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COVID-19 and Corporate Finance

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Abstract

We distill evidence about the effects of COVID-19 on companies. Stock price reactions to the shock differed greatly across firms, depending on their resilience to social distancing, financial flexibility, and corporate culture. The same characteristics affected the response of firms' sales, employment, and asset growth. Despite the shock, firms expanded their balance sheets and liquidity by raising funds from banks, bonds, and equity markets. While listed firms reduced their leverage, unlisted ones, especially small and medium enterprises, increased it. Government support programs helped firms access external funding. We conclude by identifying unexplored research issues regarding the long-run effects of COVID-19 on companies.

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Keywords: COVID-19, pandemic, firm resilience, social distancing, financial flexibility, corporate culture, credit supply, leverage, government support, public loan guarantees, Paycheck Protection Program.

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1 Introduction

COVID-19 has been a very special economic shock. Qualifying as a "rare disaster," with the corresponding sudden, violent, and wide-ranging impact, it affected different industries asymmetrically and generated massive uncertainty about its persistence. These features are important to understand its impact on financial markets and on firms, and therefore its implications for corporate finance.

First, the outbreak of COVID-19 halted or hindered the operation of entire industries while enhancing that of others, depending on their vulnerability to social distancing requirements. For instance, the air travel and hospitality industries almost entirely shut down during lockdowns, while online retailers and software providers thrived, owing to the surge in demand for their services. As a result of such asymmetries, which reshuffled both the demand for output and the supply of labor across industries and firms, COVID-19 has been labeled a "reallocation shock" (Barrero et al., 2020a,b; Bloom et al., 2020).

Second, COVID-19 was a massive uncertainty shock, at least initially. The period from late February until late March 2020 featured great uncertainty about whether and when effective vaccines could be discovered, developed and deployed in a widespread vaccination campaign. It was also unclear whether governments and central banks could deliver an effective and timely fiscal and monetary policy response to the shock. All indicators of uncertainty (based on asset prices, traditional and social media sources, forecaster disagreement, and model estimation) featured a huge jump in the wake of the COVID-19 breakout (Altig et al., 2020; Coibion et al., 2020a,b; Hanspal et al., 2021; Giglio et al., 2021). However, the initial jump in uncertainty gradually reversed as information about the effectiveness of vaccines and about the policy response started to accumulate: while initially the stock prices of the firms most vulnerable to social distancing vastly underperformed relative to those of more

resilient firms, their return differential started reversing starting in April 2020; by the same token, the expected return differential between the two groups of firms first increased and then decreased, indicating an initial rise and then a gradual reversal in the risk premium required by investors for firms' pandemic exposure (Pagano et al., 2021).

This abatement of the uncertainty shock mitigated the disruptive effects of the pandemic on the balance sheet of companies and its threat to the very survival of the most affected ones. The response by security markets and financial institutions played a key role in this respect: had they reacted to the initial spike in uncertainty by tightening their supply of funding, a wave of bankruptcies would have followed, especially in the industries more severely hit by social distancing requirements. Instead, as we shall see, good news about vaccines starting from April 2020, together with a prompt and massive response of monetary and fiscal policy, enabled financial intermediaries and markets to play a stabilizing role.

This stabilizing response benefited from banks featuring much healthier balance sheets than at the start of the 2008 financial crisis. This placed them in a good position to promptly throw a liquidity lifeline to firms. In turn, firms were quick to grab this lifeline, and used it jointly with bond issuance and various cash-preserving policies so as to raise their liquidity buffers and increase their chances of survival, as we shall see.

In this paper we draw together many pieces of evidence regarding the impact of the COVID-19 shock on companies, and the extent to which this impact was moderated by the responses of capital markets and banks, as well as by corporate financial policies and by public policies. We do this by canvassing not only recent research in this area, but also the latest available balance sheet data for U.S. and European companies. We look at the evidence through three complementary lenses:

first, the response of security prices and returns, which could be observed in real time as the shock hit and its effects unfolded (Section 2); second, the impact of the shock on firms' real outcomes, namely, sales, employment and growth (Section 3); third, firms' financial response both to the shock (Section 4) and to the support policies enacted by governments to counter the crisis (Section 5). In so doing, we shall highlight the interconnections between the findings gleaned through these three lenses: for instance, the response of firms' asset growth can hardly be understood without taking into account the response of capital markets and banks to the shock, as well as the support policies from which firms benefited during the pandemic.

As we shall see, a key takeaway from the evidence is that banks were able to provide liquidity to firms affected by the COVID-19 shock without themselves entering distress. This was possible partly because they had strong balance sheets at the start of the crisis and partly because very supportive fiscal and monetary policies were put in place quickly. This is a lesson for the future: the capitalization of banks and the promptness of the policy response will, for instance, determine the resilience of the economy to large and asymmetric shocks such as energy price hikes and supply shortages that threaten the most energy-dependent industries, especially in Europe. To some extent, the large liquidity cushions that firms have built into their balance sheets during the COVID-19 crisis may also make them more resilient to these subsequent shocks. However, the legacy of the COVID-19 crisis also highlights the downsides of the policy response to the shock: the abundance of credit has made small firms considerably more levered, and the very strength of the policy response has eroded both fiscal space and scope for monetary easing in response to future shocks. Therefore, enhancing the future resilience of companies will require overcoming these negative legacies of the COVID-19 crisis in the medium and long-term.

2 Firms' prospects through the lens of stock prices

Securities markets provided a timely gauge of the expected impact of the pandemic on companies, both at the aggregate and at the cross-sectional level. The impact of COVID-19 on stock returns was unprecedented: no previous pandemic, including the Spanish flu, had comparable effects on stock market performance, as documented by Baker et al. (2020), who use textual analysis of news articles to provide evidence that news about the pandemic drove stock market returns and volatility. The sharpest stock price movements occurred immediately after the breakout of the pandemic, from 24 February to 20 March 2020, which Ramelli and Wagner (2020) tellingly label the "fever period". In their study of the cross-sectional impact of the pandemic on stock prices, they point out that the first companies to underperform were those with the largest exposure to international trade, especially with China, and that firms with high leverage and low cash holdings experienced the sharpest stock price declines.[1] This evidence dovetails with that reported in Fahlenbrach et al. (2021), who find that corporate leverage and cash holdings were important in determining the cross-sectional impact of COVID-19 on U.S. firms' stock prices. They interpret low leverage and large cash holdings as capturing the benefit of having high financial flexibility at a time of extreme uncertainty.[2]

Baker et al. (2020) attribute the severity of the stock market reaction to the unprecedented restrictions on economic activity aimed at mitigating the contagion. Indeed social distancing restrictions turn out to be key in accounting for the cross-

[1] Ramelli and Wagner (2020), as well as Hassan et al. (2021)and Li et al. (2020a), gauge individual firms' exposure to the pandemic via text-based measures, using conference or earnings calls, and show that firms' stock returns are significantly and negatively related to disease exposures.

[2] These findings are also consistent with the fact that the firms downgraded to 'fallen angels' status at the outbreak of COVID-19 were extremely levered, having issued large amounts of debt to take advantage of cheap market finance in the low interest-rate QE environment preceding the crisis (Acharya et al., 2022).

sectional variation in the stock price responses to the break-out of the pandemic. Pagano et al. (2021) measure firms' vulnerability to social distancing by the fraction of workers affected by such restrictions in each industry, as measured by the "affected share" computed by Koren and Pető (2020). This measure captures to what extent a firm's operations require direct physical interaction among employees and/or between customers and employees. The resilience of an industry to social distancing restrictions is taken to be inversely proportional to its "affected share". Pagano et al. (2021) find that, during the "fever period", more resilient firms greatly outperformed low-resilience ones, after controlling for market risk and other established risk factors: less resilient firms realized a negative risk-adjusted return of approximately -7% during this period, whereas more resilient firms had a corresponding out-performance of approximately 5% (using the Fama-French 5-factor model to account for risk). Resilience to social distancing appears to be an important determinant of the stock price response to the COVID-19 shock even when controlling for firm liquidity and leverage. This evidence is consistent with Bretscher et al. (2020), who find that firms featuring greater labor-intensity and located in areas with a greater drop in mobility had worse stock performance: these were arguably firms more affected by social distancing restrictions.

In principle, there are two possible – and not mutually exclusive – reasons for the stock price underperformance of less resilient firms. First, their cash flow could be expected to be more severely hit than that of more resilient firms. Second, their discount rates may have increased more, due to an increase in their perceived risk. Pagano et al. (2021) find that the second channel played an important role: using an option-implied measure of expected returns, they document that the expected return of high-resilience stocks in excess of the expected return on the market dropped sharply (by -5.4% p.a.), and those of low-resilience stocks increased (by 4.4% p.a.).

This finding is consistent with investors perceiving less resilient firms as being more exposed to the risk of potential persistence of the pandemic than more resilient ones.

The extent to which corporate culture features concerns for environmental, social and governance (ESG) issues is another company characteristic that appears to have played a role in mitigating the impact of the COVID-19 shock on realized stock returns. Albuquerque et al. (2020) document that firms with high environmental and social ratings offered comparably high returns and low return volatility in the first quarter of 2020.[3] Their prices were supported by the trading strategies of ESG mutual funds (Albuquerque et al., 2022), which themselves performed better than other funds during the crisis (Pástor and Vorsatz, 2020). According to Albuquerque et al. (2020), these findings may be explained by customer and investor loyalty mitigating the drop in demand for the products and the stocks of these companies during the pandemic.

