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Dividend Suspensions and Cash Flow Risk during the Covid-19 Pandemic*

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Abstract

We examine the effect of the Covid-19 pandemic on firms' decisions to suspend dividends and estimate a model that quantifies the effect of suspensions on growth in aggregate dividends. Our estimates show that dividend suspensions had a large impact on expected future dividend growth and also helped predict the sharp declines observed in broader measures of economic activity. Firms with high leverage and low profitability were more likely to have suspended their dividends during the pandemic as were firms with the largest negative stock returns prior to the dividend announcement date. While firms that suspended their dividends experienced large negative abnormal returns, firms that substantially reduced but did not entirely eliminate dividends saw large positive abnormal returns around the announcement date.

Keywords: Corona virus; Covid-19; high-frequency cash flow news; dividend suspensions; dividend growth dynamics; event study methodology

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1 Introduction

The outbreak of the Covid-19 pandemic, resulting lockdowns and stay-at-home orders had a sharp and unprecedented effect on economic activity and financial markets. Uncertainties about the future trajectory of the virus, policy responses of governments and central bankers, and shifts in household and firm behavior massively increased firms' cash flow risks.[1] Absent any direct historical precedents, attempts at forecasting the magnitude and duration of the impact of the crisis on firms' earnings and growth prospects posed unparallelled challenges. Faced with extreme levels of uncertainty and sharp reductions in cash flows, many firms were forced to focus on preserving short-term capital to ensure their survival (Bates et al. (2009)).[2]

Dividend suspensions offer firms a way to preserve capital. In normal market conditions, most firms resist such actions because reductions in dividends tend to have a large negative impact on stock prices (Michaely et al. (1995)). However, the benefits from suspending dividends were arguably substantially higher during the pandemic and the costs may well have been lower because financial markets recognized that the underlying cause was a common economic shock. This is likely to have lead investors to infer less negative information from dividend suspensions which were, in some cases, seen as the prudent thing to do.

In this paper we examine how the onset of the Covid-19 pandemic affected firms' decisions to suspend dividends, the effect these dividend suspensions had on expectations of aggregate dividend growth, the factors leading firms to suspend dividend payments, and the stock market's reaction to dividend suspensions.

We first document the unprecedented number of firms that suspended their dividend

[1]Studies on the effect of the pandemic on growth prospects and economic uncertainty include Gourinchas (2020), Eichenbaum et al. (2020), Atkeson (2020), and Ludvigson et al. (2020).

[2]Firms' ability to manage their short-term capital appears to have been an important differentiator for their stock market performance during the crisis. Fahlenbrach et al. (2020) find that the stock prices of firms with greater financial flexibility were less adversely affected by the Covid-19 crisis and, on average, outperformed firms with less financial flexibility by around 10 percentage points. Most of this better performance occurred prior to March 24, the announcement date for a massive fiscal support package. Unsurprisingly, firms with less financial flexibility benefitted more from this announcement. Similarly, Pagano et al. (2020) find that firms with greater resilience to social distancing policies produced significantly higher returns during the early stage of the pandemic than those with lower resilience.

payments and the speed with which they did so after WHO declared a pandemic on March 11. As a telling example, during its first-quarter analyst conference call on February 4 2020, Ford confirmed it would distribute its 2020Q1 dividend of $0.15 per share.[3] Then, on March 19, Ford abruptly announced that it would scrap its dividend payout plan indefinitely; historically Ford announces its first-quarter dividend within the first ten days of April. The following day (March 20), Boeing suspended its $4.6 billion annual dividend due to concerns about a cash flow "drain".[4]

Building on the analysis in Pettenuzzo et al. (2020), we next develop a daily model that estimates the effect of dividend suspensions on aggregate dividend growth dynamics. We demonstrate that the signal value in dividend suspensions is very important and show that the propensity of dividend suspenders has a large negative effect on expected growth in future dividends. We also document the predictive content of daily dividend suspensions over broader measures of economic activity such as growth in industrial production or GDP.

The existence of dividend payments is a bit of a puzzle since they are inefficient from a tax perspective with capital gains being taxed at a lower rate than dividend income. Traditionally, dividends are viewed as a costly but credible device for signalling management's confidence in their earnings prospects.

Firms' dividend payment behavior during the pandemic can be used to provide unique insights into the dividend signaling mechanism and the trade-offs that firms face when determining their dividend policies. The pandemic was a once-in-a-century shock to the solvency and liquidity of firms in a broad array of sectors. This caused the premium on access to cash to rise sharply while, conversely, the cost of paying dividends became substantially higher for the worst affected firms.

Previous studies on dividend suspensions such as Fama and French (2001) and Hoberg and Prabhala (2008) document a downward trend in the proportion of listed

[3] In the call, Ford CEO James Patrick Hackett stated that he intended to continue paying the dividend, while CFO Timothy Stone pointed out that the company's liquidity totaled about $35billion and that they wanted to "invest in the customer experience and fund the dividend for shareholders."

[4] According to a Wall Street Journal article from March 19, 2020 (Boeing Considers Dividend Cut, Layoffs Amid Cash Drain) "investors are worrying about the company's ability to repay its debt... investors see a growing risk the company could default on its borrowing obligations."

firms that pay dividends.[5] They attribute this in part to a decline in profitability, especially among newly listed (growth) firms but also show that firm characteristics such as size, profitability, and investment opportunities are determinants of the propensity to pay dividends. Fama and French (2001) find that firms that suspend dividends tend to be distressed, have low earnings and make few investments.[6] Similarly, Hoberg and Prabhala (2008) find that risk is a key determinant of firms' propensity to pay dividends.[7]

These studies do not, however address how large, sudden shocks to firms' earnings prospects can impact their propensity to pay dividends. Our focus on announcements of daily dividend suspensions–as opposed to the more aggregate numbers studied over longer spans of time–turns out to be crucial for understanding firms' behavior during the pandemic as the economic news cycle evolved extremely fast.

We show that less profitable firms with higher leverage were more likely to suspend their dividends during the pandemic. This finding is consistent with earlier studies and is also consistent with firms' behavior during the Global Financial Crisis. In addition, we find that firms whose stock prices were particularly badly hit were much more likely to have suspended dividends. This is likely to reflect an information effect, as firms with the worst stock market performance were also under the strongest financial distress. It could also be due to a causal effect as sharply lower stock prices made it more difficult for firms to tap into equity and bond markets.

To gain insights into how stock markets reacted to announcements of dividend suspensions, we use event study methodology to inspect the evolution in abnormal returns around the dividend suspension date. For firms that suspended dividends, we observe large, negative cumulative abnormal returns (-6%), most of which precede the announcement date. Conversely, firms that substantially reduced but did not entirely

[5]Fama and French (2001) find that the proportion of former payers is quite steady at a level just below 10% between 1975 and 1999, but that this figure was much higher during the Great depression when it peaked at a level above 40%.

[6]DeAngelo and DeAngelo (1990) and DeAngelo et al. (1992) also find that only distressed firms (e.g., firms experiencing negative earnings) suspend dividend payments.

[7]Unlike Baker and Wurgler (2004), Hoberg and Prabhala (2008) do not find that catering to investor fads for high-yield stocks is an important determinant of firms' dividend decision.

eliminate their dividends experienced positive abnormal returns.

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 suspensions announced during the early stage of the pandemic. Section 3 explains our econometric modeling approach and reports empirical estimates of the effect of dividend suspensions on dividend growth dynamics. Section 4 explores which firm-specific characteristics help explain firms' decision to suspend dividend payments, while Section 5 inspects the behavior of abnormal stock returns around dividend announcement days following the WHO declaration of a pandemic. Section 6 concludes.

2 Data

This section introduces our data sources and provides evidence on how firms changed their dividend payment policies during the early stage of the Covid-19 pandemic.

2.1 Dividend Suspensions

We begin our analysis by explaining how we collect data on dividend *announcements*, including those made by firms that suspended dividends, by merging data from a variety of sources. For the pre-Covid period from January 2005 through December 2019, we use data from the Center for Research in Security Prices (CRSP) 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.[8] To be included, we require firms to have valid stock prices and shares outstanding when dividends are announced. For the more recent period spanning January 1st through April 30th, 2020 we supplement the CRSP data with stock prices and dividend announcements collected from Global Financial Data (GFD).

Both CRSP and GFD provide detailed information on dividend announcements which allows us to compute year-on-year changes in dividend distributions. However, they do

[8] Ordinary cash dividends have CRSP distribution codes below 2000.

not provide information on dividend suspensions. Historically, this has not mattered a great deal since dividend suspensions have not occurred very frequently, except during the 2008-2009 Global Financial Crisis. As we shall see, the early stage of the Covid-19 pandemic witnessed a significant change in this pattern with many firms suspending their dividend programs as they adjusted to the unprecedented economic circumstances.

To obtain information on dividend suspensions, we rely on two other data sources. First, for each of the public companies included in our data set, we use the EDGAR database to download all K-8 forms that companies filed to the SEC between January 2005 and April 2020. The top panel of Figure 1 plots the total number of monthly K-8 filings reported by firms in our dataset. Between 2005 and 2019, monthly K-8 filings averaged 1,580 and never exceeded 2,000. In January and February of 2020, the number of K-8 filings jumped to 2,152 and 2,635, respectively, before further increasing to 2,772 in March 2020 and reaching an all-time high of 3,333 during April 2020.[9] Clearly the Covid-19 pandemic led to a sharp rise in the arrival rate of information deemed to be "materially important" to firms' financial situation and, thus, triggering a K-8 filing.

While EDGAR keeps an up-to-date list of all public companies' K-8 filings, the most recent events may not yet be included. To address this concern, we complement the information extracted from EDGAR by using the NASDAQ news platform to download recent press releases on companies in our sample.[10] The middle panel of Figure 1 plots the number of daily press releases collected between February 1 and April 30, 2020 – a total of 12,601 press releases. We see a clear spike in news stories around late February–after the lockdown in Northern Italy–and towards the end of April.

Combining the textual data from EDGAR and the NASDAQ news platform, we next identify the K-8 filings and press releases that mention dividend suspensions in either the text or in the 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 375

[9] A total of 285,291 K-8 filings were reported between January 2005 and April 2020.

[10] NASDAQ 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.

suspensions. Finally, we merge these suspensions with price and accounting data from COMPUSTAT.

The bottom panel of Figure 1 plots the monthly time series of dividend suspensions between January 2005 and April 2020. Spikes in suspensions occur in 2008-2009 during the GFC and, again, during the first weeks of the Covid-19 crisis. Suspension levels are very different during these two events, however. A total of 154 dividend suspensions (78 in 2008 and 76 in 2009) got reported during the two-year period covering the GFC while, for comparison, 38 suspensions are announced in March 2020 alone, followed by an additional 64 suspensions during April, 2020. This demonstrates the historically unprecedented speed and propensity with which firms stopped paying dividends after the outbreak of the Covid-19 pandemic.

Figure 2 shows the number of firms suspending dividends (top panel) and their market capitalization (bottom panel) on each day during the period January-April, 2020. On some days in our sample, companies with a total market capitalization exceeding $30bn suspended dividends. Dividend suspensions hit small as well as large firms, with large companies such as Marriott, Hilton and Boeing all announcing dividend suspensions after the outbreak of the pandemic.

