The (Mis)Allocation of Corporate News*

Xing Guo
Bank of Canada

Alistair Macaulay
University of Surrey

Wenting Song
Bank of Canada

November 1, 2024

Abstract

This paper studies how the distribution of information supply by the news media affects the macroeconomy. We document three connected facts on media's reporting of firm news: corporate news coverage is highly concentrated, particularly among the largest firms; firms' equity financing and investments rise after media coverage; and yet these responses are largest among small, rarely-covered firms. We develop a heterogeneous-firm model with a media sector that matches these facts. Asymmetric information between firms and investors leads to financial frictions that constrain firms' financing and investments. Media's role in alleviating information frictions is limited by its focus on large and financially unconstrained firms. Reallocating news coverage, or allowing firms to buy coverage from outlets in a competitive market, leads to substantial increases in aggregate investment and output. The aggregate effects of media coverage therefore depend crucially on how that coverage is allocated.

JEL: E22, G32, D82, L82

Keywords: news media, asymmetric information, firm heterogeneity, macro-finance

*Guo (guoxing.econ@gmail.com): Bank of Canada; Macaulay (a.macaulay@surrey.ac.uk): Department of Economics, University of Surrey; and Song (wenting.w.song@gmail.com): Bank of Canada. We thank Yu-Ting Chiang, Oleksiy Kryvtsov, John Leahy, Kristoffer Nimark, Pablo Ottonello, Francisco Queirós, Víctor Ríos-Rull, Kjetil Storesletten, and participants at several conferences and seminars for helpful discussions. Maude Ouellet provided excellent research assistance. The views expressed herein are those of the authors and not necessarily those of the Bank of Canada.

1. Introduction

Information asymmetry between firms and potential investors distorts resource allocation and restricts firm growth (Myers and Majluf, 1984). At the same time, growing evidence suggests that the news media serves as a key information source for investors (e.g., Dougal, Engelberg, García and Parsons, 2012; Peress, 2014; Hu, 2024). Media coverage on firms—like other types of news (e.g., Gentzkow and Shapiro, 2008; Nimark and Pitschner, 2019)—is not randomly distributed; rather, editors and journalists selectively report on the firms they consider most newsworthy. In this paper, we study how media coverage is distributed across firms and examine how this selective, endogenous provision of information shapes firms' life cycles and aggregate investment.

We answer these questions using new data on firm-level media coverage and a quantitative heterogeneous-firm model that includes a media sector. Empirically, we begin by constructing a new dataset of firm-level media coverage in the U.S. to capture the timing and frequency of this coverage in major U.S. newspapers for a universe of publicly traded firms over a 30-year period. Using this data, we document three connected facts on the distribution of news coverage: corporate news coverage is highly concentrated, particularly among the largest firms; firms' equity financing and investments rise after media coverage; and yet these responses are largest among small, rarely-covered firms.

The first fact we document is that corporate news coverage is highly concentrated. The variation in news coverage can be mostly accounted for by firm-specific factors. Among the set of observable firm characteristics, news coverage displays a particularly strong nonlinear relationship with firm size. The largest 10% of firms account for more than 85% of all news coverage. This concentration is unique to firm size; media coverage is substantially less concentrated by other firm characteristics.

Next, combining this news-coverage data with financial data from CRSP and Compustat, we document that media coverage is associated with subsequent changes in firms' actions. In the quarters following the media coverage, firms have a greater likelihood of raising equity financing and a higher rate of investment. The association between news coverage and investment increases with the financial focus of a newspaper but is not present after social media coverage, which indicates that these relationships are not simply because the coverage makes a firm more salient to investors.[1]

The third fact we examine is the conditional distribution of news coverage. Recent studies suggest that the macroeconomic impact of micro-level heterogeneity depends heavily on the distribution (e.g., Alves, Kaplan, Moll and Violante, 2020; Sterk, Sedláček and Pugsley, 2021, and the references therein). Ranking firms by size, we document that the correlation between news coverage and firm responses is strongest for small firms and almost negligible for large firms.

We provide two pieces of evidence on the mechanisms behind this positive correlation. Using detailed texts of news coverage, we identify and exclude articles discussing equity issuance and investment, which may be subject to a form of reverse causality in which imminent firm actions attract media coverage. Complementing the U.S. data, we provide evidence from France, where media strikes create variation in media coverage that is unrelated to the firm outcomes of interest. Among firms that issued equity during media strikes, those with higher previous media coverage go on to invest less compared to other firms with less media exposure, consistent with firms relying on the media to alleviate information frictions.

Taken together, our empirical results are consistent with the interpretation that media reporting helps alleviate information asymmetries in financial markets.[2] Our findings on the conditional distribution of coverage suggest that the firms that receive the most coverage are the least responsive to it, thereby reducing the aggregate effects of media reporting. This highlights the importance of considering the distribution of media coverage when evaluating its aggregate consequences.

To quantify the macroeconomic importance of corporate news reporting, we introduce a media sector to a macro-finance model with heterogeneous firms. Firm managers seek to maximize their firm's value to existing shareholders and can raise external equity from retail investors to finance investments. However, retail investors face asymmetric information about the quality of firms' heterogeneous assets. Without media reporting, concerns over adverse selection limit equity issuance, as in the large literature pioneered by Myers and Majluf (1984). Media outlets observe full information about firms but are constrained to only reporting on a subset of firms. Once a firm appears in news reports, investors gain

[1] As in Frydman and Wang (2020).

