

Outlasting the Pandemic: Corporate Payout and Financing Decisions During Covid-19*

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Abstract

The outbreak of the Covid-19 pandemic massively increased uncertainty about firms' cash flows and access to financial markets. We examine its effect on firms' strategies for preserving cash by suspending dividends and share repurchase programs and raising new funds through bond and equity issues. Our estimates suggest that between March and December 2020 US firms saved a combined \$86bn by suspending or reducing dividend payments and another \$140bn from suspending buybacks. We identify a short list of firm and stock characteristics that explain most of the cross-sectional variation in firms' payout and financing decisions. We show that the expansive monetary policies pursued by the Federal Reserve in the early phase of the pandemic crucially affected the timing and sequencing of firms' decisions. Announcement effects on stock returns were highly unusual during the pandemic as dividend and buyback suspensions were associated with a more rapid recovery in firms' stock prices, consistent with investors interpreting them as prudent actions that helped reduce risks.

Keywords: Covid-19 pandemic; dividend suspensions; share repurchases; bond and equity issues; corporate actions; announcement effect on stock prices.

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“Whatever it takes.” — July 26, 2012

President of the European Central Bank Mario Draghi, expressing the ECB’s commitment to the Euro.

“As long as it takes.” — March 22, 2021

Federal Reserve Chairman Jay Powell, pledging continued support

1 Introduction

The outbreak of the Covid-19 pandemic in the Spring of 2020 caused economic disruption on a scale and at a speed that were unprecedented in modern history. Throughout the ensuing months, firms were scrambling to keep up with the impact the lockdown of the economy had on their cash flows, cash reserves, and balance sheets. Uncertainty about the economy’s trajectory remained extremely high throughout 2020 depending, as it did, on an unusual array of factors such as medical progress in developing a vaccine, fiscal stimulus programs, aggressive monetary policy measures, and shifts in household and corporate behavior. Absent any direct historical precedents, attempts at forecasting the magnitude and duration of the pandemic’s impact on corporate earnings and growth prospects posed unique and unparalleled challenges.¹

Uncertainty about the speed and length of the path towards recovery accompanied by sharp reductions in cash flows, forced many firms to preserve short-term capital and raise new funds to ensure their survival. Rather than taking a single action to restore their balance sheet and liquidity position, many firms engaged in a string of decisions meant to reduce cash outflows (suspensions of dividends and share buybacks) or tap into capital markets in sometimes desperate attempts at outlasting the pandemic and dealing with duration risk.

The intricate chain of actions taken by many companies in their quest to survive the pandemic is vividly illustrated through the example of Carnival, a major US-based cruise line operator. Against the background of Carnival’s share price along with major events affecting the cruise line industry, **Figure 1** shows a timeline for the corporate

¹Studies examining how the pandemic affected growth prospects and economic uncertainty include [Gourinchas \(2020\)](#), [Eichenbaum et al. \(2020\)](#), [Atkeson \(2020\)](#), and [Ludvigson et al. \(2020\)](#).

actions taken by Carnival during 2020. On March 31, Carnival announced it had suspended dividends and share buybacks. This was immediately followed the next day (April 1) by simultaneous equity and bond issues. A chain of actions ensued with bond issues on July 15 (Moody's rating: Ba1), August 14 (Ba1), and November 20 (B2), along with equity issues on August 05, September 15, and November 17. In total, Carnival raised \$8.2bn in bonds and another \$4.1bn in equity; the company also drew down a revolving credit line of \$2.8bn. Using these numbers, our estimate of the quarterly cash burn (shown in grey shades) is \$1.7bn in Q2, \$3.3bn in Q3, and \$1.9bn in Q4 of 2020.²

This example illustrates several important points that, as we shall see, hold more broadly in our sample. First, companies reacted with extraordinary speed to the pandemic. The US declared a state of national emergency on March 13 and Carnival suspended dividends and share repurchases a little more than two weeks later. Second, corporate actions that normally are distantly spaced in time frequently got compressed over very short periods.³ Third, as firms updated their expectations about the duration of the pandemic, they dynamically adjusted their actions, suspending payouts and raising capital as they thought prudent and deemed necessary.

In this paper we provide a detailed look into how US firms managed their payout policies and capital structure during 2020, notably their decisions to suspend dividend payment and share repurchase programs as well as their financing activity in the stock and bond markets. We begin by providing a comprehensive analysis of the timing and magnitude of these decisions during the Covid pandemic. The three weeks following the US declaration on March 13th of a national emergency witnessed a sharp uptick in the number of firms suspending their dividends and share repurchase programs. Payout suspensions remained elevated until mid-May before quickly receding to more normal levels.

²The cash burn rate is defined as the change in cash and cash equivalents between two consecutive quarters, accounting for new bond and equity issues. In Q1 2021, Carnival raised \$3.5bn in debt and \$1bn in equity and had an average monthly cash burn rate of \$785mn.

³Having suspended dividends and share buybacks on March 31st, Carnival promptly issued stocks and bonds the following day (April 1st). Four corporate actions announced over the course of two business days would be unheard of in normal times. Consistent with the pecking order theory, Carnival's first actions were to preserve internal sources of capital and, only then, raise funds by tapping into external capital markets.

Overall, between March and December of 2020, we estimate that US firms saved \$29bn through dividend suspensions and another \$56.5bn by reducing (but not suspending) dividends. Estimates of firm savings from buyback suspensions are more uncertain. Under the assumption that the firms that announced a suspension of their buyback programs in 2020 would have continued with the same amount of share repurchases during 2020 as they did in 2019, savings from this source amount to an additional \$140bn in 2020.

The corporate bond market came to a near-standstill in late February and the first two weeks of March before bond issues came roaring back to \$60bn during the week of March 15, increasing further to exceed \$80bn per week in late March and early April. This followed a sequence of massive policy interventions by the Federal Reserve system and the US government. From mid-March to mid-April, firms continued to issue large amounts of bonds, but only for issues rated at or above upper medium grade whereas the market for non-investment grade bonds largely disappeared.

The market for equity issues experienced even stronger disruption during the pandemic as very few companies issued stocks between the first reported Covid-related death in the US in mid-February and mid-April. Equity issuing recovered somewhat in mid-May with almost \$20bn raised during the week of May 10 and elevated activity lasting for another six weeks.

The bond market played a far more important role than the stock market for firms' ability to raise capital during the pandemic. The total dollar amount raised by bond issues went up sharply after the pandemic outbreak, peaking at \$230bn in March and April of 2020 and exceeding \$200bn in May. These are by far the largest monthly bond issues by US corporations in recent decades and are consistent with the Federal Reserve's massive purchase of investment-grade corporate bonds.

While the dollar amount raised by equity issuers also increased sharply in March and April of 2020, their peak is not nearly as large in absolute terms (less than \$50bn each month) or relative to earlier periods. This is consistent with the sharp fall in equity prices during the early phase of the pandemic which made it more difficult—and costlier—for firms to tap into this source of financing.

Next, we explore which firm and stock characteristics help explain cross-sectional variation in firms' decisions on suspending payouts or raising new funds in the bond and equity markets. We find that a short list of accounting measures capturing firm size, leverage, cash holdings, profitability and revenue growth along with two measures of return performance in the stock market in the month leading up to an announcement are strongly associated with firms' likelihood of announcing any of these actions.

Characteristics such as firm size, leverage and cash holdings played a surprisingly small role in explaining cross-sectional variation in firms' decision to suspend dividends during the pandemic. Conversely, profitability and, in particular, revenue growth were significant drivers of dividend suspensions. Negative revenue growth also correlates strongly with an increased propensity for firms to suspend buyback programs during the pandemic.

Firms' propensity to issue bonds was far less sensitive to firm and stock characteristics during the pandemic than during the Great Recession in 2008/09. Bearing this in mind, large firms with high leverage, low profitability and negative revenue growth were significantly more likely to have issued bonds during the pandemic. Large and less profitable firms were more likely than their peers to have issued equity during the pandemic while leverage and revenue growth did not play a role in this decision. This is in sharp contrast to what we found for bond issues and suggests that firms that were highly levered and experienced low (negative) revenue growth were relatively more likely to issue bonds than equity. Another contrasting finding is that firms with the largest cash holdings were more likely to issue equity but less likely to issue bonds compared to firms with smaller cash holdings.

Firms' short-term return performance in the stock market is a strong predictor of all the corporate actions that we analyze. Firms with highly volatile and large negative idiosyncratic stock returns in the 30-day period leading up to an announcement were far more likely to have suspended dividends or buybacks during the pandemic and to have issued stocks or bonds than firms with less volatile and larger stock returns.

Having inspected drivers of corporate actions, we consider the sequencing of actions undertaken by firms to outlast the pandemic. Here we exploit that the pandemic

triggered a substantial increase in the number of firms that undertook a chain of consecutive payout suspension or financing decisions. This makes the period ideal for studying some of the implications of the [Myers and Majluf \(1984\)](#) pecking order theory which holds that firms will first seek to use internal funds before issuing debt and, finally, issue equity as the least-preferred option. The pecking order theory implies testable hypotheses on how firms sequence a chain of payout and financing decisions, ruling out that firms issue equity prior to suspending dividends and share buybacks to preserve internal funds. We inspect chains of corporate actions during the pandemic as well as during the Great Recession and find fewer violations and more instances that are fully consistent with the pecking order theory during the pandemic than in 2008-09.

Finally, our paper uses event study methodology to inspect cumulative abnormal returns (CARs) and analyse how the stock market reacted to announcements of corporate actions during the pandemic. We find that firms suspended dividends and buybacks after a string of large negative returns (close to -8% in the week preceding the announcement). After the announcement, stock prices tend to bounce back, suggesting that payout suspensions were seen by markets as prudent actions that helped reduce firms' cash flow risk.

In normal times, announcements of bond issues are associated with a small and significant positive effect on CARs. We find no such announcement effect on CARs in 2020, consistent with investors not attributing any substantive information content to a bond issue. A possible explanation is the Federal Reserve's massive intervention in the bond markets which greatly reduced any information signal from successful bond issues. Interestingly, firms tended to issue bonds and shares on the back of a string of days with positive CARs and total return performance.

Our analysis is related to recent studies that examine the impact of the COVID pandemic on corporate financing decisions and financial markets. [Hotchkiss et al. \(2020\)](#) show that firms raised large amounts of capital in bond and equity markets during the first and second quarter of 2020. They find that smaller and riskier firms tended to raise funds in the equity market although they do not find evidence that financially constrained firms raised less capital than other firms. [Acharya and Steffen \(2020\)](#) show

that firms raised cash levels during the first quarter of 2020 by initially drawing down their bank credit lines. Following the policy interventions of the Federal Reserve and central government, the highest-rated firms switched to external capital markets to raise cash. [Halling et al. \(2020\)](#) show that bond issues increased substantially after the outbreak of the COVID-19 pandemic both for high- and low-rated bonds. They also find that the average maturity of the newly issued bonds exceeds that of bonds issued by the same firms prior to the pandemic. [Becker and Benmelech \(2021\)](#) document that activity in the syndicated loan market was low during the Covid crisis and show that the Federal Reserve's interventions supported the bond market, especially the investment-grade segment, more than the loan market. Compared to these papers, ours is the first analysis that looks at how firms' decisions on dividend payouts and share buybacks were affected by the Covid crisis and how firms managed their joint payout and financing decisions to preserve short-term capital.⁴

The remainder of the paper is organized as follows. Section 2 introduces the data used in the paper and provides new evidence on the dividend and buyback suspensions announced during the early stage of the pandemic. Section 3 explores which firm-specific characteristics help explain firms' decision to suspend dividend payments and buybacks, while Section 4 discusses the sequencing of firms' payout suspension and financing decisions during the Covid-19 pandemic. Section 5 examines the reaction of stock markets to corporate announcements and Section 6 concludes.

2 Data

We begin our analysis by introducing our data sources and providing initial evidence and historical context on firms' payout policies and bond and equity issues during the Covid-19 pandemic. The speed with which economic events unfolded and firms responded during the pandemic makes it crucial to conduct our analysis at a much higher frequency

⁴[Campello et al. \(2010\)](#) survey CFOs from the U.S., Europe, and Asia to assess whether their firms were credit constrained during the global financial crisis of 2008. They find that constrained firms (i) planned larger cuts in tech spending, employment, and capital spending; (ii) burned more cash, drawing more heavily on lines of credit; and (iii) sold more assets to fund their operations.

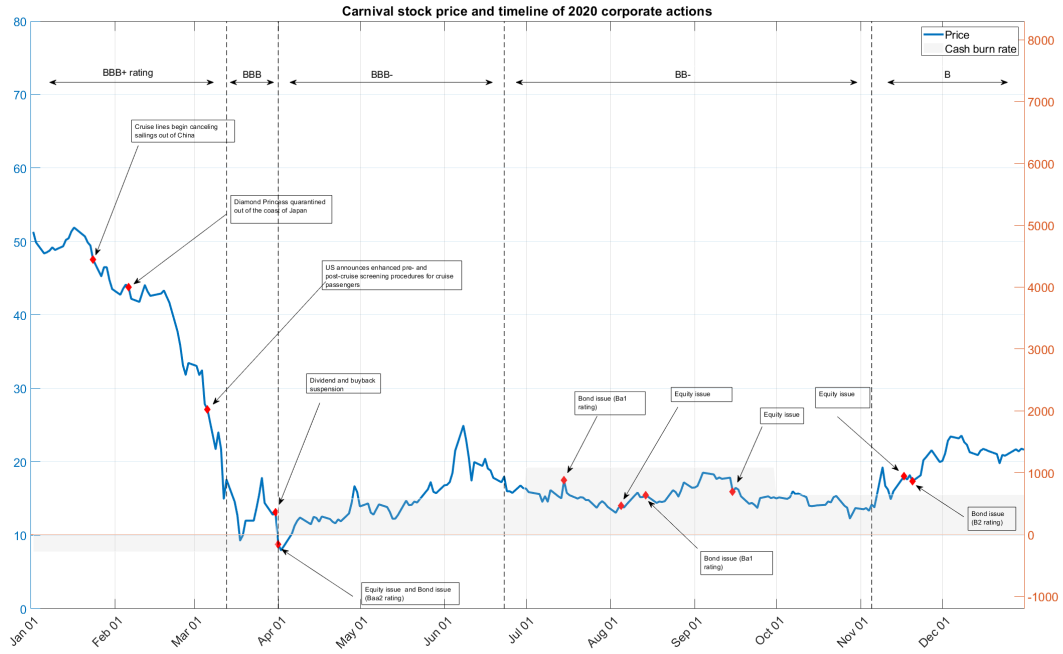


Figure 1: Timeline of corporate actions and stock price for Carnival. This figure plots the timeline of corporate actions taken by Carnival (CCL.N), together with its stock price and S&P bond issuer rating (line at the top) and Moody's bond ratings, in 2020.

than is common in the literature.⁵ It is equally important to use announcement dates rather than, say, payout dates in order to accurately capture the timing of the information content in firms' actions. We accomplish this by using daily data as the basis for our empirical analysis.

2.1 Data on Dividends and Share Repurchases

We begin our analysis by explaining how we collect *daily* data on dividend and share repurchase announcements, including those made by firms that suspended dividends and buybacks. Our analysis starts in 2005 in order to include the Great Recession period in 2008-09 and a few years preceding it. The Great Recession was the last major crisis prior to the pandemic and so provides a useful comparison that helps benchmark many of our results.

