Endogenous Corporate Disclosure During the COVID-19 Lockdown *

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Abstract

Amid state-level COVID-19 lockdowns, we compare firms filing financial statements *during* the lockdown (treated) to those reporting *just before* the lockdown (control). Lockdowns significantly constrained social mobility and the sharing of soft information between managers and investors. In response, treated firms disclosed more accounting details, especially those requiring external funding or involving hard-to-value assets and substantial trade credits. Larger firms with extensive institutional ownership and broad auditor coverage exhibited fewer such tendencies. Increasing hard information improved earnings forecasts and curtailed external funding costs. Our findings suggest a shift from soft to hard information sharing during economic uncertainty, which helps alleviate the information asymmetry between corporate insiders and outsiders.

Keywords: Information asymmetry, COVID-19 lockdown, limited soft information sharing, endogenous disclosure, financial reporting

JEL: G14, G32, M40, O32

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A firm's managers are perceived as knowing more about the value of the firm's assets and investment opportunities than do outside investors. Numerous academic studies have examined this information asymmetry and its consequences for corporate finance over the years (see for example, Leland and Pyle, 1977; Akerlof, 1978; Myers and Majluf, 1984). Firms normally undertake investment projects by selling securities to external capital markets. Under severe information asymmetry, those securities are sold at a discount. Understanding this valuation feedback from the capital market, corporate managers seek various ways to convey their internal business-related information to outside claimants.

The information they attempt to disseminate to external capital markets includes both hard and soft information (Liberti and Petersen, 2019). The latter is difficult to summarize via numeric scores and is, therefore, more subject to geographic distance and social interactions among various participants interested in valuable information collection. A large body of empirical literature has illustrated the distinction between soft and hard information in various settings (Coval and Moskowitz, 1999; Petersen and Rajan, 2002; Van Nieuwerburgh and Veldkamp, 2009; Giroud, 2013). Regarding the context of corporate disclosure policies, studies have traditionally focused on how managers strategically communicate with outside investors through financial reporting (e.g., Bushman and Smith, 2001).

Despite the relatively comprehensive discussion of information asymmetry and endogenous corporate disclosure policies aimed at countering such frictions in the literature, little attention has been given to how the two types of information could interact to mitigate information asymmetry between corporate insiders and outsiders (Bertomeu and Marinovic, 2016). The recent COVID-19 pandemic and sudden imposition of state-level lockdown policies provide an ideal opportunity to address this important issue. By examining staggered stay-at-home (SAH) orders in various states starting in mid-March 2020, we aim to identify a group of firms that had to prepare for their quarterly financial reports during the lockdown and compare them to those that completed their financial reporting just before the lockdown period.

The COVID-19 outbreak was largely unexpected, and therefore, the predetermined cross-sectional variation in the fiscal year-end month of firms located in the same state provides an ideal assessment opportunity. Specifically, we can examine how firms endogenously determine the amount of hard information to disclose in their quarterly financial reports when state-level lockdown policies significantly restrict social mobility within the state in which the headquarters of the firm are located (Gupta et al., 2021). Using these quasinatural experiments, we investigate how corporate disclosure policies interact endogenously with the reduced informa-

tion sharing among various stakeholders of firms operating during times of restricted movement within a society.

Using a difference-in-differences (DiD) specification, we examine whether firms that were required to prepare their financial reports under active state-wide lockdown (treatment group) disclosed more accounting details than those reporting just before (control). We use the disaggregation quality (DQ) of accounting data in quarterly reports developed by Chen, Miao, and Shevlin (2015) as our main dependent variable. This DQ measure captures the extent of details in firms' financial reports by counting the number of nonmissing Compustat line items. In this regard, it assesses the "fineness" of hard information disclosed in quarterly financial reports. Exploiting the variation in the timing of corporate quarter-end dates and the exogenously imposed state-wide lockdown orders, we run relatively sharp DiD regressions at the firm-state-year-quarter level.

We check the parallel trend assumption in DQ for firms in the treatment group and the control group prior to SAH orders. The characteristics of treated firms were also well balanced with those of the control group firms, showing no significant signs of deterioration in the firm quality prior to the SAH orders. We then identify the plausibly causal effects of restricted social mobility on corporate disclosure policies. To pointedly capture the effects, we focus on a relatively short period, spanning only eight quarters surrounding the onset of the pandemic (i.e., the first quarter of 2020). Controlling for comprehensive time-varying firm and local market characteristics using highly granular fixed effect dummies, we uncover the following important results concerning how firms endogenously disclosed their hard information in response to the sudden decrease in soft information collection during the lockdown period.

We first find that firms disclose more in their financial reports during the COVID-19 lockdown. Furthermore, we observe that firms with higher external financing demand were more likely to improve their disclosure quality during the lockdown. Companies with low quarterly earnings, limited financial resources, and a need for external capital were more likely to increase the amount of hard information they shared in their subsequent financial reports during the lockdown period. When soft information collection was significantly limited due to diminishing social mobility, external investors could impose a heavy discount on the prices of external claims these firms issued. In such circumstances, by substituting for missing soft information through increased hard information disclosure, companies might have attempted to alleviate such information discounts precisely when external capital is most needed.

Next, we also find that firms with more intangible assets, long-term R&D projects, and

more credit sales, as reflected by accounts receivable and payable (i.e., accrual accounts), tend to disclose more operational details through quarterly reports. Importantly, we show that these effects were driven by the increase in discretionary disclosed accounting items rather than those reported in quarterly financial reports in most cases. These results indicate that during the COVID-19 lockdown, firms endogenously disclosed more and tried to effectively communicate their opaque asset structure, risky innovation activities, and less transparent sales activities with outside investors.

We further test whether these results are evident for firms under more severe information asymmetry. We use the measures of (i) relative firm size within the industry; (ii) firms that are not covered by Big 4 auditors, making them more likely to be subject to local mobility restrictions in the absence of large auditor networks in various geographic locations; and (iii) the absence of sophisticated institutional investors with longer investment horizons. With all these information friction proxies, we run difference-in-difference-in-difference (DiDiD) regressions and find that firms suffering more from negative information externalities tend to disclose more accounting items in their quarterly reports during lockdowns.

Finally, we examine whether this endogenous corporate disclosure during the COVID-19 pandemic could improve firms' information transparency and reduce the degree of information asymmetry between firm insiders and outsiders. We find that firms that endogenously disclose more of their internal operational details to the public are covered with greater accuracy in analysts' earnings forecasts, implying that such hard information disclosure effectively substitutes for reduced soft information during the pandemic lockdown. Additionally, we find that firms were able to reduce their cost of capital when they enhanced the quality of hard information disclosure in their quarterly financial reporting.

In a battery of robustness checks, we find that our results continue to hold even after narrowing the control group by excluding 12 states that never experienced lockdowns during our sample period. When we focus solely on firms in neighboring states, where local economic conditions are more comparable than those in distant states, we still find that treated firms proactively disclose detailed accounting information in their quarterly financial reports during lockdowns.

Overall, our results indicate that hard information was a substitute for potentially missing soft information during the COVID-19 lockdown. Firms chose to disclose more discretionary reporting items to help external investors overcome information asymmetry and better understand the firms' business prospects. With mitigated information asymmetry, sell-side equity

analysts can indeed predict future earnings more accurately, thereby helping to lower firms' external funding costs. This improved funding capacity enables firms to enhance their competitive advantage in their respective product markets during times of increasing economic uncertainty and information friction.

Our work makes a significant contribution to several strands of the literature. First, we contribute to the literature on information friction and corporate financial policies. The literature documents significant information frictions that induce home bias (Coval and Moskowitz, 1999; Van Nieuwerburgh and Veldkamp, 2009), limited business transactions (Petersen and Rajan, 2002), and severe price discounts in external claims that firms issue (Diamond and Verrecchia, 1991; Lang, Lins, and Miller, 2003). We show that two distinct types of information are interactive and substitute for each other during times of increasing information friction. Firms can remain active by endogenously reallocating the amount of information sharing in each of the two distinct channels during times of rising economic uncertainty. In this regard, we complement similar recent findings by Bai and Massa (2021) on mutual fund industries.

Second, we show that firms strategically pursue an optimal disclosure policy to secure necessary capital from external claimants. By doing so, they continue long-term business plans that help them survive in innovation competition. In this regard, our paper also contributes to the literature on strategic information disclosure, such as strategic R&D expense disclosure documented by Koh and Reeb (2015) and narrative disclosure on R&D investments by Merkley (2014).

Third, we focus on the large literature on COVID-19 and its consequences for corporate sectors and capital markets in general. Existing studies in this area (Ellul, Erel, and Rajan, 2020) have focused on the bank supply of capital to corporations (Acharya and Steffen, 2020; Li, Strahan, and Zhang, 2020), equity shortfalls (Carletti et al., 2020) and return resilience (Albuquerque et al., 2020; Ding et al., 2021; Fahlenbrach, Rageth, and Stulz, 2021; Ramelli and Wagner, 2020). None of these studies explored endogenous corporate disclosure policies in financial statement reports. To our knowledge, we are the first to study this important, yet unexplored, subject during the COVID-19 pandemic.

1 Hypothesis Development

Outside claimants have difficulty obtaining value-relevant firm-specific information possessed by corporate insiders. For example, the long-term value and performance of research and development (R&D) activities might be clear to top managers who conduct and oversee the innovation process inside the firm, while outside investors may not be fully informed about such innovation value due to the high complexity and risk of R&D activities (Merkley, 2014). Likewise, intangible and opaque assets are difficult to value from outside investors' points of view. Such information asymmetry between corporate insiders and outsiders has been shown to be a key factor affecting the cost of capital and corporate investment policies (Leland and Pyle, 1977; Myers and Majluf, 1984).

To reduce this information gap, corporate managers disseminate a considerable amount of information about their business prospects. Managers transmit such value-relevant information through several avenues, including periodic financial reports, shareholder meetings, earnings conference calls, and media releases. This soft and hard information (Liberti and Petersen, 2019) is processed by external information agents, such as sell-side equity analysts, external auditors, and credit rating agencies, who help investors learn about firms' value and growth potential. They also guide investors to more efficiently price firms in external capital markets.

Effective communication with outside investors is key to corporate investment and growth, as it enables cost-effective funding. Such financing benefits are particularly valuable during economic downturns, in which information asymmetry widens and financial constraints tend to bind for a vast majority of firms.

Through active social engagement and physical interaction with various information intermediaries, top managers can share valuable soft information with outside investors and fill the information gap. This would result in efficient pricing in external capital markets through enhanced forecast ability and precision by external information agents. Earlier studies highlight the importance of such private interactions between sell-side analysts and top executives in the creation of value-relevant external information (Green et al., 2014; Soltes, 2014; Cheng et al., 2016; Bushee, Gerakos, and Lee, 2018).

The recent COVID-19 outbreak imposed an exogenously driven change in the corporate information landscape. With the sudden imposition of state-level lockdown policies, social and physical interactions were greatly limited (Gupta et al., 2021). The empirical literature has documented the importance of distance in disseminating soft information (e.g., Petersen and

Rajan, 2002). With reduced human interactions, the challenge of transmitting soft information within geographically proximate areas intensified. Bai and Massa (2021) recently reported that human-interaction-based information sharing in capital markets was severely restricted during the lockdown period.