[2] Similarly, Tetlock (2010) documents several empirical features of equity prices around news-coverage events that support the view that a media report removes information asymmetries.

full information about the firm, which alleviates the asymmetric information in the equity market. However, this effect is limited to the firms that news outlets choose to cover.

In taking the model to the data, we pay particular attention to matching media outlets' news reporting. Optimal editorial decisions indicate that a firm's probability of being reported increases with its "newsworthiness"— a measure positively related to a firm's size and idiosyncratic productivity. We calibrate the parameters of this reporting probability function to target empirical moments on news coverage and equity issuances.

Consistent with the data, the media outlets in our calibrated model disproportionately report on large firms. Our key result is that this focus on large firms strongly limits the media's effect on aggregate outcomes: Investments of large firms are unaffected by media coverage, since these firms are typically financially unconstrained and do not need external funding to finance their optimal investments. In contrast, small and financially constrained firms do benefit from news reporting, because information asymmetries otherwise cause them to under issue and under invest. By concentrating coverage on firms least influenced by coverage, the media plays a limited role in alleviating the negative effects of asymmetric information on aggregate investment.

To quantify the aggregate consequences of the distribution of media reporting, we conduct a counterfactual experiment that reallocates a portion of news coverage, while keeping the total media space constant. Specifically, we open a competitive market in which a fraction of the media coverage is available for purchase by firms. Firms that stand to gain the most from coverage have the highest willingness to pay. Targeting the media reporting to those firms significantly boosts their financing and investment, leading to a substantial reduction in aggregate output loss. A reallocation of just 5% of media resources towards firms with higher demand for coverage doubles the media's effect in reducing output loss, while a 10% reallocation mitigates half of the overall output loss from information asymmetry. Our results highlight that the distribution of media reporting is critical for its aggregate effects.

Literature Our paper is related to four strands of literature. First, we contribute to the literature on the macroeconomic consequences of the news media.[3] Most of this literature

[3]A related but distinct strand of literature studies news shocks, where news typically refers to signals obtained by agents about future productivity, with the signals arriving from an unspecified source (see Beaudry and Portier, 2014, for a review).

focuses on the role of the media in reporting macroeconomic news, demonstrating that both the selection of the macroeconomic news and the way it is reported can affect aggregate dynamics (e.g., Nimark, 2014; Larsen, Thorsrud and Zhulanova, 2021; Macaulay and Song, 2022) and help forecast macroeconomic outcomes (Bybee, Kelly, Manela and Xiu, 2020). Beyond the macroeconomic news, Chahrour, Nimark and Pitschner (2021) study the reporting of sectoral news and find that it plays a substantial role in driving the business cycle. We contribute to this literature by studying the aggregate consequences of firm-level news, which we show varies substantially even within sectors. Closer to us, Hu (2024) provides empirical evidence that the media's production of firm news responds to macroeconomic conditions and that this variation in news production amplifies aggregate fluctuations. We instead focus on the cross-sectional heterogeneity in the media coverage among firms, and we show that the distribution of the media coverage influences long-term macroeconomic outcomes.

Second, we contribute to the literature studying the importance of information frictions for firms' choices and resource allocations (Gorton and Ordonez, 2014; Asriyan, 2021; Coibion, Gorodnichenko and Ropele, 2020, 2023). We study the role of information supply by considering the news media—whose reporting has been shown to affect equity markets (e.g., Cutler, Poterba and Summers, 1988; Chan, 2003; Engelberg and Parsons, 2011; Dougal *et al.*, 2012)—as a potential market for disseminating information and alleviating information frictions. Our empirical and quantitative results indicate that the distribution of the media coverage can affect the allocation of financing across firms, which provides evidence on the connection between information frictions and misallocation.

Third, we extend an emerging literature that studies selectivity in media reporting, known as "gatekeeping,'' in journalism (Shoemaker and Vos, 2009). Within economics, selective reporting has been documented across political and other forms of news (Gentzkow and Shapiro, 2008; Enikolopov, Petrova and Zhuravskaya, 2011; Nimark and Pitschner, 2019). We extend this literature by documenting a selectivity in firm-level corporate news reporting and characterizing which firms are most likely to be selected, consistent with recent theoretical work on incentives in the news industry (Chiang, 2022; Martineau and Mondria, 2022; Perego and Yuksel, 2022; Denti and Nimark, 2022, among others).

Finally, we contribute to the broader literature on the effects of financial frictions on firm dynamics and investment (e.g., Cooley and Quadrini, 2001, and see Brunnermeier, Eisenbach and Sannikov, 2012 for a survey). Eisfeldt (2004), Kurlat (2013), and Bigio (2015) study the macroeconomic and financial implications of financial frictions that arise from asymmetric information. To study the aggregate effects of corporate news allocation, we build the firm and investor blocks of our model on Guo, Ottonello, Whited and Winberry (2024), who study the implications of information asymmetry in a model with firm heterogeneity. We extend the model to incorporate a media sector, which generates endogenous variation in the degree of asymmetric information and consequently financial frictions across firms. We find that the allocation of media-reporting resources plays a substantial role in shaping the firm distribution and dynamics.

Road map The rest of the paper proceeds as follows: in Section 2, we describe our data, document stylized facts on the structure of corporate news and study its effects on firm outcomes; in Section 3, we present a model of corporate news reporting; in Section 4, we use the model to quantify the effects of selective news reporting; Section 5 concludes.