An alternative (or possibly complementary) explanation is that these firms, being more concerned with the welfare of their stakeholders, and especially of their employees, were more prompt and effective in reorganizing when faced by adverse shocks such as a pandemic. Indeed, Li et al. (2021) show that firms' corporate culture mitigated the impact of the pandemic on their stock returns. Their measure of corporate culture is based on Li et al. (2020a), who apply a machine learning technique (the word embedding model) to 209,480 earnings call transcripts by S&P500 companies to assess their corporate culture along five dimensions: innovation, integrity, quality, respect, and teamwork. Li et al. (2021) characterize companies that score in the top quartile of their machine-learning indicator as featuring strong corporate culture. Next, they construct a firm-level text-based measure of exposure to COVID-19

[3] An important note of warning about this finding is that currently there is a variety of ESG scores, or (as others call them) measures of corporate social responsibility (CSR), and considerable disagreement regarding their respective merits. Indeed Bae et al. (2021) question the robustness of the findings by Albuquerque et al. (2020): using a sample of 1750 U.S. firms and two major sources of CSR ratings, they find no evidence that firms that scored better on such ratings featured a better stock price performance during the initial period of the COVID-19 pandemic.

based on earnings calls, and find that the interaction between this measure and firm corporate culture enters with a positive coefficient in stock return regressions for the period from January 2019 to March 2020. They conclude that the stocks of firms with a strong corporate culture outperformed their peers during the onset of the pandemic. This finding is consistent with Howe et al. (2022), who rely on an alternative method to gauge the concern for employees in a company's corporate culture: they measure the extent to which chief executive officers (CEOs) of publicly traded U.S.-based companies from the Russell 3000 Index acknowledged human costs at the onset of the COVID-19 crisis in conversations with financial analysts, and discover that the more CEOs mentioned human costs, the better was their company's stock market performance from February to March 2020.

While all the evidence discussed so far refers to U.S. stocks, many of these findings have more general validity: Ding et al. (2021) analyze the stock returns of over 6,700 stocks from 61 economies between 2 January and 22 May 2020, and find that the drop in stock prices was milder for firms with stronger pre-crisis balance sheets (i.e., more liquid, less leveraged and more profitable), less exposure to COVID-19 through global supply chains, and more corporate social responsibility activities. They also find that stock ownership structure may have played a role, as firms controlled by families featured a better stock price performance.[4]

Hence, the overall conclusion offered by evidence on the reaction of stock prices to the COVID-19 shock is that its effect was not only sharp but also very heterogeneous across companies, as it differed along three main dimensions, namely, financial

[4]There are few studies on the effects of COVID-19 on the cross-section of corporate credit risk, with the notable exception of the cross-country analysis by Hasan et al.. Their results are consistent with the findings reported above for stock market reactions. Based on a sample of 655 firms across 27 countries, they find that spreads of credit default swaps (CDS) increase in response to the country-level weekly change in COVID-19 infection rates during 2020, and that their sensitivity to this measure of contagion is greater for firms in industries that were more exposed to COVID-19 according to the measure by Koren and Pető (2020), as well as for those that were more levered, closer to default and had worse governance and stakeholder engagement.

flexibility, resilience to social distancing, and corporate culture. The next section explores whether the COVID-19 shock had a comparably severe and heterogeneous impact on firms' real performance.

3 Firms' real performance during the pandemic

Balance sheet data for 2020 and 2021 already offer some guidance to assess the impact of the COVID-19 shock on firms' real performance, and to evaluate how it differed across industries and firm size classes. In what follows, we characterize firms' real performance based on their yearly change in net sales, employment and total assets. The change in sales and employment provide a better gauge of the direct impact of the COVID-19 shock on companies' balance sheets than profitability measures, which may also reflect fiscal support policies during the crisis. The change in total assets instead offers a first indication of the impact of the crisis on firms' investment decisions. We start by presenting evidence about listed companies, and then turn to unlisted firms, whose composition by size and industry is more representative of the aggregate economy than that of listed firms.

The following figures, which refer to U.S. and European listed companies from 2017 to 2021, draw on Compustat data, with a breakdown based on firm resilience to social distancing. In each figure, the left panel refers to U.S. companies, and the right one to those based in Europe, based on the Compustat definition of companies' nationality; both subsamples include all the firms listed as of 2017. We exclude financial firms, as well as firms reporting negative values of short and long term debt, non-positive values of total assets and of net sales, or no employment data in the relevant year.[5] Since we break down the sample based on the "affected share" score

[5]We impose this criterion for consistency with our analysis of unlisted firms, for which we break down the sample by firm size on the basis of the number of employees and thus require that

by Koren and Pető (2020), we also exclude firms belonging to industries that lack this score: this filter eliminates 0.8% of the firms in the U.S. sample, and 1.6% of those in the European sample.

In each panel, the solid line plots the time series for the median high-resilience company, and the dotted line that for the median low-resilience company. The shaded areas around each line indicate the respective 95% confidence intervals.[6] High-resilience companies are those in industries with below-median value of the "affected share" score, while low-resilience companies are those in industries with above-median scores, as in Pagano et al. (2021). In the 2017-21 period, the U.S. sample contains on average 938 high-resilience firms and 1,040 low-resilience ones, while the European sample includes 1,328 high-resilience and 1,809 low-resilience firms. Firms with a score exactly equal to the median are dropped from the sample.

Figure 1 shows that for both types of firms sales featured a marked slowdown in 2020 and a sharp rebound in 2021. Indeed, in the U.S., the median high-resilience company even experienced an increase in sales in 2020, although far smaller than in previous years. Both the 2020 drop and the 2021 rebound were stronger for low-resilience companies than for high-resilience ones, their respective median growth rates being significantly different in 2020 but no longer so in 2021.

Insert Figure 1

Figure 2 reveals that in 2020 employment also suffered more in low-resilience industries: the median low-resilience company shed labor both in the U.S. and in Europe, while the median high-resilience firm increased its workforce in the U.S. and

employment data are available. For consistency with the analysis of unlisted firms, we also exclude micro firms, namely those with less than 10 employees.

[6]Each of Figures 1, 2, 3 and 4 is generated by estimating a quantile regression of the relevant firm-level variable on year dummies respectively interacted with a high-resilience and a low-resilience dummy variable. The standard errors used to construct the 95% confidence intervals have been computed with the Huber-Sandwich method.

left it unchanged in Europe. Low-resilience firms appear to have cut employment more aggressively in the U.S. than in Europe, even though they experienced a slightly milder percentage drop in sales. Contrary to sales growth, employment growth of high-resilience companies kept outpacing that of low-resilient ones in 2021.

Insert Figure 2

Figure 3 shows the change in total assets for the median firm of each subsample. In light of the previous two figures, it is surprising that in 2020 the median listed company featured an increase in total assets in all subsamples: while assets grew significantly more in high-resilience firms, they grew in low-resilience ones too. And in 2021 the rebound of European low-resilience companies was such that their asset growth did not differ significantly from that of high-resilience ones. How could firms whose sales and employment were battered by the crisis expand their balance sheets so vigorously? As we shall see in the next section, part of the answer lies in the attempt by firms to boost their liquidity by raising external funding, an attempt largely successful due to the abundant liquidity supplied by securities markets and banks (see Section 4). Another part of the answer lies in fiscal policies that provided an unprecedented level of support to firms (see Section 5).

Insert Figure 3

One may suspect that these patterns are specific to listed companies, which tend to over-represent companies that could resort to remote work practices, as documented by Papanikolaou and Schmidt (2022). Thus, to investigate the response of unlisted companies to the crisis, Figure 4 plots data for 781,382 European firms, drawn from the Orbis balance sheet data, which are available only up to 2020. The country composition of this sample is the same as that of the Compustat sample of European firms shown in the previous figures. The left panel of the figure presents

the median change in net sales for high and low-resilience unlisted firms, while the right panel presents the median change in total assets for the two groups.

Insert Figure 4

The figure shows that in 2020 the net sales of high-resilience unlisted firms declined significantly less than for low-resilience ones, while their total assets grew significantly more, a cross-sectional pattern that is in common with listed firms. However, in 2020 the median firm in both groups featured an increase in total assets, despite a drop in sales. This increase in the growth rate of unlisted firms' assets is in sharp contrast to the slowdown observed for listed firms in Figure 3, although the drop in sales squares with the finding for European listed firms in 2020 shown in Figure 1. This difference may be a reflection of the design of public support policies, such as loan guarantee programs: these were particularly targeted towards small and medium enterprises (SMEs), which are typically unlisted. This difference in findings highlights the importance of looking at data for unlisted firms, which are often neglected in empirical corporate finance.

On the whole, the above figures suggest that the COVID-19 shock led to a reallocation of resources towards more resilient industries, both in the U.S. and in Europe: in 2020-21 high-resilience firms featured a larger increase in total assets than low-resilience firms; for European firms, this applies to listed and unlisted companies alike. Evidence for such reallocation is also provided by the global patterns of venture capital (VC) investments in the wake of the pandemic. Using transaction-level data and exploiting the staggered nature of the spread of the virus, Bellucci et al. (2022) document a shift in VC portfolios towards firms developing technologies relevant to an environment of social distancing and health pandemic concerns. Their estimates of difference-in-differences models show significant increases in the invested amount and the number of VC deals in such areas, based on a sample of deals that

occurred in 126 countries around the world from January 2018 till the end of July 2020.