The degree of information asymmetry between corporate insiders and outsiders rose sharply during the COVID-19 crisis. This issue is particularly evident in terms of soft information. Therefore, corporate managers naturally shifted their attention to alternative information-sharing channels through which they could bridge the growing information gap with outside investors. In this situation, top managers might consider disclosing a greater amount of hard information as a substitute for missing soft information during the COVID-19 lockdown. However, the efficacy of substitution between the two types of information is uncertain a priori and constitutes an empirical question.

To provide more perspectives on this endogenous information disclosure by corporate managers, let us consider a firm that strategically concealed its R&D activities prior to the COVID-19 outbreak. Assume that the firm requires external capital to carry out its ongoing long-term innovation projects during the lockdown. Koh and Reeb (2015) document that a substantial number of NYSE-listed companies strategically hide their R&D activities to avoid unnecessary innovation competition from rivals. They bundle R&D expenses with other operating expenses in their financial statements. Bushee (1998) also emphasizes that corporate R&D is a critical component of evaluating a firm's long-term value, although the outcome of innovation efforts is highly uncertain. With intensive R&D expenses, the firm's near-term earnings could appear inferior to those of its rivals. This situation might disappoint outside investors who may not fully understand the firm's long-term strategic plan. Consequently, the firm might choose to endogenously disclose more about its R&D activities to justify poor near-term earnings. Through detailed disclosure of R&D expenses, outside investors could better understand the potential trade-offs between disappointing short-term earnings and long-term growth potential. Therefore, improved communication between corporate insiders and outsiders during the COVID-19 lockdown helped firms enhance access to external capital when it was most needed.

Under the environment of changing information driven by exogenous factors during the COVID-19 lockdown, firms that require external capital (Barry et al., 2022) might endogenously disclose the details of their strategic investment plans in their financial reports. Such additional hard information disclosure may be increasingly beneficial for firms with a greater amount of difficult-to-value assets (e.g., a large amount of intangibles) and a large volume of credit sales

(e.g., accounts receivable and payable) whose information is likely to be imprecisely estimated by outside investors.

Corporate managers must consider various types of external investors (Bushee, 1998). Some investors tend to be myopic (Stein, 1989), placing greater emphasis on near-term earnings than on long-term growth. In contrast, sophisticated institutional investors may understand the temporal trade-off between long-term innovative investment and poor short-term earnings. When valuable soft information sharing became limited during the COVID-19 lockdown, corporate managers had to account for all of these information externalities and carefully decide how much hard information to disclose in their financial reports.

Based on the above discussion, we hypothesize that firms adopt the following disclosure policies under state-level lockdowns to substitute for limited soft information collection:

Hypothesis 1 (Endogenous Disclosure during Lockdown) *As information asymmetry widens due to the restricted social mobility and physical interactions among investors, firms endogenously disclose more information related to business prospects in their financial reports.*

Hypothesis 2 (External Financing Demand) *When firms endogenously disclosed key operational characteristics to the public during the COVID-19 lockdown, firms that are more financially constrained with reduced short-term earnings and that rely heavily on external financing to fund their ongoing long-term projects tended to disclose their business prospects to outside investors by reporting more granular information about their operation.*

Hypothesis 3 (Asset Opacity, Investment Horizon, and Operational Transparency) *When firms endogenously disclosed their internal information to the public through financial reporting during the COVID-19 lockdown, firms with more opaque assets (e.g., intangibles), long-term R&D projects, and a large amount of accounts receivable and payable tended to disclose more operational details to the public.*

Hypothesis 4 (Investor Types and Heterogenous External Information Environment) *During the state-level lockdown, firms owned by sophisticated institutional investors, audited by Big 4 auditors, and already sizable in their respective industries, thereby suffering less from innate information asymmetry, tended to disclose less, despite the reduced soft information sharing between firm insiders and outsiders.*

Hypothesis 5 (Real Effects of Endogenous Information Disclosure in Lockdown) *Analyst forecast dispersion was lower for firms that proactively disclosed more account information during the state-level lockdown period than for other firms that did not improve disclosure quality due to mitigated information asymmetry. This lowered the firm's cost of capital and extended its external funding capacity.*

2 Identification Strategy

2.1 Background: State-level Lockdowns in 2020

As an exogenous shock to social mobility, we focus on the mandatory SAH orders (also known as "shelter-in-place" laws). Among the various forms of lockdown policies (e.g., restrictions on gatherings and school closures), SAH orders were in the most restrictive form and starkly reduced mobility in effective ways (see Adolph et al., 2021 for evidence on the effect of different types of policies on mobility outcomes). As the COVID-19 pandemic swept across states, states started to issue SAH orders starting in mid-March 2020 that lasted for weeks. When a governor issues an SAH order, the residents must stay home except for when conducting essential activities such as purchasing medicine or food.

During the early phase of the COVID-19 pandemic in mid-March 2020, it was mainly up to governor's discretion as to how to adopt state-level social distancing mandates. California was the first state to implement an SAH order on March 19th, 2020, and an additional 38 states followed and issued SAH orders by April 7th, 2020. Although most states enacted preliminary SAH orders between March 19, 2020 (California) and April 7, 2020 (South Carolina), there was also considerable heterogeneity in terms of the duration of the mandates, as depicted in Figure 1. Alaska was the first to lift its mandatory SAH on April 24, seven states ended their SAH orders by the end of April, and 32 states ended their mandatory SAH orders through May and June. The SAH order in California was not lifted until August 31. On the other hand, 12 states never issued SAH orders.[1] We implement a sharp identification strategy based on the staggered declaration of state-wide SAH orders. The timing of SAH issuance varies by approximately three weeks across these 39 states, and the duration of the state-wide mandatory

[1]Twelve states did not mandate any SAH orders, including Arkansas, Connecticut*, Iowa, Kentucky*, Massachusetts*, Nebraska*, New Mexico*, Oklahoma, South Dakota, Utah*, and Wyoming, but six of them (*) recommended SAH social distancing actions.

SAH order ranges from 27 days to 165 days.

To confirm that social mobility was dramatically restricted during the pandemic period, we directly estimate the effect of SAH orders on social traffic by using the novel Safegraph database.[2] Safegraph provides foot traffic data based on 45 million mobile devices in the U.S. to 3.6 million points-of-interest (POIs). We aggregate the information on the number of stops at the POIs and the average distance from the homes of the devices visiting the POIs at the census-block-group level.

Figure 2 shows the patterns of human movement over time. In Panel A, over a one-month period from March to April 2020, which was the starting date of SAH orders in most states, the number of stops and distance from home sharply decreased by almost 40%, and the impact, particularly measured as the number of stops, continued for the remainder of the year until the end of 2020. More importantly, when we split the states into two groups – lockdown periods less than and longer than 30 days – in Panel B, we find that the impact of social distancing policies on social mobility was more pronounced for longer state-level lockdown periods. The restriction on social mobility is also well observed in a regression setting, where we control for time trends and geographic characteristics, as presented in Table A1. We include year and month fixed effects and census block group fixed effects and find that the number of stops to a specific census block decreased by 28% and that the average distance of visitors to the area from their home sharply decreased by 16% during the lockdown period.

2.2 A Quasi-natural Experiment

This study aims to assess the impact of mobility constraints and the suspension of soft information sharing on the corporate disclosure of hard financial accounting information. The precise question we pose is as follows: Are firms that typically rely on standard channels of information sharing and social interactions more inclined to provide more granular financial accounting information when compelled to complete their financial statements under unprecedented mobility constraints? We address this question by examining the change in corporate disclosure quality for firms that had to prepare their disclosure documents under active statewide SAH mandates.

Importantly, our identification strategy relies on the interaction of *within-state variation* (fiscal quarter-end month) with the state-level lockdown shock. Our objective is to identify

[2]The data and a detailed description of the data are available from https://www.safegraph.com.

firms that prepared quarterly reports under mobility constraints, representing a subset of firms whose soft-information sharing channels were blocked due to exogenous factors. This approach is motivated by the fact that, during the SAH orders, corporate employees and accountants responsible for preparing accounting information primarily transitioned to working from home or temporarily ceased working.

Regarding the decision to issue SAH orders, the initiation time and the length of the orders were largely at the discretion of the governors. Moreover, we cross-sectionally instrument firms based on their predetermined fiscal quarter-end months. It is highly unlikely that state-level lockdown decisions are systematically correlated with the fiscal quarter-end month characteristics of firms. We leverage this sharp variation in the timing and length of the lockdown orders, coupled with the predetermined cross-sectional variation in firms' fiscal quarter-end months. Through these temporal and cross-sectional instruments, we identify exogenous shocks to the transmission of soft information among our sample firms.

We first identify the exact timing of a firm's quarter-end dates and filing dates based on the subset of observations where we could obtain actual filing dates.[3] To make a reasonable assumption about the period of preparing financial statements after the fiscal quarter-end, we examine the financial reporting practices of our sample firms in the three years before the COVID-19 pandemic (2017–2019). We find that the number of days companies took to officially disclose a quarterly financial statement after the quarterly fiscal date was 39 (44) days in median (on average). Assuming that it would take approximately one week to finalize and transfer documents, we assign that a median (average) firm would take approximately 30 (35) days to work on preparing financial statements.[4]

We construct an indicator variable, *Disclose in Lockdown*, to capture whether a firm's quarterly reporting documents had to be prepared under the state's SAH directives. We consider a firm's quarterly filing to be prepared under a state-wide SAH lockdown policy if the 30 days after the firm's quarter-end date fall within the mandatory SAH order period of the state where its headquarters are located.[5]

Note that we rely on two key variables to determine whether a firm is directly affected by unexpected mobility constraints in preparing its financial statement disclosures. The first is the

[3] 22% of observations have missing filing dates.

[4] We find that the results are robust to the use of alternative cutoffs, such as 20 or 25 days after the firm's quarter-end dates.

[5] The underlying assumption of using the location of headquarters is that corporate disclosure decisions are mostly made at the headquarters level by top executives.

firm's fiscal quarter-end dates, and the second is the dates of state-wide SAH orders. Given that a state's SAH order typically lasted for a relatively short and specific period, there is cross-firm variation within the same state regarding whether a firm's quarterly documents were prepared during the SAH directives, depending on the firm's quarter-end date. This is illustrated in Figure 3, where we demonstrate cross-state variation in the proportion of firms affected by their respective state's SAH directives, confirming the heterogeneity of the treatment within states. Furthermore, firms rarely change their fiscal year-end month, which was determined before the 2020 pandemic began. Hence, whether a firm had to prepare for the disclosure of financial statements during restricted social mobility under mandatory SAH orders likely indicates an exogenous shock.

During the first quarter of 2020, there were some states in which all of firms were affected by SAH orders during their preparation of quarterly filings. When a state-wide SAH lasts for a prolonged period, there is little variation across firms headquartered in the given state. All firm-quarterly filings were prepared under SAH mobility constraints for firms headquartered in California, Delaware, Hawaii, Idaho, Louisiana, Maine, Michigan, New Hampshire, New Jersey, New York, Oregon, South Carolina, Vermont, Washington, and West Virginia. On the other hand, in some states, no firm was affected by the SAH policy during the first quarter of 2020; i.e., Alaska, Arkansas, Connecticut, Iowa, Kentucky, Massachusetts, Mississippi, Montana, Nebraska, New Mexico, North Dakota, Ohio, Oklahoma, Rhode Island, South Dakota, Tennessee, Texas, and Utah did not impose an SAH order.