2. Empirical Evidence

This section documents three inter-related facts on corporate news coverage: news coverage is concentrated among the largest firms, is associated with real effects on firm outcomes, and is allocated to the least responsive firms.

2.1. Illustrative framework: a decomposition

To begin with, we present a simplified version of our quantitative model, in which coverage from news outlets interacts with firms' financing costs. This simple model highlights that there are three moments needed to measure the aggregate consequences of media coverage: the average level of the coverage, the average firm response to the coverage, and the covariance between the news coverage and the firms' responses.

The model is static and there is a unit mass of firms. Firm i has investment technology $f(I_i) = \frac{1}{\theta} I_i^{\theta}$. To finance its investment, the firm raises external equity from a frictional market. The news coverage of the firm, $m_i \in \{0, 1\}$, is considered exogenous to the firm and interacts with financial frictions. The marginal cost of investment is given by $\log c_i = a + a_i m_i$, where $a \in \mathbb{R}$ denotes the component of the financing costs that does not interact with the media coverage (assumed constant across firms), and $a_i \in \mathbb{R}$ denotes the component that does interact with the financing costs. This set-up allows us to study the potential role of news reporting on aggregate investment, our object of interest.

Firms choose I_i to maximize $f(I_i)$ net of the investment costs. The first-order condition of firm i's optimal investment leads to $\log I_i^* = \psi(a + a_i m_i)$, where $\psi = -\frac{1}{1-\theta}$. Aggregating individual firms' investments implies that aggregate investment is given by $I = \int_{i\in[0,1]} I_i^* di = \mathbb{E}(I_i^*) = \exp(\psi a)\,\mathbb{E}(\exp(\psi a_i m_i))$. To study the effects of the news coverage, from the media sector, on aggregate investment, we denote the log of aggregate investment without a media sector as $\log I^0 \equiv \psi a$. The effects of the media sector on aggregate investment can then be characterized as

$$\begin{aligned}
\log I - \log I^0 &= \log \mathbb{E}(\exp(\psi a_i m_i)) \\
&\approx \mathbb{E}(\psi a_i m_i) + \mathbb{V}(\psi a_i m_i) \\
&= \mathbb{E}(m_i)\,\mathbb{E}(\psi a_i) + \mathbb{C}\mathrm{ov}(m_i, \psi a_i) + \mathbb{V}(m_i \cdot \psi a_i) \\
&= \mathbb{E}(m_i)\,\mathbb{E}\left(\frac{\partial I_i}{\partial m_i}\right) + \mathbb{C}\mathrm{ov}\left(m_i, \frac{\partial I_i}{\partial m_i}\right) + \mathbb{V}\left(m_i \frac{\partial I_i}{\partial m_i}\right), \qquad (1)
\end{aligned}$$

where the second line uses a second-order Taylor approximation, the third line uses properties of an expectations operator, and the last line substitutes for ψa_i with $\frac{\partial I_i}{\partial m_i}$, which follows directly from differentiating firm i's optimal investment with respect to m_i.

The decomposition in (1) shows that the aggregate effects of the media depend not only on the average level of the coverage, $\mathbb{E}\, m_i$, and the average investment responses to the coverage, $\mathbb{E}\,\frac{\partial I_i}{\partial m_i}$, but also on the distribution of the media coverage, consistent with the broader literature on the macroeconomic implications of micro-level heterogeneity (e.g., Alves *et al.*, 2020; Sterk *et al.*, 2021). Specifically, the covariance term indicates that when the media coverage is negatively correlated with firms' responsiveness, this dampens the aggregate investment response, whereas when the media coverage is positively correlated with firms' responsiveness, it amplifies it. Motivated by this decomposition, we now measure each component in (1) in turn.

2.2. Data

We collect data on the frequency of firm news coverage by three of the largest U.S. newspapers by circulation—*The Wall Street Journal*, *The New York Times*, and *USA Today*—from Dow Jones Factiva, a news aggregator.[4] The news-coverage frequency is matched to firms' financial data from the CRSP/Compustat, using a fuzzy matching algorithm (Levenshtein, 1966), based on firm names.[5] With this procedure, we construct a dataset of the firm-level media coverage for the universe of publicly traded firms in the U.S., consisting of 375,627 articles on 18,809 unique firms from 1990 to 2021.

We complement the main data on the news frequency with three additional datasets. The first contains the full texts of the news articles obtained from Dow Jones Factiva DNA, which contains the detailed content of the subset of the news articles that the Dow Jones is licensed to redistribute (representing 54% of the full coverage sample).