Our analysis merges data from a variety of sources. First, we obtain data from the Center for Research in Security Prices (CRSP) from January 2005 through December 2020

⁵An exception is [Pettenuzzo et al. \(2020\)](#) who develop a model for dynamics in daily dividend data.

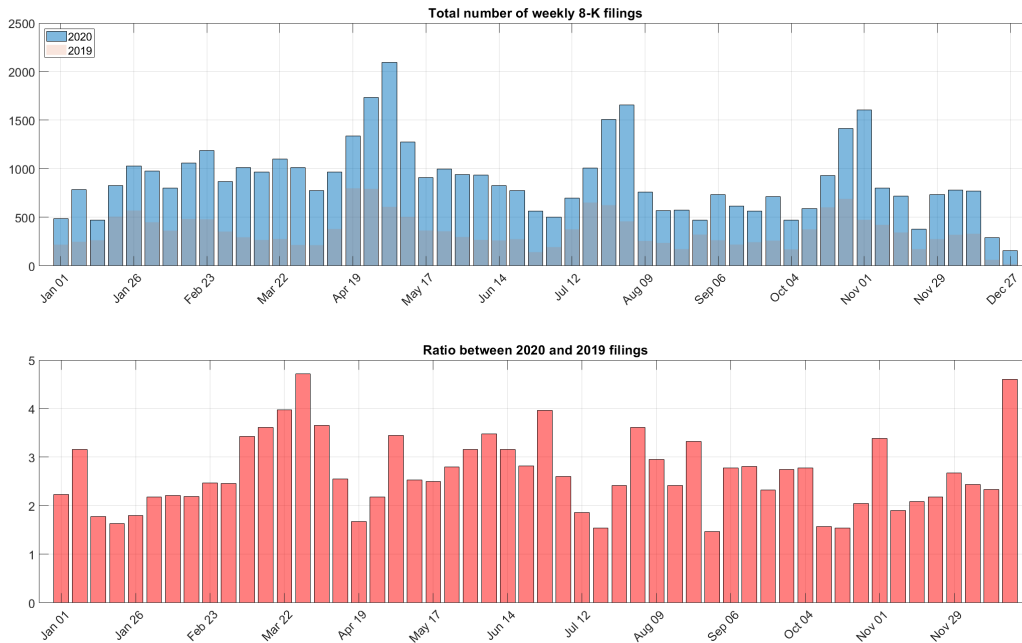


Figure 2: Total number of weekly 8-K filings in 2019 and 2020. The top panel plots the total number of 8-K filings by all public firms in our list for each week of 2020 (blue bars) and 2019 (grey bars), while the bottom panel shows the ratio between the 2020 and 2019 filings.

to extract daily stock prices, shares outstanding, and dividend announcements for individual firms. This sample includes all ordinary cash dividends declared by US firms with common stocks (share codes 10 and 11) listed on the NYSE, NASDAQ, or AMEX exchanges.⁶ To be included, firms are required to have valid stock prices and shares outstanding when dividends are announced.

CRSP provides detailed information on dividend announcements which allows us to compute year-on-year changes in dividend distributions but does *not* include information on dividend suspension dates. Historically, this has not mattered a great deal since dividend suspensions have been rare except for during the 2008-2009 Great Recession. As we shall see, the early stage of the Covid-19 pandemic witnessed a significant change in this pattern with many firms suspending dividends as they adapted to unprecedented economic circumstances.

To obtain information on dividend suspensions, we rely on two other data sources. First, for each of the public companies in CRSP, we use the EDGAR database to download

⁶Ordinary cash dividends have CRSP distribution codes below 2000.

all 8-K forms that companies filed to the SEC between January 2005 and December 2020. The top panel in [Figure 2](#) compares the total number of weekly 8-K filings reported by firms in our data set in 2020 versus the corresponding number in 2019. Comparing the same weeks across the two years is a simple way to account for the pronounced seasonal cycle in quarterly filings which tend to be higher in late April, July, and October. We see a clear spike in filings from late April to early May, from late June to early July, and from late September to early October of 2020. During these weeks, 8-K filings mostly exceed 1,500, peaking at more than 2,000 in early May.

Controlling more explicitly for the seasonality effect, the bottom panel in [Figure 2](#) shows the ratio between weekly filings in 2020 and 2019. Relative to 2019, the number of filings in 2020 is higher in every single week with increases exceeding 100% for most weeks. The largest proportional increase in filings between the two years - ranging from 300% to nearly 500% - happens in March. Clearly the Covid-19 pandemic led to a sharp rise in the arrival rate of information deemed to be “materially important” to firms and, thus, triggering an 8-K filing.⁷

While EDGAR keeps an up-to-date list of all public companies’ 8-K filings, the most recent events may not yet be included. To address this concern, we complement the information extracted from EDGAR by using as our second data source the NASDAQ news platform to download recent press releases on companies in our sample.⁸ Between January 1 and December 31, 2020, we identify a total of 122,706 press releases with a clear spike around late February (after the lockdown in Northern Italy) and late April. Combining the textual data from EDGAR and the NASDAQ news platform, we next identify the 8-K filings and press releases that mention dividend suspensions in either the text or title and extract the date of the suspension and the associated ticker using an automated text scraper. This process yields an initial list of 1,765 dividend suspensions. After manually reviewing each case to remove false positives, we identify a total of 498 suspensions from 2005 through 2020.

⁷A total of 46,771 8-K filings were reported between January and December of 2020.

⁸NASDAQ offers a platform for news and financial articles written by professional reporters and analysts from selected contributors that include leading media such as Reuters, MT Newswires, RTT news, or investment research firms such as Motley Fool, Zacks or GuraFocus.

Similarly, we collect buyback suspension data from a variety of sources. First, we obtain data on suspended and cancelled buybacks from Capital IQ. In addition to this, we scrape the 8-K forms and data on company press releases as we did for the dividend suspensions. Lastly, we manually check every single buyback suspension date to obtain a final sample of 497 buyback suspensions from 2005 through 2020.⁹ Finally, we merge the dividend and buyback suspensions with price and accounting data from COMPUSTAT.

Detailed collection and meticulous cleaning of data on suspensions of dividends and buyback programs is a key step in our analysis. It is also necessary; commonly used data providers either do not collect this data at all (e.g., on dividend suspensions) or only provide partial and incomplete data. For example, Capital IQ has partial data on buyback suspensions, but large and important firms such as Home Depot and Kohl's are missing from their data while we include them in our final data set.¹⁰

2.2 Timeline of the Pandemic

Before presenting our analysis of corporate actions during the pandemic, for context it is worthwhile briefly recalling just how rapidly economic and political events moved after the outbreak of the pandemic. The US declared a national emergency on March 13. This was followed on March 17 by the Federal Reserve Board announcing that it had established a commercial paper funding facility (CPFF) and a primary dealer credit facility (PDCF) to ensure flows of credit to households and businesses and help support their credit needs. The following day, on March 18, the Fed announced it had established a money market mutual fund liquidity facility (MMLF), followed by an enhancement of liquidity flowing to state and municipal money markets (March 20) and other extensive support measures announced on March 23. On March 27, the CARES Act was signed into law. Finally, on April 9, the Federal Reserve announced the provision of up to \$2.3 trillion

⁹Company executives will occasionally release statements such as “the buyback program has been suspended in Q1 of 2020” without providing a precise date. We exclude such suspensions from our analysis because we cannot map them to a precise date and so are slightly under-estimating the actual number of buyback suspensions. Moreover, several buyback programs do not commit the company to repurchase a certain number of shares of its common stock on a fixed schedule so a firm could have an active buyback program that in practice is suspended without a formal announcement.

¹⁰Home Depot's suspension of its share repurchase program can be found in footnote (3) on page 25 of its 2020 annual report.

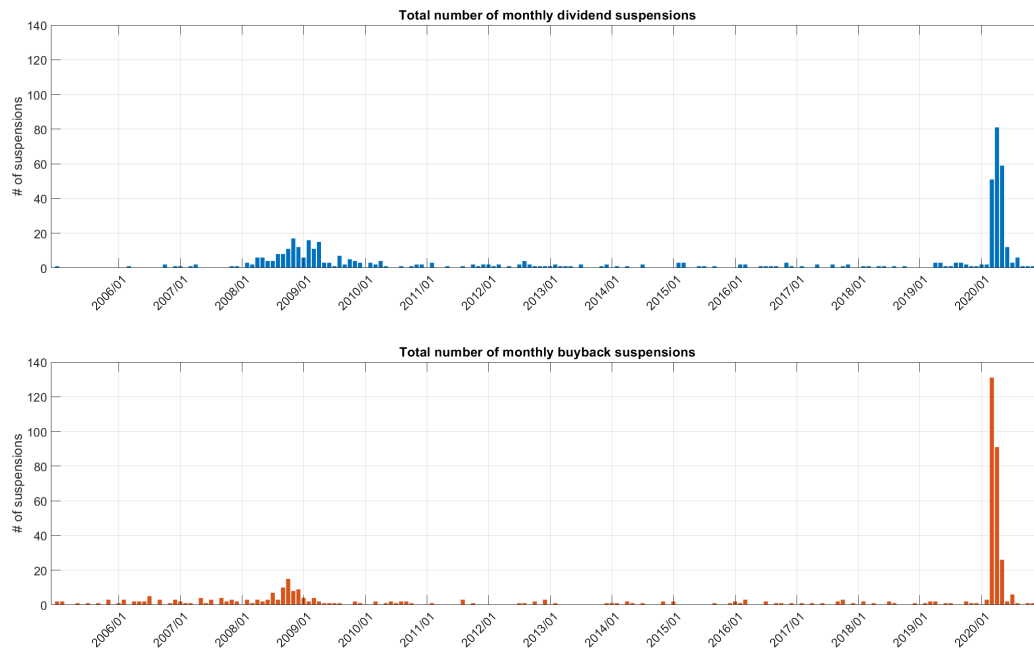


Figure 3: Total number of monthly dividend and buyback suspensions. The top panel plots the total number of dividend suspensions by all public firms in our list for each month between January 2005 and December 2020, while the bottom panel plots the number of buyback suspensions over the same period.

in loans aimed at supporting the economy. These were major policy actions that could be expected to significantly impact firms' access to liquidity and opportunities for raising funds in the capital markets.

2.3 Dividend Suspensions

The top panel in [Figure 3](#) shows the total number of announced suspensions of dividend and share repurchase programs, aggregated by month between January 2005 and December 2020. First consider the dividend suspensions (top panel). Typically less than two or three firms (and often none) announce a suspension of dividends in any given month. There are two notable exceptions to this, namely the Great Recession (2008:01-2009:06) and the Covid pandemic in 2020. During the Great Recession, dividend suspensions peaked with 17 firms suspending dividends in November 2008, two months after the default of Lehman Brothers. Still, dividend suspension activity built up gradually, rising markedly in March and April of 2008 following J.P. Morgan's acquisition of Bear Stearns on March 16. A total of 135 dividend suspensions (81 in 2008

and 54 in 2009) got reported during this 18-month period.

Dividend suspension numbers during the Great Recession are dwarfed by events during the pandemic. In March 2020, 51 firms announced they had suspended their dividends, followed by another 81 in April and nearly 60 in May before suspensions tapered back to 12 in June and returned to normal levels after August 2020. In total, 219 dividend suspensions were announced in 2020.

How much money did firms actually save by suspending or reducing their dividend payments? To address this question, [Figure 4](#) plots the actual dividend cuts – along with dividend increases – announced by individual firms and summed, each month, across all firms in our sample. We also show the imputed dollar value of dividend suspensions, computed by assuming that the dividend-suspending firms, had they not announced a dividend stop, would have paid the same dividends in a given month as they did in 2019.

This imputed figure for firms' savings on dividend payments is, as we would expect, zero or extremely small in January and February 2020 and remains quite small in March and April. From May onward, the value rises to a level between \$3bn and \$4bn in most months. Moreover, from January through March, the dollar value of dividend rises far outpaces the value of any dividend cuts. In May, July, August, and October the two roughly balance out, whereas the dividend cuts are at least twice as large as dividend increases in June and December and much larger in November of 2020.

Overall, between March and December of 2020, firms saved around \$29bn through dividend suspensions. Firms saved substantially more - with the bulk concentrated in November and December of 2020 - by cutting dividends by approximately \$56.5bn between March and December. This figure exceeded the dollar value of dividend rises over the same period (\$36.5bn) by \$20bn.

The first two columns of [Table 1](#) lists the industry composition of dividend suspensions during the two crises using the 17-industry classification scheme from Ken French's website. As expected, we observe clear differences in industry composition. During 2008-09, Banks, Insurance Companies and Other Financials counted for nearly half of all dividend suspensions (63 of 135), with Other and Automobiles counting for

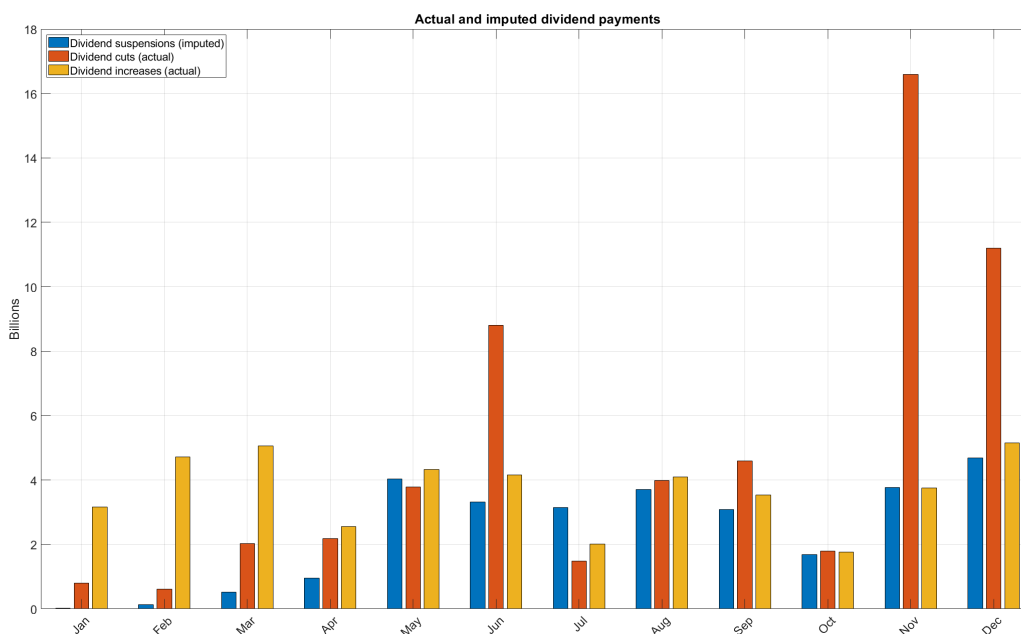


Figure 4: Actual and “imputed” dividends in 2020. This figure plots the total monthly dollar values of dividend increases and dividend cuts, summed across firms. It also shows the dollar values of “imputed” dividend suspensions, calculated as the sum of the dividend amounts that suspenders paid during the respective same-quarter periods in 2019.

another 21 and 13 suspensions, respectively.¹¹ Conversely, during the Covid-19 pandemic, the Other sector counted for 30% of dividend suspensions (66 of 219) while Retail Stores (31) and Textiles, Apparel and Footwear (11) took up another 20% combined. Conversely, Financial firms (29) counted for less than 15% - a sharp reduction from the Great Recession. Oil and Petroleum Products, Machinery and Business Equipment, and Automobiles each counted for at least 10 dividend suspensions during the Covid pandemic.

