Economic Uncertainty and the Recovery

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Abstract: Economic uncertainty jumped in reaction to the COVID-19 pandemic, with most indicators reaching their highest values on record. Alongside this rise in uncertainty has been an increase in downside tail-risk reported by firms. This uncertainty has played two roles: amplifying the drop in economic activity early in the pandemic, and slowing the subsequent recovery. In addition, uncertainty tends to reduce the impact of policy as it makes firms more cautious in responding to changes in their business conditions. As such, the incredibly high levels of uncertainty are a major impediment to a rapid recovery. We also discuss three other factors exacerbating the situation: the need for massive reallocation as COVID-19 permanently reshapes the economy, the rise in working from home which is impeding firm hiring, and the ongoing medical uncertainty over extent and duration of the pandemic. Collectively, these conditions are generating powerful headwinds against a rapid recovery from the COVID-19 recession.

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1. Introduction

Fed Chairman Jerome Powell aptly summarized the level of uncertainty in his May 21st speech, noting “We are now experiencing a whole new level of uncertainty, as questions only the virus can answer complicate the outlook”. Indeed, there is massive uncertainty about almost every aspect of the COVID-19 crisis, including the medical path of the virus, the policy response to this and the economic slowdown, and the consumer and corporate response to the pandemic.1

This paper starts by examining a few leading measures of economic uncertainty before and during the COVID-19 pandemic, building on Altig et al. (2020a). Our focus is on forward-looking uncertainty measures that are available in near real-time. We find that these measures show a massive increase in uncertainty across the board. Indicators based on Newspaper articles, forecaster disagreements and firm surveys of subjective uncertainty have all surged to all-time highs. Using our newspaper indicators we show that two components – fiscal policy and health policy uncertainty – have seen particularly large rises during the pandemic.

We also use two new large panel firm surveys, the UK Decision Maker Panel and the US Survey of Business Uncertainty to study the distributions of firm-level subjective expected outcomes. These highlight how the pandemic has induced a particularly large fear of negative tail-risk outcomes. For example, in the US survey, the typical firm reported its 10th percentile outcome – a plausible worst case scenario – before the pandemic was 0% sales growth. During the pandemic, this fell to a -15% sales decline, highlighting how firms are now concerned with the potential for extremely large contractions.

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1 On uncertainty about key parameters in epidemiological models of Covid-19 transmission and mortality, see Atkeson (2020a), Bendavid and Bhattacharya (2020), Fauci et al. (2020) and Li et al. (2020). On what key parameter values imply in standard epidemiological models and extensions that incorporate behavioral responses to the disease and various testing, social distancing, and quarantine regimes, see Anderson et al. (2020), Atkeson (2020b), Berger, Herkenhoff and Mongey (2020), Eichenbaum, Rebelo and Trabant (2020) and Stock (2020a). On the potential for vigorous antigen and antibody testing to shift the course of the pandemic, see Romer and Shah (2020) and Stock (2020b). On stock market effects, see Alfaro et al. (2020), Baker et al. (2020) and Toda (2020). On complexities arising from highly uneven supply-side disruptions caused by a major pandemic, see Guerrieri et al. (2020). On potential medium- and long-term macroeconomic consequences, see Barrero, Bloom and Davis (2020), Barro, Ursua and Weng (2020) and Jorda, Singh and Taylor (2020).
2. Measuring COVID Uncertainty

There is a wide range of measures of uncertainty\(^2\), but in this paper we focus on three broad measures that are forward-looking and available real-time or with limited delay.

**Newspaper-Based Uncertainty Measures:** Figure 1 plots the US Economic Policy Uncertainty Index of Baker, Bloom and Davis (2016). The daily version of this index reflects the frequency of newspaper articles with one or more terms about “economics,” “policy” and “uncertainty” in roughly 2,000 daily US newspapers. It is normalized such that its mean value over the period from 1985 to 2010 is 100, so values above 100 reflect higher-than-average uncertainty. This index surges to almost 600 in March 2020 before falling back to around 400 through July 2020, levels higher than anything seen in this index stretching back to 1985. The monthly US EPU index based on a balanced panel of major US newspapers displays a similar pattern and also reaches its highest values on record in March, April and May 2020. This is also clearly related to concerns over the pandemic, with over 90% of the articles about economic policy uncertainty in March 2020 mentioning “COVID,” “Coronavirus,” “pandemic” or other terms related to infectious diseases.