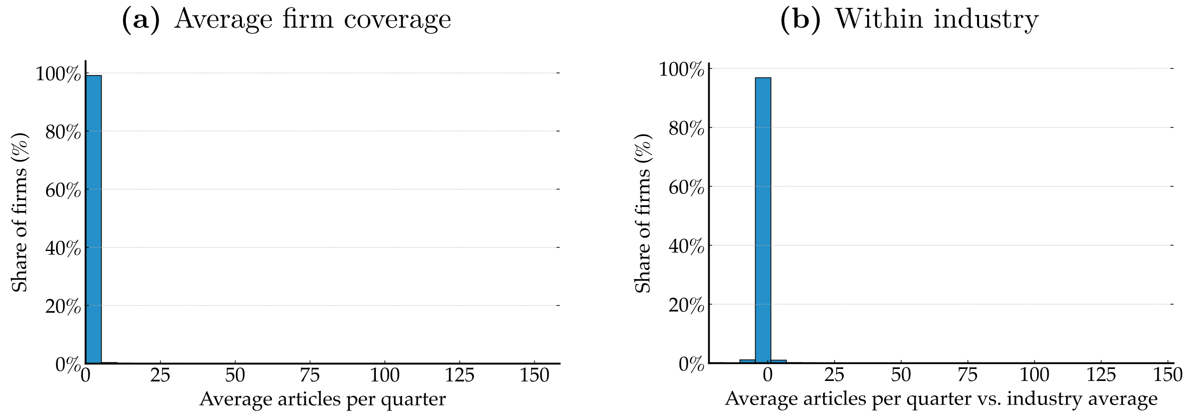
The second is the firms' social media coverage on Twitter (now X), which allows us to compare the role of the curated news coverage with the social media coverage. We identify over 3,000 publicly traded firms with official accounts on this social media platform and we collect the frequency with which a firm is mentioned (e.g., `@Microsoft`) each quarter from 2014, when Twitter became a popular platform, to 2021.

Finally, we use news-coverage data from France, where periods of media strikes introduce variation in the media coverage. We use Factiva to collect the frequency of firms' news coverage from 2005 to 2021 in four major French newspapers—*Les Echos*, *Le Monde*, *La Tribune*, and *Le Figaro*—and we link this with firm variables from Compustat Global as in the U.S. analysis.

[4] Factiva is a widely used database for measuring the frequency of news coverage (see, for example, Chahrour *et al.*, 2021; Bui, Huo, Levchenko and Pandalai-Nayar, 2022). Our search parameters closely follow those used by Chahrour *et al.* (2021), which provides media-coverage frequencies, for the top 100 firms, by news coverage in each newspaper and each quarter.

[5] Factiva provides named entity tags identifying the entities mentioned in each news article. These entities include not only firms but also organizations such as the United Nations and Harvard University. Using a fuzzy matching algorithm based on the Levenshtein distance, we match the firm names in Factiva with those of publicly traded U.S. firms in Compustat. Factiva-named entities often include slight variants of the same firm (e.g., "AT&T Inc" and "AT&T Inc."). Our algorithm recognizes that both names refer to the same firm. To ensure match quality, we perform manual checks on each of the matches.

Figure 1: Distribution of corporate news coverage



Notes: This figure reports the histograms of average articles per quarter for firms in our sample. Panel (a) reports the histogram of the times series average of firms' average number of articles per quarter. Panel (b) reports the histogram of the times series average of the residuals of firms' average number of articles per quarter, after regressing on industry fixed effects.

2.3. Frequency of news coverage

Panel (a) in Figure 1 reports the unconditional distribution of the average firm's article counts over the sample period. Most firms have zero coverage, while firms with coverage in the top 1% appear in an average of 23 articles per quarter in major newspapers.[6] The distribution is highly skewed, which shows that the news coverage is concentrated in a small number of firms. To ensure that the pattern is not driven by firms with zero coverage, Appendix Figure A.1 restricts the sample to firms with positive coverage and finds a similarly skewed distribution.

Panel (b) in Figure 1 reports the distribution of firm news coverage within industries. We demean the news coverage by industry, measured by the 4-digit NAICS, and report the residuals. The skewness in the coverage distribution is not driven by differences in industry-specific coverage. The top percentile of firms appears in 21 more articles, on average, per quarter compared to the remaining firms in the industry.

In light of the concentration in the news coverage, we next study the factors associated with the media coverage. We first estimate a panel regression

$$h_{it} = \alpha_{st} + \alpha_i + \varepsilon_{it}, , \tag{2}$$

[6]Table A.1 in the Appendix lists the top 20 firms by total media coverage. The top firms are household names such as General Motors and Microsoft, whose brand recognition may attract attention from readers who do not necessarily have a specific interest in business news.

Table 1: Variance decomposition of media coverage

	Mean	SD	$\mathbf{R^2}$		Mean	SD	$\mathbf{R^2}$
Articles per quarter	0.51	6.939	0.0000	Probability of media coverage	1.27%	0.112	0.0000
Time		6.938	0.0003			0.112	0.0000
Industry		6.763	0.0500			0.109	0.0665
Firm		3.889	0.6859			0.073	0.5728
Industry × Time + Firm		3.686	0.7214			0.070	0.6178

Notes: This table reports the variance decomposition of media coverage. The left-hand panel reports the standard deviation of ε_{it} and the R^2 from estimating equation (2): $h_{it} = \alpha_{st} + \alpha_i + \varepsilon_{it}$, where h_{it} is the article counts containing firm i in major newspapers in quarter t, α_{st} is the sector-by-time fixed effects, and α_i is the firm fixed effects. The right-hand panel reports the standard deviation of ε_{it} and the R^2 from a variant of equation (2), where the dependent variable is an indicator variable for media coverage, $\mathbb{1}(h_{it} < 0)$.

where h_{it} represents the article counts containing firm i in quarter t, α_{st} is the sector-by-time fixed effects, and α_i is the firm fixed effects. We include the fixed effects iteratively and report the standard deviations of the residuals, ε_{it}, and the resulting R^2 of the regressions.