2.2 Daily Dividend Growth

We next describe how we construct a daily dividend growth measure that allows us to incorporate the effect of dividend suspensions on expected future dividend growth. Our analysis closely follows Pettenuzzo et al. (2020) and computes dividend growth by comparing same-firm, same- (fiscal) quarter, year-over-year changes in cash flows, thus accounting for both firm-level heterogeneity and quarterly variation in dividend payments.

We briefly introduce the methodology in Pettenuzzo et al. (2020) and explain how we generalize it. Let D_t^i denote the total dividends declared by firm i on day t, calculated as the dividend per share times the number of shares outstanding for firm i on day t. Next, let I_t^i be an indicator variable that equals one if company i announces quarterly dividends on day t –including an announcement of a dividend suspension–and is zero otherwise. Also, let $\tilde{t}_i^-$ be the same-quarter, prior-year dividend announcement date for firm i. Aggregating across firms each day, the total dollar value of dividends declared on day t is $\sum_{i=1}^{N_t} I_t^i D_t^i$, where N_t is the number of publicly traded firms in existence on day t. Similarly, the total value of dividends declared by the *same* set of firms for the *same* fiscal quarter during the prior year is given by $\sum_{i=1}^{N_t} I_{\tilde{t}}^i D_{\tilde{t}_i^-}^i$. Finally, we compute a daily measure of the aggregate, year-over-year (gross) growth in dividends, G_t, from the ratio of these two numbers:

$$G_t = \frac{\sum_{i=1}^{N_t} I_t^i D_t^i}{\sum_{i=1}^{N_t} I_{\tilde{t}}^i D_{\tilde{t}_i^-}^i}. \tag{1}$$

Only firms for which $I_t^i = I_{\tilde{t}_i^-}^i = 1$ are included in this calculation, thus ensuring that the *same* firms are used in both the numerator and denominator of the ratio.[11]

Dividend suspenders are included in our dividend growth measure in (1) in the following way: when a firm announces that it will not distribute a dividend in a given quarter, on that day the numerator for the firm in (1) will be zero, while the denominator will be the dividend announced for the corresponding quarter of the previous year–regardless of whether the firm paid dividends during that quarter.[12]

Figure 3 shows the distribution of dividend announcements between January 1st and April 30th of 2020. The weekly seasonality pattern in the number of daily announcements (top panel) is very clear, with the last two weeks of April dominated by financial and tech firms announcing their 2020 Q1 results. Weeks with a substantial number of dividend announcers are also associated with larger total dollar dividend payments (bottom panel). Taken together, these panels demonstrate how unusual suspensions of dividends were prior to the WHO declaration on March 11 of a pandemic and the speed with which individual firms in large numbers suspended their dividend payments.

Large numbers of dividend suspensions were announced literally within days of the

[11] Equation (1) uses the dollar amount paid in dividends by individual firms, implicitly applying value weights since large firms tend to have larger dividend payouts. As shown in Pettenuzzo et al. (2020), it makes very little difference whether we use this measure or instead weight individual firms' dividend growth rates by their market capitalization.

[12] On two days in 2020 (March 30 and April 3 2020), the daily dividend announcements came exclusively from (three) dividend suspenders. For these cases we include the announcement on the previous day to avoid losing the information.

pandemic outbreak. For comparison, the period after the Bankruptcy of Lehman Brothers on September 15, 2008 saw only seven dividend suspensions in the second half of September followed by 11, 17 and 11 suspensions in October, November, and December of 2008, respectively.

3 A Dividend Growth Model with Suspensions

We next propose a model that captures the salient features of the dynamics in the daily dividend growth data. Our approach builds on the econometric model developed in Pettenuzzo et al. (2020) but generalizes this to incorporate the effect of dividend suspensions on both expected dividend growth and on the probability of jumps in the dividend growth process.

3.1 Dividend Growth Dynamics

Daily values of announced dividend payments and suspensions display substantial heterogeneity with both the number and type of firms varying a great deal as dividend announcement dates get shifted. This makes it difficult to draw reliable conclusions from the raw dividend data and requires us to adopt a more sophisticated econometric modeling approach that is capable of extracting any underlying persistent components in the dividend growth process.

We pursue this objective by building on, and generalizing, the econometric approach in Pettenuzzo et al. (2020) which decomposes the daily dividend growth process, $\Delta d_{t+1} = \ln(G_{t+1})$, into three parts, namely (i) a persistent term, μ_{dt+1}, which can capture a smoothly evolving mean component; (ii) a jump component, $\xi_{dt+1}J_{dt+1}$, where $J_{dt+1} \in \{0, 1\}$ is a jump indicator that equals one when dividend growth experiences a jump on day $t + 1$ and is zero otherwise, and $\xi_{dt+1} \sim \mathcal{N}\left(0, \sigma_{\xi}^2\right)$ measures the magnitude of the jump; and (iii) a temporary shock, ε_{dt+1}, whose volatility can vary over time. Adding up these three components, we have

$$\Delta d_{t+1} = \mu_{dt+1} + \xi_{dt+1}J_{dt+1} + \varepsilon_{dt+1}. \tag{2}$$

Data from the dividend futures market show that investors expect the pandemic-related shock to US dividends to be long-lasting, suggesting that it is important to include a persistent component in the dividend growth process. Pettenuzzo et al. (2020) model the persistent dividend growth component, μ_{dt+1}, as a mean-reverting first-order autoregressive process:

$$\mu_{dt+1} = \mu_d + \phi_\mu \left(\mu_{dt} - \mu_d\right) + \sigma_\mu \varepsilon_{\mu t+1}, \;\; \varepsilon_{\mu t+1} \sim \mathcal{N}(0,1). \tag{3}$$

Larger values of ϕ_μ imply greater persistence in dividend growth and, hence, a larger degree of predictability.

Suspending dividends is not a decision that firms take lightly and a limitation of equation (3) is that it does not allow dividend suspensions to have a separate, direct effect. In particular, we would not expect firms to stop making dividend payments if their cash flows are affected by a negative shock that is perceived to be short-lived. Adverse shocks perceived to be more persistent and associated with longer-lived financial distress are far more likely to trigger a dividend suspension. Hence we would expect that there is additional signal value about the severity and longevity of a negative cash flow shock from firms' decision to suspend dividends.

To account for this effect, we generalize the specification of μ_{dt+1} in (3) to include as an extra covariate the proportion of firms suspending dividends on a given day, measured as the number of dividend suspenders, N_{st+1} over the total number of dividend announcers (including suspenders), $(N_{st+1} + N_{dt+1})$:

$$\mu_{dt+1} = \mu_d + \phi_\mu \left(\mu_{dt} - \mu_d\right) + \beta_\mu \left(\frac{N_{st+1}}{N_{st+1} + N_{dt+1}}\right) + \sigma_\mu \varepsilon_{\mu t+1}, \;\; \varepsilon_{\mu t+1} \sim \mathcal{N}(0,1), \tag{4}$$

A negative value of β_μ is consistent with a greater fraction of firms suspending dividends leading to persistently lower future dividend growth.

Because of the large differences in both the amount of dividends paid by individual firms as well as in the number of firms announcing dividends on a given day, large outliers in the observed daily dividend growth rate have a higher likelihood of happening on days with few announcers. Pettenuzzo et al. (2020) incorporate this effect by allowing the jump probability in (2) to depend on the number of announcers, N_{dt+1},

$$\Pr\left(J_{dt+1}=1\right)=\Phi\left(\lambda_1+\lambda_2 N_{dt+1}\right). \tag{5}$$

where Φ is the CDF of a standard normal distribution.

Similarly, because dividend suspensions are quite uncommon in normal times, a large fraction of firms announcing they have suspended their dividends on a given day is likely to be associated with large movements in the dividend growth process. To capture this effect, we allow the jump probability to also depend on the proportion of dividend suspenders:

$$\Pr\left(J_{dt+1}=1\right)=\Phi\left(\lambda_1+\lambda_2 N_{dt+1}+\lambda_3\left(\frac{N_{st+1}}{N_{st+1}+N_{dt+1}}\right)\right). \tag{6}$$

Finally, as in Pettenuzzo et al. (2020) we allow for time-varying heteroskedasticity in Δd_{t+1} by modeling the variance of the residuals in the dividend growth process as a stochastic volatility process,

$$\varepsilon_{dt+1}\sim\mathcal{N}(0,e^{h_{dt+1}}), \tag{7}$$

where h_{dt+1} is the log-variance of ε_{dt+1}, which is assumed to follow a mean-reverting process

$$h_{dt+1}=\mu_h+\phi_h\left(h_{dt}-\mu_h\right)+\sigma_h\varepsilon_{ht+1},\ \ \varepsilon_{ht+1}\sim\mathcal{N}(0,1), \tag{8}$$

and ε_{ht+1} is uncorrelated with both ε_{dt+1} and $\varepsilon_{\mu t+1}$.

3.2 Estimation

We estimate our model using a Bayesian Gibbs sampling approach.[13] Our priors mimic those of Pettenuzzo et al. (2020) and are loose and mildly uninformative, with exception of the two persistence parameters, ϕ_μ and ϕ_h , whose priors we center on 0.98. To capture the effect of dividend suspenders on estimates of aggregate dividend growth, we estimate

[13] Interested readers are referred to the Internet Appendix of Pettenuzzo et al. (2020) for details on our estimation procedure.

the model both with and without dividend suspenders included.[14]

Table 1 reports full-sample (January 2005–April 2020) estimates of the posterior mean, standard deviation and 90% credible sets for the parameters of the model (2) - (8) estimated with and without dividend suspenders included in the data set.

In line with historical data, the estimate of μ_d implies an annualized dividend growth rate between 7.5% and 8.7%, depending on whether we include dividend suspenders and which model specification we use. Moreover, the daily dividend growth series contains a highly persistent mean component as reflected in the estimate $\phi_\mu = 0.997$. This component is very smooth at the daily frequency ($\sigma_\mu = 0.003$) compared to the far more volatile, temporary shocks to the dividend process. The stochastic volatility process is far less persistent than the mean process ($\phi_h = 0.9$).[15]

3.3 Suspensions and Dividend Growth Dynamics

Figure 4 plots the persistent component μ_{dt+1} for the three cases we consider, namely (i) the baseline specification (3) and (5) fitted to the dividend growth data that includes dividend suspensions in the construction of Δd_{t+1}; (ii) the same baseline specification fitted to data that excludes dividend suspensions; and (iii) the generalized model in (4) and (6) fitted to the dividend series that includes dividend suspensions. The top panel covers the longer period from January 2005 through April 2020 while the middle panel shows a more detailed view of the shorter sample after January 1, 2020.

For the vast majority of the sample, the three lines are indistinguishable and so it does not make much of the difference whether or not we include dividend suspensions and whether we use the baseline model or the generalized model that incorporates the effect of suspensions.

In contrast, focusing on the 2020 period (bottom panel), the persistent dividend growth rate component extracted from the baseline model with and without (models (i) and (ii)) dividend suspensions increasingly diverge during the pandemic. The end-April

[14]We exclude dividend suspenders by setting $I_t^i = 0$ for cases where firms announce that they have suspended dividends on day t.

[15]These estimates are in line with those reported in Pettenuzzo et al. (2020) for the longer 1973–2016 period.

estimate of μ_{dt} is notably lower (4% vs. 6% per annum) for the model fitted to data that account for dividend suspensions compared to the estimates that ignores them.