We have also examined the Twitter-based Economic Uncertainty (TEU) index. To construct the Twitter-based economic uncertainty index (TEU), we scraped all tweets worldwide that contain both “economic” and “uncertainty” (including variants of each term) from 1 January 2010, which yielded about 180,000 tweets.\(^3\) We then computed the weekly frequency of tweets concerning Economic Uncertainty, which is also shown in Figure 1. This also spiked to all-time high levels during the COVID pandemic (interestingly the TWU also has a notable spike in June 2016 after the Brexit vote).

In summary, both text measures suggest levels of uncertainty surged to around four to six times their normal levels during the pandemic, and both record their highest levels since their series began.

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\(^2\) See, for example, the various measures in Fernandez-Villaverde et al. (2011), Jurado, Ludvigson and Ng (2015), Scotti (2016), Dew-Becker, Giglio and Rodriguez (2017), Bachman et al. (2018), Caldara and Iacoviello (2018), and the broad reviews in Cascaldi-Garcia (2020) and Rogers and Xu (2019).

\(^3\) See Baker, Bloom, Davis and Renault (2020) for details, and the data on [http://www.policyuncertainty.com/twitter_uncert.html](http://www.policyuncertainty.com/twitter_uncert.html)
In Figure 2 we analyze the underlying categories propelling the overall economic policy uncertainty (EPU) index during the pandemic. In particular, we focus on four key categories – fiscal policy, monetary policy, health policy and trade policy. To generate these category indices we count newspaper articles that mention our core EPU index terms plus specific category terms. For example, to be in the health-policy series the article has to include the standard EPU terms plus any of “health care” or “Medicaid” or “Medicare” or “health insurance” or “prescription drugs” etc, while to be in the “Fiscal Policy” category the article has to again be in the standard EPU terms and mention one of “government spending” or “federal budget” or “budget battle” or “balanced budget” etc.4

As we can see the pandemic surge in policy uncertainty has been driven in particular by fiscal policy and health policy. This is not surprising – the CARES act and other fiscal stimulus packages have received considerable attention in the media, as has the impact of COVID-19 on the health system. More interestingly, monetary policy uncertainty has risen but not nearly as dramatically, suggesting this has contributed relatively less to overall uncertainty. This is notable given this spanned a period of extraordinary stress in financial markets, including the turmoil in the Treasury market in February and March. Our interpretation of the relative low Monetary Policy uncertainty index is this reflects the rapid action of the Fed to maintain liquidity in financial markets and stave of the crisis. Finally, we also include the trade-policy uncertainty index in Figure 1 given its role in recent rises in the EPU index during 2018 and 2019. But we note in 2020 this has not played any role (to date) in driving overall economic policy uncertainty.

Forecaster Disagreement: There is a long history of using forecaster disagreement measures to proxy for uncertainty, and also a long history of disagreement about their suitability for that purpose. Our view is that at least for real variables like GDP growth, high levels of disagreement are reasonable proxies for high levels of economic uncertainty. To quantify disagreement, we calculate the standard-deviation of one year ahead GDP growth rate forecasts for the US and UK from the Survey of Professional Forecasters (SPF) and the Survey of External Forecasters (SEF) respectively. There are, on average, 41 forecasters per survey response period in the US and 23 in the UK.

4 The full list of category terms is here: http://www.policyuncertainty.com/categorical_terms.html
The COVID-19 pandemic triggered historically high levels of disagreement in the growth rate forecasts. US disagreement rose from a standard deviation 0.32 percentage points in 2020Q1 to 2.74 in 2020Q2, a rise of nearly 8-fold. UK forecast disagreement rose from 0.49 percentage points to 10.1, an astounding 20-fold increase.