Table 1 reports the results. The left-hand panel shows that 69% of the variation in the media coverage can be accounted for by firm-specific characteristics. The firm's industry explains 5% of the variation, while the time dimension plays a minor role. The right-hand panel shows the results from the same exercise, replacing the dependent variable with an indicator variable $\mathbb{1}(h_{it} < 0)$, which takes the value of 1 if a firm appears in major newspapers in a given quarter. Similarly, firm-specific characteristics explain a sizable variation of the probability of coverage. It should be noted that Table 1 shows that some 28% of the variation in the media coverage and 38% of the variation in the probability of coverage are unexplained by the aforementioned factors. This unexplained portion, which contains the variation over time at the firm level, is the variation we use to study the relationship between the media coverage and the firm outcomes in the next section.

To understand the firm characteristics associated with media coverage, we next study the variation in the media coverage along three dimensions: firm size, age, and financial conditions.[7] Figure 2 reports binned scatter plots of the news coverage according to these firm characteristics. Each bin represents a decile of firm-quarter observations. Appendix Figure A.2 further accounts for the role of industries by demeaning each firm characteristic

[7] These firm characteristics are considered important for business cycle fluctuations and the transmission of macroeconomic policy (e.g. Gertler and Gilchrist, 1993; Cloyne, Ferreira, Froemel and Surico, 2023; Ottonello and Winberry, 2020).

by its industry average. Since patterns are similar across all firms and within industries, we focus our discussion below on untransformed series.

Panel (a) in Figure 2 reports the binned scatters by firm size, measured by log real assets. The relationship between the news coverage and firm size is highly nonlinear. The media coverage is concentrated in the largest 10% of firms, while the remaining firms receive almost no coverage. Appendix Figure A.2a shows that this concentration is also present within 4-digit NAICS industries. Market capitalization is closely related to firm size and, because of its prevalence in the popular press, this factor likely receives more attention from business readers. In Panel (b), we alternatively measure firm size with market capitalization and find a similar concentration of media coverage in the top decile of the largest firms.

This strong concentration of media coverage in the top decile is unique to firm size. Panel (c) reports the relationship between the news coverage and firm age, measured in years since their IPOs. Unlike the pattern showing firm size, the media coverage increases linearly over a firm's life cycle. Appendix Figure A.2c shows that the relationship is similar after conditioning for the industry. It is therefore not just the oldest firms that are featured in the news.

Panel (d) studies the role of firms' financial positions, reflected in their market leverage. The news coverage increases with the leverage for firms with low levels of leverage. However, for firms within a given industry, the relationship between their leverage and their news coverage is much weaker. Appendix Figure A.2d shows that after conditioning on the industry, a firm's leverage is only weakly correlated with its news coverage.

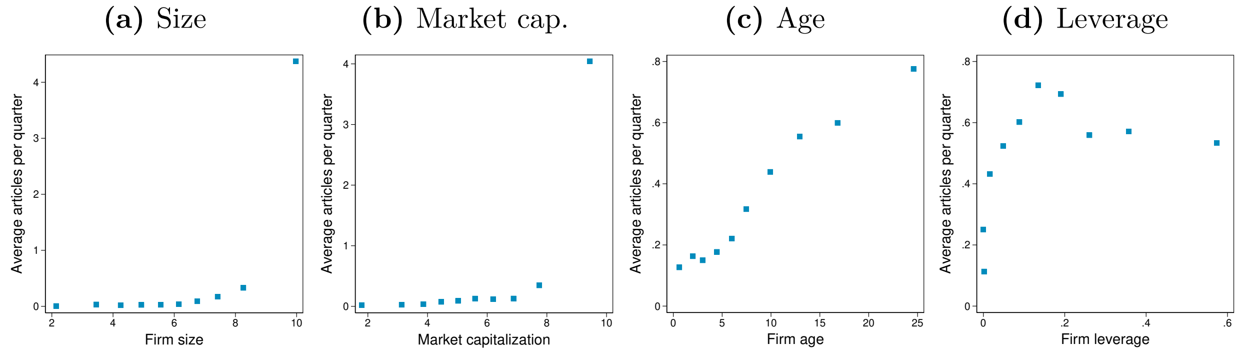
2.4. Firm responses to news coverage

Next, we study the relationship between the news coverage and firms' investments and financing. We estimate local projections for firm i in quarter t for each horizon $-4 \leq h \leq 16$ with

$$y_{it+h} - y_{it} = \alpha_{st} + \alpha_i + \beta_h \nu_{it} + \Gamma' Z_{it} + u_{ith}, \tag{3}$$

where y_{it} is the firm variable of interest for firm i in quarter t; ν_{it} is the number of mentions of that firm in major U.S. newspapers that quarter, demeaned at the firm level and standardized

Figure 2: Firm characteristics and media coverage



Notes: This figure reports binned scatterplots of average news articles per quarter. Each bin represents a decile of firms. Panel (a) sorts firms by size, measured by log real assets, from smallest to largest. Panel (b) sorts firms by market capitalization, measured by prices per share times shares outstanding. Panel (c) sorts firms by age, measured by years since their IPO. Panel (d) sorts firms by leverage, measured by their market leverage.