Interestingly, the evidence in Figures 1, 2, 3 and 4 is consistent with the picture emerging from realized stock returns in Pagano et al. (2021): investors appear to have correctly perceived that the COVID-19 shock was largely concentrated in industries more vulnerable to social distancing, while more resilient ones even benefited from the crisis, at least in terms of their balance sheet growth.

The importance of social distancing in determining the real effects of the COVID-19 shock is also consistent with the industry and firm-level evidence by Papanikolaou and Schmidt (2022), who measure the resilience of industries to the shock with the fraction of their labor force that can work remotely, using data from the American Time Use Survey of 2017 and 2018. They document that industries where fewer workers were able to work remotely experienced larger drops in employment (based on data from the Bureau of Labor Statistics) and in expected revenue growth (based on analyst revenue forecasts for the second quarter of 2020), and featured a significant rise in the probability of default over the subsequent 2 years. These findings are corroborated by firm-level replies regarding hardship faced during the pandemic, drawn from the Small Business Pulse Survey of the Census Bureau: firms that could rely less on remote work were more likely to experience major disruptions in operations, reduce headcount and payroll, miss payments, and have insufficient liquidity.

These findings dovetail with the replies given by U.S. chief financial officers (CFOs) to a survey conducted by Barry et al. (2022) to gather information about firms' plans regarding both employment and investment decisions in response to the COVID-19 shock. According to these managers, workplace flexibility, defined as employees' ability to work remotely, plays a central role in determining firms' employment plans during the crisis. CFOs view workplace flexibility as particularly

important in facing the COVID shock, and those with high workplace flexibility expect it to matter in the future too, due to the continuation of remote work and strong employment recovery. Hence, the ability to mitigate the impact of the shock via remote work practices turns out to be the real-side counterpart of social distancing resilience in moderating the stock price response documented in Section 2.

The CFOs' replies analyzed by Barry et al. (2022) reveal that two other forms of corporate flexibility regarding business plans also played an important role in the firm-level response to the COVID-19 shock: investment flexibility, defined as firms' ability to vary capital spending based on their business prospects; and financial flexibility, defined as the availability of internal funds and access to external finance. Both of these determine the extent to which firms can re-orient their activity towards more profitable products, unaffected by the crisis.

Recalling that corporate culture also appears to have affected firms' stock price responses to the COVID-19 shock (see Section 2), it is worth asking whether this is equally matched by evidence regarding the real effects of the shock. Indeed, Li et al. (2021) document that firms with stronger corporate culture featured higher sales per employee, return on assets and profit margin in 2020. They regress these variables on their measure of COVID-19 exposure and its interaction with their corporate culture score, using a sample of 2,032 firms whose accounting data are available for at least three quarters since the onset of the pandemic and four quarters prior to it, and find that the coefficients of the interaction variables are positive, precisely estimated and economically significant.

Relatedly, Cohn et al. (2021) provide evidence that establishments that featured lower incidence of workplace injuries before the pandemic experienced fewer workplace COVID-19 infections in 2020, so that the corresponding firms suffered significantly lower declines in productivity and profitability. They consider a good work-

place injury record as a measure of these firms' organizational capital, reflecting their attention to workers' welfare, which made them readier to reorganize when faced with contagion and to contain its spread.

Corporate culture may also account for the above-average response of family firms to the pandemic. Amore et al. (2022) find that family firms featured better market performance and operating profitability than other firms during the pandemic, and that their out-performance was driven by a more efficient use of labor and a lower drop in revenues. This is consistent with other evidence showing that family firms can count on implicit contracts with their workforce that give them greater flexibility in reacting to adverse shocks (e.g., in the form of more flexible wages) in exchange for greater employment stability (see Ellul et al. (2017), Sraer and Thesmar (2007), and the survey in Pagano (2020)). It is also consistent with the finding that the stock prices of family firms dropped less than those of non-family ones in early 2020 (Ding et al., 2021), as mentioned in Section 2.

Company size is another company characteristic that might be expected to have played a role in determining the cross-sectional impact of the COVID-19 shock, for two concomitant reasons. First, small firms include a disproportionately large fraction of firms in service industries (such as retail trade, hospitality and catering) that were particularly hit by social distancing restrictions (Carletti et al. (2020) and Campello et al. (2022)), and of early-stage startups, which were typically shunned by job seekers during the crisis in favor of more established firms (Bernstein et al., 2020). Second, small companies typically face more severe funding constraints, and therefore should have been more adversely affected by the drop in cash flow caused by the pandemic.

To investigate the role of company size, we focus on unlisted rather than listed companies because their size distribution is more representative of that of the econ-

omy, while large companies are over-represented in the stock market. Figure 5, which is based on the Orbis data for European unlisted companies described above, plots the change in sales and in total assets for the median small, medium and large firm (defining small firms as those with 10 to 50 employees, medium-size firms as those with 50 to 250 employees, and large ones as those with more than 250 employees).[7] The sample includes 608,677 small companies, 139,182 medium companies and 33,523 large ones.

Insert Figure 5

The figure shows that indeed the magnitude of the 2020 drop in sales was inversely and significantly related to company size, but surprisingly the same holds true for the increase in total assets: the median small company had the sharpest drop in sales, yet recorded the largest percentage increase in total assets in the economy. This suggests that financial constraints did not play a significant role in the typical firm's investment response to the crisis.[8] As we shall see in the next two sections, this can be largely explained by the very accommodating response of funding by financial markets and banks, as well as the strong support provided by fiscal policy, which privileged SMEs.

[7]This breakdown is in line with official classification by the EU Commission. Figures 5 and 8 are generated by estimating three distinct quantile regressions of the relevant firm-level variable on year dummies respectively interacted with a small, medium or large firm dummy variable. The standard errors used to construct the 95% confidence intervals have been computed with the Huber-Sandwich method.

[8]Of course financial constraints may still have played a role in some firms' short-run response to the crisis. For instance, Begley and Weagley (2021) find that in the U.S. the financial resources of nursing homes–whose residents accounted for over one-third of all U.S. COVID-19 deaths–played an important role in mitigating the spread of COVID-19: residents were more likely to be infected by COVID-19 in nursing homes with less liquidity or experiencing more severe cash flow shocks, especially if financially constrained. Also rates of transmission between staff and residents were higher in liquidity-constrained nursing homes, possibly because these where unable to invest in building effective barriers between groups as much as unconstrained facilities.

4 Firms' financial responses to the shock

Sections 2 and 3 show that the COVID shock had profound and heterogeneous adverse effects on firms' stock prices and real outcomes. Yet, surprisingly, firms increased their asset base, and unlisted firms even increased their asset growth rate, at the same time as the pandemic hit their sales and employment, and this growth in assets was larger for small firms than for large ones. In this section, we explore whether the response of firms' financial policies helps to understand this puzzle. To do so, we start by providing evidence on companies' debt and equity raising activity after the onset of COVID-19 (Section 4.1). Then we investigate whether firms' capital raising was associated with significant changes in their capital structure, cash management and payout policies in the wake of the pandemic (Section 4.2).

4.1 Raising capital

The pandemic-induced sales shock documented in Section 3 triggered a fast and widespread dry-up in firms' cash flow. Fearing to run out of liquidity, affected firms turned to banks and capital markets to shore up their cash reserves. In this section we investigate to what extent and how they managed to do so.

4.1.1 Bank credit

Firms' first line of defense against the dry-up in cash flow was to draw down their credit lines from banks (Acharya and Steffen, 2020), and to take loans from them to increase their liquidity, with large banks providing most of the required funding (Li et al., 2020b). Acharya and Steffen (2020) report that U.S. firms withdrew $240 billion from outstanding credit lines. Banks were in a good position to face this surge in the demand for liquidity, as they entered the COVID-19 crisis with substantially better capitalized balance sheets than at the inception of the 2008–09 financial crisis.

Nevertheless, as firms massively drew down credit lines at the onset of the pandemic, they still induced a crash in banks' stock prices (Acharya et al., 2021a), and the drawdown of credit lines by large firms was so fast as to induce banks to restrict credit to SMEs, as documented by Greenwald et al. (2020) and Kapan and Minoiu (2021). Banks appear to have applied more stringent criteria to the drawdown of credit lines by SMEs than by large firms, despite SME demand (Chodorow-Reich et al., 2022). The initial drop in bank credit to SMEs was not mitigated by fintech lending to small businesses, as this largely dried out at the onset of the pandemic: Ben-David et al. (2021) document that, while the number of loan applications increased sharply early in March 2020, the supply of credit collapsed as online lenders dropped from the platform, resulting in a sharp drop in the likelihood of applicants receiving loan offers. This finding is consistent with fintech lenders becoming financially constrained and losing their ability to fund new loans.