2.3 Empirical Design

By exploiting the variation in the timing of corporate quarter-end dates and state-wide SAH orders across the cross-section and time series (i.e., in and out of lockdowns), we implement DiD regressions at the firm-state-year-quarter level. We compare the extent of voluntary hard information disclosure between firms with quarterly reporting dates that coincided with the lockdown period (*treated*) and firms in the same state without such reporting requirements during the lockdown period (*control*). We exploit the fact that fiscal quarter-end dates are predetermined, and the timing of these dates determines whether a firm must file under SAH orders. The spread of the COVID-19 pandemic was unexpected for most corporations and market participants. As long as quarter-end schedules are not planned in anticipation of the timing of the SAH orders, our estimation strategy isolates the effects of disclosure during the

lockdown.

We compare the characteristics of firms that were required to disclose quarter-end information during lockdown orders (treated) with those of companies that were able to disclose information outside the lockdown period (control) and present the results in Panel B of Table 1. Our findings indicate that treated firms, with corporate disclosure schedules overlapping statewide lockdown mandates, do not represent a group of companies typically subject to a higher level of information asymmetry. The two groups had similar asset sizse, leverage ratios, ROEs, and cash flow volatility. Treated firms exhibited higher levels of tangible assets and Tobin's Q. Both groups displayed similar levels of financial constraint measures, suggesting that the need for external financing in treated firms was also not significantly greater than that of control firms.

Additionally, we check whether the trends in disclosure quality for firms in the treatment and control groups were parallel prior to the lockdown orders to ensure that the DiD framework can isolate plausible causal effects of the mobility restrictions on corporate disclosure. Our sample period spans eight quarters surrounding the onset of the pandemic, the first quarter of 2020. To sharpen the identification, we compare firms within a relatively short sample period.

To test whether firms that had to prepare their disclosure filings during the SAH mobility restrictions adjusted their disclosure quality differentially, we start by estimating the following panel regression model:

$$DQ_{i,j,t} = \alpha + \beta Disclose\ in\ Lockdown_{i,j,t} + \delta Control_{i,t-1} + \nu_i + \xi_{j,t} + \epsilon_{i,j,t}, \tag{1}$$

where DQ is the disclosure quality of firm i in state j in quarter t. The variable *Disclosure in Lockdown* is an indicator variable equal to one if a company had to prepare its disclosure documents during an SAH mandate and zero otherwise. ν_i denotes firm-level fixed effects. Since headquarters relocation events are rare during a period of just eight quarters, location-level or industry-level fixed effects are subsumed. To ensure that the state-specific time trends or COVID-19-related variations in local economic conditions are not driving our results, we include $\xi_{j,t}$ to represent state-year-quarter fixed effects. $Control_{i,t-1}$ contains firm-level control variables such as the natural logarithm of the book value of total assets, Tobin's Q, the leverage ratio, and cash flow volatility. We adjust standard errors for clustering at the state level.

Then, we evaluate whether and how the coefficient estimates, β, of our baseline model in Equation 1 differ across firms with a heterogeneous degree of need for dissolving informational

asymmetry. To capture firm-specific demands for mitigating information asymmetry resulting from soft information dissemination, we adopt measures including the need for external financing and asset opacity. This is done to examine the effects of firm-specific demands on how firms respond to statewide mobility constraints, as captured by changes in corporate disclosure quality. Specifically, we employ the following difference-in-difference-in-differences (DiDiD) regression framework:

$$\begin{aligned} DQ_{i,j,t} =& \alpha + \kappa Disclose\ in\ Lockdown_{i,j,t} \times InfoAsym_{i,t-1} + \gamma InfoAsym_{i,t-1} \\ &+ \beta Disclose\ in\ Lockdown_{i,j,t} + \delta Control_{i,t-1} + \nu_i + \xi_{j,t} + \epsilon_{i,j,t}, \end{aligned} \tag{2}$$

Our main variable of interest is the interaction term, κ, which captures the extent to which the change in disclosure quality in response to the lockdown mandates varies by firm characteristics of interest that proxy for information asymmetry ($InfoAsym$). We include $\xi_{j,t}$ to make use of within-state variations.

We first consider firms' needs for external financing as a way to measure firm-level $InfoAsym_{i,t}$. In Equation (2), $InfoAsym_{i,t}$ encompasses firm-level temporal needs for external financing, including return on equity, the WW index, the HP index, and the degree of equity dependence in financing fixed assets and R&D investments. Firms experiencing short-term earnings underperformance or greater financial constraints have greater incentives to reduce information asymmetry within a short period to better attract external financing. We posit that the imperative to bridge the information gap for external financing causes firms to adopt a shorter time horizon in managing information disclosure and improving their disclosure of hard information.

Next, we adopt asset tangibility, R&D spending, accounts payable, or accounts receivable as a set of variables measuring the firm-level $InfoAsym_{i,t}$. We use $Tangibility$ as a proxy for information asymmetry because evaluating the value of intangible assets can be more difficult during a period of high information asymmetry. Companies with abundant intangible assets may have stronger incentives to disclose more disaggregated information to assist external investors. Next, we look at $R\&D$ spending as an alternative measure of disclosure ambiguity for our triple difference specification. R&D spending is a long-term investment likely to have adverse effects on short-term cash flow. Corporate R&D disclosure is often conducted in a discretionary and strategic manner. Koh and Reeb (2015) find that firms strategically choose to report R&D and that 10.5% of firms without R&D information file patent applications and

successfully receive patents. This could be related to the difficulty of communicating the value of R&D investments (e.g., Merkley, 2014). When investors care more about information for valuing a firm, revealing that the firm is investing in R&D can be beneficial. Additionally, we use *Accounts Receivable* or *Accounts Payable* as a proxy for uncertain credit sales and purchasing activities. During the pandemic, when investors paid more attention to uncertainties related to ongoing concerns, external investors may have demanded more detailed information on the value of these current assets.

As an alternative way to measure the information environment of firms, we consider the characteristics of a firm's auditors and institutional investors. These characteristics, together with firm size could be considered proxies for the degree of information friction in the firms' external information environment. We first consider whether a firm's auditor is one of the Big 4 auditing firms. When the market believes that Big 4 auditors generally deliver higher audit quality and have broader geographic coverage than smaller auditors, external investors may demand less disaggregated financial information from firms employing Big 4 auditors. Similarly, we expect firms with patient institutional investors to suffer less from external information frictions. To test these hypotheses, we use the triple difference framework as in model (2), but employ $Industry\ Leaders$, $Big4$, IO, $IO-Patient$, and the natural logarithm of the number of analysts as $InfoAsym$ variables. IO and $IO-Patient$ denote the proportions of institutional investors and patient institutional investors with long investment horizons, respectively.

Next, to gauge the economic consequences of enhanced hard information disclosure, we test whether and how enhanced disclosure quality contributes to corporations' long-term outcomes. We first hypothesize that enhanced disclosure quality helps firms better communicate their value and improve their overall information environment. We test the hypothesis that the more disaggregated a disclosure is, the easier it is for analysts to forecast earnings. We further hypothesize that such disclosure of more disaggregated hard information would help firms reduce their cost of capital. To test these hypotheses, we run the following regression models:

$$\begin{aligned} Forecast\ Dispersion_{i,j,t+1} =& \alpha + \kappa Disclose\ in\ Lockdown_{i,j,t} \times DQ_{i,t} + \gamma DQ_{i,t} \\ &+ \beta Disclose\ in\ Lockdown_{i,j,t} + \delta Control_{i,t} + \nu_i + \xi_{j,t} + \epsilon_{i,j,t}, \end{aligned} \tag{3}$$

$$\begin{aligned} Implied\,Cost\,of\,Capital_{i,j,t+1} =& \alpha + \kappa Disclose\,in\,Lockdown_{i,j,t} \times DQ_{i,t} + \gamma DQ_{i,t} \\ &+ \beta Disclose\,in\,Lockdown_{i,j,t} + \delta Control_{i,t} + \nu_i + \xi_{j,t} + \epsilon_{i,j,t}, \end{aligned} \tag{4}$$

where DQ is the disclosure quality of firm i in state j at quarter t. The variable *Disclosure in Lockdown* is an indicator set to one if a company had to prepare its disclosure documents during the SAH mandates because the company domicile has active SAH mandates and zero otherwise. While ν_i denotes firm-level fixed effects, we also include $\xi_{j,t}$ to represent state-year-quarter fixed effects. $Control_{i,t}$ contains firm-level control variables such as the natural logarithm of the number of analysts following the firm, the natural logarithm of the book value of total assets, Tobin's Q, and the leverage ratio. We adjust standard errors for clustering at the state level.

Finally, to corroborate the findings that firms actively manage their hard information disclosure quality, we show that changes in disclosure quality are largely concentrated on the enhanced reporting of discretionary disclosure items by running the following regression model:

$$\begin{aligned} Discretionary\,DQ_{i,j,t} =& \alpha + \kappa Disclose\,in\,Lockdown_{i,j,t} \times DQ_{i,t} + \gamma DQ_{i,t} \\ &+ \beta Disclose\,in\,Lockdown_{i,j,t} + \delta Control_{i,t} + \nu_i + \xi_{j,t} + \epsilon_{i,j,t}, \end{aligned} \tag{5}$$

3 Data and Sample

We start by constructing a firm-quarter panel of publicly traded companies in the U.S. from Compustat during the period 2019Q1-20204Q around the lockdown period. We exclude firms incorporated or headquartered in non-U.S. countries and any observations with nonpositive total asset values.

3.1 Lockdown data

We collect state-level social distancing measure information from the National Governors Association and Kaiser Family Foundation and supplement it with information from other sources. These databases provide various state-level policy actions in response to the COVID-19 pandemic.[6] We construct *Disclose in Lockdown* to capture whether a firm's quarterly report

[6]We mostly rely on https://statepolicies.com/ to obtain data related to U.S. state distancing policies.

was prepared under the state's SAH directives. Specifically, it is defined as an indicator that takes a value of one when a firm had to prepare its disclosure filing during the statewide SAH mandates.

3.2 Disclosure Quality

As a primary measure for voluntary disclosure, we adopt the disclosure quality (DQ) measure from Chen, Miao, and Shevlin (2015), which captures the level of disaggregation of accounting data in financial reports. DQ is defined as the number of nonmissing Compustat items and represents the degree of granularity of the accounting information in the financial statements. The underlying assumption of this measure is that more detailed quantitative items represent higher-quality information provided to the public.

There are several advantages in using DQ as a proxy for disclosure quality rather than alternative disclosure measures constructed from conference calls or analyst ratings. First, there is no selection bias in terms of coverage because DQ can be calculated for all publicly traded firms in Compustat as long as they report financial statements. The variation of the DQ comes from the extra information that is not required but voluntarily reported on financial statements by companies and, therefore, collected by the data vendor. Although they are all required to submit financial statements compliant with SEC regulations, DQ still captures managers' voluntary and discretionary decisions on the level of detail in financial statements. In particular, the availability of DQ for the universe of sample firms is critical for an event study that compares the disclosure outcome over a short window.

Second, as DQ is calculated based on the comprehensive accounting items that are reported in financial statements, it provides standardized and quantitative scores on disclosure quality. Due to its simplicity, the DQ can be readily calculated for a broader range of companies. This enables us to compare DQ across different firms and periods.