**Subjective Uncertainty Measures Computed from Business Expectation Surveys:** Figure 3 contains subjective sales uncertainty measures from the US Survey of Business Uncertainty (SBU) and the UK monthly Decision Maker Panel (DMP). These panel surveys recruit participants by phone from population databases that cover nearly all public and private companies with employees (about 7 million in the US and about 1 million in the UK). The SBU has around 400 respondents per month, and the DMP has around 3,000. Core survey questions elicit five-point probability distributions (mass points and associated probabilities) over each firm’s own future sales growth rates at a one-year look-ahead horizon (see Appendix Figure A1 for the sales questions.). By calculating each firm’s subjective standard deviation over its own future growth rate forecast in a given month, and aggregating over firms in that month, we obtain an aggregate measure of subjective uncertainty about future sales growth rates.

Figure 3 plots these survey-based time-series measures of sales growth rate uncertainty for the United States and the United Kingdom. These measures show pronounced increases in uncertainty in March 2020 and April 2020, before falling back slightly after May 2020. Pandemic uncertainty is clearly well above any previous peaks in their (short) histories. As described in detail in Altig et al (2020b) these firm-level growth expectations are highly predictive of realized growth rates, and firm-level subjective uncertainty predicts the magnitudes of future forecast errors and future forecast revisions.

Figure 4 plots the percentiles from the distributions of expected sales pooled across all respondents in the US Survey of Business Uncertainty and the UK Decision Maker Panel. For each firm we use its five bin mass points and probabilities to calculate a probability distribution for its four-quarter ahead expected sales growth. We then take the employment weighted average across all firms probability distribution to generate a representative firm sales growth expectation distribution. From this we plot the 10th, 25th, 50th, 75th and 90th percentiles of these expectations.6

6 See Bloom, Bunn, Mizen, Smietanka and Thwaites (2020) for more details on these calculations.
We can clearly see that the COVID-19 pandemic has had three effects. First, the mean (first moment) of expected sales growth has fallen, as indicated by the fall in the median (50th percentile) of firms forecasts. Second, the uncertainty (second moment) of expected sales growth rose, demonstrated by the widening gap between the higher (e.g. 90th) and lower (e.g. 10th) percentiles (and as we saw in Figure 3). Third, the tail-risk (skewness) of expected sales growth dropped, as highlighted by the far greater drop in the lower 10th percentile. Indeed, before the pandemic growth expectations were positively skewed, while during the pandemic they have become negatively skewed. This highlights the tail-risk that has accompanied the pandemic recession – large numbers of firms have extremely negative worst-case outcome forecasts. In this case, if we take the 10th percentile outcome as a plausible estimate of firms’ “worst case” scenario, this had dropped for the typical firm from 0% growth in the US and -5% in the UK pre-pandemic to -15% in the US and -20% in the UK during the pandemic.7 These are extremely large movements in the left-tail worst-case outcomes, reflecting the surge in tail-risk perceived by firms.

A long-literature on tail-risk and skewness suggests these risks can also be extremely damaging to firm-level investment and hiring, as firms are typically not (fully) insured against these events.8 As such, the impact of the pandemic could be more damaging than implied by traditional measures of uncertainty due to the added impact of the large increase in left-tail risk.

Figure 6 plots the VIX, the 1-month implied volatility on the S&P500, and a common financial measure of uncertainty.9 This spiked to almost 70 on a weekly basis in March 2020 (reaching an all-time daily closing high of 82.7 on March 16th). But the VIX fell back rapidly as the stock-market started to recover in late March, and by July 2020 was about 25, close to its pre-pandemic levels of around 15. In contrast, real measures of uncertainty like US or UK firm subjective uncertainty or the economic policy uncertainty index have remained substantially elevated through July 2020. Firms continue to see incredibly high levels of uncertainty over the progress of the virus, policies to respond to this, and the impact on the economy. Similarly, the persistently high EPU index reflects the extensive ongoing discussion of economic uncertainty in

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7 The UK forecasts are more pessimistic potentially because of the added tail-risk due to the ongoing Brexit process.
8 See for example, Reitz (1988) and Barro (2006) for early work on macro skewness and Salgado, Guvenen and Bloom (2020) for a survey of more recent work on macro and micro-skewness.
9 See, for example, Bloom (2009) or Leduc and Liu (2020).
the media. The drop in the VIX highlights the “Wall Street” vs “Main Street” divergence in the second moment (uncertainty) that shadows the similar divergence in the first moment (the resurgent stock-market vs the depressed real economy). As such while the VIX has classically been a popular measure of uncertainty, that many (ourselves included) have used in prior research, during the pandemic it appears to be a less suitable indicator for contemporaneous uncertainty in the real “main-street” economy.  