A far bigger effect of dividend suspenders is seen for the generalized model which incorporates the direct effect of dividend suspensions on dividend growth dynamics in equations (4) and (6). Following the sharp increase in the number of firms that suspended dividends from mid-March onwards, the persistent dividend growth component begins to drift apart from that of the baseline model and reaches a sharply lower level of -2% at the end of April. This makes the April 30 estimate of the persistent dividend growth component comparable to the lowest level reached during the GFC. However, this level with negative expected dividend growth is reached at a far faster pace (two months) than during the 2008-09 crisis.

This sharp decline in μ_{dt} implied by the generalized model is a direct consequence of including the fraction of dividend suspensions in the dynamics of the persistent dividend growth component. In the generalized model (4), the coefficient β_μ measures the one-day impact of a 1% change in the fraction of dividend suspensions on μ_{dt}. The third panel of Table 1 shows that β_μ has a mean of -0.013 and is highly significant. A fraction of dividend suspensions of 25%–a level that is frequently exceeded from mid-March to the end of April–thus implies a (daily) impact on μ_{dt} of -0.32%. Summing over these effects during the period from March 11 through April 30, the cumulative impact of the daily dividend suspensions amounts to -10.8% per annum.

The jump component in the daily dividend growth series is highly volatile ($\sigma_\xi = 2.8$) with an incidence that depends negatively on both the number of announcing firms and the proportion of dividend suspensions. To illustrate the latter effect, Figure 5 plots the jump probability as a function of the proportion of dividend suspensions, $N_{st+1}/\left(N_{dt+1} + N_{st+1}\right)$, fixing the number of announcers at its historical average. As we vary the proportion of dividend suspensions from zero (no suspensions) to 100%, the jump probability fluctuates from 5% to almost 70%, showing that dividend suspensions are a key driver of the likelihood of jumps in the dividend growth process.

It is worth emphasizing that the empirical analysis conducted here is enabled by our bottom-up approach which allows us to compute the direct effect of dividend suspenders on dividend growth expectations. Aggregate top-down approaches do not distinguish between smaller dividends due to dividend reductions or dividend suspensions. However, our analysis demonstrates that this distinction is really important. The difference in the estimated dividend growth rate implied by the baseline model (3) and (5) fitted with and without dividend suspensions is much smaller than the difference resulting from allowing the propensity for dividend suspensions to directly affect the expected dividend growth rate as in (4) and (6).

3.4 Volatility of Dividend Growth

To measure how dividend suspensions affect aggregate cash flow volatility, we next compare our estimates of the time-varying cash flow volatility from the dividend series with and without dividend suspensions in (8). The difference between these two series gives an intuitive measure of the impact of dividend suspensions on cash flow uncertainty.[16]

The top panel of Figure 6 plots our two measures of daily cash flow volatility, with and without dividend suspensions along with the daily level of aggregate stock market volatility (as measured by the VIX) during 2020. Dividend suspensions are clearly very important for the level of uncertainty surrounding dividend growth during the Covid-19 crisis.[17] The model estimated on data that ignore dividend suspensions only sees dividend growth volatility increase modestly to 15% in early April. In sharp contrast, dividend growth volatility constructed from the series that includes dividend suspensions conversely climbs to 26% on Monday, March 16, shoots up to a historical peak of 70% on March 19, and remains elevated above 30% until March 30.

The VIX starts climbing on February 24 and reaches its peak (82.69) on March 16, three days before the peak in dividend growth volatility. We would normally expect firms to deliberate on their dividend decisions over a fairly long period of time, however the volatility of daily dividend growth appears to only trail the VIX by a few days. Clearly

[16] The proportion of firms suspending dividends has no significant impact on the stochastic volatility of dividend growth (equation (8)) and so is omitted from the volatility equation.

[17] In contrast, it is less important whether we use the baseline model or the generalized dividend growth model for μ_{dt}. The two models lead to similar estimates of the dividend growth volatility.

the extraordinarily swift impact of the Covid-19 pandemic caused firms to change their dividend decisions on a very short time scale.

We also construct a daily proxy for investor's sentiment using Google Trends numbers on the search word "Recession".[18] The Google Trends search interest series spikes peaks on March 17 before declining to a more normal level by March 25.

We conclude from these findings that the VIX, Google Trends search sentiment index, and dividend growth volatility measures all reached highly abnormal levels in the days after the outbreak of the pandemic. While the spike in the VIX and Google Trends sentiment clearly preceded that of the dividend growth volatility measure, it only did so by a few days, indicating the speed with which companies adjusted their dividend policies.

3.5 Dividend Suspensions and Macroeconomic Growth

The unparalleled uncertainty surrounding both the magnitude and duration of the pandemic on firms' cash flows is likely to have increased the predictive content of dividend suspensions over the aggregate dividend process. Firms' cash flows were hit by a large common shock which would have induced much higher-than-normal correlations between cash flows, possibly leading investors to infer more about the prospects of the overall economy than about the performance of individual firms from their decision to suspend dividends.

To explore this point, we next analyze if our daily dividend growth measure can be used to forecast broad measures of economic activity. To this end, we estimate regressions of the following form:

$$y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 \mu_{dt} + \beta_3 N_{st} + \varepsilon_t, \quad t = 2, ..., T, \tag{9}$$

where y_t is either a monthly or quarterly macroeconomic variable, μ_{dt} is our persistent

[18] We collect this data from the Google Trends website. The series that is made available measures the search interest for the search term "recession" relative to the highest point on the chart for the U.S. between January 1st and April 30, 2020. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means there was not enough data for this term

dividend growth component measured on the last day of the previous month or quarter, N_{st} denotes the total number of dividend suspensions in month (or quarter) t, and $\varepsilon_t \sim \mathcal{N}\left(0, \sigma_y^2\right)$.

We measure economic activity using two different variables. First, at the monthly frequency we consider growth in industrial production (IP), using data from February 2005 to February 2020 to estimate equation (9). At the quarterly frequency, we consider GDP growth using 2005:Q2-2019:Q4 as our estimation sample. Letting T denote the end of our sample, our goal is to predict y_{T+1}, which is either March or April, 2020 for industrial production or 2020 Q1 for GDP growth.

Since both μ_{dt} and N_{st} are available in real time at the daily frequency, we can use the coefficient estimates from (9) to update our predictions of the macro variables on a daily basis for all days in the prediction period $T+1$. This gives a set of daily predictions, $\widehat{y}_{T+i/m}$,

$$\widehat{y}_{T+i/m} = \widehat{\beta}_0 + \widehat{\beta}_1 y_T + \widehat{\beta}_2 \mu_{T+i/m} + \widehat{\beta}_3 N_{s,T+i/m}, \quad i = 1, ..., m, \tag{10}$$

where $i = 1, ..., m$ and m equals 22 and 66 for the monthly and quarterly data, respectively.[19]

Figure 7 displays the results of this out-of-sample forecasting exercise in the case of monthly growth in IP for March (top panel) and April (bottom panel) 2020. Each day we show how that day's estimate of μ_{dt} translates into an estimate of IP growth. For March, our daily IP growth forecasts start to decline near-monotonically around March 13, reaching a level of -6.25% on March 31, which is close to the actual value (-4.88%). The predicted decline in IP growth continues throughout April, although at a trough of -12.73% the forecasts do not quite reach the level of the actual IP growth figure (-15.04%).

The key variable in the regression in (9) is the number of suspensions, N_{st}. Ignoring dividend suspensions only in the construction of μ_{dt} does not materially change the forecasts.

Figure 8 shows our daily GDP growth forecasts from January 2[nd] to March 31[st] along

[19]To update our daily out-of-sample predictions in (10), we re-estimate $\mu_{T+i/m}$ each day within period $T+1$. This ensures that our forecasts could have been generated in real-time for all days within period $T+1$. Figure A.1 plots our real-time measure for all days past Jan 2, 2020.

with the actual GDP growth figure which came in at -4.8%. We see sharp downward revisions to GDP growth forecasts from March 12 onwards with the predicted GDP growth going from 2.33% on March 12 to zero on March 18 and -7.55% on March 31st.

In related work, Gormsen and Koijen (2020) use dividend futures data on the aggregate stock markets in the US and Europe to extract market expectations and provide lower-bound estimates of changes in expected dividend and GDP growth. Their calculations, as of June 8, 2020, suggest that the Covid-19 shock had a substantial effect on expected US dividend growth (down by 9%) and GDP growth (down by 2%). A key difference between the work of Gormsen and Koijen (2020) and ours is that we incorporate information on dividend announcements from the cross-section of U.S. firms which allows us to separately quantify the impact of dividend suspensions on forecasts of dividend and GDP growth.[20] This helps explain some of the differences in empirical findings. For example, Gormsen and Koijen (2020) find that the economic relief programs announced on March 13 failed to raise long-term dividend growth expectations, while conversely, the fiscal stimulus package announced on March 24 boosted long-term growth expectations but not short-term expectations.

4 Dividend Suspensions and Firm Characteristics

To better understand what drove firms to suspend dividends during the Covid-19 pandemic, we next study which firm characteristics help explain firms' decisions to suspend dividend payments. The existing literature focuses on the long-term decline in dividend-paying firms; our objective is instead to identify which variables led firms to suspend their dividends during the Covid-19 pandemic and, for comparison, during the 2008-09 Global Financial Crisis.

[20] Dividend futures contracts do not distinguish between two identical firms each of which reduce their dividends by 50% as opposed to one firm maintaining its dividends in full and the other firm suspending its dividends. Limited liquidity is also a potential concern in the dividend futures market.

4.1 Empirical results

As a starting point, the Appendix (Table A.1) lists the subset of 101 firms that suspended their dividends between January 1 and April 30, 2020 along with firm betas and market capitalizations on the dividend announcement date and at the end of our sample (April 30, 2020). Our list includes small as well as very large firms from industries with high as well as low betas (e.g., energy vs. restaurants). Reflecting the strong performance of the U.S. stock market in April 2020, most firms' market value on April 30 exceeded their value on the announcement date.

Previous 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. Fama and French (2001) identify variation in profitability, size, and investment opportunities as important factors for dividend suspensions. Hoberg and Prabhala (2008) consider the importance of idiosyncratic and systematic risk measures captured from data on stock returns, both of which have a negative and highly significant effect on firms' propensity to pay dividends.[21]

Building on these studies, we next present results from a set of probit regressions in which the dependent variable is an indicator for whether a firm suspends its dividends. Following Fama and French (2001), Hoberg and Prabhala (2008), and Ding et al. (2020), we consider several variables that signal the financial conditions of the firms that suspended dividends such as firm size, market capitalization, leverage, cash, ROA, cumulative returns, and idiosyncratic volatility. Firm size is measured as the quantile of the market value of equity relative to the population of listed firms, consistent with 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). Idiosyncratic volatility is measured using a 30-day period preceding the dividend

[21] 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.

announcement date and is based on a three-factor Fama-French model. We also use a 30-day window preceding the announcement date to measure cumulative stock returns. This predictor is used to capture changes in the market's assessment of firms' outlook which could be an important determinant of their decision to suspend dividends, particularly during adverse economic conditions. Finally, we include a set of twelve industry fixed effects since the pandemic crisis had a particularly severe impact on specific sectors of the economy such as transportation, leisure, and lodging.

Table 2 reports the results of cross-sectional probit regressions used to model the probability of dividend suspensions as a function of our set of firm-specific variables during the GFC (left column) and the pandemic (right column). During the GFC, size, leverage, cash, ROA and idiosyncratic volatility are highly significant determinants of the probability of dividend suspensions. Large firms with small amounts of debt (low leverage), large cash holdings, high profitability and low stock market volatility were less likely to suspend their dividends during the 2008-09 crisis. In contrast, firms' 30-day cumulative stock market performance did not seem to matter for this decision.

