153**	-2.145***
			(2.37)	(-3.45)
SGA / sales			6.171*	-0.212
			(1.82)	(-0.56)
COGS / sales			4.257**	-0.168
			(2.13)	(-0.75)
RD / assets			-2.717	0.203
			(-0.33)	(0.22)
Payout / assets			0.969	0.113
			(0.24)	(0.25)
Equity beta	1.269***	-0.114**	1.089**	-0.065
	(2.65)	(-2.13)	(2.09)	(-1.12)
BM at EoY 2019	2.252***	-0.157***	1.829***	-0.116**
	(5.21)	(-3.26)	(3.96)	(-2.24)
Ln(MVE) at EoY 2019	-0.115	-0.013	0.133	-0.034
	(-0.76)	(-0.74)	(0.71)	(-1.63)
Momentum 2019	-1.703	-0.918	-2.645	-1.059
	(-0.29)	(-1.42)	(-0.45)	(-1.60)
Profitability	-1.077	0.035	-2.578	0.135
	(-0.73)	(0.21)	(-1.19)	(0.56)
Observations	238	238	228	228
Adjusted R^2	0.379	0.222	0.419	0.275

Table 11: Financial flexibility and stock returns between February 3 and May 29, 2020

The table shows results from cross-sectional regressions of stock returns in excess of the risk-free interest rate on firm characteristics. All columns show results for cumulative stock returns for sample firms from February 3, 2020 to May 29, 2020. The financial flexibility indicator variable in columns (1) to (3) is equal to one if firms are in the top quartile of the cash over assets distribution and in the bottom quartile of the long-term debt over assets distribution at the end of fiscal year 2019, and zero otherwise. Variable definitions are provided in Appendix B. Characteristics from the asset pricing literature include the firm's equity beta, the stock return in calendar year 2019, the book-to-market ratio, the natural log of the market value of the firm's equity, and gross profitability scaled by assets. Numbers in parentheses are t-statistics, and ∗∗∗, ∗∗, and ∗ indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
Ind: High financial flexibility	0.217***	0.084***	0.085***	
	(8.81)	(3.19)	(2.78)	
Cash / assets				0.223***
				(3.57)
St-debt / assets				-0.193
				(-1.28)
Lt-debt / assets				-0.091**
				(-2.25)
Capex / lagged assets			0.258	0.273
			(1.40)	(1.49)
SGA / sales			0.006	-0.011
			(0.33)	(-0.54)
COGS / sales			0.048	0.042
			(0.96)	(0.85)
RD / assets			0.363**	0.239
			(2.40)	(1.55)
Payout / assets			-0.117	-0.112
			(-0.81)	(-0.77)
Equity beta			-0.063***	-0.062***
			(-3.69)	(-3.54)
BM at EoY 2019			0.026	0.018
			(1.63)	(1.07)
Ln(MVE) at EoY 2019			0.028***	0.027***
			(5.72)	(5.50)
Momentum 2019			0.161	0.097
			(1.18)	(0.71)
Profitability			0.144***	0.129**
			(2.77)	(2.45)
Industry fixed effects	NO	YES	YES	YES
Observations	1831	1831	1484	1482
Adjusted R2	0.040	0.133	0.186	0.196

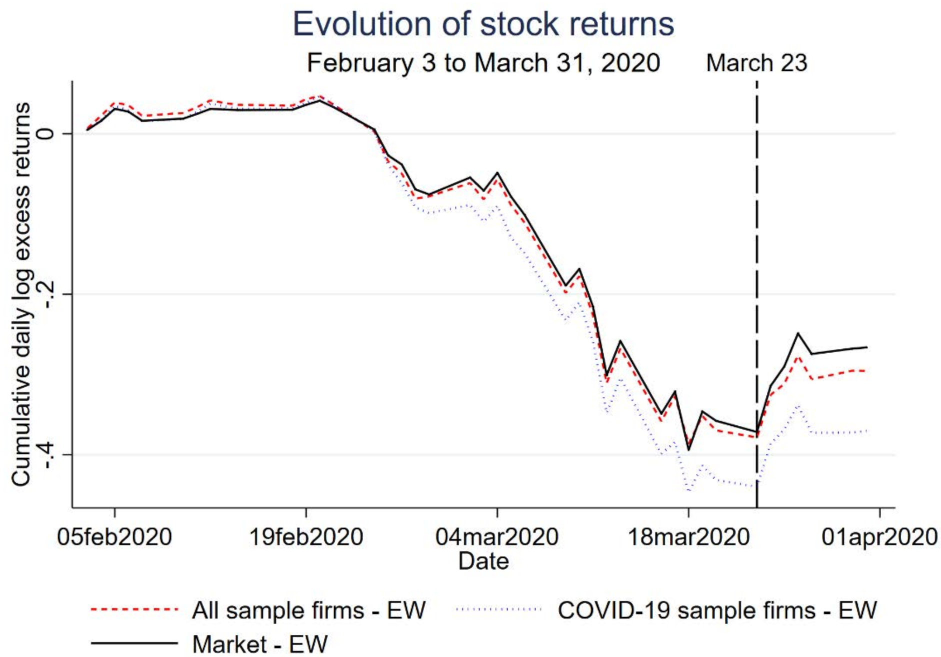

Figure 1. Evolution of stock returns

The figure shows equally weighted cumulative daily log excess returns from February 3 to March 31, 2020 for all non-financial and non-utility firms with available fiscal-year 2019 data in Compustat (red dashed line, 1858 firms), for firms belonging to industries that are particularly affected by the measures designed to fight the COVID-19 outbreak (blue dotted line, 512 firms) and for a market portfolio based on all stocks listed on NYSE, AMEX, and Nasdaq (black solid line).