3. The Impact of Uncertainty

There are three primary channels through which uncertainty could delay the recovery – the impact through risk-aversion to raise discount rates, the impact through real-options to reduce investment, hiring and consumption, and the impact of real-options to make firms and consumers less responsive to stimulus policy. These highlight both the damaging effect of uncertainty on the recovery, but also the potential benefits of reducing macro and micro uncertainty though stable and predictable policy.

Risk Aversion and Risk Premia

Economists since Keynes and Tobin have long pointed out how investors need to be compensated for higher risk. Hence, the COVID induced surge in uncertainty will increase risk premia, raising the cost of finance (see also Landier and Thesmar 2020). Furthermore, uncertainty also increases the probability of default, by expanding the size of the left-tail default outcomes, raising the aggregate deadweight cost of bankruptcy. This role of uncertainty in raising borrowing costs has repeatedly been shown to reduce micro and macro growth, as emphasized in papers on the impact of uncertainty in the presence of financial constraints (e.g. Christiano, Motto and Rostagno, 2009; Gilchrist, Sims and Zakrasjek, 2010 and Arellano, Bai and Kehoe, 2019).

Another precautionary effect of uncertainty may impact firms through the incentives of their chief executive officers. Most top corporate executives are not well-diversified: both their personal financial assets and their human capital are disproportionately tied up in their firm.

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10 One possible reason is the S&P500 is becoming increasingly concentrated on hi-tech firms, which is now approaching 30% of its valuation, which has been performing well during the pandemic. Another possible reason is the S&P500 is more long-run focused, pricing in an eventual recovery (see, for example, Abel and Eberly’s (2012) discussion of the impact of long-horizon news on current stock valuations).
Indeed, Panousi and Pananikolaou (2012) show in a panel of US firms that when uncertainty is higher investment drops, particularly in firms where the chief executive officers hold extensive equity in the firm and so are highly exposed to firm-level risk. This effect will be particularly pronounced due to the large increase in negative tail risk under COVID-19.

**The Delay Effect of Real Options**

A second body of literature on uncertainty focuses on “real options” (e.g. Bernanke 1983; Brennan and Schwartz 1985; McDonald and Siegel 1986, Abel and Eberly 1994, and Dixit and Pindyck 1994). The idea is that firms can look at their investment choices as a series of options: for example, a restaurant chain that owns an empty plot of land has the option to build a new store on the plot. If the restaurant becomes uncertain about the future – for example, because it is unsure to what extent consumers will return to inside dining vs home-delivery – it may prefer to wait. If post-pandemic consumers do return to inside dining the restaurant chain can develop the site with high internal dining capacity. If instead consumer preferences continue to favor home-delivery (and take-out), it can develop the restaurant with less internal space but better vehicle access. In the language of real options, the option-value of delay for the restaurant chain is high when uncertainty is high. As a result, uncertainty makes firms cautious about actions like investment and hiring, which adjustment costs can make expensive to reverse.

Investment adjustment costs have both a physical element (equipment may get damaged in installation and removal) and a financial element (the used-good discount on resale). However, real-options effects are not universal. They arise only when decisions cannot be easily reversed; after all, reversible actions do not lead to the loss of an option. Thus, firms may be happy to hire part-time employees even when uncertainty is extremely high, because if conditions deteriorate they can easily lay-off these employees. As such the extremely high levels of pandemic uncertainty may lead to a rise in the share of part-time hiring.

Real-options effects can be exacerbated in the presence of financial constraints because firms also have an incentive to hoard cash (Gilchrist, Sims and Zakrasjek, 2010, Alfaro, Bloom and Lin 2018). These “cash-options” can amplify the impact of real options, highlighting the importance of continuing to maintain the stability of the financial system through-out the pandemic crisis. Price stickiness can also augment the impact of uncertainty shocks since firms are unable to
rapidly adjust prices to changing conditions (e.g. Fernandez-Villaverde et al. 2015 and Basu and Bundick 2017), highlighting the importance of also maintaining stable inflation.