¹¹The "Other" category includes many service firms, e.g., hotels such as Hilton, Marriott, and Choice Hotels and gambling/entertainment/casinos such as Las Vegas Sands and Boyd Gaming Corporation.

Table 1: Number of dividend/buyback suspensions and bonds/equity issues by year and industry. This table reports the total number of dividend and buyback suspensions, together with the number of bond and equity issues during the Global Financial Crisis (2008-2009) and the Covid-19 crisis (2020), broken down by industry. We use the SIC codes and the Fama-French 17 industry definitions to classify companies into the various industries.

Dividend and Buyback Suspensions, Bonds and Equity Issues								
Industry	Dividends		Buybacks		Bonds		Equity	
	2008-09	2020	2008-09	2020	2008-09	2020	2008-09	2020
Food	2	3	3	3	47	32	8	11
Mining and Minerals	1	5	0	0	18	21	45	17
Oil and Petroleum Products	1	14	3	12	134	39	74	16
Textiles, Apparel and Footwear	1	11	0	12	5	11	5	0
Consumer Durables	8	5	3	5	15	4	6	10
Chemicals	1	5	1	0	28	14	21	14
Drugs, Soap, Perfumes, Tobacco	0	3	1	3	102	45	152	74
Construction and Construction Materials	5	2	0	6	36	27	16	7
Steel Works Etc	1	2	1	0	14	9	8	1
Fabricated Products	0	2	0	3	8	4	2	1
Machinery and Business Equipment	5	15	13	27	99	67	77	39
Automobiles	13	11	2	9	19	29	9	6
Transportation	4	14	2	11	67	55	27	25
Utilities	0	1	1	0	140	65	63	26
Retail Stores	9	31	6	33	59	33	12	21
Banks, Insurance Companies, and Other Financials	63	29	24	64	588	366	429	118
Other	21	66	18	74	473	386	1,072	751
Total	135	219	78	262	1,852	1,207	2,026	1,137

2.4 Buyback Suspensions

Buyback suspensions ([Figure 3](#), lower panel) follow a similar pattern to dividend stops with few cases – typically less than three – in any given month. During the Great Recession, buyback suspensions peak at 15 in October of 2008 before gradually tapering off and reaching normal levels in early 2009. Compared with the Great Recession, buyback suspensions picked up far more rapidly and were more concentrated in time during the Covid pandemic: suspensions peak at over 130 in March 2020, followed by 91 in April and another 26 in May. Hence, more firms (248) suspended buybacks than suspended dividends (191) during the turbulent first three months of the pandemic (March-May, 2020). By August, buyback suspension numbers were back to normal.

In total, buyback suspensions tripled in numbers during the Covid pandemic relative to the Great Recession (262 versus 78). Banks, Insurance Companies and Other Financials, Other, and Machinery and Business Equipment lead the industries with the highest number of buyback suspensions during both crises (columns 3 and 4 in [Table 1](#)). In addition, 33 firms in the Retail Stores industry suspended buybacks during the pandemic - far more than during the Great Recession (6).

Reliably estimating how much money firms saved by suspending their share repurchase programs during the pandemic is difficult. Many programs do not commit firms to buy back shares on a particular schedule and some firms might simply have chosen to let their share repurchase programs lapse without formally announcing their suspension. Bearing this caveat in mind, if we assume that the buyback suspenders would have carried out the same amount of share repurchases during 2020 as they did in 2019, we would have expected an additional \$140bn of net buybacks in 2020, including \$16bn in April, \$22.5bn in July, and \$33bn in October.

2.5 Bond and Equity Issues

We collect data on bond and seasoned equity issued by U.S. domiciled firms from SDC Platinum. Our bond data includes convertible and non-convertible bonds, and MTN programs. We also collect information on the specific bond rating from Moody's, and

global USD proceeds from the bond sales. Our equity dataset includes new issues of common/ordinary and preferred shares, and equity rights.¹² We require firms to have valid tickers in order to match them with CRSP/COMPUSTAT data.¹³

We begin by inspecting bond and equity issues by month. The top panels in [Figure 5](#) show the total dollar amount raised from bond (top left panel) and equity (top right panel) issues between January 2005 and December 2020. In the aftermath of the pandemic outbreak, the total dollar value of bond issues rose sharply, peaking at \$230bn in March and April of 2020 and exceeding \$200bn in May. These values are, by some distance, the largest monthly dollar values raised in the bond market during our entire 16-year sample. While the dollar value of equity issues also rose significantly in May and June of 2020, their peak is not nearly as large in absolute terms (less than \$50bn each month) or relative to earlier months in our sample.

Zooming in on the events during 2020, the plots of weekly bond and equity issues shown in the bottom panels of [Figure 5](#) reveal that the corporate bond market came to a near-standstill in late February and the first two weeks of March before bond issues came roaring back to \$60bn during the week of March 15, increasing further to more than \$80bn per week in the last two weeks of March and early April.

US equity markets experienced even stronger disruption during the pandemic as very few companies issued stocks between the first reported Covid-related death in the US in mid-February and mid-April. In mid-May the equity market began to thaw with almost \$20bn raised during the week of May 10. Elevated activity in the market for equity issues lasted for another six weeks until the end of June before falling back to its pre-Covid level.

Corporate bond markets recovered faster than equity markets following the decisive interventions of the Federal Reserve. Still, the pandemic had a longer-lasting impact on the ratings composition of bond issues. To see this, [Figure 6](#) plots, for each week in 2020 and, for comparison, 2019, the fraction of bond issues using four categories of Moody's ratings, namely Prime and high grade, upper medium grade, lower medium grade, and non-investment grade. During the three weeks starting on March 8, 2020, bond issues

¹²We exclude IPOs from our sample.

¹³We exclude Freddie Mac and Fannie Mae from the bond issuers as they are outliers.

rated at or above upper medium grade accounted for 60-80% of all bond issues. Conversely, non-investment grade issues accounted for less than 10% and, during the last two weeks of March, zero, and remained low until mid-April. For the remainder of the year, non-investment grade issues picked up in volume, averaging roughly 30% of all bond issues compared to 25% during 2019. Lower medium grade issues also accounted for a larger fraction of corporate bond issues: from March through December, 2020, these bonds accounted for 40% compared to 30% during the same period in 2019.

These figures show that during the period from mid-March to mid-April, the market for corporate bond issues was almost entirely limited to bonds rated at or above upper medium grade. Conversely, the market for non-investment grade bonds froze during the early stage of the pandemic outbreak (March - mid April). In common with the market for lower medium grade bonds, the non-investment grade bond segment bounced back markedly from mid-April onward. This followed a sequence of massive policy interventions taken by the Federal Reserve system and the US government.

Table 1 show that the Other sector accounted for an outsized proportion of bond and equity issues - nearly 70% of all equity issues - in 2020, reflecting the need for new capital for firms in the service sector. Conversely, Banks, Insurance Companies and Other Financials accessed equity market far less in 2020 than during the Great Recession.

Overall, our findings show that the bond market played a far more important role than the stock market for firms' ability to raise cash from capital markets during the pandemic. This is consistent with the sharp fall in equity prices during the early phase of the pandemic which made it more difficult—and costlier—for firms to tap into this source of financing. It is also consistent with the Federal Reserve's efforts targeting the purchase of investment-grade corporate bonds.¹⁴

¹⁴For 2020 as a whole, the companies in our sample issued \$1.996tn of new bonds compared to \$1.049tn in 2019 (a 90% increase). They raised another \$245bn of equity in the form of ordinary and preferred shares and right issues compared to \$125bn in 2019 (a 95% increase).

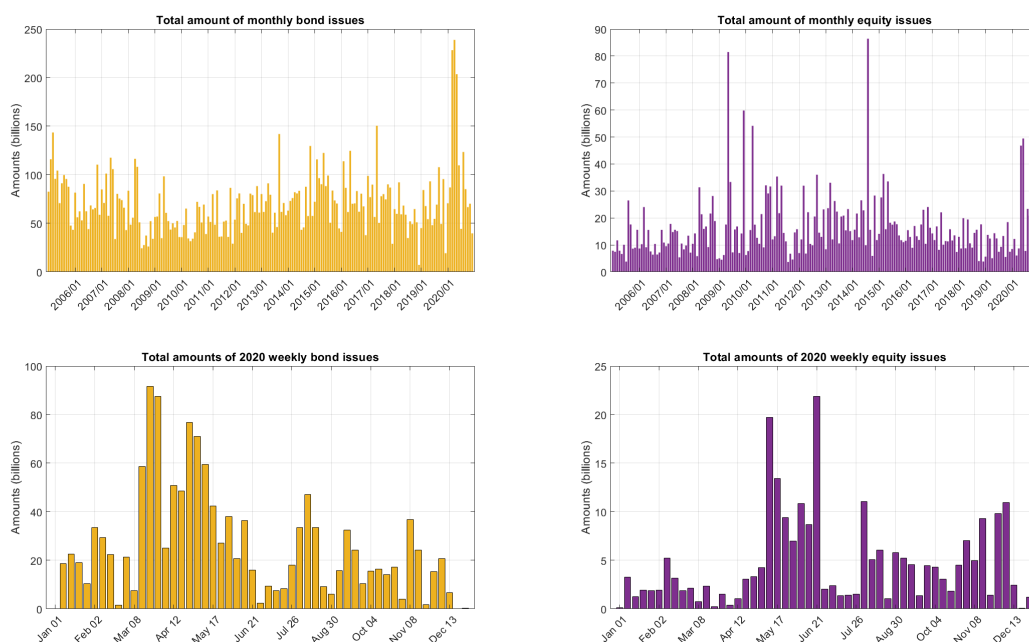


Figure 5: Total amounts of bonds and equity issues. The top panels plot the nominal dollar amounts of bond and equity issues summed across all firms in our final data for each month between January 2005 to December 2020. The bottom panels show the weekly breakdown of the total dollar amounts of bonds and equity issues during 2020.

2.6 Summary of Corporate Actions During the Pandemic

To summarize our findings in this section, [Figure 7](#) plots the total number of weekly corporate announcements by type along with markers for some of the main events related to the pandemic and the policy responses it triggered as noted earlier. We see a sharp uptick in the number of buyback and dividend suspensions during the three weeks that include the initial round of policy interventions by the Federal Reserve and Congress.

Accounting for all four corporate actions, activity levels remain elevated well into mid-June. The unusually large number of bond and equity issues between August 3 and 16 followed the announcement by the Federal Reserve Board on July 28 that it had extended its lending facilities through December 31st.¹⁵

¹⁵These facilities had previously been scheduled to expire on September 30.

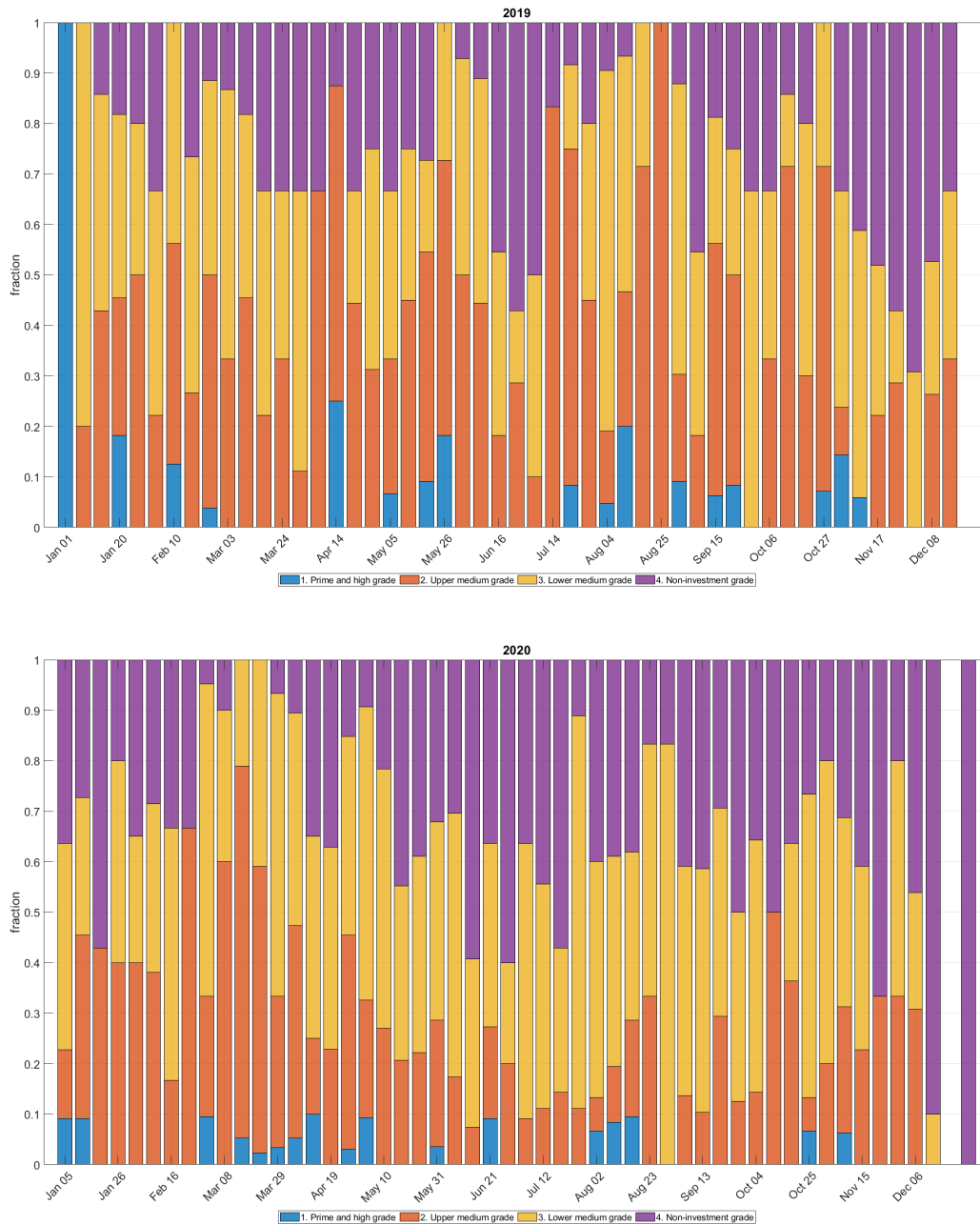


Figure 6: Weekly bond issues by rating. This figure shows the rating breakdown of all bond issues for all weeks of 2019 (top panel) and 2020 (bottom panel). Rating categories are based on Moody's Investors Service's ratings system and are defined as follows: (1) Prime and high grade bonds include bond issues with ratings Aa3 and above; (2) Upper medium grade includes all bond issues with ratings between A1 and A3; (3) Lower medium grade includes all issues with ratings between Baa3 and Baa1; (4) Non-investment grade includes all bond issues rated Ba1 or below.