This initial credit reduction to SMEs was however mitigated by fiscal policy interventions: both the U.S. and European governments stepped in to support bank lending via loan guarantee programs prioritizing small businesses, equity injections into firms particularly hit by the pandemic (such as airline companies), and short-term work (STW) support programs to facilitate the retention of employees. At the same time, central banks implemented measures to foster bank credit to firms, such as the Targeted longer-term refinancing operations (TLTROs) in the eurozone and the Term Funding Scheme in the United Kingdom, while prudential authorities relaxed regulatory requirements for banks. These joint fiscal, monetary and prudential policy interventions made lending to companies significantly safer and enabled banks to supply a significant amount of liquidity to them, especially to SMEs (see Section 5). This not only helps to understand why firms expanded their asset base in 2020, but also why particularly small firms did so, as shown by Figure 5.

4.1.2 Corporate bond issuance

Corporate bond issuance also contributed to firms' funding at the inception of the pandemic. As documented by Halling et al. (2020), corporate bond issues increased between March 16-20 and May 11-15, 2020. Corporate bond issuance over this period in fact exceeded that for the same time period in previous years, and also issuance in the pre-crisis weeks of 2020. These effects were particularly strong for bonds rated A or higher, but were also present to some extent for bonds rated BBB or lower. According to Acharya et al. (2021a), BBB-rated firms relied less on the primary bond market due to the risk of becoming fallen angels after the pandemic and the implied unfavorable funding conditions. These firms may also have turned to bank debt rather than bonds because of the greater ease of bank loan renegotiation during the pandemic or the better monitoring provided by banks (Halling et al., 2021b).

The resilience of the U.S. corporate bond market is also documented by (Becker and Benmelech, 2021), who show that, especially in response to Federal Reserve interventions, many firms preferred to issue bonds rather than new syndicated bank loans. A large share of bond issuance was used to either repay existing bank loans or to increase liquid assets rather than to fund investment (Darmouni and Siani, 2022). Consistent with this evidence, we shall see below that firms greatly increased their liquidity in 2020. Cheap bond funding played an important role in this increase.

4.1.3 Equity issuance

The supply of equity capital responded more slowly than that of debt. As shown by Halling et al. (2020), equity issuance slowed down in the first few weeks of the crisis, largely because of withdrawn initial public offerings (IPOs). Indeed, the capital raised during COVID-19 between March 16 and May 15 via equity issues in the U.S. only amounted to approximately 5% of capital raised via bond issues (Halling et al.,

2020).

However, after this initial slowdown, the U.S. primary market for equity featured a robust recovery, which may have contributed to the growth in companies' assets documented in Section 3. As shown in Figure 6, in the U.S. the number of IPOs rose to historically high levels in 2020 and in 2021. In the U.K. and Germany, the number of IPOs also rose slightly in 2020 relative to 2019, but IPO activity in these countries remained substantially below levels achieved in 2017 and 2018.[9]

Insert Figure 6

The steep increase in IPO activity in the U.S. is consistent with evidence by Hotchkiss et al. (2021) that some U.S. public companies, especially smaller ones, were able to raise fresh equity via stock issuance during the COVID-19 crisis.

4.2 Corporate financial policies

By and large, companies took advantage of the opportunities offered by capital markets to raise external finance, as illustrated above. In this section we investigate whether this capital raising was associated with changes in firms' capital structure and to what extent firms used the capital raised primarily to fund their real investment, build up their cash holdings or rather increase dividends and share repurchases.

4.2.1 Corporate capital structure and liquidity

The substantial amount of capital raised via credit and bond markets described above did not result in an increase in leverage for listed companies during the pandemic. This is shown in the top panel of Figure 7, which displays the median leverage ratio for U.S. and European listed firms for the same sample used in Figures 1, 2 and 3: in

[9] We are grateful to Jay Ritter for kindly providing IPO data for this figure.

2020 the median leverage declined slightly, and dropped even further in 2021, both in the U.S. and in Europe.[10] Considering that listed companies expanded their balance sheet in both years (see Figure 3), this implies that their equity capital must have increased considerably. This is striking, as one might have expected firms to emerge from the COVID-19 shock with weaker balance sheets, due to the negative effect of the crisis on their profits. Since the median company in our sample faced a drop in ROA in 2020 (by approximately 2 percentage points in the U.S. and 1 percentage point in Europe), the only possible explanations for this increase in capitalization are that the typical listed firm managed to raise more external equity than debt, and/or reduced payouts to equity holders. The lower panel of Figure 7 shows that in 2020 the median listed firm also significantly increased its liquidity, especially in the United States.

Insert Figure 7

However, this figure may not provide a representative picture of the response of firms' capital structure and cash holdings to the COVID-19 shock, since it refers to listed firms, which over-represent large companies that can easily access security markets, while the majority of unlisted firms are small and can only rely on bank credit. Indeed, it turns out that the response of unlisted firms' capital structure to the COVID-19 shock was quite different from that of listed firms, while that of their liquidity was qualitatively similar. The left panel of Figure 8 shows the leverage ratio for unlisted European firms from 2017 to 2020, dividing the sample by size classes and plotting values for the median company within each size class: in 2020 leverage rose for all size classes, in contrast with the result found for listed companies. This increase in leverage was significantly larger for small companies than for large

[10]Note that this sample includes the firms belonging to industries for which the "affected share" score by Koren and Pető (2020) is missing, which had to be dropped in Figures 1, 2 and 3.

ones. This different response may reflect the fact that, differently from publicly listed companies, unlisted firms cannot raise equity via the stock market, and therefore were less able to offset their debt issuance with external equity issuance. It is also likely to reflect the fact that most public support to unlisted firms came in the form of government-guaranteed bank loans rather than equity grants.

Insert Figure 8

A substantial fraction of the capital raised by firms in 2020 appears to have been hoarded in the form of historically high levels of cash reserves, most likely for precautionary reasons, as shown in the two bottom charts in Figure 7 for listed firms and in the right panel of Figure 8 for unlisted ones, which also shows that SMEs increased their cash reserves even more than large firms. This may either result from a stronger increase in their precautionary demand for cash, due to the greater risk aversion of their controlling shareholders, or from the fact that loan guarantee programs favored small firms, and therefore for once they could raise external funding more easily than large ones.

4.2.2 Dividend payout and share repurchase policies

An established stylized fact about corporate dividend policy is that dividends are much smoother than earnings. However, firms may forgo dividend smoothing in extreme circumstances, such as the COVID-19 disaster: in light of the unprecedented uncertainty at the onset of COVID-19, firms may have sharply reduced dividends so as to raise their capitalization and liquidity. Indeed Cejnek et al. (2021) find evidence that is consistent with this conjecture. Using prices of dividend futures with different maturities, they document that the values of near-term dividend futures prices declined dramatically in response to the COVID-19 shock and only recovered partially by the end of 2020. As a result, the fraction of the overall equity market

value due to near-term dividends dropped substantially, which indicates a breakdown of dividend smoothing. They also document that the disproportionate adverse effect of the COVID-19 shock on the value of near-term dividends is larger for firms more exposed to COVID-19 and facing regulatory measures restricting dividends.

These findings are consistent with the evidence by Pettenuzzo et al. (2022), who find that the COVID-19 shock induced U.S. firms to enact a set of strategies aimed at preserving and increasing their cash holdings, namely, suspend dividends and share repurchase programs and raise new funds through bond and equity issues. The size of the shock was such that corporate payout and capital structure responses that normally unfold gradually over time were compressed over very short periods. Their estimates suggest that between March and December 2020 U.S. firms saved a combined $86bn by suspending or reducing dividend payments and another $140bn by suspending buybacks.[11] Some of these drops in dividend payouts may also have been due to policy responses by governments and supervisory agencies: for example, certain COVID-19 funding programs were only available to firms that did not pay dividends, and both the Federal Reserve and the ECB placed limits on the ability of financial institutions to make payments to shareholders.

Pettenuzzo et al. (2022) also investigate which firms responded more with such cash-preserving policies to the shock, and find that dividend suspension policies were more likely to occur for firms with low profitability and especially low revenue growth, while they are weakly correlated with firm size, leverage and cash holdings, unlike in the financial crisis of 2008-09. Decisions to suspend buyback programs during the pandemic were also strongly correlated with drops in revenue growth.

[11] This evidence is consistent with that reported by Gormsen and Koijen (2020), who conclude that annual dividend growth dropped by 8% in the U.S. and by 14% in the European Union by July 20th, 2020. They estimate short-term expected dividend growth over a 2-year horizon to have dropped even more dramatically, and monetary and fiscal stimulus bills to have had little effect on these negative short-term dividend growth expectations.

4.3 Firms' financial responses: main takeaways

To sum up, in response to the COVID-19 shock firms were able to raise massive amounts of external funding from both banks and security markets. While for listed firms this did not result in an increase of leverage, it did for unlisted firms, and especially SMEs. Firms used much of this external finance to increase their corporate cash balances, and again this cash buildup was stronger for SMEs. The objective of cash preservation seems to have also guided dividend and share repurchase policies, leading to an unusual breakdown of dividend smoothing.

These responses by firms' financial policies were made possible by the abundant supply of funding made available by financial markets and intermediaries, which acted as a stabilizer of the real sector, unlike in the 2008-09 financial crisis. This accommodating response has several complementary explanations: the strong capitalization of banks, the realization of the temporary nature of the COVID-19 shock (owing to effective vaccination campaigns), and proactive monetary and fiscal policies that favored a recovery in asset prices and transferred credit risk to the public sector, to which we turn to next.