Turning from investment to consumption, there is an analogous channel for uncertainty to cause postponed consumption (e.g. Romer 1990 and Eberly 1994). When consumers are making decisions on buying durables like housing, cars, and furniture, they can usually delay purchases relatively easily. For example, people may be thinking about moving to another house, but they could either move this year or wait until next year. This option value of waiting will be much more valuable when income uncertainty is higher – if, for example, you are unsure about whether you will keep you job until the end of this year it makes sense to wait until this is decided before undertaking an expensive house move. Delaying purchases of non-durable goods like food and entertainment is harder, so the real-options effects of uncertainty on non-durable consumption will be lower.

So overall, this literature suggests that the real-options impact of COVID-19 uncertainty will strongly reduce investment, hiring and durable consumption by US firms and consumers. Indeed, one estimate of this for investment is shown in Figure 6 from Baker, Bloom and Terry (2020) plotting empirical and model based estimates of the uncertainty impact of the COVID shock on US GDP. The impact is large at between 2% to 4% of GDP, although it is clearly not the primary driver of the 10.8% cumulative drop in US GDP to date versus 2019Q4.

**The cautionary effect of real options**

The real-options impact of uncertainty also has an additional channel which could delay the recovery by blunting the impact of stimulus policy. Uncertainty makes economic actors – firms and consumers - less sensitive to changes in business conditions, including monetary and fiscal stimulus. This occurs because these agents become more cautious, so they respond less strongly to any given change in demand or prices. For example, while the investment elasticity with respect to interest rates might be 0.5 in low uncertainty times it could fall to 0.25 in high uncertainty times. This has been shown for both firms (e.g. Guiso and Parigi 1999 and Bloom, Bond and

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11 In formal economic models this is discussed in terms of widening S-s bands. A lower density of consumers or firms is near their adjustment bands when uncertainty is high (particularly if uncertainty has recently increased) because this expands the Ss bands. This then reduces the response to any stimulus that may move those bands.
Van Reenen 2007) and consumers (e.g. Foote, Hurst and Leahy 2000 and Bertola, Guiso and Pistaferri 2005).

As such, this suggests the response to any given policy response is likely to be lower because of high COVID-19 uncertainty. This also highlight the benefits of policies that can reduce uncertainty – for example, by reducing systemic financial risks or providing transparent long-run policy guidance.

4. Other factors delaying the recovery

In closing we want to highlight three other factors we have been examining that are likely to further complicate the recovery.

Reallocations: The pandemic has exacted a staggering economic toll on the US and countries around the world. Yet, even as much of the economy shut down, many firms expanded in response to pandemic-induced demand shifts. As Bender and Dalton (2020) put it in the Wall Street Journal, “The coronavirus pandemic is forcing the fastest reallocation of labor since World War II, with companies and governments mobilizing an army of idle workers into new activities that are urgently needed.” That is, COVID-19 is a major reallocation shock.

This heterogeneous impact is illustrated in Figure 7 showing the distribution of responses from a survey of 2,380 US firms in April 2020 to a question about the expected impact of the pandemic on their next 3 months and 12 months sales.12 The mean impacts are strongly negative (-30% for 3 months and -13% for 12 months), with 13% of reporting a 100% sales drop in their 3-month predictions due to their business closures. But there is also 15% of firms reporting positive 3-month sales change expectations and 22% reporting positive 12-month sales changes expectations. This heterogeneity of outcomes holds across industries – hi-tech is seeing surging demand while accommodation, travel and entertainment are seeing large declines. And it also holds within industries – for example, commercial vs private flights (commercial flights were down 65% in July 2020 while private flights were only 16% down13) or eat-in vs home delivery restaurant meals.

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12 See Bloom, Fletcher and Yeh (2020) for full survey details.
Figure 8 plots one overall measure of the degree of reallocation from Barrero, Bloom and Davis (2020), which is the expected absolute gross-change in sales across all firms less the net total change.\textsuperscript{14} This statistic is the forward-looking analog to the backward-looking measures of excess job reallocation examined in Dunne, Roberts and Samuelson (1989), Davis and Haltiwanger (1992), and many later studies. It calculates how much sales levels have changed across firms less the change needed for the overall expansion/contraction. This graph shows that expected sales reallocation jumped an incredible 600\% after the pandemic.