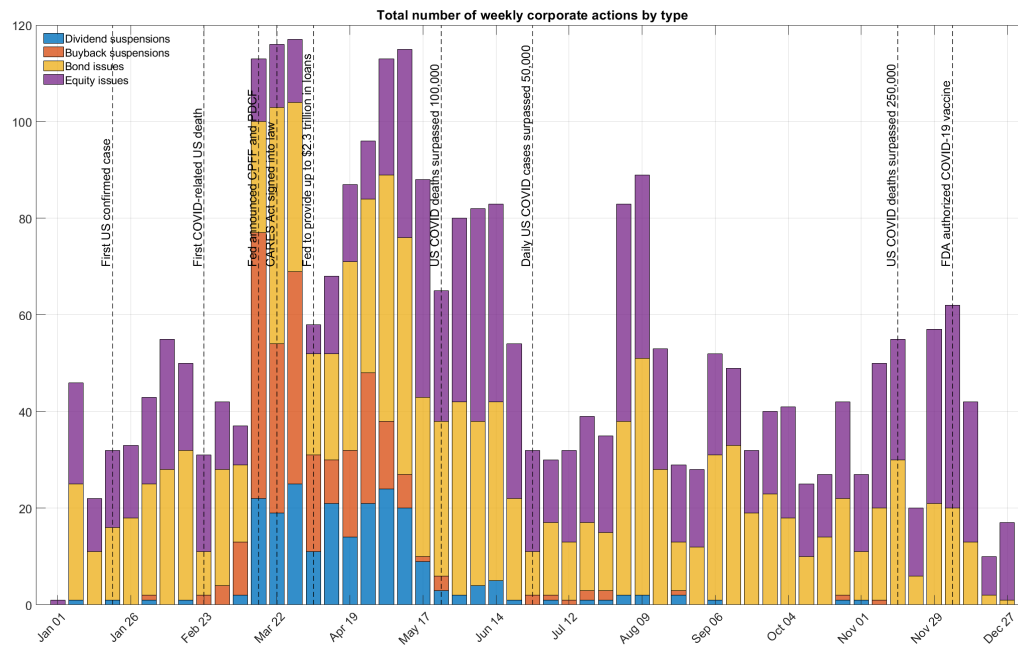


Figure 7: Corporate actions by week in 2020. This figure plots the total number of dividend suspensions, buyback suspensions, and equity and bond issuance by all public firms for each week between January 2020 and December 2020.

3 Payout Suspensions, Financing Decisions, and Firm Characteristics

To better understand what drove some firms to suspend dividends and buybacks during the pandemic - and raise funds by issuing bonds or stocks - while others continued with their payouts or chose not to tap into capital markets, we next study which firm and stock characteristics help explain corporate decisions.

Studies such as [Fama and French \(2001\)](#) and [Hoberg and Prabhala \(2008\)](#) analyze the drivers of the long-term trend away from firms paying dividends. For example, [Fama and French \(2001\)](#) identify variation in profitability, size, and investment opportunities as important determinants of dividend stops. [Hoberg and Prabhala \(2008\)](#) consider idiosyncratic and systematic risk measures estimated from stock returns, both of which are strongly correlated with firms' propensity to stop dividend payments.¹⁶

¹⁶[Hoberg and Prabhala \(2008\)](#) find that the two risk measures explain around 40% of the trend variation in firms' propensity to pay dividends between 1978 and 1999, a finding that is only strengthened by including a post-1983 dummy for the introduction of safe harbor provisions which increased firms' share repurchases.

The objective of our analysis here is instead to identify which characteristics led firms to suspend their payouts in the immediate aftermath of the pandemic outbreak and, for comparison, during the 2008-09 Global Recession.

3.1 Regression Model

We start by listing the set of covariates used to explain variation in firms' decisions to suspend dividend payments and share repurchase programs. Following [Fama and French \(2001\)](#), [Hoberg and Prabhala \(2008\)](#), and [Ding et al. \(2021\)](#), we consider several variables that measure the financial conditions of firms such as firm size (market capitalization), leverage, cash holdings, profitability, changes in revenues, idiosyncratic stock returns, and idiosyncratic return volatility.

We add to this list a “prior corporate action” dummy which takes a value of unity if a firm has taken one or more corporate actions prior to taking the corporate action under examination and otherwise is zero. For example, in the case of dividend suspensions, this indicator would equal one if, prior to the announcement of its dividend suspension, a firm had previously announced it had suspended its buyback program or issued bonds or equity during the period under study (e.g., in 2020). The idea is to examine whether suspending dividends is more or less likely if a firm has preserved capital or raised new funds through its previous corporate actions.

To determine which of the variables on our list explain companies' actions, we estimate a set of cross-sectional Probit regressions. Specifically, define the indicator variable $A_{it} = 1$ if, in period t , company i took some action $A \in \mathcal{A} = \{\text{dividend stop, buyback stop, bond issue, share issue}\}$; otherwise $A_{it} = 0$. Using this definition, our quarterly-frequency Probit models take the following form:

$$\begin{aligned} \Pr(A_{it}) = & \alpha + \beta_1 size_{it} + \beta_2 lev_{it} + \beta_3 cash_{it} + \beta_4 ROA_{it} + \beta_5 \Delta rev_{it} \\ & + \beta_6 \hat{\sigma}_{it} + \beta_7 \overline{ret}_{it} + \beta_8 \sum_{A' \in \mathcal{A}, A' \neq A} A'_{it'} + \sum_{j=1}^{17} \lambda_j Ind_{ijt} + \varepsilon_{it}. \end{aligned} \quad (1)$$

As in [Fama and French \(2001\)](#), firm size ($size_{it}$) is defined as the quintile of the natural logarithm of the market value of equity, leverage (lev_{it}) is computed as the long-term

debt (DLTTQ) plus debt in current liabilities (DLCQ) divided by assets (ATQ), cash holdings ($cash_{it}$) is the sum of actual cash and short-term investments (CHEQ) divided by total assets (ATQ). Return-on-assets (ROA_{it}) is the ratio of net income (NIY) to total assets (ATQ). Growth in revenues, Δrev_{it} is the year-on-year change in quarterly revenues. All quarterly accounting variables are calculated as of Q1 2020 (Q1 2008) for the non-suspenders, and as of the same calendar quarter of the suspension for the suspenders in 2020 (2008).¹⁷

Idiosyncratic volatility of firm-level returns, $\hat{\sigma}_{it}$, is computed from a three-factor Fama-French model and estimated using a 30-day window preceding the announcement date for the corporate action. Similarly, \overline{ret}_{it} measures the cumulative value of firm i 's idiosyncratic returns, again based on the three-factor model and cumulated over the preceding 30-day window prior to the announcement date. The prior corporate action dummy equals unity if firm i took another corporate action A' on a prior date $t'_i < t_i$ during the event window, where t_i is the announcement date for A_{it} . Finally, Ind_{ijt} is a set of 17 industry fixed effects (dummies) that control for variation in the propensity for corporate actions across industries. All continuous variables have been normalized by scaling their values by their standard deviation so coefficient estimates are comparable across covariates.

3.2 Dividend Suspensions

Table 2 shows empirical results for the Probit specification in equation (1) estimated with the dividend suspension indicator as the dependent variable. We estimate separate Probit models on two cross-sections of data covering the Great Recession 2008:01-2009:06 and the pandemic (2020). Industry fixed effects are always included but we do not report their estimates because they are insignificant for the vast majority of industries—the main exception being Oil and Petroleum Products which generates a significantly negative coefficient during the pandemic but not for 2008/09.

First consider the results for the Great Recession (columns 1-4). During this period,

¹⁷Our results are robust to lagging the accounting variables by one quarter since most of these are quite persistent.

firm size was a highly significant negative predictor of dividend suspensions with small firms having a higher chance of suspending dividend payments than larger ones. Leverage had a significantly positive effect on firms' propensity to suspend dividends with highly levered firms more likely to suspend dividend payments. Cash holdings did not seem to matter for suspension probabilities, while profitability and revenue growth were significantly negatively correlated with the likelihood of dividend suspensions. Less profitable firms whose revenue growth were most adversely impaired were therefore more likely to have suspended their dividend payments during the Great Recession.

Turning to the two return-based variables, idiosyncratic return volatility was highly positively correlated with the likelihood of dividend suspensions with greater uncertainty about firm prospects translating into a higher chance of a dividend suspension. Similarly, 30-day cumulative idiosyncratic returns prior to the announcement date were strongly negatively correlated with the likelihood of a dividend suspension as recent underperformance in the stock market made it more likely that a firm would suspend its dividend payments.¹⁸ Finally, the prior corporate action dummy has a highly significant and positive effect on the likelihood of a dividend suspension. Prior corporate actions would thus have raised the likelihood that a firm subsequently suspended its dividends during the Great Recession.

We conclude from these findings that small, unprofitable firms with high leverage, low or negative revenue growth, and uncertain prospects reflected in their stock market performance were more likely to have suspended their dividends during the Great Recession. Overall, our list of variables explains a sizeable part of the cross-sectional variation in firms' decisions to suspend dividends during the Great Recession with (pseudo) R^2 -values around 60%.

Turning to the 2020 pandemic, a very different picture emerges: firm size and leverage are no longer statistically significant and cash holdings also remain insignificant. Profitability and revenue growth are the only accounting-based variables

¹⁸Because idiosyncratic volatility and cumulative returns are highly correlated, we include them in separate regressions instead of simultaneously.

that retain significant (negative) associations with the likelihood of dividend suspensions. Although less profitable firms with low or negative revenue growth were more likely to suspend dividends during the pandemic, the slope coefficient on the ROA variable is only one-third of that observed for the Great Recession. In contrast, the estimated coefficient on idiosyncratic volatility nearly doubles compared to the Great Recession, and the coefficient on 30-day idiosyncratic returns is also substantially higher for the pandemic sample. The prior corporate action dummy retains its positive and significant coefficient.

The explanatory power of the Probit model that includes idiosyncratic volatility remains very high during the pandemic (R^2 of 63%) but is somewhat lower (54%) if we swap idiosyncratic volatility for cumulative idiosyncratic returns.

The columns labeled ΔPr , listed after the Probit estimates, provide an estimate of how much the probability of a dividend suspension changes as we move from the 10th to the 90th percentile value of each of the variables listed in the rows, keeping the remaining variables at their sample means.¹⁹ For example, for the pandemic sample, moving from a firm with substantial negative revenue growth (10th percentile) to a firm with much larger growth (90th percentile) reduces the probability of a dividend suspension by 13.4%. This is a far bigger effect than seen for revenue growth during the Great Recession (0.7%). To put this into perspective, 19.3% of the firms in our 2020 sample suspended dividends, while only 8.1% of firms did so in 2008-09.

The ΔPr estimates show that 30-day idiosyncratic return volatility and cumulative idiosyncratic returns were very powerful predictors of the likelihood of a dividend suspension during the pandemic: A shift from the 10th to the 90th percentile of the idiosyncratic volatility distribution is associated with a 49% increase in the dividend suspension probability, while the same shift for cumulative idiosyncratic returns (from a large negative value to a value near zero) reduces the dividend suspension probability by nearly 22% during the pandemic. The corresponding numbers for the Global Recession are only 2% and -1%, respectively. Hence stock market volatility and return

¹⁹The percentile distribution for each variable is generated separately for the Great Recession and pandemic periods.

performance were far more powerful predictors of dividend suspension probabilities during the pandemic than during the Great Recession. Part of the reason for this difference is the bigger coefficient estimates on these variables during the pandemic; however, the main reason is the far greater differences in return performance experienced during the pandemic than during the Great Recession.

Firms' decisions to suspend dividends turn out to have predictive power over next-quarter revenue growth. Specifically, regressing next-quarter revenue growth during the pandemic on dividend and buyback suspension dummies along with bond and equity issues, both scaled by firm size, industry fixed effects, and time fixed effects, we find that the dividend suspension dummy obtains a highly significant, negative coefficient. Moreover, the effect is economically large as firms that suspended dividends saw their revenue growth decrease by an average of 35% the following quarter, compared to non-suspending firms. Hence, dividend suspensions appear to have been taken in correct anticipation of worsening future revenue growth.

To summarize, we find that characteristics such as firm size, leverage and cash holdings played no significant role in explaining cross-sectional differences in firms' decision to suspend dividends during the pandemic. Profitability and, in particular, revenue growth were important predictors of dividend suspensions. Short-term performance in the stock market, particularly return volatility which proxies for uncertainty about firms' future prospects, were also important predictors of which firms were more likely to suspend dividend payments during the pandemic. Revenue growth and short-term stock market performance had a much stronger ability to identify which firms suspended dividends during the pandemic compared to during the Great Recession.

3.3 Buyback Suspensions

Table 3 reports estimates for the Probit model fitted to buyback suspensions. For the Great Recession period (columns 1-4), firm size (positively) and profitability and revenue growth (both negatively) correlate significantly with suspension probabilities,

Table 2: Probit regressions of dividend suspenders on firm characteristics. This table reports estimates of the cross-sectional probit regression $Prob(\text{dividend suspender})_{i,t} = \alpha + \beta_1 size_{i,t} + \beta_2 leverage_{i,t} + \beta_3 cash_{i,t} + \beta_4 ROA_{i,t} + \beta_5 \Delta revenues + \beta_6 30dayidiovola(cumulativeidiosyncraticret)_{i,t} + \beta_7 firstactiondummy + \varepsilon_{i,t}$ of dividend suspenders on firm characteristics. Firm size is defined as the quintile of the natural logarithm of the market value of equity as in Fama and French (2001). Leverage is calculated as Long term debt (DLTTQ) plus debt in current liabilities (DLCQ), divided by assets (ATQ). Cash is calculated as the sum of actual cash and short-term investments (CHEQ) divided by total assets (ATQ). Return-on-assets (ROA) is the ratio of net income (NIY) to total assets (ATQ). Δ revenues is the year-on-year, same quarter, change in revenues. 30-day idiosyncratic volatility and 30-day cumulative idiosyncratic return are calculated using the Fama-French three-factor models. The prior corporate action dummy is equal to one if the dividend suspension is not the first action in the year, and zero otherwise. Square brackets report t -statistics. ***, **, * indicate statistical significance at the 1%, 5%, 10% level, respectively. The sample period is 2008-2009 (2020), with firm characteristics as of the end of Q1 2008 (Q1 2020) for non-suspenders, and on the quarter of suspension in 2008-2009 (2020) for suspenders.