The Covid-19 pandemic saw a big shift in the drivers of firms' decision to suspend dividends. During the pandemic, firm size and cash holdings seem to matter far less for suspensions as their coefficients are substantially lower and no longer significant. Leverage and profitability retain their significance, with lower leverage and higher profitability implying a reduced chance of a dividend suspension. A one-standard deviation increase in leverage (ROA) resulted in a 18% (-19%) change in the dividend suspension probability during the GFC, slightly larger than the corresponding ones (16% and -13%, respectively) during the current Covid-19 pandemic. Both effects are robust to the inclusion of industry fixed effects.

Recent idiosyncratic volatility is not a significant driver of the probability of dividend suspensions. However, the recent (30-day) cumulative return performance becomes highly significant with a negative sign, suggesting that firms with poor recent stock market performance were more likely to suspend their dividends during the pandemic. This observation is consistent with two possible, and not mutually exclusive, mechanisms. First, we would expect stock markets to have identified the companies and sectors most adversely affected by the outbreak of the pandemic and, thus, most likely to benefit from a suspension of dividends. This is an information story and is consistent with the significantly negative coefficient on cumulative stock returns. Second, large negative stock returns may have made it more difficult for firms to raise capital through the equity market and also triggered tighter loan conditions through existing bond covenants. This is more of a causal effect that would directly increase the benefits from dividend suspensions.

4.2 Comparison with the Global Financial Crisis

Table 2 suggests that the determinants of firms' decision to suspend dividends were quite different during the pandemic as compared to during the GFC. We next follow up on this finding and address in more detail how dividend suspensions differed during the two crises.

As a first way to conduct this comparison, Figure 9a and Figure 9b present word clouds for the two crises. The word clouds are both benchmarked against dividend-related words extracted from K-8 forms during the intermediary ("neutral") 2010-2019 period. The two panels therefore highlight the most common dividend suspension words in the two crises and differences in semantics should be interpreted as reflecting different circumstances and drivers of dividend suspensions during these crises.

The most common words during the GFC are "capitalized", ″mortgage″, ″banks", ″residential mortgage″, ″non performing (loans)″. Decisions to suspend dividends during the GFC were clearly related to problems originating in the financial sector. Put simply, the GFC originated from a financial sector shock that drove financial institutions to cut their dividend payments.

The word cloud for the pandemic emphasizes "pandemic", ″coronavirus″, ″safety″, ″health″, ″unprecedented (crisis)″, ″disruption″ – all words that emphasize the extraordinary severity and disruptive nature of the Covid-19 crisis. Decisions to suspend dividends during the pandemic were caused by the great uncertainty surrounding the unique health crisis which triggered systematic lockdowns that disrupted business activities throughout the economy.

Differences between the two crises are also clear from the industry composition of firms that suspended dividends. Industry effects matter because the cash flow effect of the two crises went along industry lines. Moreover, for firms operating in industries seeking government support and loan guarantees, suspension of dividends could be seen as a politically astute action. This made it more difficult for financial institutions to continue paying dividends during the GFC and for airlines to pay dividends during the pandemic.

Table 3 groups dividend suspensions using 12 industry classifications from Ken French website. As expected, we observe clear differences in industry composition. During the GFC, Banks, Insurance Companies and Other Financials counted for more than half of all suspensions (79 of 150), with Wholesale, Retail and Services (17) and Consumer Durables (13) being the second and third most affected industries. Conversely, during the Covid-19 pandemic, financial firms have not announced many dividend suspensions (6), whereas Wholesale, Retail, and services (24), Manufacturing (13) and Oil and Gas (10) have been harder hit during the pandemic.[22]

5 Event Study Analysis

During normal times, dividend suspensions along with reductions in dividends are likely to be interpreted as a strong negative signal about firm-specific growth prospects and so can be expected to have a strongly adverse effect on firms' stock price. The Covid-19 pandemic was clearly an economy-wide, common shock which altered the information content investors could infer from changes in firms' dividend decisions.

Stated differently, observing that companies like Hilton or Marriott suspended their dividends after the pandemic outbreak, the first order effect for investors may have been to significantly downgrade their views on the prospects of the hospitality industry rather than changing their views on Hilton and Marriott's firm-specific risk.

These points suggest that the conventional announcement effect of changes in

[22]The "Other" category includes hotels such as Hilton, Marriott, and Choice Hotels and gambling/entertainment/casinos such as Las Vegas Sands and Boyd Gaming Corporation.

dividend policies could have been quite different during the pandemic compared to during more normal times.

5.1 Methodology

To explore this possibility, we next study how stock returns behaved during a short event window surrounding firms' announcement of dividend reductions or suspensions. We begin with the universe of all firms that announced or suspended dividends between the WHO announcement of a pandemic on March 11, 2020 and the end of our sample (April 30). Next, we remove from the sample all announcements pertaining to 2019Q4. This leaves us with a sample of 668 firms which includes 554 announcements and 114 suspensions. The 554 announcements further partitions into 37 quarter-on-quarter increases, 44 quarter-on-quarter decreases, and 473 cases with the exact same dividend per share as announced in the preceding quarter.[23]

Firms with large reductions in their dividend payments deserve special analysis. Avoiding a complete suspension of dividends during an economic crisis as severe as that caused by the pandemic may have sent a stronger-than-expected signal to markets and so we analyze such firms separately. Still, large reductions in dividends would still, in many cases, have sent a strong signal. For example, Royal Dutch Shell were renowned for guaranteeing near-constant payouts to investors and catering to pension funds in search of stable yields. As shown in Figure A.2, Shell reduced its dividends by an unprecedented -66% during the pandemic.

Our analysis categorizes firms into four groups, namely (i) firms announcing no changes or small reductions in their dividends; (ii) firms announcing increases to their dividends; (iii) firms with dividend cuts; and (iv) firms suspending dividends.

We adopt tools from standard event study methodology in our analysis. Specifically, we first regress each firm's excess returns using a three-factor Fama-French model that includes the market, SMB, and HML returns as factors. These regressions use daily data during a 100-day window stretching back from 115 days to 15 days prior to each firm's

[23]A few firms announce dividends late in the quarter but, subsequently, suspend dividends and we categorize these firms as having suspended their dividend.

dividend announcement date. Using the estimated coefficients from this regression, we compute abnormal returns from ten days before each firm's announcement or suspension to ten days after. For each firm we cumulate these residuals to obtain cumulative abnormal returns (CARs). Finally, we compute simple cross-sectional averages of the CARs, averaging across firms grouped into the four categories described above.

5.2 Empirical Results

Figure 10 plots the CAR values from ten days before each firm's announcement or suspension to ten days after. Firms that reduced their dividends but did not entirely eliminate them (top panel) see their CAR values rising two days prior to the announcement date, peak at over 5% on the day after the announcement, before stabilizing around 3%.

Reductions in dividends would normally be associated with negative CAR values. This effect appears to have been reversed during the pandemic. A possible explanation is that many of the firms announcing dividend cuts were expected to completely eliminate their dividends given the financial distress caused by the epidemic. Retaining some dividends in this situation was interpreted by investors as a sign of financial strength and so resulted in positive abnormal returns.

Firms suspending their dividends (top panel) see their CAR values starting to decline five days prior to the announcement day and bottom out at -6% two days after the announcement before stabilizing. This suggests that a large part of the negative–and significant–abnormal returns experienced by the firms that suspended dividends precede the dividend announcement date. One possible interpretation of this is that information about the upcoming dividend suspension was leaked. Another possibility is that the large negative abnormal returns that preceded dividend suspensions reflected extraordinarily poor economic prospects for this group of firms which in turn triggered the decision to suspend dividends. This explanation is particularly plausible for those firms whose dividend announcement date was not planned ahead of time.

Economic and financial conditions deteriorated very rapidly during the pandemic and the largest drop in stock prices are likely to have occurred for firms enduring the highest levels of financial distress. In addition, lower stock prices could have become a causal factor in firms' decision to suspend dividends as they made it harder to raise capital through seasoned equity offerings and also may have triggered more stringent loan conditions through bond covenants.

The fact that CAR values only fell by another 2% on the two days following the dividend suspension announcement date–and essentially bounce back to their original level during the following two days–suggests that markets saw dividend suspensions as a natural precaution and prudent action.

The bottom panel of Figure 10 shows the CAR values for firms with no changes along with firms that increased their dividends. The curve for firms with no change in their dividends hovers around zero, displaying a very different pattern compared to firms that either suspended their dividends or reduced them. Firms that increased their dividends experienced a modest (less than 3%) lift in stock prices with significantly positive CAR values on the dividend announcement date and its two adjacent days.

6 Conclusion

Suspension of dividend payments is not a decision taken lightly by firms. The sharp and sudden shock to economic prospects caused by the outbreak of the Covid-19 pandemic saw firms suspend their dividends in unprecedented numbers and at an unparalleled speed–in some cases leading firms to overturn previous plans to pay regular dividends within days of the economic lockdown.

Our analysis shows that dividend suspensions have a more profound effect on expected future dividend growth and broad economic conditions than the mere dollar amount by which they reduce dividend payments. Consistent with this disproportionately strong signaling effect, the stock market's reaction to dividend suspensions during the pandemic (strongly negative) was very different from its reaction to large dividend reductions (positive). Apparently, a firm's ability to pay even a small amount of dividends despite the highly adverse economic effects of the pandemic was interpreted by investors as a sign of better-than-expected financial strength.

Firms' dividend policies are the result of a complex process that embeds a substantial amount of budgeting decisions and earnings projections. Dividend decisions are conventionally viewed as being slow-moving and reactive. Our analysis suggests that valuable forward-looking information can be gained from modeling the effect of suspensions on dividend dynamics, particularly during economic crises where the news cycle develops very rapidly.