This massive movement of sales, and thus capital and labor, across firms and industries will likely compound the challenges induced by high uncertainty. Firms are not only facing massive macro uncertainty, policy and medical uncertainty, but also challenges over making adjustments to permanent shifts in industrial structures, many of which are hard to predict given the uncertainty over the course of the virus and its impact on consumer preferences.

**Working from home:** A second compounding shift is the enormous increase in employees working from home. Data from the 2018 Bureau of Labor Statistics American Time Use Survey\textsuperscript{15} reveals that before COVID around 5\% of working days were spent by US employees at home. The majority of this was by employees taking occasional days to work from home, with only 2\% from employees who were full-time home based workers. Figure 9, left-panel, highlights how this has radically changed under COVID. This reports the results from two 2500 person surveys over May-July 2020 on individuals aged 20-64 in the US that earned over $20,000 in 2019 (so would be likely to have been employed in 2020 if not for the pandemic). We see that 42\% of employees now report working from home, with these almost entirely working full-time at home. This has important implications for hiring since employees and firms in interviews we carried out mention the challenges with onboarding and training new employees remotely. This is also shown in the right-panel of Figure 9 where we see that 46\% of employees report that working from home has made it “substantially harder” to hire new employees at their firm. In discussions with firms and employees the issues that are raised revolve around the

\textsuperscript{14} Formally this is defined as follows, noting that $E_{t+12}g_{i,t+12}$ is the t-period expected growth of employment in firm i until period t+12.

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E_tX_{t+12} \text{jobs} = \sum_{i \in S_t} \left( \frac{Z_{it}}{Z_t} \right) \left| E_t g_{i,t+12} \right| + \sum_{i \notin S_t} \left( \frac{Z_{it}}{Z_t} \right) \right| E_t g_{i,t+12} \left| - \sum_{i} \left( \frac{Z_{it}}{Z_t} \right) E_t g_{i,t+12} \right|
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\textsuperscript{15} See https://www.bls.gov/news.release/flex2.t01.htm.
problems of training new hires and getting them adjusted to their firm’s culture. For example, one respondent, a home-based new hire, reported struggling to learn even basic behavior, such as the typical start and end time for her team, and the length of coffee and lunch breaks, citing her inability to observe colleagues in person.

Ongoing medical uncertainty: Finally, the COVID-19 pandemic contains an additional element of uncertainty which goes beyond our experience in examining prior uncertainty shocks, which is the non-economic medical side. This is extremely wide-ranging, from when a vaccine will discovered, when this will be widely available, how effective it will be to who will even take the vaccine given pockets of anti-vax sentiment.16

As Fed Chairman Jerome Powell noted on July 28th 2020 “the path forward for the economy is extraordinarily uncertain and will depend in large part on our success in containing the virus”. Figure 10 provides one measure of this, which is the frequency of discussions of the word “uncertainty” in the context of infectious diseases in the Economic Intelligence Unit (EIU) quarterly country reports. The EIU provides quarterly reports for over 140 countries on a monthly basis, which are constructed and edited in a harmonized way, which provides a text source for creating country and global uncertainty indices. Ahir, Bloom and Furceri (2019) take this data and search for the overall frequency of the word “uncertainty” in the context of infectious disease terms, and average this across all countries, to construct the World Pandemic Uncertainty Index plotted quarterly in Figure 10. This index reached its highest level in 2020Q2, surpassing its prior-peak in 2020Q1, reflecting the extreme ongoing uncertainty. Until this medical uncertainty abates it is hard for the broader policy and economic uncertainty to recede, highlighting the uncertainty over even the duration of the current pandemic.

5. Conclusions

Economic uncertainty jumped in reaction to the COVID-19 pandemic, with most indicators reaching their highest values on record. Using newspaper indicators of uncertainty we find that

16 See, for example, the discussion over the potential lack of uptake of a new vaccine due to anti-vaccine sentiment, which could prevent vaccination rates reaching the levels necessary to eliminate the virus
https://www.ft.com/content/89b90830-b301-4712-9655-49a1b5d94e4e
two components – fiscal policy and health policy uncertainty – have seen particularly large rises during the pandemic.