Probit of dividend suspenders										
	2008-2009					2020				
	(1)	(2)	(3)	(4)	ΔPr	(5)	(6)	(7)	(8)	ΔPr
Firm size	-0.350** [-2.78]	-0.492*** [-3.45]	-0.397** [-3.28]	-0.539*** [-3.93]	-2.00%	0.0174 [0.20]	-0.0619 [-0.68]	-0.110 [-1.40]	-0.184* [-2.25]	-1.67%
Leverage	0.734*** [3.88]	0.793*** [3.86]	0.748*** [4.08]	0.802*** [4.05]	1.11%	0.113 [0.85]	0.125 [0.93]	0.134 [1.12]	0.142 [1.18]	2.16%
Cash	-0.383 [-1.85]	-0.442 [-1.81]	-0.362 [-1.82]	-0.414 [-1.78]	-0.64%	0.0923 [0.83]	0.101 [0.87]	0.0619 [0.60]	0.0685 [0.63]	1.92%
ROA	-1.913*** [-3.77]	-1.830** [-3.26]	-2.063*** [-4.11]	-2.008*** [-3.66]	-0.52%	-0.609* [-2.11]	-0.552 [-1.91]	-0.788** [-2.71]	-0.744* [-2.53]	-3.04%
Δ revenues	-0.555*** [-4.15]	-0.645*** [-4.43]	-0.564*** [-4.32]	-0.638*** [-4.56]	-0.72%	-0.697*** [-5.77]	-0.673*** [-5.58]	-0.798*** [-6.81]	-0.769*** [-6.63]	-13.40%
30-day idiosyncratic vol	1.009*** [5.18]	1.081*** [4.91]			1.96%	1.780*** [11.57]	1.738*** [11.15]			49.38%
30-day cumulative idiosyncratic returns			-0.576*** [-4.61]	-0.593*** [-4.33]	-0.97%			-0.961*** [-9.14]	-0.918*** [-8.72]	-21.89%
Prior corporate action dummy		0.983*** [3.65]		0.904*** [3.55]			0.830*** [3.29]		0.879*** [3.73]	
Industry FE	Y	Y	Y	Y		Y	Y	Y	Y	
Pseudo R^2	60.44%	63.97%	58.51%	61.79%		62.14%	63.59%	53.56%	55.50%	
Observations	756	756	756	756		901	901	901	901	

while leverage and cash holdings are both insignificant. The estimated coefficient on firm size has switched from negative for dividend suspensions to positive for buyback suspensions. While small firms were more likely to have suspended their dividends, the largest firms were instead more likely to have suspended their share repurchase programs.

Idiosyncratic return volatility and cumulative idiosyncratic returns are both strong predictors of buyback suspensions. As expected, firms whose returns in the 30-day period leading up to the suspension date were either highly volatile or very low had a significantly higher chance of suspending their share repurchase programs. Without the prior corporate action dummy included, our list of regressors has lower explanatory power over buyback suspensions (R^2 of 23-25%) than over dividend suspensions. Adding this dummy increases the explanatory power to 40%, suggesting that prior corporate actions made it far more likely that firms would suspend their buybacks during the Great Recession.

During the pandemic (columns 5-8), firm size obtains a significantly positive coefficient in explaining buyback suspensions, with larger firms again more likely to suspend buybacks than smaller ones. Leverage, cash holdings, and profitability are not significant drivers of firms' propensity to suspend buybacks. However, revenue growth is even more important in explaining buyback suspensions during the pandemic, with coefficients that are about 50% larger than for the Great Recession sample. 30-day prior idiosyncratic return volatility obtains a highly significant, positive coefficient and cumulative returns a significantly negative coefficient. The estimated coefficients of both return-based measures are at least twice as large for the pandemic sample as for the Great Recession, highlighting how return performance became an even stronger predictor of the likelihood of buyback suspensions during the pandemic.

The prior corporate action dummy obtains a very large positive and highly significant coefficient that is far greater for the 2020 pandemic sample than for the Great Recession. Without the prior corporate dummy action included, the (pseudo) R^2 is 43% for the model that includes idiosyncratic return volatility as a predictor and 33% for the model that instead includes cumulative idiosyncratic returns. These values rise to 81%

and 80%, respectively, once the prior corporate action dummy is included, consistent with this variable being an important predictor of firms' decisions to suspend share repurchases.

The ΔPr columns show that firm size was a strong differentiator of buyback suspensions, particularly during the Great Recession where a large firm ranked in the 90th size percentile was nearly 5% more likely to suspend its share repurchases than a small firm ranked in the 10th size percentile. Since 14.8% of firms suspended buybacks in our 2020 sample while only 6.2% did so in 2008-09, a 5% difference in the 2008-09 suspension probability is clearly a large effect. The second most important predictor of buyback suspension probabilities is 30-day idiosyncratic volatility, although its effect on buyback suspensions in 2020 is much smaller than that seen for dividend suspensions.

To summarize, large firms whose revenues dropped sharply and whose stock market performance indicated highly uncertain prospects were far more likely to suspend their buyback programs during the pandemic, particularly if they had previously suspended dividends or issued shares or bonds.

3.4 Bond and Share Issues

We finally consider Probit regressions fitted to the indicators tracking if firms issued bonds or equity at least once during a particular sample. First consider the determinants of firms' decisions to issue bonds (Table 4). During both the Great Recession (columns 1-4) and the pandemic (columns 5-8), large firms with high leverage, low profitability and negative revenue growth were significantly more likely to have issued bonds than their counterparts.

Higher idiosyncratic return volatility and lower cumulative idiosyncratic returns, both measured over the 30-day period prior to the bond issue, are highly significant predictors of firms' decision to issue bonds. Prior corporate actions also made a bond issue more likely. Interestingly, in the models that exclude the prior action dummy, the estimated coefficient on cash holdings is negative and marginally significant. This is consistent with larger cash holdings reducing the need for issuing bonds, particularly during the

Table 3: Probit regressions of buyback suspenders on firm characteristics. This table reports estimates of the cross-sectional probit regression $Prob(\text{buyback suspender})_{i,t} = \alpha + \beta_1 \text{size}_{i,t} + \beta_2 \text{leverage}_{i,t} + \beta_3 \text{cash}_{i,t} + \beta_4 \text{ROA}_{i,t} + \beta_5 \Delta \text{revenues} + \beta_6 \text{30daysidiov}(\text{cumulativeidiosyncraticret})_{i,t} + \beta_7 \text{firstactiondummy} + \varepsilon_{i,t}$ of buyback suspenders on firm characteristics. Firm size is defined as the quintile of the natural logarithm of the market value of equity as in [Fama and French \(2001\)](#). Leverage is calculated as Long term debt (DLTTQ) plus debt in current liabilities (DLCQ), divided by assets (ATQ). Cash is calculated as the sum of actual cash and short-term investments (CHEQ) divided by total assets (ATQ). Return-on-assets (ROA) is the ratio of net income (NIY) to total assets (ATQ). Δ revenues is the year-on-year, same quarter, change in revenues. The 30-days idiosyncratic volatility and 30-days cumulative idiosyncratic return are calculated using the Fama-French 3 factors models. Prior corporate action dummy is equal to one if the buyback suspension is not the first action in the year, and zero otherwise. Square brackets report t -statistics. ***, **, * indicate statistical significance at the 1%, 5%, 10% level, respectively. The sample period is 2008-2009 (2020), with firm characteristics as of the end of Q1 2008 (Q1 2020) for non-suspenders, and on the quarter of suspension in 2008-2009 (2020) for suspenders.

	Probit of buyback suspenders									
	2008-2009					2020				
	(1)	(2)	(3)	(4)	ΔPr	(5)	(6)	(7)	(8)	ΔPr
Firm size	0.726*** [4.72]	0.705*** [3.93]	0.606*** [4.17]	0.631*** [3.62]	4.68%	0.664*** [8.50]	0.504*** [3.61]	0.492*** [6.99]	0.396** [2.98]	1.60%
Leverage	-0.0878 [3.88]	-0.0640 [3.86]	-0.0583 [4.08]	-0.0403 [4.05]	-0.11%	-0.150 [0.85]	-0.234 [0.93]	-0.0672 [1.12]	-0.180 [1.18]	-0.36%
Cash	-0.321* [-2.27]	-0.154 [-1.02]	-0.298* [-2.14]	-0.138 [-0.92]	-0.90%	-0.0906 [-1.21]	0.216 [1.66]	-0.0633 [-0.89]	0.216 [1.69]	0.43%
ROA	-0.970** [-2.80]	-1.457*** [-3.51]	-0.975** [-2.82]	-1.486*** [-3.57]	-1.44%	0.258 [1.44]	-0.716* [-2.16]	0.253 [1.44]	-0.704* [-2.16]	-0.35%
Δ revenues	-0.443*** [-3.60]	-0.369** [-2.63]	-0.471*** [-3.94]	-0.393** [-2.86]	-1.27%	-0.641*** [-6.21]	-0.594*** [-3.59]	-0.662*** [-6.68]	-0.598*** [-3.63]	-0.89%
30-days idiosyncratic vol	0.929*** [5.04]	0.656** [3.06]			2.38%	1.898*** [13.50]	1.378*** [5.57]			3.39%
30-days cumulative idiosyncratic returns			-0.484*** [-4.01]	-0.335* [-2.33]	-0.90%			-1.257*** [-10.91]	-0.868*** [-4.52]	-1.26%
Prior corporate action dummy		1.410*** [6.12]		1.473*** [6.50]			3.634*** [10.49]		3.695*** [11.26]	
Industry FE	Y	Y	Y	Y		Y	Y	Y	Y	
Pseudo R^2	27.27%	41.45%	23.77%	40.10%		43.42%	80.57%	33.85%	79.09%	
Observations	657	657	657	657		1,176	1,176	1,176	1,176	

pandemic (Fahlenbrach et al. (2020)).

The explanatory power of our list of variables is around 40% during the pandemic for the models that do not include the prior corporate action dummy. Adding this dummy increases the R^2 to 47%. For the Great Recession, the explanatory power is marginally lower.

The ΔPr columns show that the probability of issuing bonds was far more sensitive to firm and stock characteristics during the Great Recession than during the pandemic. For example, in 2008-09 a firm in the 90th percentile of the idiosyncratic volatility distribution had a 22% higher chance of issuing bonds than a firm in the 10th percentile compared to an incremental effect of 7% in 2020.²⁰

Turning to the Probit estimates for firms' equity issues (Table 5), we find that large firms with big cash holdings and low profitability were more likely than their peers to have issued equity during the Great Recession and Covid pandemic. Interestingly, leverage and revenue growth are not significant in any of the specifications for equity issues. This is in sharp contrast to what we found for bond issues and suggests that firms that were highly levered and experienced low (negative) revenue growth during the two crises were relatively more likely to raise funds by issuing bonds rather than equity.

The estimates for cash holdings suggest that firms with the *largest* holdings of short-term reserves were *more* likely to issue equity. A possible explanation of this somewhat counter intuitive finding is that the larger cash holdings created a short-term buffer which made it possible for such firms to tap into the equity market without seeing a strongly adverse effect on their stock market valuation. When combined with the negative estimate of cash holdings on bond issuance in the previous table, our estimates show that firms with larger cash holdings were more likely to have raised funds by issuing equity rather than bonds compared to firms with small cash holdings.

High idiosyncratic return volatility and negative cumulative idiosyncratic returns during the 30-day period preceding an equity issue are highly significant predictors of the likelihood that a firm will issue equity during the two crises. Firms with highly volatile returns (in the 90th percentile of the idiosyncratic volatility distribution) were

²⁰Overall, 30.6% and 19.3% of firms in our sample issued bonds in 2008-09 and 2020, respectively.

13% more likely to issue equity in 2008-09 than firms with less volatile returns in the 10th percentile. The corresponding figure is 6% in 2020.²¹

Without the prior corporate action dummy included, the R^2 for the Probit model fitted to equity issues is around 32% during our 2020 sample and about 10% lower for the Great Recession. Including this dummy increases the R^2 value by 10-12 percentage points indicating that, as in the earlier cases, a prior corporate action made it more likely that a firm would follow up with another action.

In summary, these results suggest both similarities and important differences in the determinants of firms' decisions to issue bonds or equity during the pandemic. Large firms with low profitability were more likely to issue either bonds or equity. Similarly, high idiosyncratic return volatility or large negative idiosyncratic returns in the preceding 30-day period significantly raised the probability that a firm would subsequently issue bonds or equity as did the existence of a prior corporate action.

Conversely, whereas highly levered firms with low (negative) revenue growth were more likely to issue bonds, these factors do not seem to have played an important role for firms' decisions to issue equity during the pandemic. Firms with large cash holdings, on the other hand, were more likely to issue equity while short term cash reserves did not correlate with the decision to issue bonds.

4 Sequencing of Firms' Actions

Theories of firms' optimal choice of capital structure have testable implications for the sequence in which firms use access to internal sources of capital versus tap into bond or equity markets. For example, the [Myers and Majluf \(1984\)](#) pecking order theory stipulates that firms' choice of which financing sources to use follows a hierarchical ordering. The theory holds that the adverse selection costs from issuing equity (net of any benefits) are sufficiently large that they dominate the costs from other funding sources. In particular,

²¹Overall, 17% and 12% of firms in our sample issued equity in 2008-09 and 2020, respectively.

Table 4: Probit regressions of bond issues on firm characteristics. This table reports estimates of the cross-sectional probit regression $Prob(\text{bond issue})_{i,t} = \alpha + \beta_1 \text{size}_{i,t} + \beta_2 \text{leverage}_{i,t} + \beta_3 \text{cash}_{i,t} + \beta_4 \text{ROA}_{i,t} + \beta_5 \Delta \text{revenues} + \beta_6 \text{30dayidiosyncvol}(\text{cumulativeidiosyncraticret})_{i,t} + \beta_7 \text{firstactiondummy} + \varepsilon_{i,t}$ of bond issues on firm characteristics. Firm size is defined as the quintile of the natural logarithm of the market value of equity as in [Fama and French \(2001\)](#). Leverage is calculated as Long term debt (DLTTQ) plus debt in current liabilities (DLCQ), divided by assets (ATQ). Cash is calculated as the sum of actual cash and short-term investments (CHEQ) divided by total assets (ATQ). Return-on-assets (ROA) is the ratio of net income (NIY) to total assets (ATQ). Δ revenues is the year-on-year, same quarter, change in revenues. 30-day idiosyncratic volatility and 30-day cumulative idiosyncratic return are calculated using the Fama-French three-factor models. Prior corporate action dummy is equal to one if the bond issue is not the first action in the year, and zero otherwise. Square brackets report t -statistics. ***, **, * indicate statistical significance at the 1%, 5% , 10% level, respectively. The sample period is 2008-2009 (2020), with firm characteristics as of the end of Q1 2008 (Q1 2020) for non-issuers, and on the quarter of the first bond issue in 2008-2009 (2020) for bond issuers.