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Parameter estimates												
	Without suspenders				**With suspenders**				**With suspenders dynamics**			
	Mean	*Std*	*90% Credible Set*		*Mean*	*Std*	*90% Credible Set*		*Mean*	*Std*	*90% Credible Set*	
μ_d	0.078	0.021	0.051	0.107	0.075	0.021	0.050	0.103	0.087	0.010	0.072	0.103
ϕ_μ	0.997	0.002	0.994	0.999	0.997	0.002	0.994	0.999	0.995	0.002	0.992	0.997
β_μ									-0.013	0.003	-0.019	-0.008
σ_μ	0.003	0.000	0.002	0.003	0.003	0.000	0.002	0.003	0.003	0.000	0.002	0.003
μ_h	-4.978	0.119	-5.175	-4.780	-4.961	0.116	-5.156	-4.765	-4.956	0.118	-5.151	-4.762
ϕ_h	0.900	0.008	0.887	0.914	0.902	0.008	0.889	0.915	0.903	0.008	0.890	0.917
σ_h	0.714	0.044	0.645	0.786	0.710	0.046	0.637	0.785	0.695	0.045	0.624	0.770
σ_ξ	2.875	0.043	2.805	2.947	2.911	0.044	2.842	2.985	2.911	0.045	2.842	2.987
λ_1	-1.349	0.061	-1.449	-1.250	-1.345	0.060	-1.441	-1.246	-1.367	0.059	-1.466	-1.271
λ_2	-0.017	0.003	-0.022	-0.012	-0.014	0.003	-0.019	-0.009	-0.013	0.003	-0.018	-0.009
λ_3									2.136	0.802	1.036	3.577

Table 1: Parameter estimates for the dividend growth rate model. This table shows parameter estimates for a range of models fitted to the daily dividend growth series. The equations for the most general version of the components model, further described in Section3, take the following form:

$$\Delta d_{t+1} = \mu_{dt+1} + \xi_{dt+1} J_{dt+1} + \varepsilon_{dt+1},$$

$$\mu_{dt+1} = \mu_d + \phi_\mu (\mu_{dt} - \mu_d) + \beta_\mu \frac{N_{st+1}}{N_{st+1} + N_{dt+1}} + \sigma_\mu \varepsilon_{\mu t+1},$$

$$\varepsilon_{dt+1} \sim \mathcal{N}(0, e^{h_{dt+1}}),$$

$$h_{dt+1} = \mu_h + \phi_h (h_{dt} - \mu_h) + \sigma_h \varepsilon_{ht+1},$$

$$\Pr(J_{dt+1} = 1) = \Phi\left(\lambda_1 + \lambda_2 N_{dt+1} + \lambda_3 \frac{N_{st+1}}{N_{st+1} + N_{dt+1}}\right),$$

$$\xi_{dt+1} \sim \mathcal{N}\left(0, \sigma_\xi^2\right),$$

where μ_{dt+1} captures the mean of the smooth component of the underlying dividend process, $J_{dt+1} \in \{0,1\}$ is a jump indicator that equals unity in case of a jump in dividends and otherwise is zero, ξ_{dt+1} measures the jump size, ε_{dt+1} is a temporary cash flow shock, $\varepsilon_{\mu t+1} \sim \mathcal{N}(0,1)$ is assumed to be uncorrelated at all times with the innovation in the temporary dividend growth component, ε_{dt+1}, and $|\phi_\mu| < 1$. h_{dt+1} denotes the log-variance of ε_{dt+1}, and $\varepsilon_{ht+1} \sim \mathcal{N}(0,1)$ is uncorrelated at all times with both ε_{dt+1} and $\varepsilon_{\mu t+1}$. N_{dt+1} and N_{st+1}denote the number of firms announcing or suspending dividends on day $t+1$, while Φ stands for the CDF of a standard Normal distribution and $\xi_{dt+1} \sim \mathcal{N}\left(0, \sigma_\xi^2\right)$ captures the magnitude of the jumps. Within each panel, the columns report the posterior mean, standard deviation and 90% credible sets for the parameter estimates.

Table 2: Probit regressions of dividend suspenders on firm characteristics. This table reports estimates of the cross-sectional probit regression $Prob(suspender)_{i,t} = \alpha + \beta_1 size_{i,t} + \beta_2 leverage_{i,t} + \beta_3 cash_{i,t} + \beta_4 ROA_{i,t} + \beta_5 30 days\ cumret_{i,t} + \beta_6 idiovol_{i,t} + \varepsilon_{i,t}$ of dividend suspenders on firm characteristics. Firm size is defined as the quantile 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). 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 2007 (2019).

Probit of dividend suspenders		
	(1)	(2)
	2008-2009	2020
Firm size	-.19***	-.071
	[-4.39]	[-1.17]
Leverage	1.02***	0.65***
	[3.32]	[3.02]
Cash	-1.42**	0.73
	[-2.47]	[1.25]
ROA	-1.98***	-2.06**
	[-3.03]	[-2.00]
30-days cumulative returns	-.26	-.97**
	[-0.79]	[-2.39]
idiosyncratic vol	8.39***	4.71
	[2.62]	[0.87]
Industry FE	Y	Y
R^2	14.26%	19.18%
Observations	1,308	1,134

Table 3: Number of dividend suspensions by year and industry classification. This table reports the total number of dividend suspensions in the 2008–2009 and 2020 years, broken down by the industry classification. We use the SIC codes and the Fama-French 12 industry definitions to classify companies into the various industries.

Dividend Suspensions by Industry and Year		
Industry	2008-2009	2020
Consumer NonDurables – Food, Tobacco, Textiles, Apparel, Leather, Toys	11	3
Consumer Durables – Cars, TVs, Furniture, Household Appliances	13	8
Manufacturing – Machinery, Trucks, Planes, Off Furn, Paper, Com Printing	7	13
Oil, Gas, and Coal Extraction and Products	1	10
Chemicals and Allied Products	1	3
Business Equipment – Computers, Software, and Electronic Equipment	3	4
Telephone and Television Transmission	3	0
Utilities	0	0
Wholesale, Retail, and Some Services (Laundries, Repair Shops)	17	24
Healthcare, Medical Equipment, and Drugs	2	2
Finance	79	6
Other – Mines, Constr, BldMt, Trans, Hotels, Bus Serv, Entertainment	13	32
Total	150	105

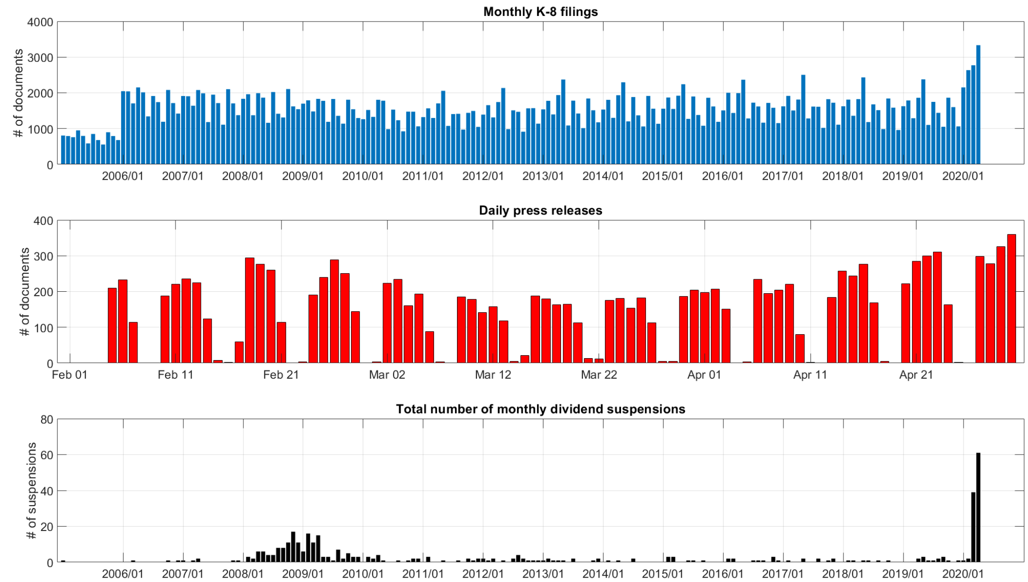


Figure 1: Total counts of monthly K-8 filings, daily press releases, and daily dividend suspensions. The top panel of this figure plots the total number of K-8 filings submitted to the SEC by all public firms in our list for each month between January 2005 to April 2020. The middle panel plots the total number of press releases posted on the NASDAQ news platform by all public firms in our list for each day between February 1, 2020 and April 30, 2020. The bottom panel plots the total number of dividend suspensions by all public firms in our dataset for each month between January 2005 and April 2020.

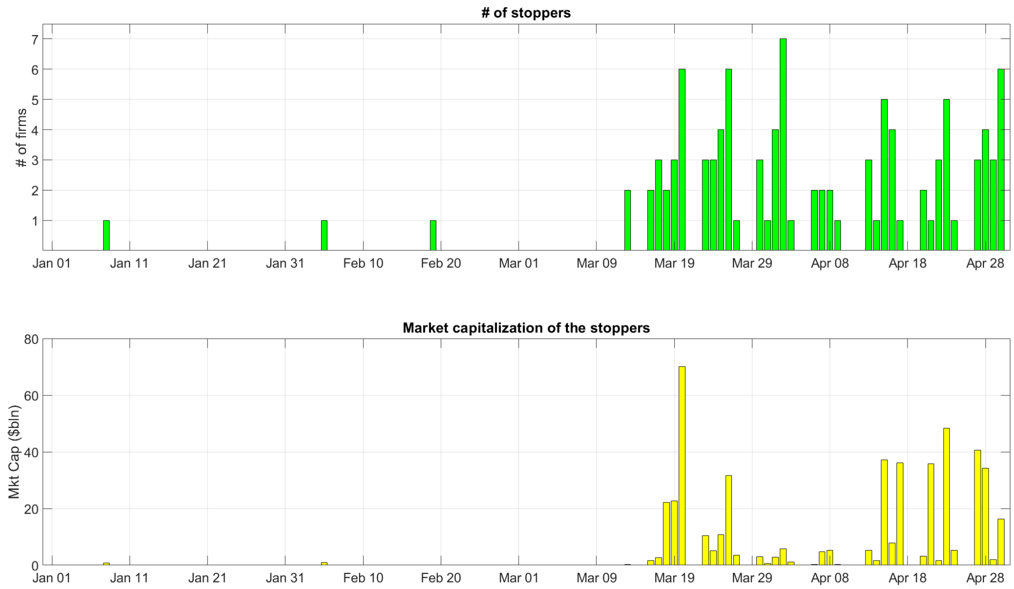


Figure 2. Distribution of the dividend suspenders during the period from January 1st to April 30th 2020. This figure plots time series of daily dividend suspensions since the start of 2020. For each day within this quarter, the top panel shows the number of firms who announce a dividend suspension, while the bottom panel shows the total market capitalization of the dividend suspenders on that day.

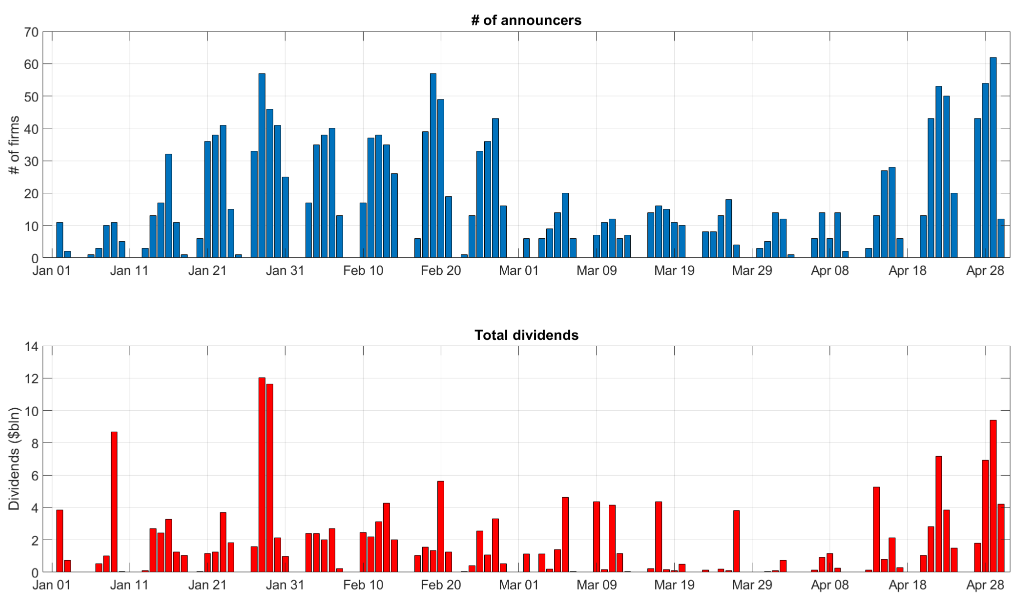


Figure 3. Distribution of dividend announcements during the period from January 1st to April 30th 2020. This figure plots time series of dividend announcements since the start of 2020. For each day within this quarter, the top panel shows the number of firms announcing dividends (both positive and suspenders). The bottom panel shows the overall nominal amount of dividends announced by those firms (in billion dollars).