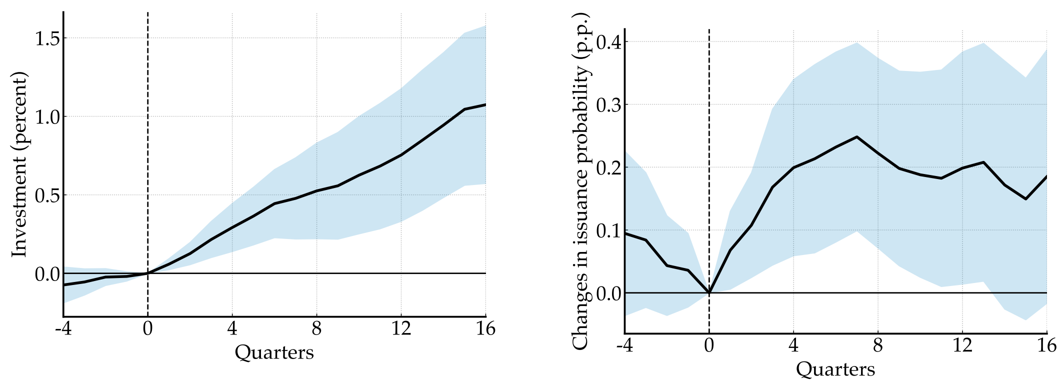
so that the unit can be interpreted as a one standard-deviation within-firm change in the media coverage; $\{\alpha_{st}, \alpha_i\}$ are sector-by-quarter and firm fixed effects; Z_{it} is a vector of firm controls including sales growth, size, and current assets as a share of total assets; and u_{it+h} is a random error. The firm variables of interest include (i) the investment rate, $\Delta \log k_{it}$, defined as the log change in the book value of the firm's tangible capital stock, and (ii) the cumulative probability of equity issuance, E_{it}, defined as an indicator variable that takes the value 1 if a firm issues new equity between quarters t and $t+h$ and zero otherwise. Variables are constructed following standard practices in the literature and are detailed in Appendix A.1. We double cluster the standard errors by firm and quarter.

Figure 3 reports our baseline findings. Panel (a) shows that a higher coverage is associated with a subsequent increase in investment. A one standard deviation higher media coverage is associated with 0.05% higher investment in the quarter after the coverage. The positive association rises gradually over the estimation horizon, reaching a peak effect of approximately 1%. Panel (b) shows that media coverage is also associated with a higher probability of raising financing from the equity market. In the quarter after the news coverage, a one standard deviation higher media coverage is associated with a 0.07 percentage point greater probability of a firm issuing equity. The effect rises gradually to a peak of around 0.2 percentage points after 6 quarters.

Appendix A.3 presents three additional analyses that reveal the specialized role of *curated* news that is featured in traditional news outlets. First, Appendix Figure A.3 shows

Figure 3: News coverage, firm investment, and financing

(a) Investment **(b)** Equity issuance



Notes: This figure reports the results from estimating the local projections in equation (3) for quarters $-4 \leq h \leq 16$: $y_{it+h} - y_{it} = \alpha_{st} + \alpha_i + \beta_h \nu_{it} + \Gamma' Z_{it} + u_{ith}$, where $\{\alpha_{st}, \alpha_i\}$ denote the sector-by-quarter and firm fixed effects; ν_{it} denotes the news coverage of firm i in major U.S. newspapers in quarter t, demeaned at the firm level and standardized; and Z_{it} is a vector of firm controls including their size, age, and real sales growth. The dependent variable y_{it} includes the investment rate ($\Delta \log k_{it}$) in panel (a), defined as the log change in the book value of the firm's tangible capital stock, and the cumulative probability of equity issuance (E_{it}) in panel (b), defined as an indicator variable that takes the value 1 if a firm issues new equity between quarters t and $t + h$ and zero otherwise. Standard errors are double clustered by firm and quarter. 90% confidence intervals are reported.

that the effect of the news coverage is specific to equity financing: the effects of the coverage on debt financing and cash financing are much smaller in magnitude and statistically insignificant. This is consistent with equity being an informationally sensitive form of financing, whereas debt and cash financing are insensitive to information (Gorton and Pennacchi, 1990; Gorton and Ordonez, 2014; Hoberg and Maksimovic, 2015).

Second, we compare the curated news with the social media platform Twitter (now X), which has become a major alternative to traditional news media over the last decade. While newspaper articles are produced by trained journalists and curated by editors, tweets are produced by individual users and are largely unmoderated. Appendix Figure A.4 shows that unlike newspaper coverage, Twitter coverage is associated with a slightly lower rate of investment and equity issuance probability, which suggests that the positive association with firms' outcomes is specific to the curated news.

Third, the three newspapers differ markedly in the types of content they specialize in and the audiences they appeal to. Appendix Figure A.5 studies the effects of the news coverage from each newspaper, repeating regression (3) but replacing ν_{it} with the frequency of the coverage in each individual newspaper. The coverage in *The Wall Street Journal*, which specializes in financial news, has the largest positive association with firm investment and financing. The coverage in *The New York Times*, which maintains a dedicated section on business news, also displays a positive association. However, the coverage in *USA Today*, which is the least finance-focused newspaper among the three, does not appear to have a significant association with firm financing. Overall, the effects of the newspaper coverage increase with the degree of the specialization in financial news, consistent with a mechanism in which the information contained in specialized coverage receives attention from financial market participants.

2.5. Distribution of the news coverage

The decomposition in Section 2.1 highlights that the aggregate effects of corporate news depend on how this news coverage is distributed across firms. Specifically, aggregate investment depends on whether the coverage is correlated with firm-level responsiveness to this news. Motivated by this, we now study the conditional distribution of the news-coverage responsiveness in the data. We focus on the size dimension, the strongest observed driver of these firms' news coverage.