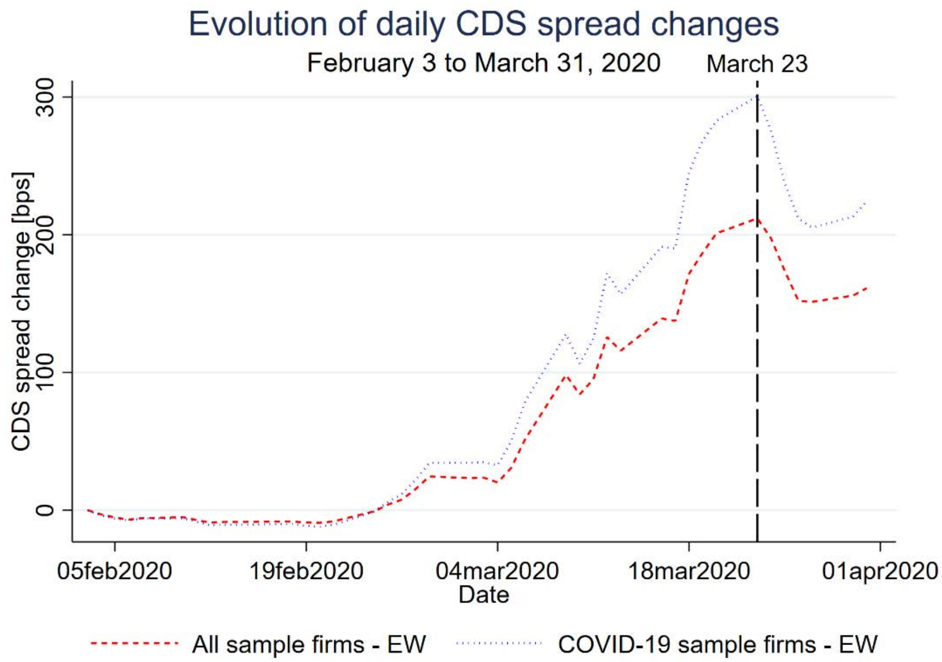

Figure 2. Evolution of daily CDS spread changes

The figure shows daily CDS spread changes (mid-quote prices) for the CDS contract with five-year maturity from February 3 to March 31, 2020 for all non-financial and non-utility firms in our sample with available CDS data in CapitalIQ (red dashed line, 239 firms) and for firms with available CDS data belonging to industries that are particularly affected by the measures designed to fight the COVID-19 outbreak (blue dotted line, 93 firms).

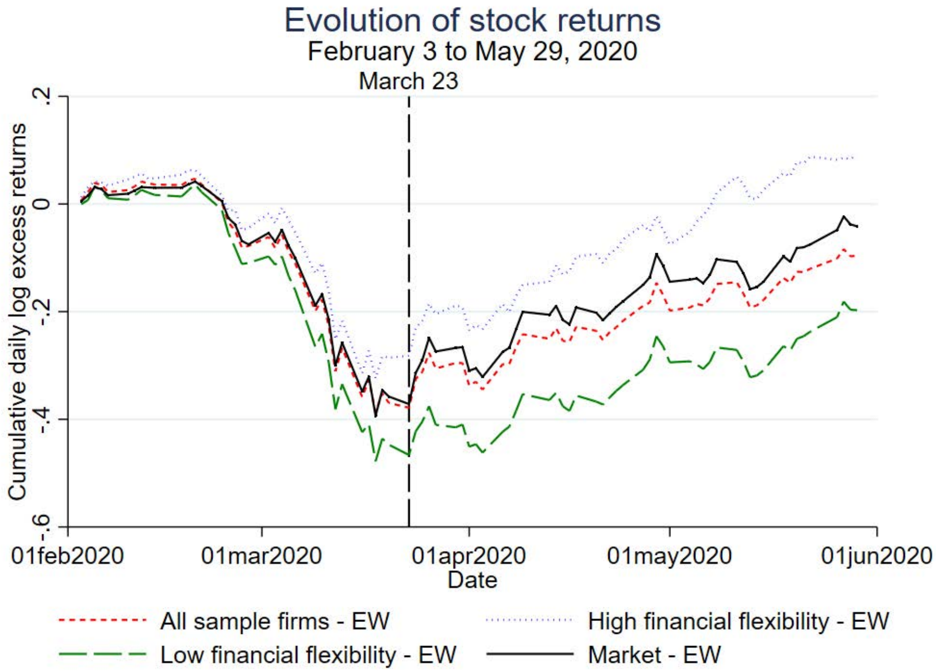

Figure 3. Evolution of stock returns for groups of firms with high and low financial flexibility

The figure shows cumulative daily log excess stock returns from February 3 to May 29, 2020 for four different portfolios. The red dashed line shows returns for an equal-weighted portfolio of all sample firms. The black solid line shows returns for an equal-weighted market portfolio based on all stocks listed on NYSE, AMEX, and Nasdaq. The blue dotted line shows returns for a portfolio of 257 sample firms with high financial flexibility, and the green dashed line shows returns for a portfolio of 184 sample firms with low financial flexibility. We classify a firm as having high financial flexibility if it is in the top quartile of the cash over assets distribution and the bottom quartile of the long-term debt over assets distribution at the end of fiscal year 2019. A firm has low financial flexibility if it is in the bottom quartile of the cash over assets distribution and the top quartile of the long-term debt over assets distribution at the end of fiscal year 2019.