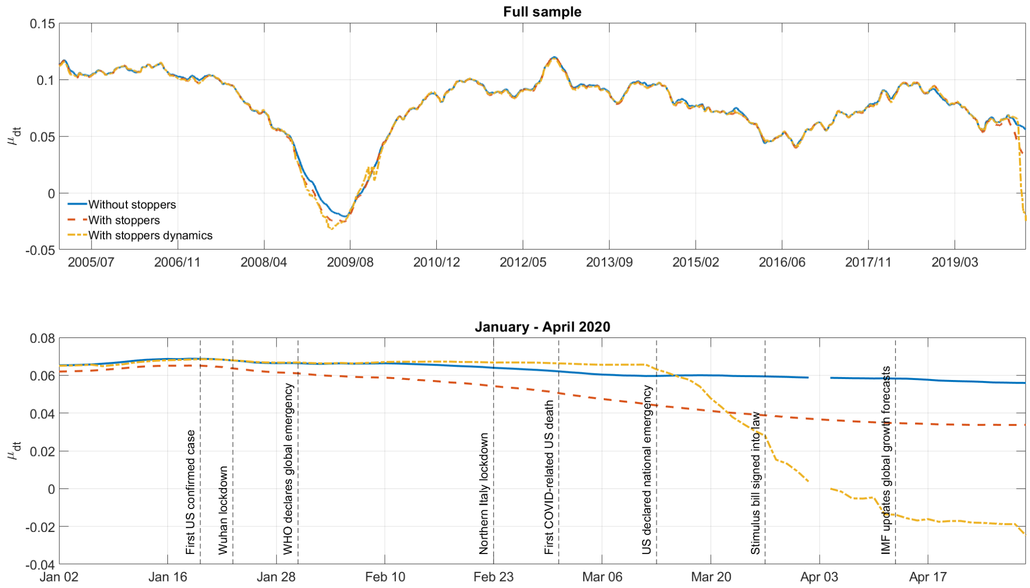


Figure 4: Comparison between our daily μ_{dt} with and without dividend suspenders. This figures plot our daily μ_{dt} with and without dividend suspenders. The blue line shows the persistent component in dividend growth without taking into account dividend suspenders, while the remaining two lines incorporate the information coming from the announcement of dividend suspenders, in the way we construct our Δd_t measure (red dotted line) or both in the construction of Δd_t and in accounting for the suspenders' dynamics in the econometric model (yellow dashed-dotted line).

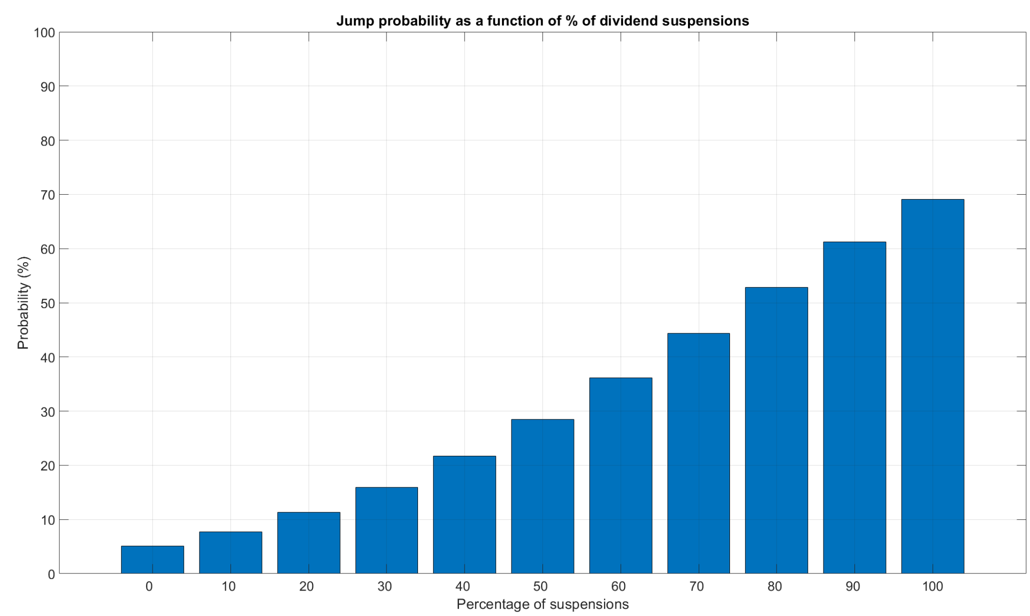


Figure 5: Jump probability as a function of the number of dividend announcers and the fraction of dividend suspenders. This figure plots the jump probability as a function of the proportion of dividend suspensions, $N_{st+1} / (N_{dt+1} + N_{st+1})$, fixing the number of announcers N_{st+1} at its historical average.

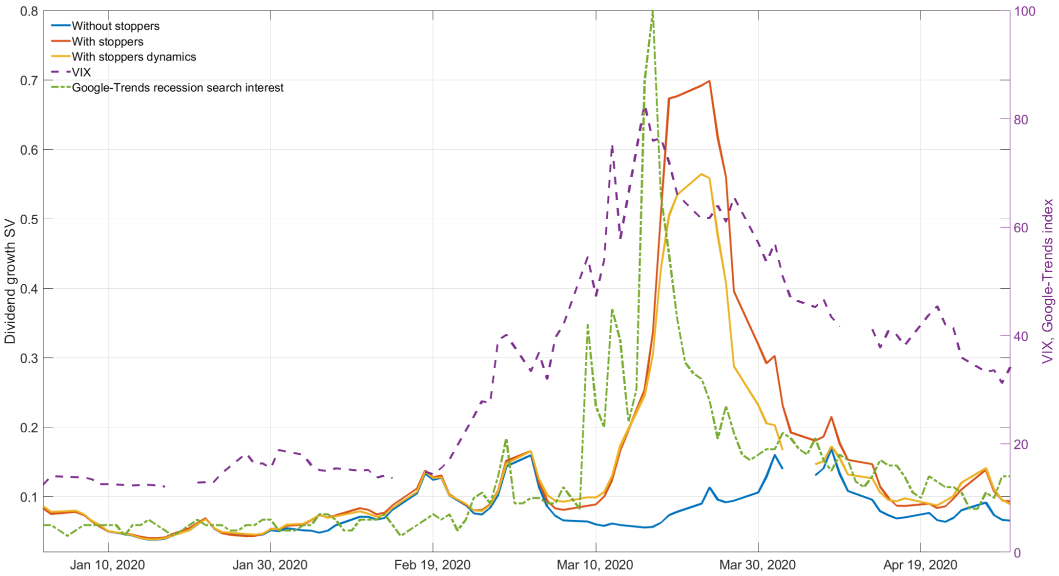


Figure 6: Stochastic volatility of the various daily dividend growth series against VIX and Google-Trends sentiment index. This figure plots the stochastic volatility of the daily dividend growth series with and without suspensions included against the daily VIX and Google-Trends recession search interest index. The sample period is January 2, 2020 through April 30, 2020.

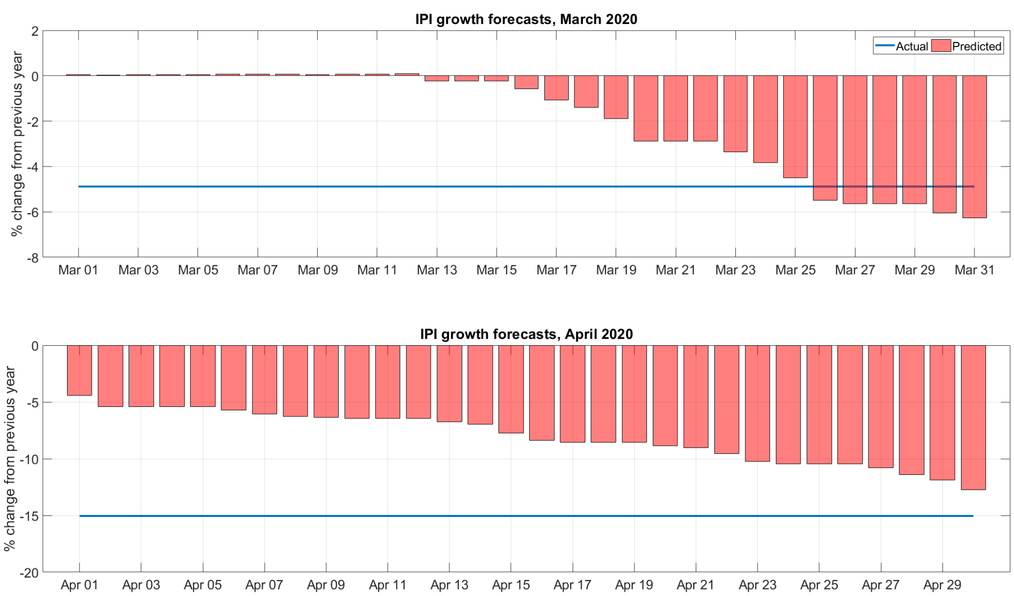


Figure 7: IP growth forecasts, daily updates. The top panel depicts the daily nowcasts of IP growth for March 2020, computed in real time during each day between March 2nd and March 31st. The bottom panel depicts the daily nowcasts of IP growth for April 2020, computed in real time during each day between April 1st and April 30th. Forecasts are computed using a linear model where the monthly IP growth rate in month t is regressed on its lagged value, the last daily value of μ_{dt} from the same month, and the total number of dividend suspensions in the same month.