Finally, DQ represents the granularity of information found across the entire 10-Q and 10-K reports, making it a representative measure of a firm's voluntary disclosure. This stands in contrast to indices that rely solely on information from a particular section of financial reports, such as Management's Discussion and Analysis section.

We first count the number of nonmissing GAAP items reported in Compustat in the Balance Sheet and Income Statements of the 10-Qs and 10-Ks. Then, we aggregate those measures into broader categories and apply several filtering mechanisms as in Chen, Miao, and Shevlin

(2015).[7] Since our analyses are at the quarterly level, we adjust their measure to the quarterly frequency by using both 10-Qs and 10-Ks. For readability, we show DQ in percentage (%) in our regressions.[8]

Table 1 reports the summary statistics of the main variables in our analysis. We find that 11.4% of firm-quarter statements are defined as disclosed during the SAH orders, which implies a significant variation in the impact of SAH orders across firms based on which state they are headquartered and how long the SAH orders stay. During the first quarter of 2020, 69% of the firms disclosed their financial statements during the SAH orders. The distribution of DQ is comparable to that of Chen, Miao, and Shevlin (2015), confirming the validity of the disclosure quality measure even based on quarterly reports (10-Qs).

3.3 Control Variables

Firm-level financial variables are constructed from Compustat. We also collect the actual filing dates when each financial statement was submitted to the SEC from the WRDS SEC Analytics Suite. Additionally, we obtain auditor information from Audit Analytics and define *Big4* as an indicator variable for the Big 4 auditing companies. Institutional holding data are obtained from the Thomson Reuters Institutional (13F) Holdings database. We classify institutional investors as patient investors when they are identified as either dedicated or indexers, according to Bushee (1998). All variable definitions are provided in Appendix 2.

4 Results

4.1 Dynamics of Disclosure Quality Responses

Before documenting the heterogeneous effects of the lockdown on firms' disclosure policy, we check the dynamic response of disclosure quality around the lockdown period for the average

[7] We follow the procedure in Chen, Miao, and Shevlin (2015) to identify the missing items that are irrelevant to firms' operations from nonreported missing items. For example, inventory items might be missing not because they are intentionally unreported but because those items do not exist for many internet companies. These steps ensure that any coding schemes in the Compustat database bias the measure.

[8] We exclude several subaccounts that are used in counting the annual DQ measure in Chen, Miao, and Shevlin (2015) but do not exist in the Compustat quarterly database. For example, subaccounts AM, DFXA, XAD, XLR, XRENT and XSTFO, which comprise a group variable XOPR, exist in annual data but not in quarterly data.

firm by year. We use a firm-quarter panel spanning from the first quarter of 2019 to the fourth quarter of 2020 and estimate Equation (1) with the indicator variables for each year around the first quarter of the SAH order instead of *Disclose in Lockdown*. We present the results of this formal test of the parallel assumption in Figure 4. We find a sharp increase in DQ in the first quarter of the lockdown period and the level remains stable for the next few quarters. More importantly, we do not find any pretrends in DQ before the lockdown announcement. If anything, we see a decrease in DQ two quarters before the event quarter, but the differences are not statistically significant.

4.2 Disclosure Quality with Social Mobility Restriction

We first examine the overall effect of the COVID-19 lockdown on the disclosure quality in 2020. We hypothesize that as channels for soft information transmission were limited during the SAH lockdown orders, external investors and analysts increasingly relied on public disclosure to learn about firms. Firms may react to such restrictions strategically and decide to enhance the quality of their financial disclosure.

The baseline regression estimate consistently shows the improved disclosure quality during the lockdown period in Figure 4. Our baseline results are presented in Table 2. In column (1), the coefficient of *Disclose in Lockdown* is 0.21, which is positive and statistically significant. This implies that firms increased their disclosure quality when they prepared quarterly financial statements during the state-level lockdown period. As this regression includes firm and year-quarter fixed effects, the improvement in disclosure quality cannot be explained by firm-specific unobservables, the cyclicality of financial statement information by quarter, or time trends in DQ. The increase in DQ of the quarterly reports disclosed in the lockdown period (0.21) is equivalent to 1.2% of the standard deviation of DQ. This is not negligible if we consider that DQ is sticky (i.e., the temporal variation in DQ is not large). Chen, Miao, and Shevlin (2015) argue that this is because all firms must report a list of required items under the SEC Regulation S-X requirement.[9]

[9]For this reason, Chen, Miao, and Shevlin (2015) recommend the use of DQ in event studies or cross-sectional tests such as our study.

4.3 Disclosure Quality and External Financing Demand

Next, we test whether firms with higher financing demand are more likely to improve disclosure quality during the lockdown. In particular, we consider firms that reported low earnings and firms that rely on external financing because these firms with high financing demands are more likely to suffer from information asymmetry. We hypothesize that demand for external financing increases the temporal need for information dissemination to help investors reduce the information gap.

During the COVID-19 pandemic, revenue sharply decreased for typical firms, and they faced friction in raising external funds. Several papers have empirically documented how firm performance during the COVID-19 pandemic varied depending on financial conditions such as cash holdings, undrawn lines of credit and debt structure (Acharya and Steffen, 2020; Fahlenbrach, Rageth, and Stulz, 2021; Ding et al., 2021; Ramelli and Wagner, 2020). In particular, Acharya and Xu (2017) show that only highly rated firms with stable earnings can access public finance markets. In such extreme situations, incremental financial information about firms' prospects could help firms increase their external capital. It is well-known in the accounting literature that higher reporting quality is associated with a lower cost of capital (e.g., Leuz and Verrecchia, 2000; Lambert, Leuz, and Verrecchia, 2007; Baginski and Rakow, 2012; Fu, Kraft, and Zhang, 2012). In addition, using the disclosure quality measure, Chen, Miao, and Shevlin (2015) directly validate the negative relationship between the DQ measure and the cost of equity.

Thus, we expect that when capital is scarce in an economy with high uncertainty, firms with more external financing needs intend to convey more positive information to explain their prospects to maintain access to capital. We estimate Equation (2) with the interaction term with firm characteristics that capture firms' external financing needs, including ROE, two indices for financial constraints (the Whited-Wu and Hadlock and Pierce indices), and equity dependence. The results are reported in Table 2. We find that the interaction terms of *Disclose in Lockdown* are negative for *ROE* and positive for *WW, HP, Equity Dep*, all of which are statistically significant at the 1-5% level. The estimated coefficient of the interaction term with *ROE* is -2.041, with a t-statistic of -3.40. Regarding economic magnitude, a one-standard-deviation decrease in *ROE* is equivalent to an increase in DQ of 0.7 during the lockdown, explaining 4% of the standard deviation of DQ.[10]

[10]When we consider the variation of the accounting items not required to be reported in Tables 8 and 9, we find a larger economic magnitude.

These estimates imply that the improvement in disclosure quality during the lockdown period is more pronounced for firms that experienced poor operating profitability and a strong need for external debt and equity capital.[11] The result of equity dependence verifies that firms that need to rely on external capital for long-term investment, including capital expenditure and R&D expenses, disclosed more information publicly during the lockdown period.

The main specification in Table 2 with firm and year-quarter fixed effects exploits the variation in the timing of the lockdown orders across states and a firm's fiscal month predetermined before 2020. One might be concerned that the test does not fully capture the state-level policy changes during the lockdown period. State-specific factors can simultaneously affect a state's lockdown policy and the clustering of firms in each state, which might correlate with disclosure tendencies during the lockdown period. To address this issue, we incorporate state-year-quarter fixed effects in the estimation model to account for the time-varying state-specific economic conditions. Note that this is a highly restrictive model as we compare the impact of disclosure incentives captured by firm characteristics (e.g., tangibility) within the treated firms that are located in the same state in the same quarter. In this specification, the variation in *Disclose in Lockdown* solely comes from the predetermined fiscal month of the firms in the same state, which is presumably quite exogenous.

The results are documented in Table 3. As in Table 2, the coefficients on the firm characteristics capturing financing demands are consistent and statistically significant even with the state-year-quarter fixed effects. We find that within the same state-year-quarter, the disclosure quality was greater for firms with stronger financing demands when they were required to prepare and file their disclosure document during the SAH orders. As we compare treated and control firms within the same state, it is unlikely that the changes in disclosure quality are driven by differences in state-level local conditions during the pandemic. The remaining tables estimate the regressions with firm and state-year-quarter fixed effects.

4.4 Disclosure Quality and Asset Structure

Next, we test the heterogeneous effects of the lockdown on disclosure quality depending on firms' asset structure. Our hypothesis is that as information asymmetry widened when social mobility was sharply restricted during the lockdown in 2020, firms are incentivized to disclose

[11] The proxies for financing needs lag by one year, meaning that they are predetermined before the treatment. The results are quantitatively similar when we use contemporaneous *ROE* or *Equity Dep*, which might reflect firms' performance during the COVID-19 pandemic.

more financial information, especially when they have more intangible assets and a large amount of assets and liabilities that are difficult to value from outside investors' perspectives.

To test this argument, we examine whether the increase in DQ during the lockdown period is more concentrated in firms that face more information asymmetry in a DiDiD setting. We include the interaction term between *Disclose in Lockdown* and variables for asset structure. The estimation results of Equation (2) are reported in Table 4.

First, we find that the interaction term of *Disclose in Lockdown* with *Tangibility* in column (1) is -3.2, which is statistically significant at the 1% level. We also find a significant and positive coefficient on *Disclose in Lockdown*$\times$*R&D* (6.3) in column (2). In terms of the economic magnitude, a one-standard-deviation decrease in tangibility leads to an increase in *DQ* of 0.8, explaining 4% of the standard deviation of *DQ*. These results suggest that firms with more intangible assets and high R&D expenses tend to disclose more financial information during the lockdown period. The strategic disclosure of long-term R%D information is consistent with the view that firms with significant long-term investments that might press short-term earnings choose to deliver more information about their asset structure to outside investors during times of high uncertainty.

Our finding of an increase in DQ by firms with more intangible assets is consistent with the argument in accounting literature about the relevance-reliability tradeoff in measuring intangibles (e.g., see Kanodia and Sapra (2016) for the review of studies for and against intangible measurement). rom the outsiders' perspective, intangible assets are difficult to observe and monitor, creating noisy measures. However, even with respect to reliability, to the extent that investment in intangibles is significant and relevant to valuation, the measurement and disclosure of intangible assets can improve price efficiency in the market (Aboody and Lev, 1998; Healy, Myers, and Howe, 2002). As stock markets sometimes do not fully recognize the long-term value of intangibles (Edmans (2011)) and justification for long-term investments such as R&D expenses becomes more relevant when reporting low earnings, firms decide to disclose more information to the public to alleviate information asymmetry.

We also examine the differential effects of firms' credit-based sales and purchases on the response of disclosure quality to lockdown constraints. In particular, we use the amount of accounts receivable and payable, both scaled by sales, as a proxy for the amount of credit associated with their suppliers and customers that would be realized as profits. The interaction terms of *Disclose in Lockdown* with accounts payable in Column (3) and accounts receivable in Column (4) have positive coefficients with statistical significance at the 1% level.