Alongside this rise in uncertainty has been an increase in downside tail-risk reported by firms. In pre-pandemic times the 10th percentile of US firms’ subjective forecasts was for flat sales growth while during the pandemic this has dropped to -15%, highlighting how firms are concerned over the potential for extremely large contractions.

This high uncertainty will have increased the risk premium for investing and increased the value of “real options” to wait, leading firms to delay investing and hiring. This will have increased the size of the initial pandemic drop and also slowed the rate of recovery. In addition, uncertainty tends to reduce the impact of policy as it makes firms more cautious in responding to changes in their business conditions. As such, the incredibly high levels of uncertainty are a major impediment to a rapid recovery.

We concluded by focusing on three other factors exacerbating the situation. First, the need for massive reallocation as COVID permanently reshapes the economy, which is forcing huge increases in cross-firm and industry movements of capital and labor, making the general environment yet more volatile and uncertain. Second, the rise in working from home, which survey evidence suggests is impeding firm hiring due to the difficulties in onboarding and training new employees fully remotely. Finally, the uncertainty over the medical extent, severity and duration of the pandemic are creating enduring uncertainty over the economic and political impact of the pandemic and even its duration. Collectively, these conditions are generating additional headwinds in the ability to enact a rapid recovery from the COVID-19 recession.
References
Abel, Andrew and Janice Eberly,


Figure 1: Newspaper and Twitter text uncertainty measures hit all-time highs during the pandemic

Notes: Weekly values for Economic Policy Uncertainty (EPU) index categories from www.policyuncertainty.com. See Baker, Bloom and Davis (2016) for details of EPU index construction. We plot data from 1 January 2011 to 30 July, with categories showing large rises in 2020 or 2019 plotted. Note that the average of the four plotted categories from 1985-2019 is as follows: Fiscal Policy=45.7, Health=17.7, Monetary Policy=27.1, and Trade Policy=5.7. This highlights how the rise in health policy in 2020 and trade policy in 2019 are particularly striking given their otherwise relatively low level.
Figure 3: Firm subjective sales uncertainty doubled during the pandemic, and has remained high.

Figure 4: The pandemic generated extensive downside tail-risk for firms

Notes: Each graph displays quantiles of the aggregate distribution of firm’s distributional expectations of future sales growth, looking ahead at a four-quarter horizon. In each month, we aggregate individual firms’ five-point subjective distributions by weighting a given firm’s five support points by their probabilities and then weigh the support points for each firm by its employment. US data are from the Survey of Business Uncertainty conducted by the Federal Reserve Bank of Atlanta, Stanford University, and the University of Chicago Booth School of Business (https://www.frbatlanta.org/sbu) (see Altig et al. 2020). UK data from the Decision Maker Panel Survey conducted by the Bank of England, Nottingham University and Stanford University (see Bloom et al. (2019) and www.decisionmakerpanel.com).
Figure 5: “Wall Street” financial uncertainty has fallen more than “Main Street” output uncertainty.

Notes: The VIX (Source: CBOE via Yahoo! Finance) and EPU (Source: [www.policyuncertainty.com](https://www.policyuncertainty.com)) series are simple averages of daily values in each week. The UK Sales Uncertainty data comes from the Decision Maker Panel survey conducted by the Bank of England, Nottingham University and Stanford University. Because of the large sample of almost 3000 firms per month this has been broken down into a weekly survey based on reporting periods. See Bloom et al. (2019) and [www.decisionmakerpanel.com](https://www.decisionmakerpanel.com) for details. The US Sales Uncertainty data comes from the Survey of Business Uncertainty conducted by the Federal Reserve Bank of Atlanta, Stanford University, and the University of Chicago Booth School of Business ([https://www.frbatlanta.org/sbu](https://www.frbatlanta.org/sbu)). This has been plotted monthly as the smaller sample does not permit an accurate weekly survey. For plotting, we re-scale the EPU and UK and US Sales Uncertainty indices to have the same mean pre-pandemic (i.e. in weeks 1 to 7) and the same peak as the VIX.
Figure 6: Estimates suggest the pandemic uncertainty reduced GDP by around 2% to 4%