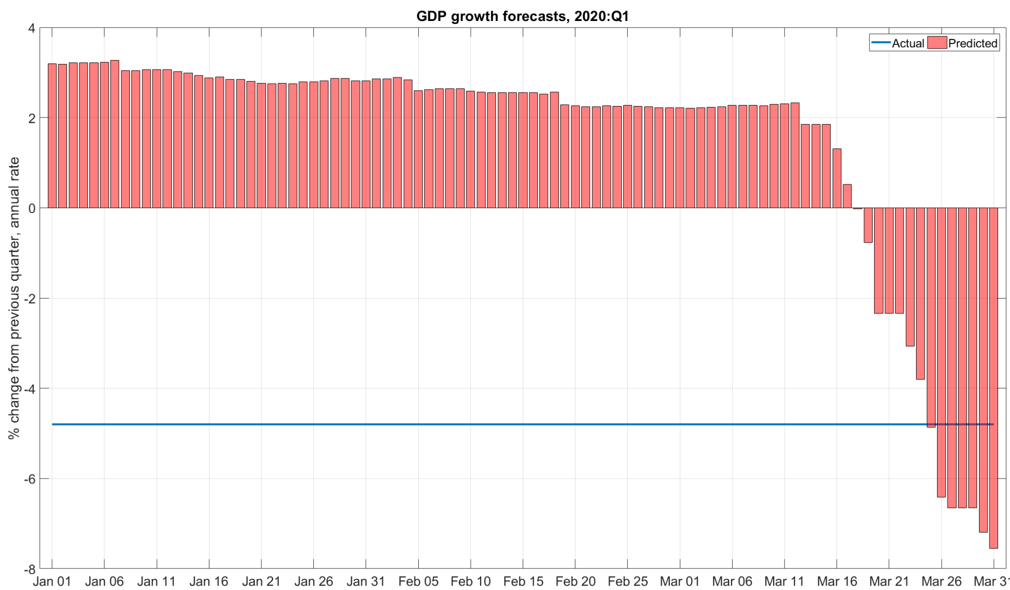
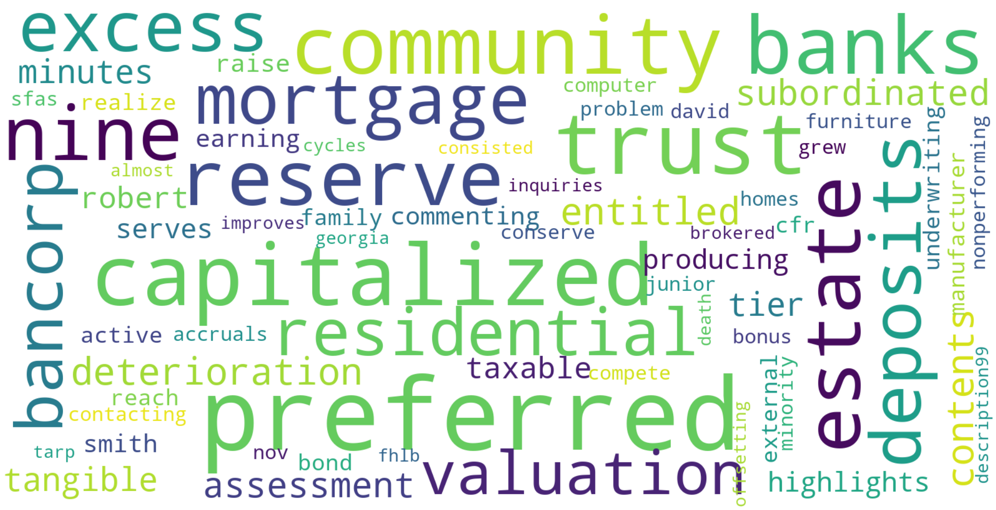
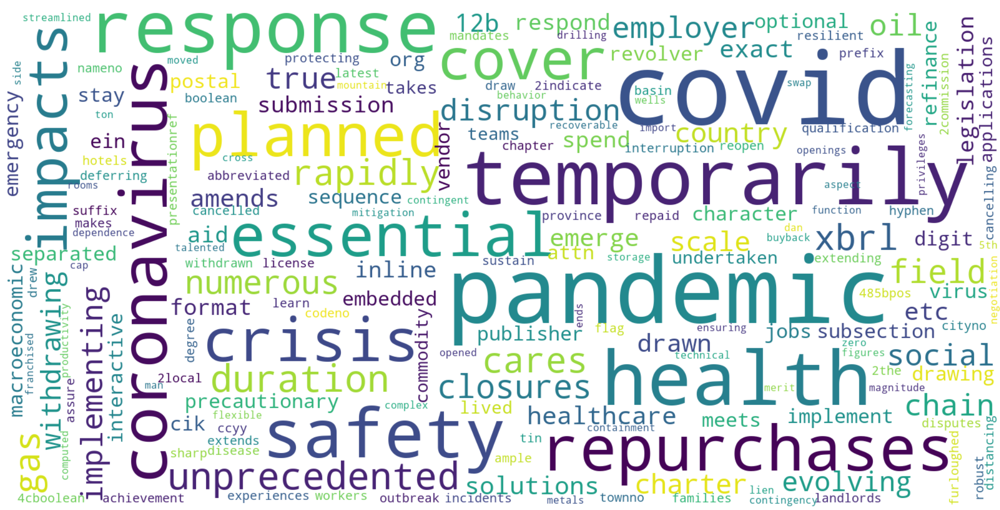


Figure 8: GDP growth forecasts, daily updates. The figure depicts the daily nowcasts of GDP growth in the first quarter of 2020, computed in real time during each day between January 2nd and March 31st. Forecasts are computed using a linear model where the quarterly GDP growth rate in month t is regressed on its lagged value, the last daily value of μ_{dt} from the same quarter, and the total number of dividend suspensions in the same quarter.



(a) January 2, 2008 – December 31, 2009



(b) Janaury 2, 2020 – April 30, 2020

Figure 9: Word clouds of dividend suspensions based on K-8 filings and press-releases. This figure reports the list of the most common words in the set of K-8 and press releases that we identified as discussing dividend suspensions. The top panel focuses on documents filed during the period between January 2, 2008 and December 31, 2009, while the bottom panels focuses on the period between January 2, 2020 and April 30, 2020. Font size of a word is proportional to the number of times that the word appears in the set of documents. Both clouds are benchmarked against the "normal" years 20102-2019, so to highlight those words that are unique to the periods.

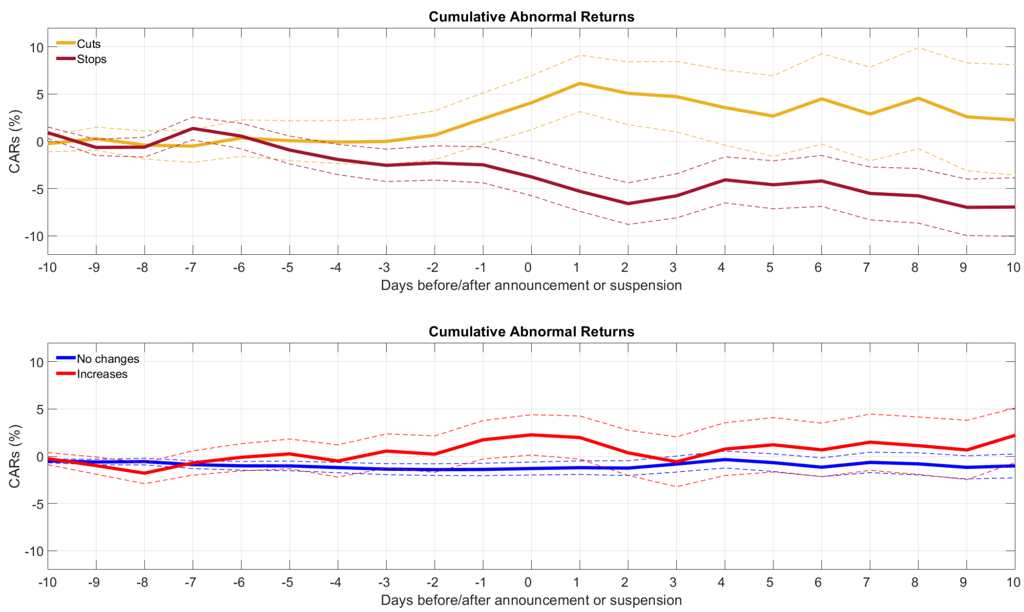


Figure 10: Cumulative abnormal returns during the Covid-19 period. This figure plots the average cumulative abnormal returns during a window of twenty days around the individual firms' dividend announcements, separately for firms with decreases in dividends, firms with dividend suspensions (top panel), firms with no changes in their dividend announcements, and firms increasing their dividends (bottom panel).

Internet Appendix A Additional results

Table A.1: Descriptive statistics of the dividend suspenders in 2020. This table reports summary statistics on all the dividend suspenders from the start of 2020.

suspension date	ticker	last dividend	mktcap on suspension date	mktcap on April 30	beta
2/5/2020	BTU	$ 14,036,000	$ 901,000,000	$ 328,152,000	1.55
2/13/2020	FORR	$ 3,720,000	$ 857,000,000	$ 582,180,000	0.94
2/19/2020	JMP	$ 772,000	$ 58,400,000	$ 48,250,000	0.78
2/27/2020	RRC	$ 5,020,000	$ 691,000,000	$ 1,463,330,000	2.7
3/13/2020	ARKR	$ 874,750	$ 49,700,000	$ 40,990,785	1.15
3/13/2020	QEP	$ 4,760,000	$ 205,000,000	$ 234,668,000	4.89
3/16/2020	PK	$ 107,550,000	$ 1,650,000,000	$ 2,272,890,000	2.1
3/16/2020	CPHC	$ 323,750	$ 48,400,000	$ 45,463,750	0.58
3/17/2020	KOS	$ 18,090,000	$ 279,000,000	$ 663,300,000	3.46
3/17/2020	PLCE	$ 8,456,000	$ 306,000,000	$ 446,356,000	1.95
3/18/2020	MAR	$ 156,960,000	$ 20,900,000,000	$ 29,737,380,000	1.64
3/18/2020	ALGT	$ 11,410,000	$ 1,210,000,000	$ 1,279,224,000	1.3
3/19/2020	F	$ 583,500,000	$ 17,400,000,000	$ 19,800,100,000	1.25
3/19/2020	DRI	$ 108,240,000	$ 5,200,000,000	$ 9,076,170,000	1.31
3/19/2020	FSI	$ 915,000	$ 15,400,000	$ 19,520,000	1.45
3/20/2020	BLMN	$ 17,380,000	$ 420,000,000	$ 1,047,145,000	1.83
3/20/2020	SABR	$ 38,360,000	$ 907,000,000	$ 1,991,980,000	1.77
3/20/2020	M	$ 116,493,000	$ 1,860,000,000	$ 1,810,740,000	1.54
3/20/2020	EEX	$ 5,355,000	$ 226,000,000	$ 162,792,000	1.45
3/20/2020	BA	$ 1,156,965,000	$ 53,500,000,000	$ 79,394,260,000	1.56
3/23/2020	JWN	$ 57,350,000	$ 2,420,000,000	$ 2,910,900,000	1.42
3/23/2020	FCX	$ 72,500,000	$ 7,820,000,000	$ 12,803,500,000	2.25
3/23/2020	BJRI	$ 2,496,000	$ 184,000,000	$ 419,712,000	1.9
3/24/2020	TGI	$ 2,004,000	$ 258,000,000	$ 352,704,000	0.95
3/24/2020	SNX	$ 20,440,000	$ 4,140,000,000	$ 4,474,316,000	1.16
3/24/2020	BKE	$ 76,260,000	$ 860,000,000	$ 753,252,000	2.71
3/24/2020	BDL	$ 557,700	$ 20,500,000	$ 26,026,000	1.47
3/25/2020	BYD	$ 7,770,000	$ 1,710,000,000	$ 1,852,590,000	1.49
3/25/2020	ALK	$ 46,125,000	$ 3,680,000,000	$ 3,999,960,000	2.26
3/26/2020	TPR	$ 93,288,000	$ 4,180,000,000	$ 4,106,880,000	1.26
3/26/2020	MOV	$ 3,280,000	$ 183,000,000	$ 169,084,000	1.33
3/26/2020	LEA	$ 46,585,000	$ 5,800,000,000	$ 5,907,825,000	1.43
3/26/2020	HLT	$ 42,300,000	$ 20,700,000,000	$ 21,350,220,000	0.51
3/26/2020	GPS	$ 90,639,000	$ 3,150,000,000	$ 3,028,760,000	1.39
3/26/2020	EQT	$ 7,680,000	$ 1,780,000,000	$ 3,735,040,000	1.63
3/27/2020	LB	$ 82,800,000	$ 3,480,000,000	$ 3,281,640,000	1.11
3/30/2020	RUTH	$ 4,290,000	$ 181,000,000	$ 321,893,000	2.75
3/30/2020	PBF	$ 36,000,000	$ 916,000,000	$ 1,368,000,000	2.04
3/31/2020	ECOL	$ 3,978,000	$ 672,000,000	$ 724,438,000	0.93
4/1/2020	PVH	$ 2,815,800	$ 2,420,000,000	$ 3,647,943,000	2.07
4/1/2020	GCI	$ 46,740,000	$ 146,000,000	$ 138,990,000	NA
4/1/2020	DAKT	$ 2,255,000	$ 200,000,000	$ 203,852,000	0.73
4/1/2020	BRY	$ 9,720,000	$ 163,000,000	$ 277,830,000	1.15
4/2/2020	QUAD	$ 5,880,000	$ 82,000,000	$ 145,824,000	1.95
4/2/2020	PLAY	$ 4,896,000	$ 307,000,000	$ 447,984,000	1.61
4/2/2020	MIC	$ 86,500,000	$ 2,080,000,000	$ 2,386,535,000	1.52
4/2/2020	LBRT	$ 3,795,000	$ 187,000,000	$ 358,248,000	3.58
4/2/2020	EAT	$ 14,212,000	$ 377,000,000	$ 870,672,000	2.19
4/2/2020	BSET	$ 1,262,500	$ 48,900,000	$ 69,084,000	1.53
4/3/2020	MLHR	$ 12,411,000	$ 1,050,000,000	$ 1,332,114,000	1.58
4/6/2020	RRD	$ 2,127,000	$ 69,500,000	$ 121,239,000	0.73
4/6/2020	CATO	$ 7,557,000	$ 228,000,000	$ 257,854,000	2.85
4/7/2020	GPI	$ 5,580,000	$ 838,000,000	$ 1,052,574,000	2.18
4/7/2020	CLR	$ 18,550,000	$ 3,880,000,000	$ 6,080,690,000	3.56
4/8/2020	SIX	$ 21,125,000	$ 1,210,000,000	$ 1,690,845,000	1.35
4/8/2020	CHH	$ 12,532,500	$ 4,030,000,000	$ 4,180,285,000	2.21
4/9/2020	REVG	$ 3,110,000	$ 273,000,000	$ 330,904,000	2.87
4/13/2020	SKYW	$ 7,056,000	$ 1,350,000,000	$ 1,559,880,000	1.86
4/13/2020	EXP	$ 4,160,000	$ 2,640,000,000	$ 2,538,016,000	1.27
4/14/2020	ARNC	$ 8,660,000	$ 4,180,000,000	$ 3,775,760,000	NA
4/15/2020	PLT	$ 5,985,000	$ 554,000,000	$ 563,388,000	1.92
4/15/2020	KELYA	$ 2,677,500	$ 480,000,000	$ 551,565,000	1.11
4/15/2020	HNRG	$ 1,208,000	$ 28,400,000	$ 23,003,340	0.27
4/15/2020	EL	$ 107,040,000	$ 35,100,000,000	$ 39,337,200,000	2.08