These results suggest that firms highly reliant on credit-based sales disclose more information in their quarterly financial statements when it is difficult to disseminate soft information. The information about the details of credit accounts became more relevant in assessing fair value during the lockdown period when customers or suppliers faced financial constraints. For example, a firm with more accounts receivable might want to convey more granular information about the impairment of credit-based sales, which can be captured by items such as "Receivables-Estimated doubtful" (Compustat item: RECDQ) and "Unbilled receivables" (Compustat item: RECUBQ). Using data on the transaction account information of borrowers reported to banks, Mester, Nakamura, and Renault (2007) and Norden and Weber (2010) highlight that the monthly use of account receivables and inventories can predict default. Although outside investors cannot access frequent reports on credit accounts to monitor firms such as lenders, detailed information about the creditworthiness of credit-based assets would mitigate the uncertainty concerning firm performance during the COVID-19 pandemic.

4.5 Disclosure Quality and External Information Environment

As Bertomeu and Marinovic (2016) argue, a disclosure can be soft, particularly when firms are closely monitored by sophisticated investors. We expect those firms not to need to disclose hard information during the lockdown period. Similarly, we hypothesize that increased disclosure is much less common for firms audited by Big 4 auditors and for market leaders because they suffer less from information asymmetry.

We test this hypothesis in Table 5. We include indicators for industry leaders, firms audited by Big 4 auditors and the percentage of institutional ownership in the regressions. The interaction terms of *Disclose in Lockdown* with *Ind Leaders* and *Big 4* have negative and significant coefficients. Thus, industry leaders or firms audited by reputable auditors did not increase the disclosure quality as much as did other firms that do not have a proper channel for soft information disclosure. In column (3), we also confirm that when firms are owned by more institutional investors who are sophisticated and professional in collecting private information, their DQ did not increase as much during the state-level lockdown period. This result holds in column (4) when we focus on holdings by dedicated institutional investors, who are more likely to interact closely with firms.

The results suggest that firms choose to disclose more information when the information provided by external intermediaries for investors is likely to be scarcer. Our finding is consistent

with those of earlier studies documenting the complementarity between the external information environment and the disclosure quality of firms' filings. For example, Lehavy, Li, and Merkley (2011) find that the information provided by sell-side analysts complements the informativeness of corporate disclosure. Lougee and Marquardt (2004) document that the informativeness of the pro-forma earnings to investors varies by the types of investors holding the company.

4.6 Real Effects of Endogenous Information Disclosure

The results documented thus far collectively suggest that firms strategically disclosed more accounting information when uncertainty was heightened during the lockdown to alleviate any adverse consequences of information asymmetry. In this section, we examine whether there are any economic consequences of enhanced disclosure quality during the lockdown in two dimensions.

First, we look at whether higher disclosure quality during lockdown helps forecast earnings. If the addtional disclosure of detailed financial information during the lockdown period reduced the uncertainty of the firms' prospects, we would expect to observe less disagreement among analysts and better predictability of long-term earnings.

To test this idea, we construct an analyst forecast dispersion variable and estimate Equation (3) in Table 6. We include *Num of Analysts*, *Size*, *Q*, *Leverage* and*Cash Flow Vol* as controls. As we include firm and state-year-quarter fixed effects, the coefficient of the interaction term between *Disclose in Lockdown* and *DQ* indicates the incremental impact of disclosure quality during the lockdown on forecast dispersion, holding time-invariant firm characteristics and any state-specific seasonal macroeconomic factors constant.

We find that analysts' forecast precision improved for firms whose DQ increased when they had to report financial statements during the lockdown. The positive impact of higher DQ on forecast accuracy holds both the forecast dispersion in column (1). An increase of one standard deviation in the DQ of the report released during the lockdown period improves analyst forecast accuracy in the next quarter by 0.07 for firms that filed their financial statements during lockdown, equivalent to a 7.5% increase in the mean. Similarly, an increase of one standard deviation in DQ improves the likelihood that analysts report long-term earnings forecasts in the next quarter by 0.02 for firms that filed their financial statements during the lockdown, which is equivalent to a 5.3% increase in the mean. The results are consistent with earlier findings that analysts who extensively use the public information available via EDGAR show smaller

forecasting errors than do their peers (e.g., Gibbons, Iliev, and Kalodimos (2021)).

Second, we examine whether greater disclosure quality during the lockdown effectively allowed firms to access more external financing and lower the cost of capital. To do so, we estimate Equation 4. The dependent variables include the implied cost of capital next quarter, as in (Lambert, Leuz, and Verrecchia, 2007), and the amount of net equity and debt issuance scaled by total assets. The results are reported in Table 7. The estimate in column (1) suggests that an increase of one standard deviation in DQ during the lockdown period would lower the cost of capital by 5 basis points, equivalent to a 3.7% decrease in the cost of capital. The external financing amount raised in the next quarter also increased by 4.5% of its standard deviation if a firm increased its DQ by one standard deviation in the quarterly report prepared during the lockdown period.

Overall, our findings in this section suggest that the improved disclosure quality during the lockdown period had material economic consequences. In particular, firms that strategically communicated financial information to outside investors experienced less analyst forecast dispersion during the COVID-19 pandemic. Consequently, high-quality financial reports helped firms raise external financing at a lower cost during the pandemic.

5 Robustness Checks

We find that firms choose to improve their disclosure quality when physical mobility is severely restricted during the SAH orders in 2020. In our main analyses, we estimate the impact of disclosure during the lockdown with firm fixed effects; therefore, the results hold with the firms' location constant. Nonetheless, one might be concerned that the quality of disclosure would be fundamentally different based on their locations, and our results could be driven by firms located in specific states or fundamental differences in firms located in different states. To corroborate the main findings, we conduct several robustness tests.

5.1 Discretionary Accounting Items

Many items in Compustat used to calculate the DQ measures should be reported under accounting reporting rules, which implies that firms do not have much choice in disclosing more information about these items. In other words, most variation in DQ comes from discretionary accounting items. For example, most firm-year observations have nonmissing sales (SALEQ)

or cash (CHQ) items. However, other discretionary items, such as "Inventory Work in Progress (INVWIPQ)," "Inventory - Raw Materials (INVRMQ)," and "Inventory - Finished Goods (INVFGQ)," might convey more information about firms' aspects (in this case, the status of the operating process by showing the inventories separately by stage).

To isolate the discretionary component of the disclosure quality, we construct an alternative measure of disclosure quality by counting the nonmissing items that are reported in less than 90% of firms on average over the full sample. The mean of this new DQ is 70.87, with a standard deviation of 17.65. It has a lower mean compared to the original DQ. Then, we replicate Tables 2 and 3, replacing the dependent variable with discretionary accounting DQ. The results are reported in Tables 8 and 9. Most results are quantitatively comparable to the results obtained with the original DQ measure. This indicates that firms were able to increase disclosure quality largely through the enhanced reporting of discretionary items.

5.2 Excluding States with No Lockdown Mandates

We narrow down the control firms by excluding 12 states that never issued lockdown mandates during the sample period. Thus, in this new set of samples, we compare firms required to prepare and file their annual reports under SAH orders to those that happened to file either immediately before the implementation of SAH orders or after their termination. We make use of the fact that the fiscal quarter-end dates, which are preset, determined whether a firm had to file under SAH orders. Our assumption in categoriazing these firms is that as long as the quarter-end schedules are not planned in anticipation of the timing of the SAH orders, our estimation strategy isolates the effects of disclosure during the lockdown. We present the results in Table 10. The results show that the findings remain robust even after we further restrict the sample to the firms located in states that had SAH orders in 2020. This test also excludes an alternative explanation that the increase in DQ can be driven by some state-level macro-level conditions that might simultaneously affect state-level decisions of imposing SAH orders and firm performance, which might affect their DQ policies.

5.3 Comparison to Neighboring States

To further address the concern that state-level macroeconomic conditions affect firm performance during the pandemic, hence changing disclosure incentives, we refine our control firms

by considering those located in neighboring states. As adjacent states tend to have similar economic conditions, we can compare the disclosure quality of firms with comparable local economic environments, except for the differences in stay-at-home order mandates. To the extent that both companies face the same level of macroeconomic conditions at the state level, any differential impact on DQ is more likely to be driven by the existence of SAH orders imposed by state governments. We present the results in Table 11. By contrasting firms in neighboring states, we assess the differential impacts of disclosure during the lockdown period. Our analysis shows that the primary results are both quantitatively and qualitatively consistent.

6 Conclusion

We investigate whether and how reduced social mobility and the sharing of soft information within the state of headquarters during the COVID-19 lockdown period impacted firms' decisions to voluntarily disclose hard information in their financial reports. We hypothesize that with reduced social mobility during the lockdown, information agents are constrained in their ability to disseminate soft information about firms to external investors. Under such circumstances, we expect firms to be more likely to voluntarily disclose granular information on their operations through the hard information sharing channel. Such tendencies are more likely for firms that require external funding and have opaque asset structures during the pandemic.

We employ the disclosure quality measure from Chen, Miao, and Shevlin (2015) to capture the disaggregation levels of accounting items in financial reports. Our findings show that firms whose quarterly reporting dates fall into the lockdown period (treated) increase their hard information disclosure. Compared with firms in the same state without such reporting requirements during the lockdown period (control), treated firms that require external funding are more likely to disclose detailed financial accounting information. Furthermore, we find that treated firms disclose more when they are perceived as more difficult for outside investors to comprehend, such as regarding intangible assets, R&D activities, and accrual accounts.

We show that this endogenous information disclosure policy is effective in helping firms enjoy more accurate future earnings forecasts by sell-side analysts and that those firms experience reduced funding costs. Increasing disclosure quality was largely achieved by increasing the reporting of discretionary items. Overall, our results suggest that soft information, subject to social networks and geographic proximity, versus hard information, verifiable without social

interactions, is a viable substitute under conditions of severe information asymmetry. Strategic disclosure by firms appears to be key in curtailing the cost of capital, thereby sustaining growth during times of increasing economic uncertainty and information frictions.

Our work contributes to the literature on information friction and corporate financial policies, which highlights the significant home bias and limited economic transactions resulting from severe information asymmetry. We demonstrate that corporate disclosure policy, when it interacts with the external information environment, could alleviate such frictions. It empowers firms to maintain access to external capital markets through the support of external information agents such as reputable auditors and sophisticated institutional investors, who can more accurately predict firms' operations using valuable, strategically fed hard information. In this regard, we provide novel evidence that soft information can be effectively substituted by hard information when overall information quality is poor and quantity is scarce.

Using the sudden SAH orders, together with the predetermined financial reporting schedules of firms in the same state, as novel instruments, we uncover significant impacts of the COVID-19 pandemic on the overall U.S. economy. We are the first to identify strategic disclosure changes in the U.S. corporate sector during an exogenous global health shock, which has never been documented in the literature on the impact of COVID-19 on corporate finance and valuation. In subsequent research, we hope to evaluate the broader impact of these findings by extending our analyses to other capital markets and firms around the globe.

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Figure 1: Duration of Covid-19 Stay-at-home Lockdown Mandatory Order by State
This figure shows a map of the duration of COVID-19 stay-at-home lockdown mandatory orders by state.