5 Public policies

The extreme severity of COVID-19 prompted public policy to react with an almost unprecedented speed and variety of instruments, ranging from non-conventional monetary policy to relaxation of prudential standards in banking supervision, from government grants aimed at bailing out distressed companies to public loan guarantees and STW schemes that paid a large fraction of furloughed workers' salaries.

Some policy interventions were hybrids: the Paycheck Protection Program (PPP), which was the main plank in the U.S. fiscal response to COVID-19, was a guaranteed

loan program, whereby eligible firms applied to a participating bank, which disbursed it upon approval by the Small Business Administration (SBA); but the loans were forgivable if the firm kept employment and wages at pre-pandemic levels, and therefore turned into an equity injection conditional on employees' retention, just like the payments that firms received via STW schemes.

Clearly, all of these programs contributed to some extent to provide liquidity to firms, which at least partly accounts for one of the findings of Section 4, namely the great increase of firms' cash holdings in 2020 and 2021. By the same token, they are likely to have all contributed to the decrease in the number of business bankruptcies, which dropped to an unusually low level in 2020 (Wang et al., 2021). Indeed, Gourinchas et al. (2020), who investigate the effects of public support policies on business survival and investment using SME data for several OECD countries, find that these programs were largely effective in avoiding SMEs failures. They measure each firm's liquidity shortfall during and after COVID-19, allowing for a combination of sectoral and aggregate supply, productivity, and demand shocks. According to their estimates, absent government support, SME failures would have increased by 6.15 percentage points, representing 3.15 percent of employment.

However, the various government support programs adopted in 2020 are likely to have had considerably different effects on the capital structure of firms. For instance, public loan guarantees arguably led firms to issue more debt, by encouraging banks to issue more loans and offer better conditions to firms. In contrast, both public bailouts (mostly directed to large distressed companies such as airlines) and STW schemes were equity injections that should have lowered company leverage, other things being equal, while the net effect of the PPP is unclear, due to its hybrid nature.

The effects that such a panoply of policy interventions had on companies are

obviously very hard to assess, not least because of their mutual interaction:[12] a full account of their magnitude and effects is beyond the scope of this paper. In what follows, we only focus on two similar fiscal policy programs, namely, government loan guarantees and the PPP, both of which have been extensively studied by recent research in finance.

5.1 Loan guarantees

Bank loan guarantees have been massively used as a tool to provide liquidity to firms in response to the COVID-19 shock, with many countries relying on them as the main policy response to the pandemic. This is because in economic crises public loan guarantees can be effective in mitigating the destabilizing effects of default waves, which tend to propagate across firms' interlocking balance sheets (Glode and Opp, 2021), triggering also the liquidation of viable firms and threatening to destroy valuable matches between them and employees, suppliers and customers, as well as firm-specific know-how. By transferring default risk to the government, public loan guarantees encourage banks to increase lending and avoid these inefficient outcomes. They may also be a more efficient intervention than direct government funding to firms, as they leverage on banks' superior information about firms' business prospects compared to the government (Philippon, 2020).

This bright side of loan guarantees is particularly important for SMEs, which are highly dependent on bank credit. An additional benefit is that they may support undercapitalized banks with risky and/or illiquid borrowers, and thus strengthen the

[12]For instance, in the eurozone the coordinated intervention of monetary, microprudential and macroprudential authorities amplified the effects of individual measures in supporting the provision of liquidity to firms (Altavilla et al., 2020). In turn, the ECB's Pandemic Emergency Purchase Program (PEPP) complemented the national fiscal responses to the pandemic, as the strength of the latter enhanced the positive effect of the PEPP's announcement on firms' equity and debt valuations (Demirgüç-Kunt et al., 2020).

post-pandemic recovery via a more stable banking system.

However, loan guarantee programs also have a dark side, namely, excessive forbearance of bad debt. This may have two adverse effects: (i) survival of "zombie firms", which may lead to persistently low productivity, also via entry deterrence of new productive firms, strengthened by a "diabolical sorting", whereby low-capitalization banks extend new credit or evergreen existing loans to low-productivity firms (Acharya et al., 2021b); (ii) debt overhang problems (Myers, 1997), which may weaken post-pandemic investment, as indeed was the case after the 2008-09 crisis (Kalemli-Özcan et al., 2022).

Crouzet and Tourre (2021) recognize the trade-off between the bright and the dark sides of loan guarantee programs in the context of a disaster such as the COVID-19 pandemic and, to analyze it, they develop and estimate a model to assess which of the two effects dominates empirically. They find that, if the recession is accompanied by financial market disruptions, the short-term benefits of loan guarantees in forestalling inefficient liquidations quantitatively dominate the long run overhang costs. Additionally, constraining shareholder distributions and targeting high-leverage firms increases the benefit of credit interventions.

However, public loan guarantees may not be effective in expanding credit, insofar as the banks that extend the guaranteed loans may reduce their non-guaranteed loans to the same debtors, in order to reduce their exposure towards them, as stated by Blanchard et al. (2020): "The main danger is the transfer of pre-existing exposures. A bank with an exposure to a firm could ask it to use the guaranteed debt to repay its existing loans. This would be a transfer of risk to the state." Altavilla et al. (2021) investigate the extent of such substitution of non-guaranteed with guaranteed credit using unique eurozone credit register data, matched with supervisory bank data, and find that guaranteed loans issued between March and August 2020 were partially off-

set by reductions in non-guaranteed debt. For firms borrowing from multiple banks, the substitution arose from the lending behavior of the bank extending guaranteed loans, whose drop in non-guaranteed lending was about 9 times larger than for other banks lending to the same firm. Substitution was highest for loans granted to riskier and smaller firms in sectors more affected by the pandemic, and borrowing from larger and stronger banks. However, on the whole the evidence indicates that in the eurozone public loan guarantees contributed to the continued extension of credit to relatively creditworthy firms hit by the pandemic, especially smaller ones.

5.2 The Paycheck Protection Program (PPP)

Consistently with the program's objectives, firms that obtained PPP loans tended to be small, and featured comparatively low liquidity, high leverage and few investment opportunities (Cororaton and Rosen, 2021). PPP loans alleviated the liquidity shortfall faced by SMEs due to restrictions in the use of their credit lines, even enabling them to repay non-PPP loans (Chodorow-Reich et al., 2022), and increased their expected survival by 14% to 30% (Bartik et al., 2020). Based on real-time administrative payroll data, the program raised employment at eligible firms by 2% to 4.5% through the first week of June 2020 (Autor et al., 2020). The timeliness with which firms received PPP loans was key in its effectiveness: Denes et al. (2021) exploit variation in the timing of PPP loans, due to a discontinuity in the availability of funds in April 2020, and find that firms that received loans later became more financially distressed and faced reductions in credit supply, especially if they were already financially constrained.

While the PPP is generally acknowledged to have been effective in raising employment and avoiding business failures, several studies highlight its shortcomings and wastefulness in providing relief against the pandemic shock. Granja et al. (2020)

find that its aid disproportionately flowed to areas and sectors less severely hit by the virus, and Chetty et al. (2020) highlight that the PPP failed to restore the vast majority of jobs lost after the COVID-19 shock. This is also consistent with Cole (2021), who relies on administrative data including mainly very small firms: comparing employment and wages in firms that successfully applied for PPP loans with non-applicants, she finds that the effects for these very small firms are much greater than those found for larger firms by other studies, yet PPP funds went entirely to industries least affected by the pandemic or government shutdowns, i.e., more resilient industries. The higher take-up by these less affected firms is probably due to their greater likelihood to retain their employees and thus convert PPP loans into grants. In contrast to the PPP, the loan guarantee programs adopted by eurozone countries appear to have been directed mainly to the firms most affected by the pandemic (Altavilla et al., 2021; Core and De Marco, 2020; Kozeniauskas et al., 2020).

Less is known about the impact of the program on allocation efficiency, namely, whether it induced entrepreneurs to keep running unviable firms or deter workers from seeking more productive jobs, although Barrero et al. (2020a) argue that the PPP failed in both dimensions, compared to policies that do not condition financial support to firms on employee retention, and thus do not obstruct the efficient reallocation of resources.

6 Conclusions and questions for future research

The evidence surveyed in this paper refers to the short-term impact of the pandemic. What remains to be understood is whether the pandemic will have any lasting effects on companies. In principle, this may be the case for one of two reasons (or both). First, the pandemic itself may not be over for some time to come, as new strains of the virus or similar ones may appear and force the reinstatement of social distancing

restrictions. Second, even if this is ruled out, the 2020 shock itself may have long-lasting consequences for companies, at least for those that proved less resilient during the pandemic.

Some evidence on the first point, namely the effect of companies' exposure to future pandemic risks, can come from asset prices, which are by definition forward-looking, and more specifically from estimates of the risk premium associated with this exposure. Pagano et al. (2021), who estimate option-implied measures of expected returns for S&P500 stocks, find that for most companies the risk premium associated with vulnerability to social distancing declined starting from May 2020, after rising in the early stage of the pandemic. However, some of the least resilient firms, such as airlines, hotel and cruise ship companies, still featured a sizeable risk premium as of December 2020. So, at that point in time, investors perceived those companies to be still exposed to pandemic risk.