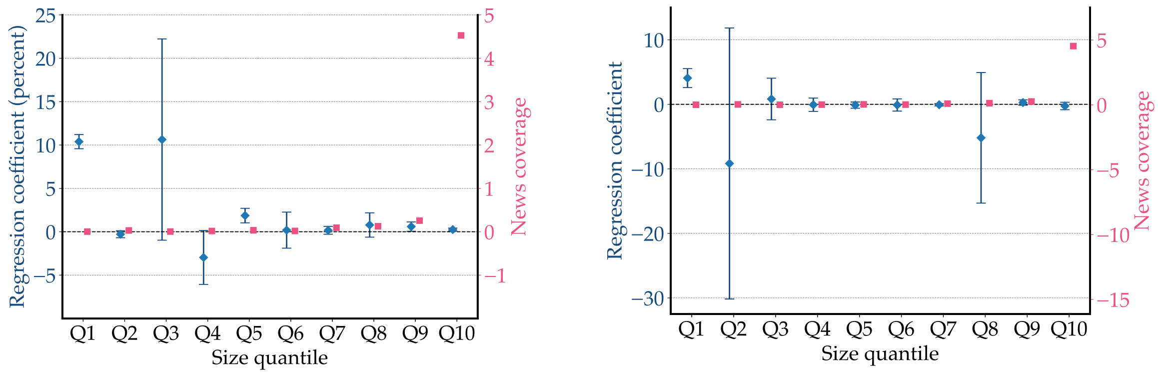
Sorting firms into 10 size deciles, ranked from smallest to largest as $q = 1, \cdots, 10$, we estimate

$$\Delta y_{it} = \alpha_{st} + \alpha_i + \beta_q \cdot \mathbb{1}_{Q_{it}=q} \times \nu_{it} + \Gamma' Z_{it} + u_{it}, \tag{4}$$

where y_{it} is the firm variable of interest; $\mathbb{1}_{Q_{it}=q}$ is an indicator variable that takes the value 1 if a firm's size quantile within quarter Q_{it} belongs to quantile q; ν_{it} is the news coverage of firm i that major U.S. newspapers mention in quarter t, demeaned at the firm level and standardized; $\{\alpha_{st}, \alpha_i\}$ are sector-by-quarter and firm fixed effects; Z_{it} represents a vector of standard firm controls that include sales growth, size, and current assets as a share of total assets; and u_{it+h} is a random error. The firm variables of interest include (i) the cumulative investment rate, defined as the log change in the book value of the firms' tangible capital stock one year from coverage, and (ii) the firms' equity issuances one year from coverage, defined as the log equity issuance scaled by the firms' tangible capital stock. We double

Figure 4: News coverage and firm responses: by firm size

(a) Investment responses　　　**(b)** Equity responses



Notes: This figure reports the results from estimating equation (4): $\Delta y_{it} = \alpha_{st} + \alpha_i + \beta_q \cdot \mathbb{1}_{Q_{it}=q} \times \nu_{it} + \Gamma' Z_{it} + u_{it}$, where $\{\alpha_{st}, \alpha_i\}$ denote the sector-by-quarter and firm fixed effects; $\mathbb{1}_{Q_{it}=q}$ is an indicator variable that takes the value 1 if a firm's size quantile within quarter Q_{it} belongs to quantile q; ν_{it} is firm i's news coverage mentioned in major U.S. newspapers in quarter t, demeaned at the firm level and standardized; and Z_{it} is a vector of firm controls including size, age, and real sales growth. The dependent variable Δy_{it} includes the cumulative investment rate in panel (a), defined as the log change in the book value of the firm's tangible capital stock one year from coverage, and the equity issuance one year from coverage in panel (b), defined as the log equity issuance scaled by the firm's tangible capital stock. Standard errors are double clustered by firm and quarter. "Q1" in the figure denotes the smallest 10% of firms, and "Q10" denotes the largest 10% of firms. 90% confidence intervals are reported.

cluster the standard errors by firm and quarter.

The estimates for β_q are reported in Figure 4 in blue, along with 90% confidence intervals. Firms are ordered from smallest to largest, with "Q1" denoting the smallest 10% of firms and "Q10" denoting the largest 10% of firms. We overlay the estimated coefficients with the average level of media coverage from Figure 2a, reported in red on the right-hand axis.

Panel (a) shows that the smallest 10% of firms are the most responsive to media coverage. A one standard deviation higher media coverage is associated with a 10% higher investment in the year after the coverage. However, these small firms receive close to zero coverage from news outlets. In contrast, the largest 10% of firms receives substantial news coverage, but they do not respond to the media coverage through investment.

Panel (b) finds a similar pattern for equity issuance. Among firms with equity issuances one year from the news coverage, the smallest firms issue the most equity after having received higher news coverage, while for larger firms, equity issuances do not vary significantly with coverage.

The conditional distribution in Figure 4 indicates that the correlation between a firm's news coverage and its responses to this coverage is negative. The firms that receive the most coverage are those that respond the least to it, which, as equation (1) shows, will reduce the aggregate effect of news coverage on firm investment. We quantify this effect in Section 4.

2.6. Evidence on the mechanism

Before turning to the model, we provide suggestive evidence on the causal mechanism behind our results so far. We documented a positive relationship between news coverage and firms' investments and equity financing. The concern with interpreting the relationship as causal is that newspapers may report on firms because they are planning investment projects and equity issuances, in which case our estimates would partly reflect reverse causality. In this section, we present two analyses aimed at addressing this concern. First, using the content of the news articles, we identify whether the news coverage is related to investment and financing and we remove such articles from our sample; second, using international evidence from France, we study the effects of the variation in the news coverage that is unrelated to firms' outcomes.