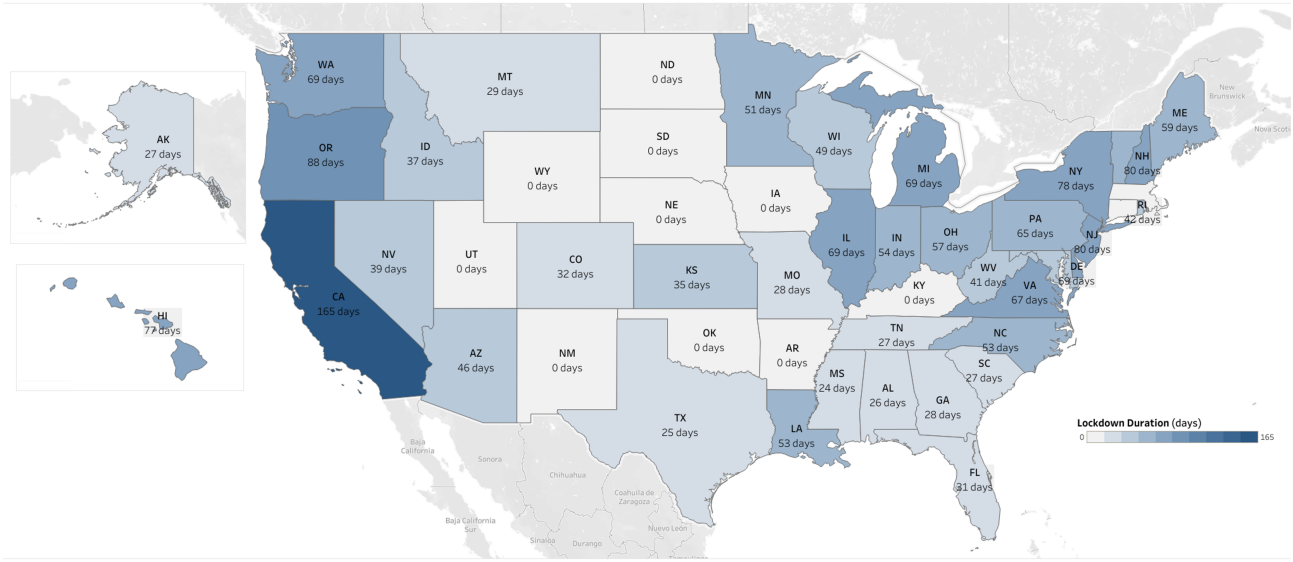
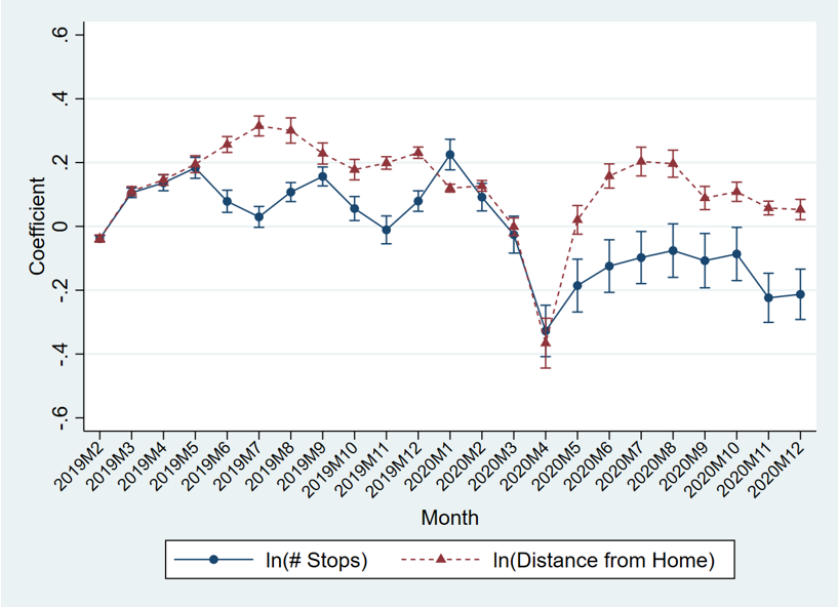


Figure 2: Mobility Change after Stay-at-home Lockdown Order
These figures show the changes in social mobility after COVID-19 lockdown orders. We obtain monthly data on social mobility on the number of stops in the area and the average distance from home of the devices visiting in the area at the census block group level from January 2019 to December 2020 from Safegraph. Panel A plots the coefficients and confidence intervals from the regressions of the monthly log change in the number of stops and the distance from home (baseline = January 2019) on time indicators with census-block-group fixed effects. Panel B plots the log change in the number of stops as in Panel A but separately for states with lockdown duration less than 30 days and the others with lockdown duration longer than 20 days.

Panel A. Mobility Change



Panel B. Mobility Change by Lockdown Duration

Figure 3: Proportion of Firms Affected by Covid-19 Stay-at-home Lockdown Mandatory Order

This figure shows a map of the distribution of firms that had to prepare their quarterly filings under a state's mandatory COVID-19 stay-at-home lockdown mandatory orders in the first quarter of 2020.

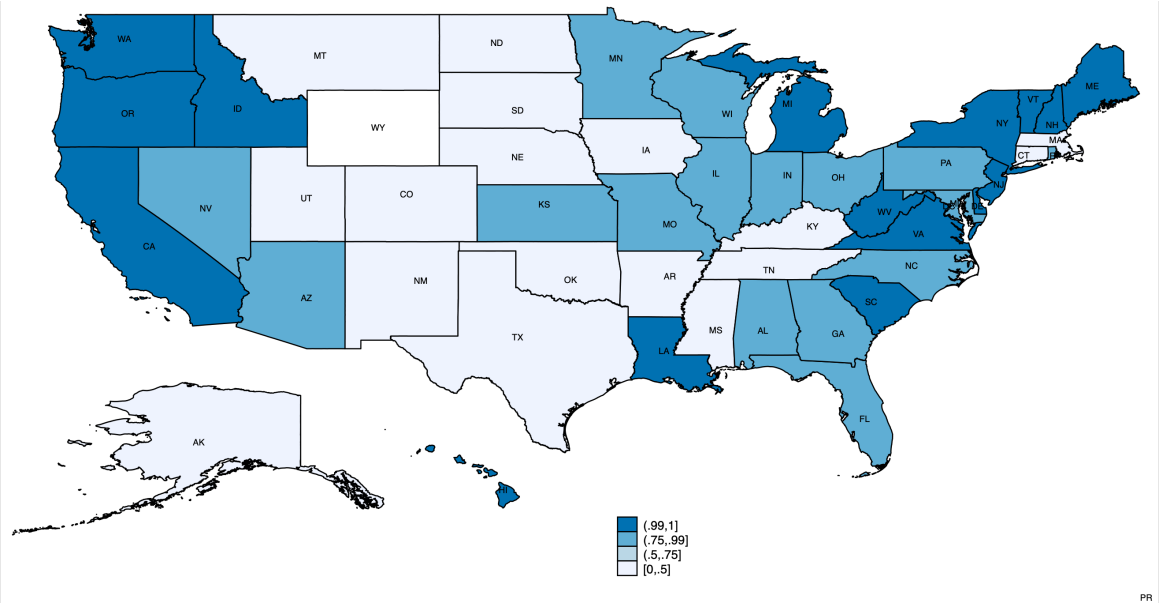


Figure 4: Dynamics of DQ Responses
This figure shows the dynamics of Disclosure Quality changes over event time, which is the first quarter of the lockdown period of each state. *DQ* is regressed on indicator variables denoting whether it is four, three, two, or one quarter before a firm was hit by a stay-at-home order. The regression follows the baseline specification in Table 2, including firm and year-quarter fixed effects. We present the coefficient of each quarter indicator and confidence interval at 95%. Each pre-treatment coefficient is not individually statistically significant.

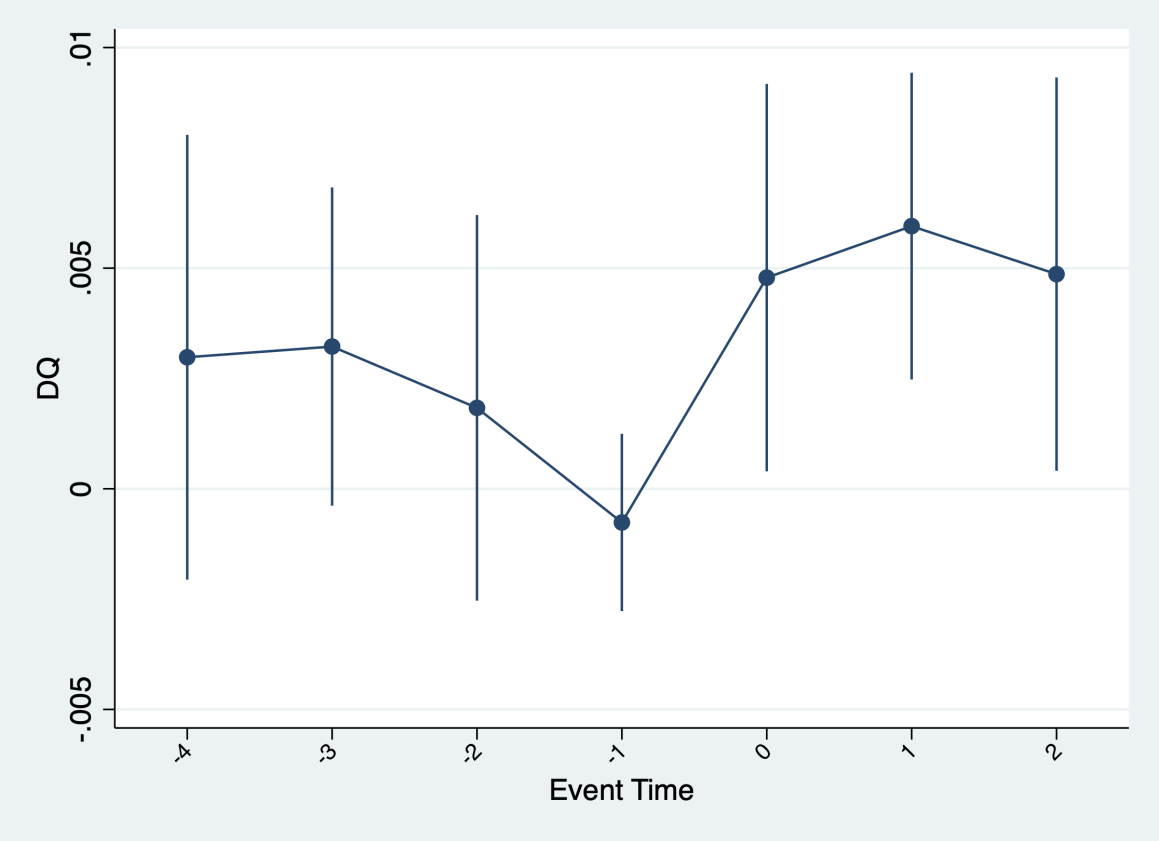


Table 1: Summary Statistics

We report summary statistics for the sample of firm-year-quarter observations from the first quarter of 2019 to the fourth quarter of 2020. Panel A reports the overall sample. Panel B displays the firm characteristics of two subsamples: firms that disclose during the stay-at-home lockdown orders and firms that disclose outside the orders. We evaluate the differences in means of the two subsamples using t-tests. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. We report the variable construction in Appendix B.