Probit of bond issue										
	2008-2009					2020				
	(1)	(2)	(3)	(4)	ΔPr	(5)	(6)	(7)	(8)	ΔPr
Firm size	1.134*** [22.52]	1.072*** [20.34]	1.033*** [21.86]	0.971*** [19.67]	59.15%	1.156*** [20.05]	1.052*** [18.05]	1.175*** [19.79]	1.070*** [17.93]	45.87%
Leverage	0.236*** [5.19]	0.268*** [5.59]	0.245*** [5.43]	0.277*** [5.83]	6.84%	0.143** [2.81]	0.117* [2.24]	0.152** [2.98]	0.125* [2.40]	2.08%
Cash	-0.0934* [-2.36]	-0.0433 [-1.02]	-0.0852* [-2.17]	-0.0371 [-0.89]	-2.95%	-0.156** [-3.20]	-0.0797 [-1.54]	-0.147** [-3.04]	-0.0762 [-1.48]	-2.70%
ROA	-0.396*** [-6.47]	-0.429*** [-6.48]	-0.409*** [-6.75]	-0.441*** [-6.76]	-6.03%	-0.223* [-2.41]	-0.306** [-3.05]	-0.210* [-2.25]	-0.266** [-2.63]	-3.17%
Δ revenues	-0.189*** [-6.19]	-0.177*** [-5.47]	-0.199*** [-6.57]	-0.191*** [-5.92]	-5.44%	-0.0843** [-2.73]	-0.0748* [-2.13]	-0.0882** [-2.90]	-0.0808* [-2.34]	-1.14%
30-day idiosyncratic vol	0.701*** [12.89]	0.682*** [12.02]			21.58%	0.404*** [10.14]	0.384*** [9.45]			6.55%
30-day cumulative idiosyncratic returns			-0.550*** [-10.32]	-0.526*** [-9.58]	-10.04%			-0.512*** [-10.03]	-0.539*** [-10.19]	-4.94%
Prior corporate action dummy		1.403*** [15.80]		1.393*** [15.97]			1.276*** [10.96]		1.309*** [11.26]	
Industry FE	Y	Y	Y	Y		Y	Y	Y	Y	
Pseudo R^2	37.12%	46.42%	35.34%	44.82%		40.95%	47.79%	40.14%	47.37%	
Observations	2,730	2,730	2,730	2,730		2,280	2,280	2,280	2,280	

Table 5: Probit regressions of equity issues on firm characteristics. This table reports estimates of the cross-sectional probit regression $Prob(\text{equity issue})_{i,t} = \alpha + \beta_1 size_{i,t} + \beta_2 leverage_{i,t} + \beta_3 cash_{i,t} + \beta_4 ROA_{i,t} + \beta_5 \Delta revenues + \beta_6 30dayidiosyncraticvol(cumulativeidiosyncraticret)_{i,t} + \beta_7 firstactiondummy + \varepsilon_{i,t}$ of equity issues on firm characteristics. Firm size is defined as the quintile of the natural logarithm of the market value of equity as in [Fama and French \(2001\)](#). Leverage is calculated as Long term debt (DLTTQ) plus debt in current liabilities (DLCQ), divided by assets (ATQ). Cash is calculated as the sum of actual cash and short-term investments (CHEQ) divided by total assets (ATQ). Return-on-assets (ROA) is the ratio of net income (NIY) to total assets (ATQ). Δ revenues is the year-on-year, same quarter, change in revenues. 30-day idiosyncratic volatility and 30-day cumulative idiosyncratic return are calculated using the Fama-French 3 factors models. Prior corporate action dummy is equal to one if the equity issue is not the first action in the year, and zero otherwise. Square brackets report t -statistics. ***, **, * indicate statistical significance at the 1%, 5% , 10% level, respectively. The sample period is 2008-2009 (2020), with firm characteristics as of the end of Q1 2008 (Q1 2020) for non-issuers, and on the quarter of the first equity issue in 2008-2009 (2020) for equity issuers.

Probit of equity issue										
	2008-2009					2020				
	(1)	(2)	(3)	(4)	ΔPr	(5)	(6)	(7)	(8)	ΔPr
Firm size	0.341*** [7.92]	0.374*** [8.02]	0.256*** [6.28]	0.297*** [6.69]	15.75%	0.253*** [5.07]	0.281*** [5.13]	0.220*** [4.48]	0.242*** [4.52]	7.31%
Leverage	0.0570 [1.13]	0.116* [2.13]	0.0699 [1.41]	0.126* [2.34]	2.26%	-0.121 [-1.66]	-0.0804 [-1.00]	-0.118 [-1.63]	-0.0776 [-0.99]	-1.04%
Cash	0.109** [3.17]	0.108** [2.93]	0.113*** [3.34]	0.113** [3.10]	4.79%	0.345*** [8.48]	0.353*** [8.08]	0.348*** [8.62]	0.355*** [8.21]	11.68%
ROA	-0.501*** [-8.51]	-0.500*** [-7.86]	-0.526*** [-9.01]	-0.522*** [-8.26]	-5.74%	-0.402*** [-5.52]	-0.405*** [-5.14]	-0.421*** [-5.76]	-0.427*** [-5.45]	-3.17%
Δ revenues	-0.0225 [-0.89]	-0.00530 [-0.19]	-0.0232 [-0.92]	-0.00771 [-0.28]	-0.11%	0.00287 [0.11]	0.0138 [0.48]	0.000838 [0.03]	0.0101 [0.35]	0.17%
30-day idiosyncratic vol	0.616*** [12.70]	0.618*** [11.98]			12.72%	0.412*** [10.22]	0.435*** [10.19]			6.25%
30-day cumulative idiosyncratic returns			-0.469*** [-9.85]	-0.495*** [-9.60]	-6.33%			-0.400*** [-9.29]	-0.406*** [-8.86]	-3.70%
Prior corporate action dummy		1.349*** [14.32]		1.358*** [14.62]			1.395*** [9.31]		1.328*** [9.30]	
Industry FE	Y	Y	Y	Y		Y	Y	Y	Y	
Pseudo R^2	22.23%	34.26%	19.41%	32.01%		32.04%	40.69%	30.73%	39.07%	
Observations	2,521	2,521	2,521	2,521		2,123	2,123	2,123	2,123	

the theory holds that firms will first seek to use internal funds before issuing debt and, finally, equity as the least-preferred option.

The pecking order theory predicts how firms sequence a chain of payout and financing decisions. According to the theory, we should not expect to see instances in which firms issue equity prior to suspending dividend payments or buybacks since these actions preserve internal funds. The pandemic sample is well suited for testing this prediction because, as we saw earlier, an unusually large number of firms undertook multiple corporate actions during this period.

Before turning to our broader analysis of transitions between a chain of corporate actions, we consider a subset of multiple corporate actions deemed either to be consistent with or in violation of the pecking order theory. These chains of actions are particularly interesting because they can help shed light on the evolution during the pandemic in how firms' perceived the trade-offs between preserving cash through internal funds (suspensions) versus raising capital externally.

4.1 Chains of Actions Consistent with the Pecking Order Theory

Table 6 reports a complete list of companies whose chain of actions was fully consistent with what we should expect from the pecking order theory, i.e., a buyback or dividend stop followed by a bond issue, and, finally, an equity issue.²² The table shows the company name (first column) and industry (second column), followed by the announcement dates for the four possible actions (columns 3-6). Rows are sorted by date of first action. The list only includes firms that announced at least two actions.

First consider the list generated for the pandemic crisis (Panel A). In total, 30 firms started a chain of actions with a buyback stop with the vast majority of these suspensions occurring in March and April. Retail Stores selling clothing or furniture, fast food restaurants, airlines (Alaska Air and Hawaiian Holdings) and firms in the travel industry (Expedia, Marriott) feature prominently on the list. Another 12 firms started

²²Because some firms either may not have a share repurchase program in place or may have suspended an existing program without a formal announcement, we allow the first action to be either a buyback stop or a dividend suspension.

with a dividend suspension followed by a bond issue. This list includes companies like Macy's and Designer Brands and oil companies such as Continental Resources.

The corresponding list for the Great Recession (Panel B) is much shorter and only includes two firms that first stopped buybacks before suspending their dividend payments. Another 10 firms started by suspending dividends prior to issuing bonds and, in three cases, equities.

4.2 Chains of Actions in Violation of the Pecking Order Theory

Table 7 shows the list of firms whose chain of actions represents a strong violation of the pecking order theory defined as equity issues that occur prior to dividend or buyback suspensions. We identify a total of 30 such cases during the pandemic. Ten of these occur in the "other" industry that includes mining, construction, building material and transportation followed by seven cases in utilities and four cases among financial firms.

The list of strong violations is, however, much longer for the Great Recession (136 firms) than for the pandemic (30). The industry composition is also very different as many more Banks, Insurance Companies and Other Financials, Chemicals, and Construction firms appear on the 2008/09 list relative to the list for 2020.

These comparisons show that the list of firms that sequenced a chain of multiple corporate actions fully consistent with the pecking order theory was much longer for the 2020 pandemic than for the Great Recession. In sharp contrast, the list of firms whose actions were in strong violation of the pecking order theory was much longer for the Great Recession period than during the pandemic.

4.3 Transitions between Corporate Actions

Having analyzed specific instances of chains of corporate actions that were either consistent with or in violation of the pecking order theory, we next provide a broader analysis of the transitions between corporate actions.

Recall from earlier that $A \in \mathcal{A} = \{\text{dividend stop, buyback stop, bond issuance, equity issuance}\}$ denotes the set of corporate actions included in our analysis. Further, define

Table 6: Pecking Order Theory: Consistent Firms This table reports the list of firms whose chain of actions are consistent with the pecking order theory in 2020 (Panel A) and 2008-2009 (Panel B). The initial corporate action must be either a dividend or a buyback suspension and firms must have taken multiple corporate actions over a 12-month window. We use SIC codes and the Fama-French 17 industry definitions to classify companies into the various industries.

Panel A: 2020					
Company	Industry	Buyback stop date	Dividend stop date	Bond issue date	Equity issue date
Gap Inc	Retail Stores	12-Mar-2020	26-Mar-2020	23-Apr-2020	
Expedia Inc	Other	13-Mar-2020	23-Apr-2020	23-Apr-2020	07-Jul-2020
Alaska Air Group Inc	Transportation	16-Mar-2020	25-Mar-2020	23-Jun-2020	
Texas Roadhouse Inc	Retail Stores	17-Mar-2020	24-Mar-2020		
Hawaiian Holdings Inc	Transportation	18-Mar-2020	20-Apr-2020	07-Aug-2020	01-Dec-2020
Ford Motor Co	Automobiles	19-Mar-2020	19-Mar-2020	17-Apr-2020	
Emerald Expositions Events Inc	Other	20-Mar-2020	20-Mar-2020		
SYNNEX Corp	Other	24-Mar-2020	24-Mar-2020		
Marriott Vacations Worldwide	Banks, Insurance Companies, and Other Financials	24-Mar-2020	06-May-2020		
Cracker Barrel Old Country Store	Retail Stores	25-Mar-2020	25-Mar-2020		
Dick's Sporting Goods	Retail Stores	25-Mar-2020	14-Apr-2020		
Terex Corp	Other	25-Mar-2020	23-Apr-2020		
Carter's Inc	Retail Stores	26-Mar-2020	05-May-2020		
Abercrombie & Fitch Co	Retail Stores	26-Mar-2020	21-May-2020	18-Jun-2020	
La-Z-Boy Incorporated	Consumer Durables	29-Mar-2020	29-Mar-2020		
Herman Miller Inc	Other	30-Mar-2020	03-Apr-2020		
Kohl's Corp	Retail Stores	30-Mar-2020	17-Apr-2020	27-Apr-2020	
Polo Ralph Lauren Corp	Textiles, Apparel & Footware	31-Mar-2020	27-May-2020	01-Jun-2020	
Phillips-Van Heusen Corp	Textiles, Apparel & Footware	01-Apr-2020	01-Apr-2020	21-Apr-2020	06-Jul-2020
Bed Bath & Beyond Inc	Retail Stores	02-Apr-2020	02-Apr-2020		
Group 1 Automotive Inc	Automobiles	07-Apr-2020	07-Apr-2020	03-Aug-2020	
National Oilwell Varco Inc	Machinery and Business Equipment	09-Apr-2020	20-May-2020		
Jack In The Box	Retail Stores	15-Apr-2020	13-May-2020		
DineEquity Inc	Retail Stores	16-Apr-2020	29-Apr-2020		
HCA Inc	Other	21-Apr-2020	21-Apr-2020		
Yum China Holdings	Retail Stores	28-Apr-2020	28-Apr-2020		
Standard Motor Products Inc	Automobiles	29-Apr-2020	29-Apr-2020		
Dunkin Brands Group Inc	Other	30-Apr-2020	30-Apr-2020		
Foot Locker	Retail Stores	03-May-2020	22-May-2020		
Marathon Oil Corp	Oil and Petroleum Products	06-May-2020	06-May-2020		
Domtar Corporation	Other	08-May-2020	08-May-2020		
Twin River Worldwide Holdings	Other	11-May-2020	13-May-2020	06-Oct-2020	
Viad Corp	Other	14-May-2020	14-May-2020		
Maxim Integrated Products Inc	Machinery and Business Equipment	13-Jul-2020	28-Jul-2020		
Park Hotels & Resorts Inc	Other		16-Mar-2020	15-Sep-2020	
Triumph Group Inc	Transportation		19-Mar-2020	05-Aug-2020	
Macy's Inc	Retail Stores		20-Mar-2020	27-May-2020	
Boyd Gaming Corp	Other		25-Mar-2020	13-May-2020	
Vail Resorts Inc	Other		01-Apr-2020	29-Apr-2020	
Arconic Corporation	Steel Works Etc		06-Apr-2020	29-Apr-2020	
Continental Resources Inc	Oil and Petroleum Products		07-Apr-2020	10-Nov-2020	
Meredith Corp	Other		20-Apr-2020	25-Jun-2020	
Designer Brands	Retail Stores		01-May-2020	08-May-2020	04-Sep-2020
KAR Auction Services Inc	Automobiles		07-May-2020	26-May-2020	
Penske Automotive Group Inc	Automobiles		13-May-2020	04-Aug-2020	
Townsquare Media Inc	Other		15-Jun-2020	16-Dec-2020	
Panel B: 2008-2009					
Lee Enterprises Inc	Other	28-Sep-2008	19-Nov-2008		
WABCO Holdings Inc	Automobiles	29-Oct-2008	27-Apr-2009		
Warner Music Group Corp	Other		08-May-2008	19-May-2009	
Nelnet Inc	Banks, Insurance Companies, and Other Financials		22-May-2008	25-Nov-2008	
Landry's Restaurants Inc	Retail Stores		20-Jun-2008	04-Feb-2009	
M/I Homes Inc	Construction and Construction Materials		31-Jul-2008	04-Aug-2008	19-May-2009
Boyd Gaming Corp	Other		01-Aug-2008	12-Dec-2008	
Centex Corp	Construction and Construction Materials		14-Oct-2008	06-Nov-2008	
CNA Financial Corp	Banks, Insurance Companies, and Other Financials		27-Oct-2008	30-Apr-2009	
Midwest Banc Holdings Inc	Banks, Insurance Companies, and Other Financials		07-Nov-2008	29-Dec-2008	
Brookdale Senior Living Inc	Other		02-Mar-2009	12-May-2009	02-Jun-2009
Harman Intl Industries Inc	Consumer Durables		29-Apr-2009	15-Jun-2009	17-Jun-2009

Table 7: Pecking Order Theory: Violations This table reports the total number of firms whose chain of actions during the Global Financial Crisis and the Covid-19 pandemic constitute a strong violations of the pecking order theory. Strong violations happen when a dividend-paying firm raises equity without suspending their ordinary dividend payments. The last column lists the name of the companies and the date of their first equity issue in 2020. We use SIC codes and the Fama-French 17 industry definitions to classify companies into the various industries.