It remains to be investigated whether the cost of capital for these industries will remain persistently higher. This may be the case even if COVID-19 is completely eradicated, since the world economy will remain exposed to the risk of novel pandemics in the future.[13] Such a persistent increase in the cost of capital can be expected to lead firms less resilient to pandemic risk to downsize or exit, or else to restructure or adopt financial policies to increase their resilience For instance, for these firms the increase in cash ratios documented in Section 4 may become a persistent feature. Indeed, Dominik Asam, CFO of Airbus, explained in 2022 that his company has increased its cash reserves to €10 billion precisely to hedge against future crises and supply chain issues, after seeing significant losses at the start of the COVID-19

[13] Jones et al. (2008) document the emergence of 335 new infectious diseases from 1940 to 2004, with a rising incidence of zoonotic diseases (due to increasing contacts between animals and humans) and increasing potential for global pandemics (due to urbanization and travel).

pandemic.[14]

It would be no less interesting to explore the second issue, namely to what extent the COVID-19 shock itself has persistently changed the productivity and profitability of the most affected industries. One channel may be the post-pandemic shortage of labor, especially in the service sector, and more specifically in the catering, hospitality, travel and health sectors, as employees reallocated themselves to jobs elsewhere or withdrew from the labor force during the pandemic. The pandemic also induced persistent changes in the nature of work and the type of positions into which firms seek to hire, for instance requiring greater flexibility from new hires (Campello et al., 2022). A related persistent change may be the increased preference of both employees and employers for remote working, at least in hybrid forms (Barrero et al., 2021; Bloom et al., 2022): this could lead to a reallocation of labor and capital towards industries that can rely more extensively on these work practices. So an issue for future research is to assess the persistence and magnitude of these effects of the pandemic and their impact on the reallocation of resources across industries and companies.

Another legacy of the COVID-19 shock may stem from the increased leverage of unlisted firms, especially SMEs (see Figure 8), which can result in debt overhang and thus slow recovery in these firms' post-pandemic investment. The problem may however not be limited to unlisted firms: even though the median listed company reduced its leverage in 2020 and 2021 (see Figure 7), many U.S. listed companies saw their indebtedness jump relative to their profitability, as documented by Blickle and Santos (2022). They interpret this as an increase in the number of companies facing debt overhang issues after the pandemic, as historically increases in the ratio of liabilities to earnings before interest, taxes, depreciation, and amortization (EBITDA) coincided with significantly lower company growth. Indeed, the firms whose indebt-

[14]See "Airbus to amass €10bn as protection against future crises", Financial Times, 21 May 2022.

edness jumped relative to earnings in 2020 experienced a significant contraction in asset growth in 2021. However, this is not necessarily a reflection of debt overhang: these are probably low-resilience firms for which it may have subsequently been optimal to shrink their assets, due to an economy-wide restructuring towards greater pandemic resilience. Thus, their lower growth may reflect efficient resource reallocation rather that debt overhang. Which of the two interpretations is correct of course matters for the assessment of the pandemic's long-run effects on companies.

A related legacy is that fragile companies that increased their leverage during the pandemic, mostly due to the generous public support that they received, are unlikely to survive new macroeconomic shocks such as those deriving from the war in Ukraine and the attendant increase in energy prices, especially considering that both monetary and fiscal policies will probably be far less accommodating in response to these shocks, due to the current increase in inflation.[15] Hence, the hardships that these companies were spared by the pandemic policy response may materialize in the post-pandemic years: the "missing bankruptcies" of 2020 may have only been postponed. While Gourinchas et al. (2021) find that policies supporting firms during the pandemic did not create a "time bomb" of potential post-COVID SMEs failures, they condition this prediction on corporate lending not contracting after the pandemic. However, to some extent bankruptcies may be efficient, insofar as they enable the most levered firms to restructure their liabilities and avoid debt overhang, or even exit if no longer viable (Brunnermeier and Krishnamurthy, 2020). So the efficiency of post-pandemic bankruptcies is also related to how much resource reallocation is required.

Finally, just as the pandemic changed workers' preferences, it may have modified investors' preferences, raising their awareness of the health risks stemming from a

[15]Evidence that during the pandemic companies may have become more dependent on government support is that corporate and sovereign credit risk (as measured by the respective default swaps) have become significantly more correlated, at least in core eurozone countries (Jappelli et al., 2022).

mismanaged environment, and thus contributing to a reorientation of their portfolios towards environmentally responsible companies. This links research on the persistent effects of COVID-19 to the growing literature on how environmental concerns are modifying both portfolio management and corporate policies.

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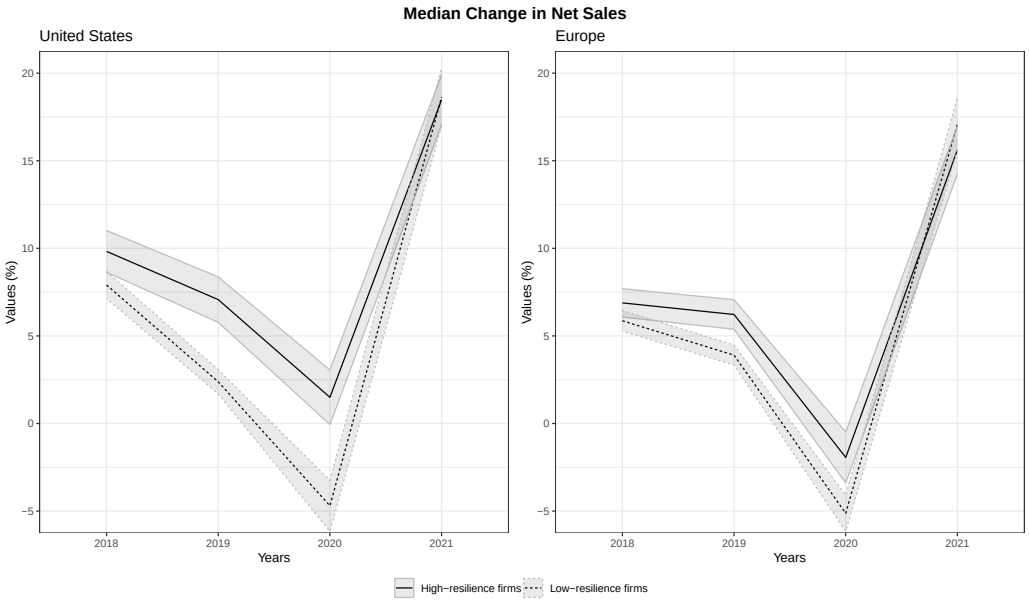

Figure 1. Change in net sales, by resilience to social distancing. The figure shows the median change in net sales for U.S. and European publicly listed companies, based on Compustat data. The results are displayed separately for companies in industries whose "affected share" (as defined by Koren and Pető, 2020) is below and above the median, respectively. The "affected share" is an inverse proxy for industries' resilience to social distancing: low values of "affected share" indicate high resilience. The shaded areas around each line indicate the respective 95% confidence intervals.

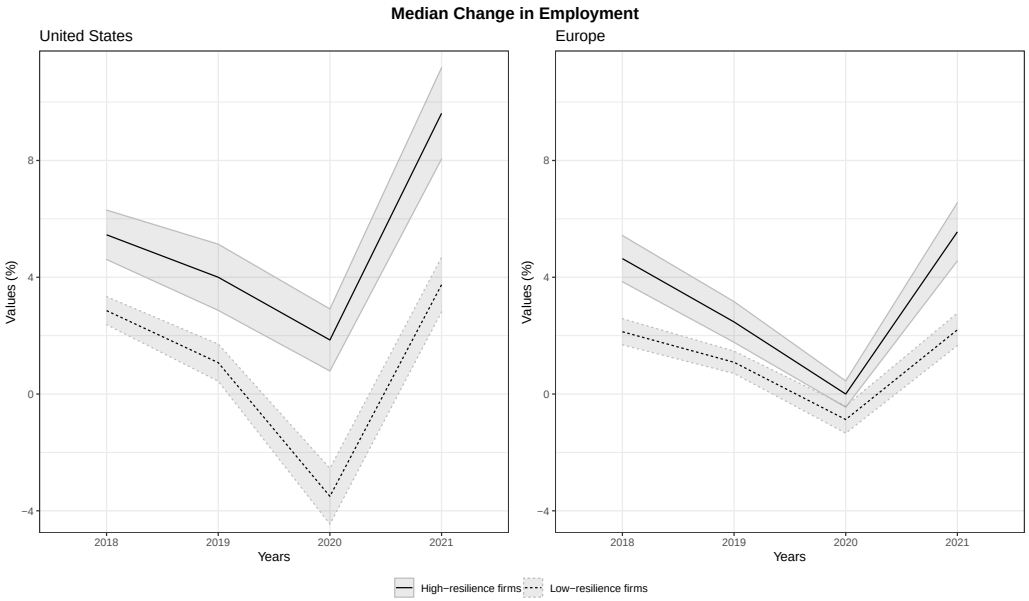

Figure 2. Change in employment, by resilience to social distancing. The figure shows the median change in the number of employees for U.S. and European publicly listed companies, based on Compustat data. The results are displayed separately for companies in industries whose "affected share" (as defined by Koren and Pető, 2020) is below and above the median, respectively. The "affected share" is an inverse proxy for industries' resilience to social distancing: low values of "affected share" indicate high resilience. The shaded areas around each line indicate the respective 95% confidence intervals.