Panel A: Firm Characteristics - Full Sample

	mean	sd	p10	median	p90
DQ	72.630	17.836	30.512	78.196	87.348
Discretionary DQ	70.870	17.657	34.346	76.176	86.280
Tangibility	0.220	0.243	0.011	0.124	0.643
R&D	0.019	0.043	0.000	0.000	0.062
Size	6.993	2.201	3.898	7.152	9.771
Tobin's Q	1.793	1.131	0.926	1.358	3.363
Leverage	0.442	0.448	0.026	0.409	0.846
Cash Flow Vol	0.049	0.209	0.001	0.015	0.089
AP ratio	0.146	0.243	0.008	0.048	0.716
AR ratio	0.176	0.219	0.007	0.097	0.622
ROE	-0.026	0.109	-0.116	0.003	0.028
WW index	-0.330	0.114	-0.477	-0.336	-0.174
HP index	-3.722	0.824	-4.894	-3.688	-2.692
Equity Dep.	0.254	8.892	-1.767	0.000	0.570
External Financing	0.019	0.161	-0.029	0.000	0.068
ICC	0.175	0.141	0.067	0.123	0.361
Forecast Dispersion	0.535	1.015	0.022	0.155	1.365
Long-term Forecast Issuance	0.337	0.473	0.000	0.000	1.000
Disclose in Lockdown	0.114	0.318	0.000	0.000	1.000
Observations	24146				

Panel B: Firm Characteristics by Exposure to Disclose-in-Lockdown Shock

	Disclose in Lockdown	Disclose outside lockdown
	mean	mean
Size	7.060	6.990
Leverage	0.432	0.453
ROE	-0.025	-0.032
Q	1.867***	1.691
Cash Flow Vol	0.047	0.047
Tang	0.191***	0.300
R&D	0.021	0.020
External Fin	0.019	0.015
WW index	-0.334	-0.330
Equity Dep.	0.466	0.142
Observations	2123	937

Table 2: Effects of Lockdown on Disclosure Quality - Differential Effects of External Financing Needs

The table presents the differential effects of financial constraints on the response of disclosure quality to lockdown constraints. *Disclose in Lockdown* is an indicator that takes a value of one when a firm has to prepare their disclosure filing during the state-wide stay-at-home mandates. The standard errors are adjusted for clustering at the state level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dep. Var =			DQ		
VAR=		ROE	WW	HP	Equity Dep.
Disclose in Lockdown	0.209*	0.131	1.026***	1.979***	0.246**
	(1.96)	(1.14)	(3.67)	(5.22)	(2.23)
Disclose in Lockdown×VAR		-2.041***	2.379**	0.479***	0.038***
		(-3.40)	(2.64)	(4.45)	(3.53)
VAR		-0.221	4.831**	1.645*	-0.000
		(-0.38)	(2.44)	(1.74)	(-0.04)
Size	0.091	0.129	0.161	0.590	0.249
	(0.48)	(0.75)	(0.61)	(1.62)	(1.07)
Q	0.046	0.039	0.086	0.045	0.075
	(0.56)	(0.44)	(1.04)	(0.53)	(0.71)
Leverage	-0.096	-0.094	-0.025	-0.094	-0.118
	(-0.63)	(-0.62)	(-0.14)	(-0.61)	(-0.83)
Cash Flow Vol	-0.682	-0.714	-0.942**	-0.716	-0.602
	(-0.97)	(-1.00)	(-2.01)	(-1.05)	(-0.77)
Observations	24000	23983	16408	24000	20363
R-Squared	0.948	0.948	0.947	0.948	0.951
Firm FE	Yes	Yes	Yes	Yes	Yes
Year-Qtr FE	Yes	Yes	Yes	Yes	Yes
State Cluster	Yes	Yes	Yes	Yes	Yes

Table 3: Heterogeneous Effects of Lockdown on Disclosure Quality - State-year-quarter Variations

The table presents the differential effects of financial constraints on the response of disclosure quality to lockdown constraints. We examine changes in *DQ* within state-year-quarter. *Disclose in Lockdown* is an indicator that takes a value of one when a firm has to prepare their disclosure filing during the state-wide stay-at-home mandates. The standard errors are adjusted for clustering at the state level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dep. Var =			DQ	
VAR=	ROE	WW	HP	Equity Dep.
Disclose in Lockdown	-0.749	0.161	1.131	-0.881
	(-1.28)	(0.23)	(1.40)	(-1.47)
Disclose in Lockdown×VAR	-1.847***	2.267**	0.476***	0.040***
	(-3.29)	(2.41)	(4.10)	(3.49)
VAR	-0.256	4.870**	1.584	-0.001
	(-0.43)	(2.59)	(1.66)	(-0.15)
Size	0.177	0.205	0.621*	0.298
	(1.01)	(0.76)	(1.71)	(1.21)
Q	0.033	0.077	0.039	0.075
	(0.37)	(0.97)	(0.46)	(0.70)
Leverage	-0.095	-0.038	-0.093	-0.127
	(-0.63)	(-0.21)	(-0.61)	(-0.88)
Cash Flow Vol	-0.599	-0.884*	-0.595	-0.518
	(-0.89)	(-1.96)	(-0.92)	(-0.69)
Observations	23983	16408	24000	20361
R-Squared	0.948	0.947	0.948	0.951
Firm FE	Yes	Yes	Yes	Yes
State-Year-Qtr FE	Yes	Yes	Yes	Yes
State Cluster	Yes	Yes	Yes	Yes

Table 4: Effects of Lockdown on Disclosure Quality - Characteristics of Assets and Operations

The table presents the differential effects of firm characteristics on the response of disclosure quality to lockdown constraints. We examine the differential effects of asset, investment, and sales opacity. *Disclose in Lockdown* is an indicator that takes a value of one when a firm has to prepare their disclosure filing during the state-wide stay-at-home mandates. The standard errors are adjusted for clustering at the state level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dep. Var =	DQ			
VAR=	Tang	R&D	Payables	Receivables
Disclose in Lockdown	0.061	-0.780	-0.968	-1.015*
	(0.10)	(-1.33)	(-1.67)	(-1.86)
Disclose in Lockdown×VAR	-3.165***	6.311***	1.614***	1.667***
	(-6.46)	(3.80)	(5.75)	(5.78)
VAR	-1.535*	-3.465	-0.378	0.670
	(-1.87)	(-1.43)	(-0.45)	(0.53)
Size	0.097	0.072	0.145	0.168
	(0.55)	(0.35)	(0.73)	(0.88)
Q	0.024	0.054	0.054	0.049
	(0.28)	(0.64)	(0.59)	(0.61)
Leverage	-0.090	-0.076	-0.095	-0.124
	(-0.60)	(-0.49)	(-0.61)	(-0.78)
CF Vol.	-0.397	-0.567	-0.562	-0.606
	(-0.55)	(-0.85)	(-0.84)	(-0.94)
Observations	23547	23864	23752	23628
R-Squared	0.948	0.948	0.948	0.948
Firm FE	Yes	Yes	Yes	Yes
State-Year-Qtr FE	Yes	Yes	Yes	Yes
State Cluster	Yes	Yes	Yes	Yes

Table 5: Differential Effects of Information Environment

The table presents the differential effects of lockdown on disclosure quality depending on firms' external information environment. *Disclose in Lockdown* is an indicator that takes a value of one when a firm has to prepare their disclosure filing during the state-wide stay-at-home mandates. *IO* is the proportion of institutional ownership. $IO - Patient$ is the proportion of dedicated institutional stockholders and indexers. The standard errors are adjusted for clustering at the state level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dep. Var = DQ					
VAR=	Ind Leaders	Big 4	IO	IO - Patient	Ln(Num of Analysts)
Disclose in Lockdown	-0.637	-0.251	-0.525	-0.448	0.214
	(-1.07)	(-0.40)	(-0.92)	(-0.81)	(0.37)
Disclose in Lockdown×VAR	-0.726**	-0.735***	-0.607**	-0.920***	-0.374***
	(-2.51)	(-3.57)	(-2.20)	(-2.69)	(-3.55)
VAR	0.309	0.251	-0.811***	-0.791***	-0.610***
	(1.23)	(1.00)	(-3.41)	(-2.99)	(-3.07)
Size	0.131	0.144	0.263	0.267	0.302
	(0.68)	(0.75)	(1.35)	(1.37)	(1.35)
Q	0.040	0.043	0.094	0.088	0.189**
	(0.49)	(0.53)	(1.04)	(0.99)	(2.10)
Leverage	-0.098	-0.102	-0.147	-0.137	-0.012
	(-0.64)	(-0.66)	(-0.88)	(-0.82)	(-0.06)
Cash Flow Vol	-0.559	-0.557	-0.643	-0.625	-0.595
	(-0.84)	(-0.83)	(-1.00)	(-0.96)	(-0.85)
Observations	23977	23977	22389	22389	19579
R-Squared	0.948	0.948	0.950	0.950	0.948
Firm FE	Yes	Yes	Yes	Yes	Yes
State-Year-Qtr FE	Yes	Yes	Yes	Yes	Yes
State Cluster	Yes	Yes	Yes	Yes	Yes

Table 6: Effects of Disclosure Quality on Analysts' Forecast Accuracy and Issuance of Long-term Forecast

The table presents the impacts of enhanced disclosure quality on analysts' forecast accuracy and the likelihood of issuance of analysts' long-term forecasts. *Disclose in Lockdown* is an indicator that takes a value of one when a firm has to prepare their disclosure filing during the state-wide stay-at-home mandates. The standard errors are adjusted for clustering at the state level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Dispersion/Price	Issuance of Long-term Forecast
Disclose in Lockdown × DQ	-0.004***	0.001**
	(-3.88)	(2.02)
Disclose in Lockdown	0.101	-0.017
	(0.70)	(-0.41)
DQ	0.001	0.000
	(0.67)	(0.13)
ln(Num of Analysts)	-0.000	0.121***
	(-0.01)	(5.73)
Size	-0.004	0.034**
	(-0.10)	(2.19)
Q	-0.030*	0.009
	(-1.77)	(1.33)
Leverage	0.093*	-0.001
	(1.85)	(-0.27)
Cash Flow Vol	-0.079	-0.043
	(-0.42)	(-1.49)
Constant	0.520*	-0.154
	(1.74)	(-1.13)
Observations	17860	13940
R-Squared	0.545	0.731
Firm FE	Yes	Yes
State-Year-Qtr FE	Yes	Yes
State Cluster	Yes	Yes

Table 7: Response of Cost of Capital and External Financing

This table displays the consequences of enhanced disclosure on external financing during the lockdown. *Disclose in Lockdown* is an indicator that takes a value of one when a firm has to prepare their disclosure filing during the state-wide stay-at-home mandates. The standard errors are adjusted for clustering at the state level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Cost of Capital	External Financing
Disclose in Lockdown × DQ	-0.0003***	0.0004***
	(-3.84)	(3.66)
Disclose in Lockdown	-0.014	-0.010
	(-0.99)	(-0.86)
DQ	-0.000	0.000
	(-1.27)	(0.50)
Log(Num Analysts)	-0.015**	0.030***
	(-2.06)	(5.92)
Size	-0.031***	-0.197***
	(-5.10)	(-13.41)
Q	-0.029***	0.052***
	(-11.13)	(10.83)
Leverage	0.014*	0.003
	(1.78)	(0.40)
Cash Flow Vol	-0.005	-0.005
	(-0.26)	(-0.11)
Constant	0.501***	1.307***
	(10.77)	(11.10)
Observations	16056	14552
R-Squared	0.720	0.339
Firm FE	Yes	Yes
State-Year-Qtr FE	Yes	Yes
State Cluster	Yes	Yes