Panel A: Violations			
Industry	2008-2009	2020	List in 2020
Food	1	0	
Mining and Minerals	5	1	Gold Resource Corp: 15-Jun
Oil and Petroleum Products	8	2	Brigham Minerals: 09-Jun; Panhandle Oil & Gas: 28-Aug
Consumer Durables	1	0	
Chemicals	5	0	
Drugs, Soap, Perfumes, Tobacco	2	3	Owens & Minor: 01-Oct; Turning Point Brands: 08-Jul Vector Group: 13-May
Construction and Construction Materials	6	0	
Steel Works Etc	1	0	
Machinery and Business Equipment	5	2	GrafTech International: 14-Dec; Vertiv Holdings: 12-Aug
Automobiles	1	0	
Transportation	2	2	Heartland Express: 21-Jul; Werner Enterprises: 03-Jun
Utilities	12	7	Avista: 15-May; Chesapeake Utilities: 30-Jun; MGE Energy: 12-May Dominion Resources: 17-Mar; Consolidated Edison: 01-Dec Ormat Technologies: 18-Nov; South Jersey Industries: 06-Apr
Retail Stores	5	0	
Banks, Insurance Companies, and Other Financials	58	4	Bain Capital Specialty Finance: 30-Mar; Flagstar Bancorp: 10-Aug Houlihan Lokey: 18-May; Stewart Information Services: 12-Aug
Other	24	10	The ADT Corp: 15-Sep; Bentley Systems Inc: 12-Nov; Cable One: 19-May; Hamilton Lane: 02-Jun; Kinsale Capital Group: 04-Aug Mesa Laboratories: 09-Jun; Simulations Plus: 05-Aug; Shutterstock: 11-Aug-2020 Strategic Education: 05-Aug; Towers Watson: 22-Apr
Total	136	31	

an indicator variable $z_{A,i,t}$ such that $z_{A,i,t} = 1$ if company i announces action A on day t , while otherwise $z_{A,i,t} = 0$. We can then study the chain of corporate actions, focusing on whether some action A by firm i ($z_{A,i,t}$) precedes another action A' ($z_{A',i,t'}$) by the same firm, i.e., if $t < t'$. Chains of corporate actions during some window can be measured through the number and proportion of transitions from action A to action A' .

During normal times, corporate actions are often distantly separated in time, making it important to clearly define transitions between corporate actions. Because pairs of corporate actions may not be linked if they occur far apart, we only count as transitions those instances in which the two corporate actions are separated by at most one year.

Table 8 shows the number and proportion of transitions computed for a baseline period (2009:07-2019:12, Panel A) and the Covid pandemic (2020, Panel B). With four types of corporate actions, this yields a 4×4 transition table. Each entry (cell) shows the number of times a given row action preceded a column action. For example, during the baseline period (Panel A) an equity issue preceded a bond issue within one year on 1,975 occasions. The bottom row labeled "total" shows the number of times the action listed in the corresponding column was preceded by an earlier action while the "total" column shows the number of times the row actions preceded other actions.²³ Finally, the right-most column labeled "single actions" counts the number of instances in which the action listed in the corresponding row was not followed by another action within a year.

The roughly 10-year baseline period saw a total of 15,789 transitions between corporate actions. In the vast majority of these instances, bond or equity issuance either precede another action (7,672 and 8,058 cases, respectively) or follow it (7,488 and 8,266 cases, respectively). Conversely, there are only 33 and 26 cases in which buyback or dividend suspensions preceded other actions and even fewer cases (19 and 16, respectively) where they followed another action.²⁴

²³Because the actions listed in the rows could themselves have been preceded by other actions, the "total" column does not equal the number of times the row action was the first to occur. For example, a chain consisting of a bond issue \rightarrow buyback stop \rightarrow equity issue and a shorter chain consisting of a buyback stop \rightarrow equity issue would both add one to the count of buyback stop \rightarrow equity issue transitions. However, the buyback stop is the first action only for the second chain.

²⁴Consistent with the pecking order theory, we see very few (two and three) instances in which a buyback or dividend stop is preceded by an equity issue.

Converting these numbers into transition probabilities, in normal times bond and equity issuance account for about 48% and 51% of all transitions, respectively. By far the most common chain is equity issuance→equity issuance (38.5%), followed by bond issuance→bond issuance (34.7%) and bond→equity issuance or equity→bond issuance, both of which account for roughly 13% of the transitions between actions. All other pairs of actions account for a tiny fraction of overall transitions.

Among the list of single actions that were not followed by another action within a year (final column), buyback stops account for a disproportionately large part, namely 450 out of 1,901 single actions compared to 33 of 15,789 of the transitions. In many cases, a buyback stop was thus the only action taken by firms, at least within a one-year window.

Turning to the pandemic period (Panel B), out of a total of 1,069 transitions the preceding action was a bond issue in 532 cases, an equity issue in 382 cases, with buyback and dividend suspensions accounting for 93 and 62 cases, respectively. Thus, while buyback and dividend suspensions remained less common than bond and equity issuance during the pandemic—in part because the latter can occur multiple times—they account for a nontrivial proportion of corporate actions and a much larger share than during the baseline period.

During the pandemic, bond and equity issues accounted for 52% and 37% of transitions between corporate actions with buyback and dividend suspensions accounting for 6% and 5% of transitions, respectively. The most common transitions are bond→bond issuance (35%) and equity→equity issuance (27%) followed by bond→equity issuance (11%) and equity→bond issuance (9%).

In marked contrast with the baseline period, 10% of transitions during the pandemic come from buyback or dividend suspensions preceding a bond issue. This chain of actions is consistent with internal funds being the least costly way of accessing capital and also fully consistent with the pecking order theory. Equally consistent with this theory, we only see a single case in which an equity issue precedes either a buyback stop or a dividend suspension.

Table 8: Transitions between corporate actions. This table reports the total number (N) and percentages (%) of transitions between dividend and buyback suspensions, bond and equity issues during the benchmark period (July 2009 – December 2019, Panel A) and the Covid-19 crisis (2020, Panel B). Rows and columns labeled "Total" sum up the underlying numbers of transitions, while the final column (Single Actions) shows the number of cases in which an initial corporate action was not followed by a second action within the listed period.

Panel A: July 2009 – December 2019											
From/To	Bond issue		Buyback stop		Dividend stop		Equity issue		Total		Single actions
	N	%	N	%	N	%	N	%	N	%	N
Bond issue	5,483	0.347	15	0.001	11	0.001	2,163	0.137	7,672	0.486	1,372
Buyback stop	18	0.001	1	0.000	2	0.000	12	0.001	33	0.002	450
Dividend stop	12	0.001	1	0.000	0	0.000	13	0.001	26	0.002	25
Equity issue	1,975	0.125	2	0.000	3	0.000	6,078	0.385	8,058	0.510	54
Total	7,488	0.474	19	0.001	16	0.001	8,266	0.524	15,789	1	1,901

Panel B: 2020											
From/To	Bond issue		Buyback stop		Dividend stop		Equity issue		Total		Single actions
	N	%	N	%	N	%	N	%	N	%	N
Bond issue	370	0.346	33	0.031	9	0.008	120	0.112	532	0.498	441
Buyback stop	68	0.064	0	0.000	20	0.019	5	0.005	93	0.087	349
Dividend stop	45	0.042	9	0.008	0	0.000	8	0.008	62	0.058	118
Equity issue	91	0.085	1	0.001	1	0.001	289	0.270	382	0.357	115
Total	574	0.537	43	0.040	30	0.028	422	0.395	1,069	1	1,023

4.4 Multiple Simultaneous Corporate Actions

On rare occasions, a firm announces multiple corporate actions on the same day. Such instances are of particular interest because they often indicate that a firm faces very high levels of financial distress as reflected in the fact that (a) a single corporate action was deemed insufficient; or (b) the firm did not have the time to separate the two actions and see if a single action would suffice. To examine these events during the pandemic, [Figure 8](#) plots a weekly count of the number of times a firm announced multiple corporate actions on the same day in 2020. With four different types of actions, there is a total of six possible combinations; only five of these occur during our pandemic sample.

The most common pairs of actions announced simultaneously are bond and equity issues and suspensions of dividends and share repurchases. The time profile of these paired actions is very different, however. Whereas simultaneous bond and equity issues are fairly evenly spread out across the pandemic and never exceed three in any one week, same-day suspensions of buybacks and dividends are entirely concentrated between March 22 and May 27. During this spell, there were up to nine weekly same-day announcements of a dividend and buyback suspension. Days on which the

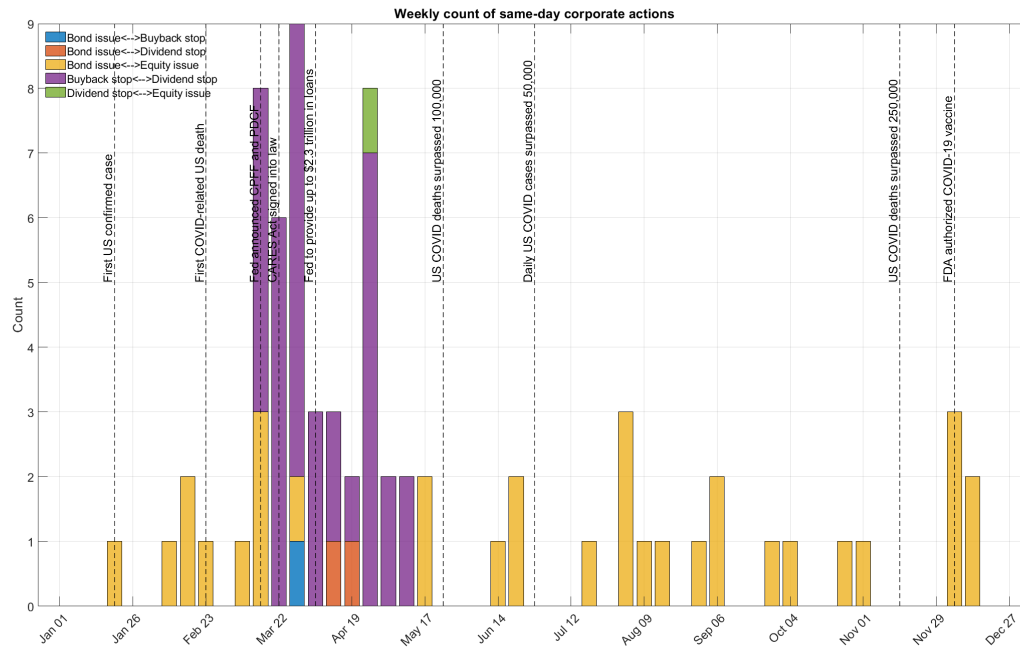


Figure 8: Weekly count of the number of cases for which a firm announced multiple corporate actions on the same day. This figure plots the weekly count of the number of instances in which a firm announced multiple corporate actions on the same day during 2020.

same firm announces either a bond issue and a buyback, a bond issue and a dividend stop, or a dividend stop and an equity issue occur only once or twice in our 2020 sample.²⁵

5 Stock Market's Reaction to Corporate Announcements

During normal times, corporate actions such as suspensions of dividends or share repurchase programs are likely to be interpreted by financial markets as strong signals about firm-specific growth prospects. The Covid-19 pandemic clearly does not fit this mold - the ensuing lockdown was an economy-wide, common shock that fundamentally altered the information content investors could infer from firms' payout or financing decisions. Stated differently, the first order effect of companies like Hilton or Marriott suspending their dividends after the pandemic outbreak, could plausibly have been for

²⁵Readers may wonder whether there are any cases in which a company announced more than two corporate actions on the same day. We have found only one such instance: On April 28, 2020, Southwest Airlines announced that they had suspended dividends, stopped share buybacks, and also issued equity.

investors to infer that these firms wanted to preserve capital in a situation with uncertain revenue prospects. It is less likely that such announcements caused investors to fundamentally revise their views on Hilton and Marriott's firm-specific prospects because data on sharp declines in hotel occupancy rates and business travel was already publicly available.

Before presenting our analysis, we note that other papers have studied the stock market's reaction to the COVID-19 shock. [Ramelli and Wagner \(2020\)](#) conduct a cross-sectional analysis of how stock prices responded to the emergence of the COVID-19 pandemic. [Albuquerque et al. \(2020\)](#) and [Pagano et al. \(2020\)](#) find evidence that firms with high environmental and social ratings and firms from industries that were less affected by social distancing outperformed the market. [Fahlenbrach et al. \(2020\)](#) document that firms with greater financial flexibility and larger cash holdings were better able to withstand the COVID-19 revenue shock, as evidenced by a drop in their stock price that was 9.7 percentage points lower on average than for firms with more limited financial flexibility.

As will become clear below, our focus is very different from these papers as we analyze the impact of dividend and buyback policy announcements on asset prices. Specifically, to explore whether the stock market reacted differently to announcements of corporate actions during the pandemic compared to during the baseline period (2009:07-2019:12), we study how firms' stock prices evolved during a short event window surrounding the announcement dates.

5.1 Methodology

Our analysis uses tools from standard event study methodology. Specifically, using a three-factor Fama-French model we first regress each firm's excess returns on market, SMB, and HML factors. These regressions use daily data during a 100-day window stretching back from 115 days to 15 days prior to each firm's announcement date. Using the estimated coefficients from this regression, we next compute abnormal returns from ten days before each firm's announcement date to ten days after. For each firm we accumulate these residuals to obtain cumulative abnormal returns (CARs). Finally, we

compute simple cross-sectional averages of the CARs.

5.2 Dividend Suspensions

First consider dividend suspensions (left panels in [Figure 9](#)). During the benchmark sample (2009:07-2019:12), firms that suspend dividends on average earn CARs around -2% in the period from 10 days to 3 days prior to the announcement - values that are borderline significant on most days. CAR values then start rising and actually turn slightly positive on the announcement date (day 0), though this value is not significant. For the remainder of the event window, CAR values are essentially zero. During the pandemic, the pattern and magnitude of movements in CAR values is very similar to that seen for the benchmark period: small negative values in the period leading up to the announcement date, followed by a slight increase on the announcement date with CAR values that remain insignificantly different from zero thereafter.

On a cumulative basis, CAR values during the pandemic rose by 4% in the period preceding the suspension announcement by a few days and ending 10 days after. A plausible explanation for this reaction is that dividend suspensions did not come as a big surprise to markets and, when announced, were seen as a prudent action that helped reduce risk in a situation with extreme uncertainty surrounding firms' future cash flows.

5.3 Buyback Suspensions

During the baseline period (top right panel in [Figure 9](#)), CAR values are essentially zero prior to the announcement of a buyback suspension. The announcement date sees a sharp negative effect of about -2% with CAR values remaining quite stable and borderline significant for up to 10 days afterwards. This pattern is consistent with no leakage of news about the buyback suspension prior to its announcement and a clear, if economically modest, negative short-term announcement effect.

Buyback suspensions announced during the pandemic (second row, right panel) were associated with a very different pattern in CAR values. Between five and ten days prior to the suspension announcement, CAR values are significantly negative and trend

downward from zero to -2%. They then reverse course and begin to trend upwards, peaking around 2-3% (which is significant) towards the end of the post-announcement window. Moreover, there is a modest positive announcement effect - the opposite of what we find for the baseline period.

During the pandemic, buyback suspensions were, thus, both preceded and followed by a sequence of positive abnormal returns, consistent with the action being seen as prudent and precautionary by the markets.²⁶ The fact that the CAR curve begins to trend upward five days prior to the announcement also suggests that markets were expecting buybacks to be suspended ahead of time.

5.4 Total Stock Returns Around Suspension Dates

Our estimates in [Table 2](#) and [Table 3](#) suggest that cumulative return performance in the stock market are strongly predictive of firms' decision to suspend dividends and buybacks. Ultimately it is difficult to separate a "causal" effect from stock prices to suspension decisions (lower stock prices making suspensions more attractive) from a more traditional information channel (markets anticipating a suspension announcement and reacting accordingly) and the two mechanisms need not be mutually exclusive. However, it is certainly plausible that negative return performance triggered suspension decisions. First, large negative returns could reflect the stock market's pessimism on the economic impact of the pandemic. This, in turn, could have caused firms to revise downward their expectations of future revenues. Second, large negative stock returns and a reduced stock market valuation would have made it more attractive for firms to save on internal sources of capital as it made it harder for firms to tap into equity markets. Lower valuations may also have triggered more stringent loan conditions through bond covenants, making it more difficult to access external capital markets.