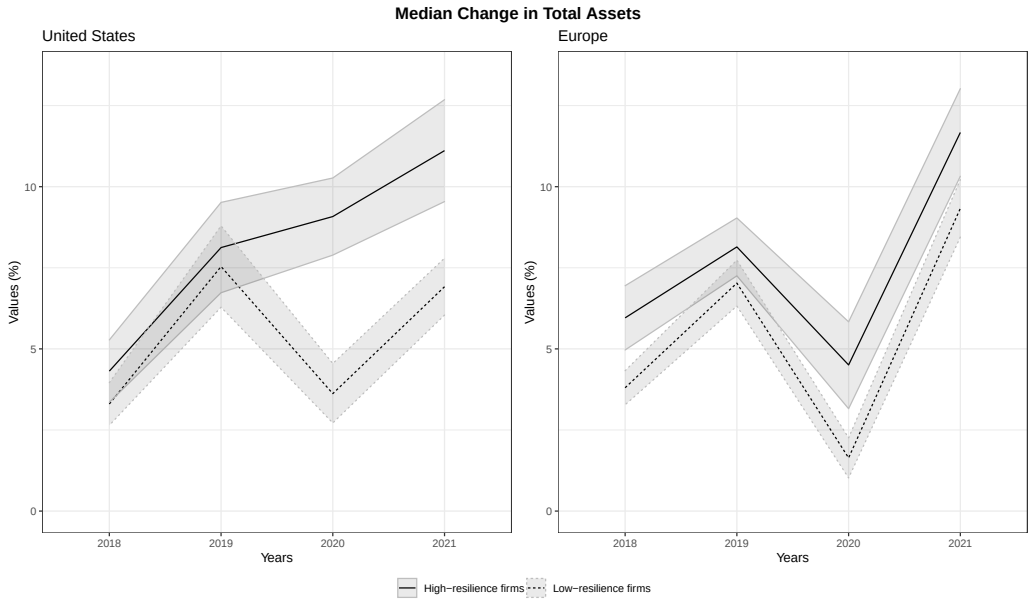

Figure 3. Change in total assets, by resilience to social distancing. The figure shows the median change in total assets for U.S. and European publicly listed companies, based on Compustat data. The results are displayed separately for companies in industries whose "affected share" (as defined by Koren and Pető, 2020) is below and above the median, respectively. The "affected share" is an inverse proxy for industries' resilience to social distancing: low values of "affected share" indicate high resilience. The shaded areas around each line indicate the respective 95% confidence intervals.

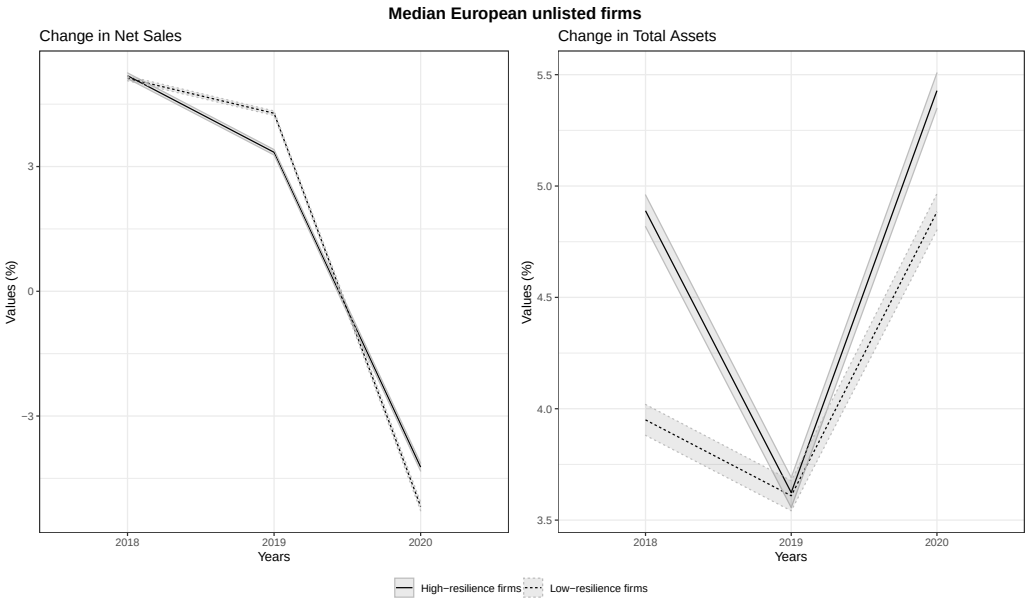

Figure 4. Change in net sales and in total assets for median European unlisted firms, by resilience to social distancing. The figure shows the median change in net sales and total assets for unlisted European firms. The results are displayed separately for firms in industries whose "affected share" (as defined by Koren and Pető, 2020) is below and above the median, respectively. The "affected share" is an inverse proxy for industries' resilience to social distancing: low values of "affected share" indicate high resilience. The shaded areas around each line indicate the respective 95% confidence intervals.

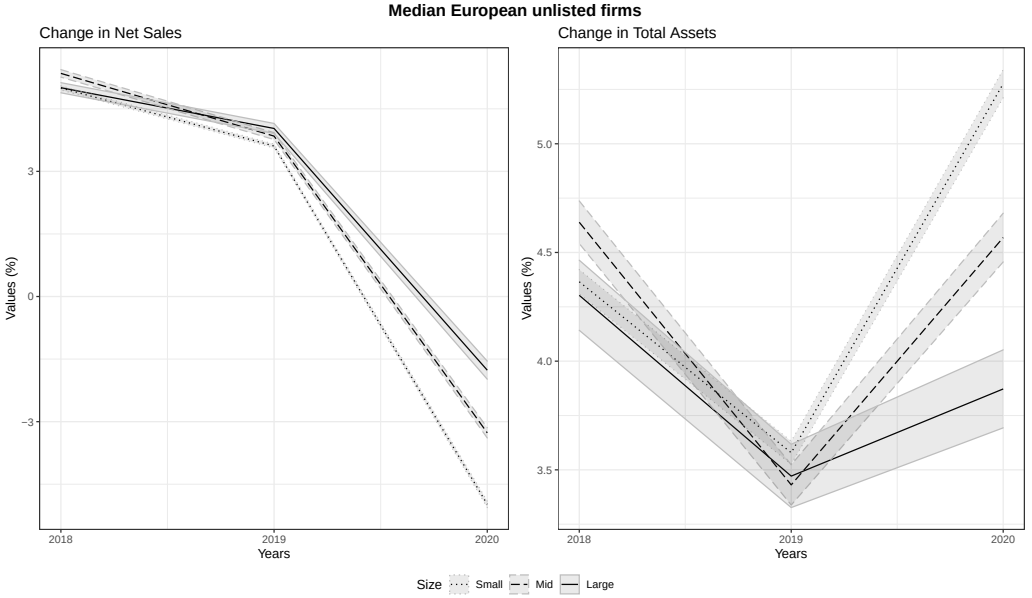

Figure 5. Change in net sales and in total assets for median European unlisted firms, by size classes. The figure shows the median change in net sales (left-hand panel) and total assets (right-hand panel) for non-listed European firms, broken down in three size classes. Size thresholds are based on the classification of the EU Commission: small firms (with 10 to 50 employees), medium-size firms (with 50 to 250 employees) and large firms (over 250 employees). The sample consists of all unlisted firms from the Orbis database for those European countries, which are also covered by the Compustat sample underlying Figures 1, 2 and 3. The shaded areas around each line indicate the respective 95% confidence intervals.