Table 8: DQ on Discretionary Accounting Items

This table displays the results indicating that increased disclosure quality primarily stem from the more disaggregated reporting of discretionary items. *Disclose in Lockdown* is an indicator that takes a value of one when a firm has to prepare their disclosure filing during the state-wide stay-at-home mandates. The standard errors are adjusted for clustering at the state level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dept. Var =	DQ on Discretionary Accounting Items				
VAR=		ROE	WW	HP	Equity Dep.
Disclose in Lockdown	0.253**	-0.792	0.226	1.223	-1.038
	(2.15)	(-1.30)	(0.29)	(1.51)	(-1.53)
Disclose in Lockdown×VAR		-2.228***	2.550**	0.508***	0.000
		(-4.15)	(2.54)	(4.80)	(1.04)
VAR		-0.051	4.448**	1.436	-0.000***
		(-0.11)	(2.38)	(1.27)	(-12.88)
Size	0.231	0.299*	0.294	0.718*	0.440*
	(1.25)	(1.68)	(1.12)	(1.85)	(1.88)
Q	-0.030	-0.046	-0.006	-0.039	0.041
	(-0.32)	(-0.46)	(-0.06)	(-0.40)	(0.34)
Leverage	-0.051	0.000	0.034	-0.050	-0.076
	(-0.28)	(0.00)	(0.16)	(-0.27)	(-0.42)
Cash Flow Vol	-0.969	-0.836	-1.199***	-0.856	-0.616
	(-1.51)	(-1.35)	(-3.79)	(-1.42)	(-0.96)
Observations	24003	23984	16407	24003	20718
R-Squared	0.941	0.942	0.941	0.942	0.945
Firm FE	Yes	Yes	Yes	Yes	Yes
State-Year-Qtr FE	Yes	Yes	Yes	Yes	Yes
State Cluster	Yes	Yes	Yes	Yes	Yes

Table 9: DQ on Discretionary Accounting Items

This table displays the results indicating that increased disclosure quality is primarily driven by the enhanced reporting of discretionary items. *Disclose in Lockdown* is an indicator that takes a value of one when a firm has to prepare their disclosure filing during the state-wide stay-at-home mandates. The standard errors are adjusted for clustering at the state level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dept. Var =	DQ on Discretionary Accounting Items			
VAR=	Tang	R&D	Payables	Receivables
Disclose in Lockdown	0.883***	0.122	-0.020	-0.075
	(7.31)	(0.88)	(-0.14)	(-0.57)
Disclose in Lockdown×VAR	-3.256***	6.825**	1.608***	1.648***
	(-6.95)	(3.86)	(6.02)	(6.20)
VAR	-1.372	9.053	-0.466	0.741
	(-1.33)	(0.79)	(-0.58)	(0.59)
Size	0.195	0.197	0.087	0.115
	(1.13)	(0.99)	(0.44)	(0.62)
Q	-0.052	-0.023	0.053	0.045
	(-0.53)	(-0.24)	(0.60)	(0.55)
Leverage	-0.053	-0.035	-0.096	-0.119
	(-0.30)	(-0.19)	(-0.62)	(-0.76)
Cash Flow Vol	-0.709	-0.964	-0.674	-0.729
	(-1.01)	(-1.47)	(-0.95)	(-1.06)
Observations	23666	24003	23879	23751
R-Squared	0.942	0.942	0.948	0.948
Firm FE	Yes	Yes	Yes	Yes
State-Year-Qtr FE	Yes	Yes	Yes	Yes
State Cluster	Yes	Yes	Yes	Yes

Table 10: Robustness - Excluding Never Lockdown States

The table presents the differential effects of firm characteristics on the response of disclosure quality to lockdown constraints using an alternative sample. We exclude states that never issued stay-at-home orders. *Disclose in Lockdown* is an indicator that takes a value of one when a firm has to prepare their disclosure filing during the state-wide stay-at-home mandates. The standard errors are adjusted for clustering at the state level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dept. Var =		DQ			
VAR=		ROE	WW	HP	Equity Dep
Disclose in Lockdown	0.282***	-0.744	0.148	1.112	-0.880
	(3.11)	(-1.27)	(0.21)	(1.38)	(-1.46)
Disclose in Lockdown×VAR		-1.784***	2.223**	0.473***	0.041***
		(-3.22)	(2.31)	(4.06)	(3.50)
VAR		-0.477	5.207**	1.992*	-0.002
		(-0.75)	(2.49)	(1.97)	(-0.32)
Size	0.061	0.170	0.253	0.707*	0.386
	(0.28)	(0.84)	(0.87)	(1.83)	(1.41)
Q	0.006	-0.013	-0.006	-0.008	0.055
	(0.07)	(-0.13)	(-0.10)	(-0.09)	(0.45)
Leverage	0.012	0.021	0.096	0.027	-0.005
	(0.07)	(0.13)	(0.63)	(0.16)	(-0.03)
Cash Flow Vol	-0.073	-0.243	0.014	-0.201	-0.198
	(-0.09)	(-0.27)	(0.02)	(-0.25)	(-0.22)
Observations	20876	20859	14389	20876	17716
R-Squared	0.948	0.948	0.948	0.948	0.951
Firm FE	Yes	Yes	Yes	Yes	Yes
State-Year-Qtr FE	Yes	Yes	Yes	Yes	Yes
State Cluster	Yes	Yes	Yes	Yes	Yes

Table 11: Robustness - Only Adjacent States

The table presents the differential effects of firm characteristics on the response of disclosure quality to lockdown constraints using an alternative sample. The sample is restricted to the firms located in states that are adjacent to the states under stay-at-home orders. *Disclose in Lockdown* is an indicator that takes a value of one when a firm has to prepare their disclosure filing during the state-wide stay-at-home mandates. The standard errors are adjusted for clustering at the state level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dept. Var =		DQ			
VAR=		ROE	WW	HP	Equity Dep
Disclose in Lockdown	0.282***	-0.241	0.522	1.667*	-0.322
	(3.34)	(-0.36)	(0.60)	(1.69)	(-0.45)
Disclose in Lockdown×VAR		-1.396***	2.046*	0.465***	0.034***
		(-2.91)	(1.92)	(3.44)	(2.86)
VAR		-0.469	5.097**	1.857*	-0.003
		(-0.70)	(2.34)	(1.76)	(-0.36)
Size	0.163	0.251	0.359	0.760*	0.302
	(0.72)	(1.27)	(1.22)	(1.83)	(1.14)
Q	0.064	0.046	0.106	0.058	0.077
	(0.66)	(0.44)	(1.19)	(0.60)	(0.62)
Leverage	-0.128	-0.127	-0.042	-0.125	-0.160
	(-0.72)	(-0.72)	(-0.20)	(-0.69)	(-0.93)
Cash Flow Vol	-0.808	-0.703	-0.915*	-0.685	-0.545
	(-1.12)	(-1.00)	(-1.80)	(-1.02)	(-0.65)
Observations	19252	19238	13025	19252	16200
R-Squared	0.950	0.951	0.950	0.950	0.953
Firm FE	Yes	Yes	Yes	Yes	Yes
State-Year-Qtr FE	Yes	Yes	Yes	Yes	Yes
State Cluster	Yes	Yes	Yes	Yes	Yes

Appendix A

Table A1: Changes in Mobility during the COVID-19 Lockdown Period
This table describes the effect of COVID-19 lockdown orders on social mobility measures, using the census-block-group-month panel during the period of January, 2018 – April, 2021. The estimates are from OLS regressions, where the dependent variable is the log number of the stops in columns 1 and 2 and the log number of the distance from home of the devices visiting the area in columns 3 and 4. All regressions include year, month, and census-block-group fixed effects. We report coefficient estimates and their t-statistics. Standard errors are clustered at the state level. $^{*}p<.1$; $^{**}p<.05$; $^{***}p<.01$

	(1)	(2)	(3)	(4)
Dependent Var.	Ln(# Stops)		Ln(Distance from home)	
Lockdown	-0.383***	-0.281***	-0.318***	-0.164***
	(-5.77)	(-9.84)	(-5.58)	(-10.39)
Observations	8,827,031	8,827,030	8,822,219	8,822,209
R-squared	0.0234	0.890	0.0138	0.854
Year FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
CBG FE	No	Yes	No	Yes
State cluster	Yes	Yes	Yes	Yes

Appendix B: Variable definition

- *Size*: the natural logarithm of total assets (atq)
- *Tang*: the value of plant property and equipment ($ppent$) scaled by total assets.
- *Receivables*: receivables ($rect$) scaled by (annualized) sales ($sale * 4$).
- *Payables*: payables (apq) scaled by (annualized) sales ($sale * 4$).
- *ROE*: net income scaled by beginning-of-the-quarter stockholder equity (seq).
- R&D is research and development spending (xrd) divided by beginning-of-the-year book value of assets (at).
- *Q*: defined as the market-to-book ratio, where the numerator equals the market value of equity ($prcc * csho$) plus the book assets (at) minus the sum of the book value of common equity (ceq) and deferred taxes and investment credit ($txdb$), and the denominator is (0.9*book value of assets (at)+0.1*market value of assets)(Duchin, Ozbas, and Sensoy (2010)).
- *CashFlow*: calculated by dividing the sum of income before extraordinary items (ib) and depreciation and amortization (dpc) by the value of total assets.
- *CashFlowVol*: the standard deviation of the quarterly cash flow over the past 8 quarters.
- *Leverage*: the ratio of total debts ($dltt + dlc$) to the sum of total debts and the book value of equity (dlc+$dltt$+ceq).
- Equity dependence (*Equity Dep*): defined as the ratio of the net amount of equity issued (sale of common and preferred stock ($sstk$)-purchase of common and preferred stock ($prstkc$)-cash dividends (dv)) to the sum of capital expenditures ($capx$) and research and development expenses (xrd).
- WW: -0.091*cf-0.062*$divpos$+0.021*$tltd$-0.044*$size$+0.102*isg-0.035*sg, where cf denotes the ratio of cash flow to total assets; $divpos$ is an indicator that takes a value of one if the firm pays cash dividends; $tltd$ is the ratio of the long-term debt to total assets; $size$ is the value of the natural logarithm of total assets; isg is the firm's three-digit sic industry sales growth; and sg is firm sales growth (Whited and Wu (2006)).
- HP: (-0.737*$size$) + (0.043*$size^2$) - (0.040*age) where $size$ equals the value of the natural logarithm of total assets, and age is the number of years the firm has been listed since it first appeared on Compustat. $size$ is capped at (the log of) \$4.5 billion, and age is capped at 37 years (Hadlock and Pierce (2010)).

- IO: the proportion of institutional ownership.
- *IO Patient*: the proportion of ownership held by dedicated institutional stockholders and indexers.
- $Dispersion/Price$: standard deviation of forecasts ($stdev_1$) scaled by price.
- *ln(Num of Analysts)*: the number of analysts ($numest$).
- *External Financing*: the ratio of net issuance (sum of net equity issuance ($sstk$ - $prstkc$) and net debt issuance ($dltis$ - $dltr$)) to total assets (at).