To the extent that poor stock market performance played a role in triggering suspensions, we would expect companies' total returns, rather than the abnormal return component alone, to matter most during the even window. We pursue this idea by

²⁶This is also very different from a sharply negative association between buyback suspensions and CAR values during the Great Recession.

plotting in the bottom four panels of **Figure 9** the cumulative *total* returns during the 21-day event window surrounding the dividend and buyback suspensions. During the benchmark period (third row), cumulative total returns around dividend suspension announcements are borderline flat between -1% and -2% before increasing to a level near zero where they remain from the event date and onward with none of these values being statistically significant. A very different pattern emerges during the pandemic (bottom left panel): cumulative total returns decline from about -1% ten days prior to the announcement to a highly significant level of -6% two days prior to the announcement date before sharply reversing the direction of the trend and finishing above 5% at the end of the event window.

Similar differences in the total return patterns are seen for buyback suspensions: during the benchmark period, cumulative total returns are negative on most days with borderline significant values mostly in the range of -1% to -3%. Conversely, in 2020, cumulative total returns drop sharply from zero to -8% two days prior to the announcement. From this point onward, cumulative total returns start rising, reaching a level near zero by the end of the event window.

These plots show that firms announced the suspensions of their dividend and share repurchase programs during the pandemic following large drops in their total returns. The subsequent recovery in cumulative total returns of 8-10% from two days prior to the announcement day to ten days after is more difficult to explain. One possibility is that markets anticipated the suspension decision two days prior to the announcement and rewarded firms for taking what was seen as a "prudent" action. This does not explain why cumulative returns continued to rise even after the announcement. This rise could possibly be due, instead, to firms being perceived as "lower risk" as a result of their decision to suspend payouts and preserve capital. For this mechanism to have played out over several days - as opposed to on a single (announcement) day - investor expectations would need to display some degree of stickiness, however.

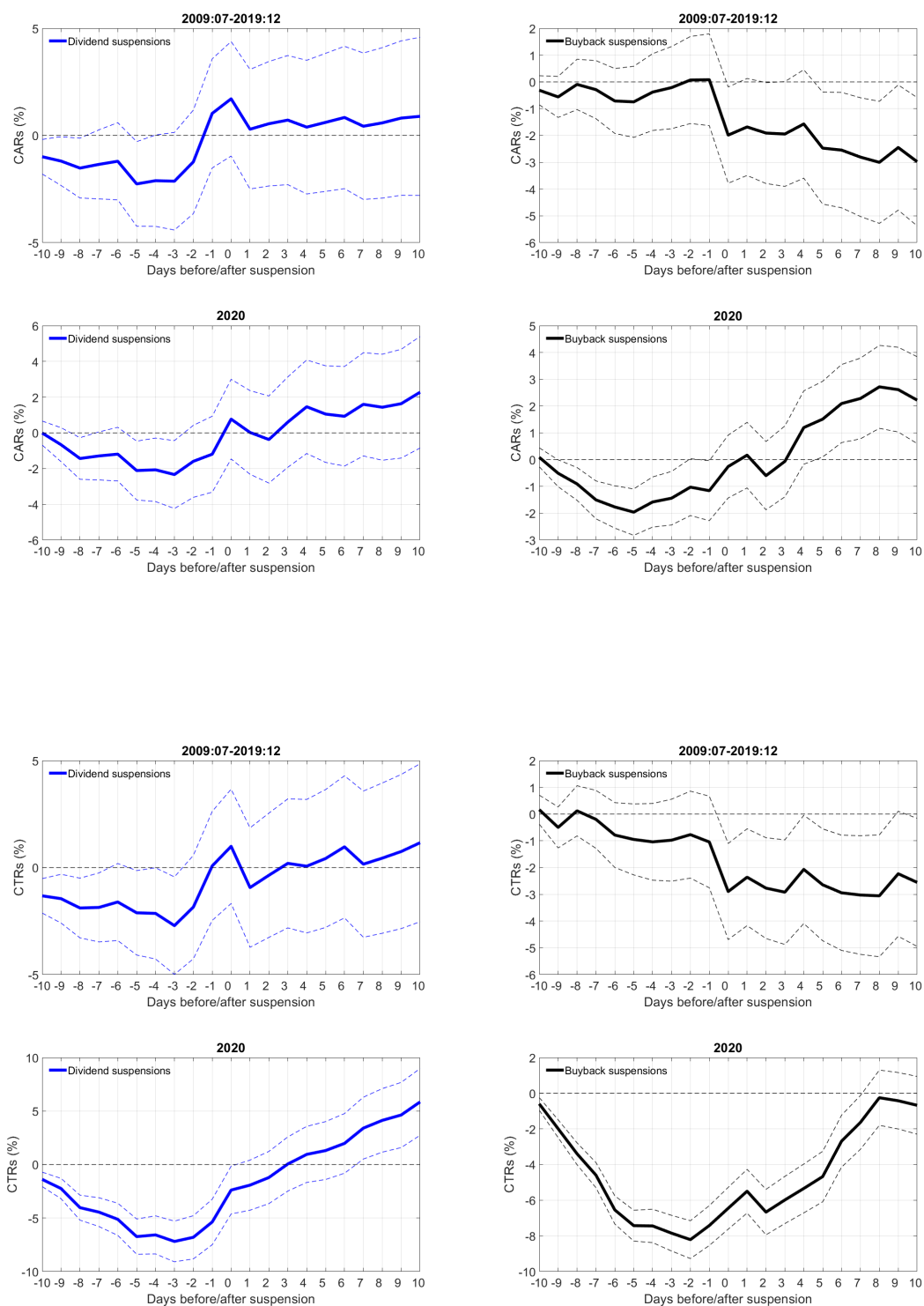


Figure 9: Stock market's reaction to announcements of dividend and buyback suspensions. This figure plots the cumulative abnormal returns (CARs, top two rows) and the cumulative total returns (CTR, bottom two rows), averaged across firms, during a window of twenty days around individual firms' announcements of dividend (left quadrants) and buyback (right quadrants) suspension (day 0). Results are shown separately for the Covid-19 pandemic and the 2009:07–2019:12 period.

5.5 Equity and Bond Issues

Figure 10 shows that movements in CAR values associated with news of equity and bond issues in general were smaller than what we saw for payout suspensions. During the baseline period, announcements of equity issues (top left panel) were associated with positive and mostly significant CAR values that rose from zero ten days prior to the announcement to 0.7% one week later where it plateaued until the announcement date. CAR values then dropped sharply the following day and stayed near 0.4% for the remainder of the event window. A few days after the announcement, CAR values were no longer statistically significant, suggesting that announcements of equity issues were associated with an economically small and short-lived effect on stock prices.

During the pandemic, equity issues (second row, left panel) were associated with significantly positive and economically large CAR values that steadily rose from zero 10 days prior to the announcement and peaked above 3% one day prior to the announcement. The announcement is associated with a reversal in the trend in CAR values which start a systematic decline and turn negative and insignificantly different from zero after a few days. While the pattern in CAR values during the pandemic is, thus, broadly similar to what we see in the benchmark period, the magnitude of movements is much greater during 2020.

Turning to the bond issues (top right panels in **Figure 10**), CAR values during the baseline period hover around zero until four days prior to the announcement date. They then climb to reach a statistically significant level of 0.4% on the announcement date and remain constant thereafter, consistent with a small positive, medium-term effect of bond issues on stock prices.

Conversely, during the pandemic, the estimated effect of bond issue announcements on CAR values is small and statistically insignificant throughout the entire event window. A possible explanation of this is that the Federal Reserve's intervention in the bond markets made it easy for the majority of firms to tap into this source of capital and suspended the usual price discovery and screening process associated with raising external capital. This easy access to raise money by issuing bonds essentially muted the

signaling value of bond issues which is seen during more normal times.

The bottom four panels of **Figure 10** display results using cumulative total returns. During both the baseline and pandemic periods, stock prices rose near-monotonically both before and after the announcement date, with a small reversal seen on the announcement date itself. No reversal effect on the announcement date is seen for bond issues: In both samples, cumulative total returns rise near-monotonically from near-zero, ten days prior to the announcement to 2.5% during the benchmark period or 4.5% during 2020.

Assuming that movements in total returns prior to the issue announcements were not driven by leaked information, these plots suggest that companies tend to issue equity and bonds after a run of significantly positive (total) stock returns. A string of positive returns enables firms to raise new funds from external markets at a better price. The continued rise in total returns after the announcement of an issue could again be related to a lower perceived risk after a firm has managed to successfully raise capital.

5.6 Market Reaction for Firms that did not Suspend Dividends

In a separate analysis we consider the stock market's reaction to news about firms that chose not to suspend their dividend payments. Our analysis categorizes non-dividend suspending firms into three groups, namely (i) firms announcing no changes or small reductions (less than 30% year-on-year decreases) in their dividends; (ii) firms announcing increases to their dividends; and (iii) firms with large dividend cuts. For all three groups, CAR values are economically small (typically below 1%) and insignificantly different from zero throughout the 21-day event window.

6 Conclusion

US firms suspended their dividend and share repurchase programs in unprecedented numbers and at unparalleled speed after the outbreak of the Covid-19 pandemic; they

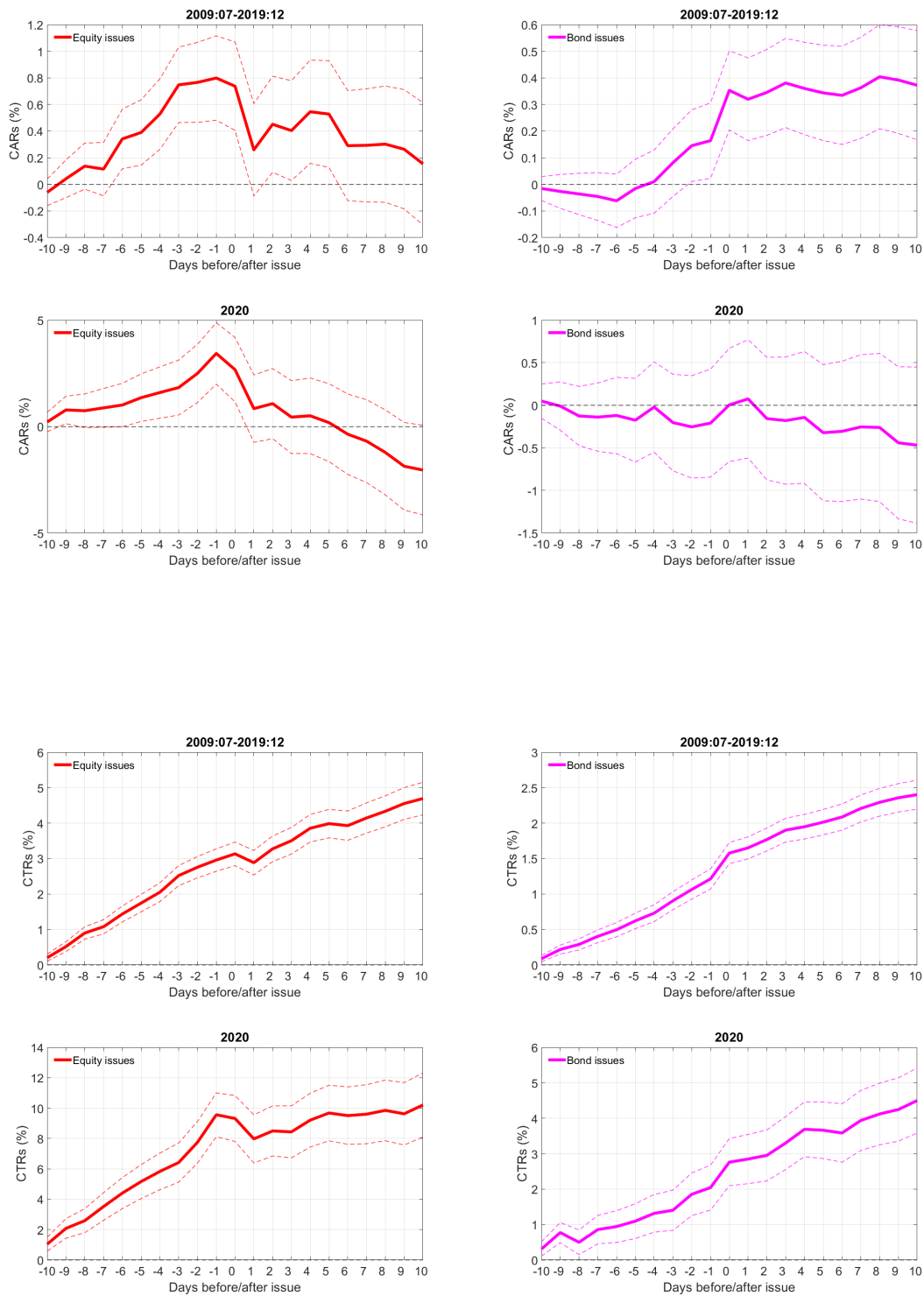


Figure 10: Stock market's reaction to announcements of equity and bond issues. This figure plots the cumulative abnormal returns (CARs, top two rows) and the cumulative total returns (CTR, bottom two rows), averaged across firms, during a window of twenty days around individual firms' announcements of equity (left quadrants) and bond (right quadrants) issues. Results are shown separately for the Covid-19 pandemic and the 2009:07-2019:12 period.

also raised large sums of money by issuing bonds and stocks. We provide a detailed analysis of the timing and importance of these decisions, quantifying how much money US firms preserved by suspending or reducing dividends, stopping share buybacks, and issuing bonds and equity. We also examine the determinants of firms' decisions to suspend payouts and issue debt or equity. Firm characteristics such as size, leverage, profitability, cash holdings, and revenue growth were important predictors of many of these decisions, with revenue growth playing a particularly important role. In addition, firms with highly volatile and large negative idiosyncratic stock returns in the 30-day period leading up to an announcement were far more likely to have suspended dividends or buybacks and to have issued stocks or bonds than firms with less volatile and larger returns.

The stock market's reaction to corporate announcements during the pandemic shows that investors were aware of the highly unusual circumstances that led to the flurry of payout suspensions and financing decisions. For example, payout suspensions that normally would contain bad news about firm prospects tended to be associated with higher stock returns, possibly because they reduced firm risks.

As the stock and bond markets bounced back from the initial pandemic shock, companies dynamically adjusted their payout and financing decisions, in many cases raising new capital multiple times. For the most part, the sequence of corporate decisions during the pandemic was consistent with that predicted by the pecking order theory, with firms initially preserving internal capital by suspending dividends or buybacks, followed by bond issues and, finally, equity issues.

Our analysis demonstrates the crucial role played by the Federal Reserve's massive interventions which helped firms with below-investment grade ratings regain market access after the market for their bond issues came to a standstill in March. The continued supply of liquidity kept the financial markets functioning smoothly after the initial pandemic shock. The many firms in our sample that raised capital over multiple rounds throughout 2020 demonstrates how the continued access to deep and liquid capital markets proved pivotal to firms' ability to outlast a pandemic whose adverse impact on revenues turned out to be severe and long-lived.

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