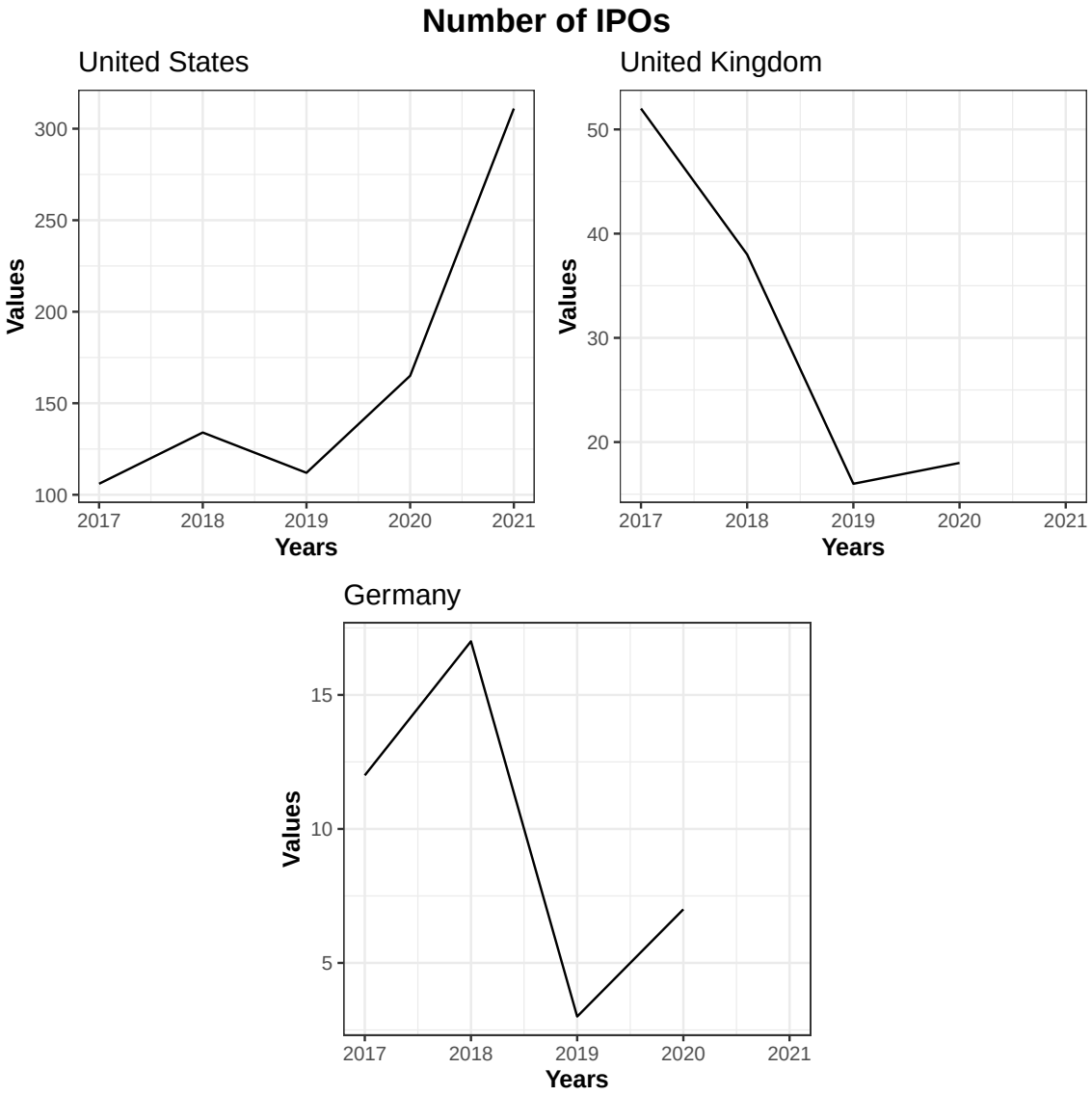

Figure 6. Number of initial public offerings in the U.S., U.K. and Germany. This figure shows the number of IPOs in the U.S., Germany, and the U.K. Source: Jay Ritter.

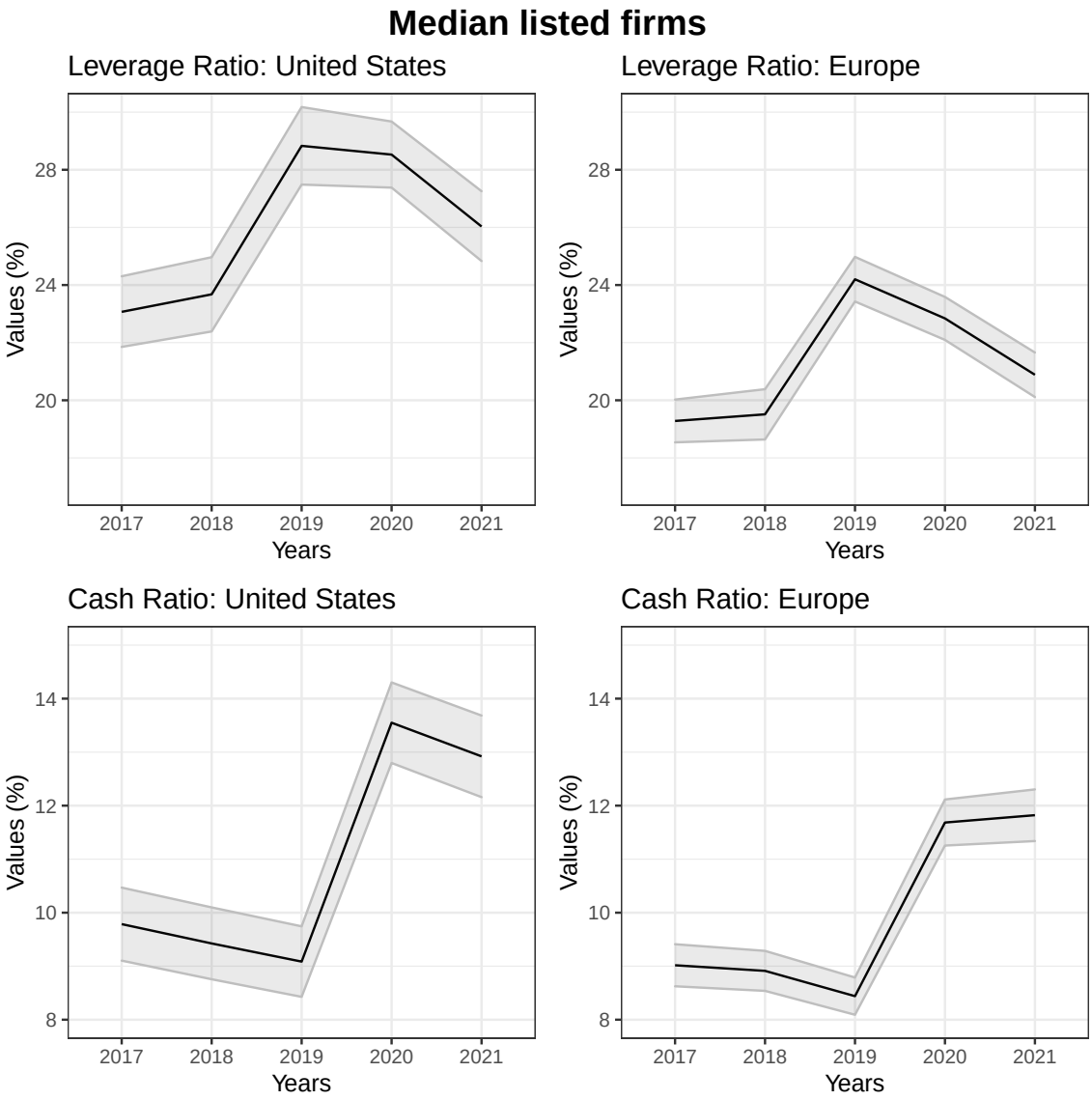

Figure 7. Median leverage and cash ratio of U.S. and European companies. This figure shows the median leverage and cash ratios of listed companies in the U.S. and in Europe, based on Compustat data. The shaded areas around each line indicate the respective 95% confidence intervals.

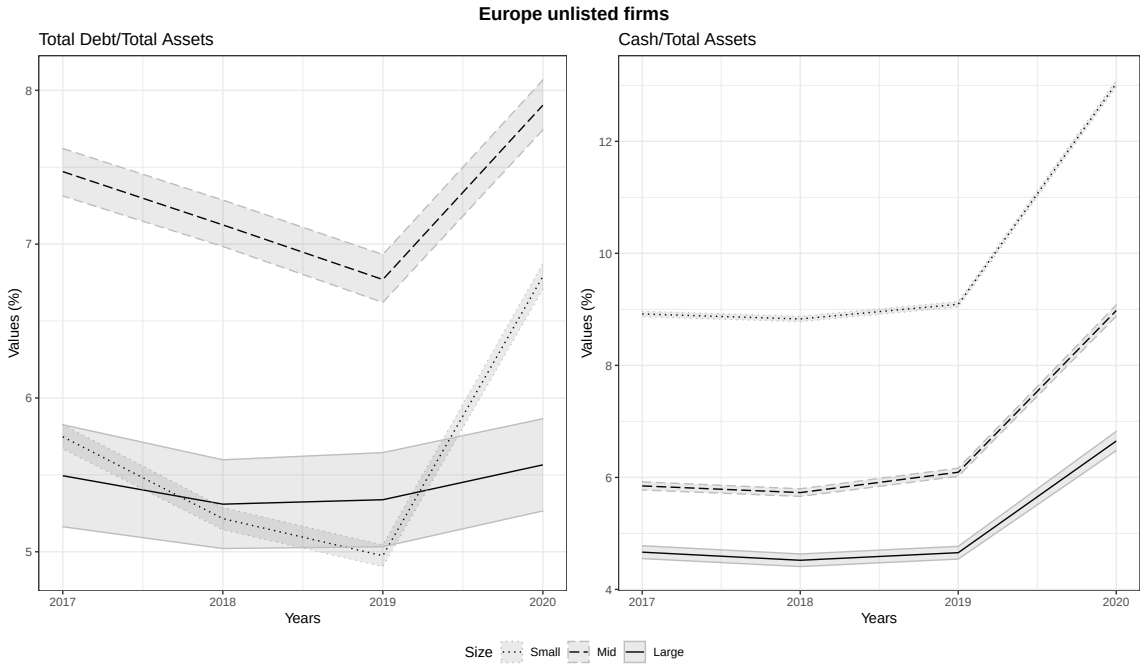

Figure 8. Leverage and cash ratio of European unlisted companies, by size classes. This figure shows the median ratio of total debt to total assets (left-hand panel) and the median ratio of cash plus cash equivalent to total assets (right-hand panel) for non-listed European firms, broken down by size class. Size thresholds are defined in accordance with the classification of the EU Commission: small firms (with 10 to 50 employees), medium-size firms (with 50 to 250 employees) and large firms (over 250 employees). The sample consists of all unlisted firms from the Orbis database for those European countries, which are also covered by the Compustat sample underlying Figures 1 and 2. The shaded areas around each line indicate the respective 95% confidence intervals.