4/15/2020	CLF	$ 16,200,000	$ 1,030,000,000	$ 1,182,600,000	0.77
4/16/2020	MTSC	$ 5,730,000	$ 363,000,000	$ 406,257,000	2.02
4/16/2020	GT	$ 37,280,000	$ 1,570,000,000	$ 1,670,610,000	1.49
4/16/2020	DAN	$ 14,400,000	$ 1,210,000,000	$ 1,656,000,000	0.65
4/16/2020	COLM	$ 17,550,000	$ 4,780,000,000	$ 4,920,075,000	2.62
4/17/2020	LVS	$ 606,720,000	$ 36,100,000,000	$ 36,879,360,000	1.89
4/17/2020	CHK	$ 169,650,000	$ 28,200,000,000	$ 34,125,000,000	1.62
4/20/2020	HXL	$ 14,348,000	$ 2,620,000,000	$ 2,919,396,000	1.21
4/21/2020	HCA	$ 145,770,000	$ 35,800,000,000	$ 37,249,320,000	1.31
4/22/2020	MN	$ 312,000	$ 47,000,000	$ 55,068,000	1.27
4/22/2020	IPAR	$ 10,395,000	$ 1,410,000,000	$ 1,407,735,000	0.91
4/22/2020	DAL	$ 260,741,000	$ 14,500,000,000	$ 16,763,770,000	3.03
4/22/2020	BBX	$ 999,700	$ 135,000,000	$ 163,028,000	1.64
4/23/2020	TEX	$ 8,556,000	$ 950,000,000	$ 1,083,047,000	0.93
4/23/2020	NTIC	$ 590,850	$ 63,400,000	$ 70,720,200	0.89
4/23/2020	BOOM	$ 1,825,000	$ 381,000,000	$ 376,826,000	1.09
4/23/2020	ARCH	$ 7,500,000	$ 391,000,000	$ 437,850,000	1.62
4/23/2020	APD	$ 294,800,000	$ 46,600,000,000	$ 49,627,600,000	1.32
4/24/2020	ALV	$ 54,064,000	$ 5,300,000,000	$ 5,233,744,000	1.75
4/27/2020	UHS	$ 16,060,000	$ 8,440,000,000	$ 8,486,907,000	1.39
4/27/2020	GM	$ 543,400,000	$ 32,100,000,000	$ 31,874,700,000	1.17
4/27/2020	CHS	$ 10,710,000	$ 149,000,000	$ 178,500,000	1.05
4/28/2020	YUMC	$ 45,120,000	$ 17,300,000,000	$ 18,220,960,000	1.27
4/28/2020	OI	$ 7,800,000	$ 1,210,000,000	$ 1,285,440,000	1.66
4/28/2020	LUV	$ 94,680,000	$ 15,600,000,000	$ 16,437,500,000	0.87
4/28/2020	CTRN	$ 936,000	$ 128,000,000	$ 132,912,000	1.44
4/29/2020	WHG	$ 3,811,520	$ 226,000,000	$ 204,137,920	0.73
4/29/2020	SMP	$ 5,625,000	$ 968,000,000	$ 915,525,000	1.74
4/29/2020	DIN	$ 12,768,000	$ 778,000,000	$ 745,752,000	1.57
4/30/2020	WDC	$ 148,500,000	$ 13,700,000,000	$ 13,685,760,000	0.89
4/30/2020	ULH	$ 2,866,500	$ 380,000,000	$ 380,289,000	1.42
4/30/2020	MCS	$ 3,910,000	$ 334,000,000	$ 334,420,000	1.3
4/30/2020	DNKN	$ 33,327,000	$ 5,210,000,000	$ 5,203,152,000	1.68
4/30/2020	ALEX	$ 13,737,000	$ 949,000,000	$ 950,022,000	1.58
4/30/2020	AAL	$ 43,800,000	$ 5,260,000,000	$ 5,260,380,000	1.76
5/1/2020	FLR	$ 14,000,000	$ 1,430,000,000	$ 1,638,000,000	2.91
5/1/2020	DBI	$ 6,490,000	$ 398,000,000	$ 412,115,000	1.84

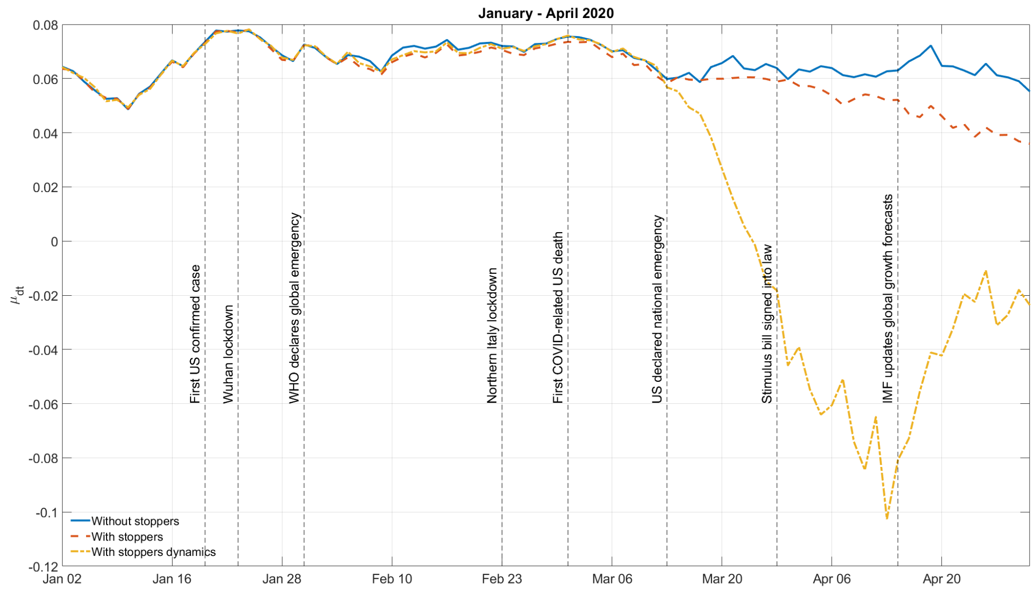


Figure A.1: Comparison between our daily μ_{dt} with and without dividend suspenders, real-time. This figure plots the real-time versions of our daily μ_{dt} with and without dividend suspenders. The blue line shows the persistent component in dividend growth without taking into account dividend suspenders, while the remaining two lines incorporate the information coming from the announcement of dividend suspenders, in the way we construct our Δd_t measure (red dotted line) or both in the construction of Δd_t and in accounting for the suspenders' dynamics in the econometric model (yellow dashed-dotted line).

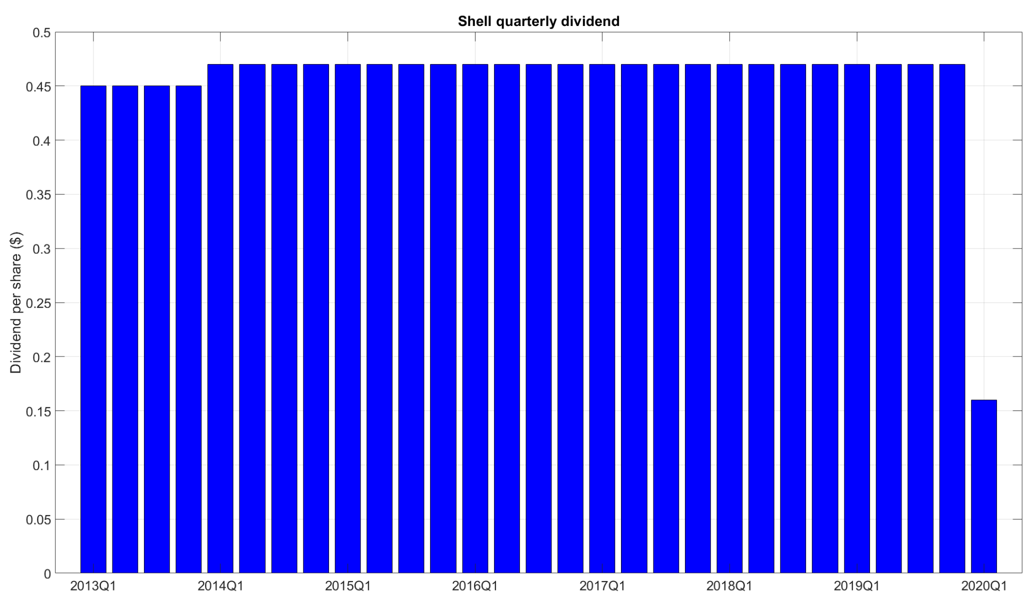


Figure A.2. Shell quarterly dividend. This figure plots time series of the quarterly dividend per share (in $) of Royal Dutch Shell from 2013Q1 to 2020Q1.