Notes: Source: Baker, Bloom and Terry (2020). The “Data Estimation” figure shows the response of GDP growth to a COVID-19 calibrated innovation in uncertainty. The parameters are estimated from a disaster instrumental variable VAR estimation. The estimation sample is a panel of about 4,400 nation-quarters spanning around 40 nations from 1987Q1-2017Q3. GDP growth in period t is the percentage growth from quarter t-4 to t. The estimated VAR includes time + country effects, country dummies, 3 lags, with GDP growth, stock returns, and the stock return uncertainty index. The instruments include natural disasters, coups, revolutions, & terrorist attacks. 90% empirical block bootstrapped bands plotted. The “simulation model” estimates the impact of a pandemic calibrated uncertainty shock in a general equilibrium model of firms with capital and labor adjustment costs model calibrated to US data.
Figure 7: The Pandemic has a heterogeneous impact on firms

Notes: Source Stanford-Stripe survey of 2,380 smaller US firms using the Stripe.com payments system (see Bloom, Fletcher and Yeh 2020). These are almost entirely privately held smaller firms, with a mean of 9 employees and $350,000 annual sales, spread across the US and all industrial groups. The figure plots the histogram of the responses to two questions: "By what percentage will COVID-19 impact your firms in the next three months" on the left and "By what percentage will COVID-19 impact your firms in the next twelve months" on the right.
Figure 8: The Pandemic is inducing a large increase in cross firm and industry reallocation.

Notes: Source Barrero, Bloom and Davis (2020). The expected excess reallocation rate for sales revenue measures the rate at which sales revenue will move from one firm to another over the next four quarters, after accounting for aggregate sales revenue growth. This is computed as the activity-weighted average of the absolute (gross) value of individual firms’ expected sales revenue growth, less the absolute value of the activity-weighted average sales revenue growth. The underlying data are from the Survey of Business Uncertainty conducted by the Federal Reserve Bank of Atlanta, Stanford University, and the University of Chicago Booth School of Business. [https://www.frbatlanta.org/sbu](https://www.frbatlanta.org/sbu).
Figure 9: The large increase in working from home is making it harder to hire

Work status in June 2020

<table>
<thead>
<tr>
<th>Work status</th>
<th>Percent of respondents by work situation, May 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working from home</td>
<td>41.9</td>
</tr>
<tr>
<td>Not working</td>
<td>32.6</td>
</tr>
<tr>
<td>Working on business premises</td>
<td>25.6</td>
</tr>
</tbody>
</table>

Impact of Working from Home on Hiring

<table>
<thead>
<tr>
<th>Impact of Working from Home</th>
<th>Percent of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>More difficult</td>
<td>45.8</td>
</tr>
<tr>
<td>Little or no impact</td>
<td>41.6</td>
</tr>
<tr>
<td>Less difficult</td>
<td>12.6</td>
</tr>
</tbody>
</table>

Notes: Source Barrero, Bloom and Davis (2020). On the left we show responses to the question “Currently (this week) what is your work status?”. On the right, we show responses to the question “What impact has working from home had on the ability to make new full-time hires in your employer’s business?” Data are from two surveys of 2,500 US residents aged 20 to 64, who earned more than $20,000 per year in 2019 carried out between May 21-29 and June 30 to July 9 by QuestionPro on behalf of Stanford University. Sample reweighted to match current CPS by income, industry, and state.
Figure 10: COVID uncertainty remains extremely high

Notes: Data are from the World Uncertainty Index website’s World Pandemic Uncertainty Index (WPUI), which measures discussions about pandemics at the global and country level in the Economist Intelligence Unit’s approximately 140 country reports which are produced quarterly (or monthly for some larger countries, although we use only the quarterly updates for consistency). The underlying data are at https://worlduncertaintyindex.com/data/ (see Ahir, Bloom and Furceri, 2020)
Notes: The top row shows the questions about the scenarios and then probabilities from the UK Decision Maker panel and the bottom row the same questions from the US Survey of Business Uncertainty. In both surveys these questions are preceded by questions about current and year ago sales levels.