2.6.1. Text of news articles

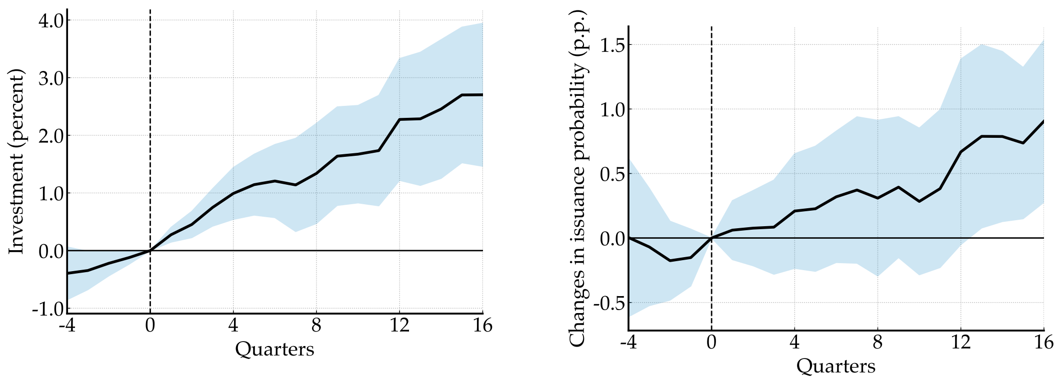
To analyze the content of the news coverage, we employ latent Dirichlet allocation (LDA) to extract 20 distinct "topics" that represent the text of these newspaper articles. LDA, a generative probabilistic model from natural language processing, assumes that each article is a mixture of topics and each topic is a mixture of words. By analyzing the co-occurrence patterns of words within the articles, the model identifies the underlying topics that best represent the content.[8]

The resulting topics are reported in Appendix Figure A.4. The news coverage about firms falls into three broad categories: the news related to overall financial conditions (e.g., "stock markets"), the news related to firms' industries (e.g., "technology" and "automobiles"), and firm-specific news (e.g., "investment," "financing," "litigation," and "employees").

[8] We use the `gensim` library in Python to estimate the LDA model. The pre-processing of texts includes removing stop words, numbers, cases, and single-letter words, and then lemmatizing. We specify uniform Dirichlet priors. To select the model hyperparameter that governs the number of topics, we take a data-driven approach and perform a grid search of 200 topics in increments of 20. Through this procedure, we choose 20 as the number of topics as this generates the highest topic coherence.

Figure 5: News coverage, firm investment, and financing: Excluding the coverage in investment and financing articles

(a) Investment **(b)** Equity issuance



Notes: This figure reports the results from estimating a variant of the baseline local projections in equation (3) for quarters $-4 \leq h \leq 16$: $y_{it+h} - y_{it} = \alpha_{st} + \alpha_i + \beta_h \nu_{it} + \Gamma' Z_{it-1} + u_{it+h}$, where $\{\alpha_{st}, \alpha_i\}$ denote the sector-by-quarter and firm fixed effects; ν_{it} denotes of firm i' coverage in major U.S. newspapers, in quarter t, that exclude coverage on investment and equity financing, demeaned at the firm level and standardized; and Z_{it-1} is a vector of firm controls including size, age, and real sales growth. The dependent variable y_{it} includes the investment rate ($\Delta \log k_{it}$) in panel (a), defined as the log change in the book value of the firm's tangible capital stock, and the cumulative probability of the equity issuance (E_{it}) in panel (b), defined as an indicator variable that takes the value 1 if a firm issues new equity between quarters t and $t+h$ and zero otherwise. Standard errors are double clustered by firm and quarter. 90% confidence intervals are reported.

We exclude any news articles that have any positive loadings on topics related to firm investment and financing—topic 5 ("investment"), topic 16 ("financing"), and topic 8 ("financing from international markets") in Appendix Figure A.6. Using the frequency of the news, *excluding* this coverage of firm investment and financing, we re-estimate the baseline local projections in (3). The estimates in Figure 5 indicate that, in this restrictive sample, firms' news coverage remains associated with a higher probability of equity issuance and a higher rate of investment, with somewhat stronger effects than those estimated using the total news frequency in the baseline estimation in Figure 3.

2.6.2. Evidence from media strikes

We now complement our U.S. evidence with international evidence from France, where media strikes introduce variation in the news coverage that is unrelated to firm choices.[9] During strikes, journalists stop reporting, reducing the amount of information provided by the media sector, for reasons that are unrelated to individual non-media firms (Peress, 2014).

[9] Appendix Figure A.7a reports the distribution of corporate news coverage in France, which displays a similar pattern of concentrated coverage as the U.S. coverage.

Media strikes in the U.S. have been rare in recent history. However, in France we identify 6 episodes of large-scale media strikes, using the criteria developed by Peress (2014), detailed in Appendix Table A.2.[10] We focus on sector-wide strikes and exclude strikes against individual newspapers, to ensure that these strikes occur not because of individual newspaper or non-media firm factors but rather as a response to the government's policy changes (such as Nicolas Sarkozy's broadcasting-advertising reform and Emmanuel Macron's pension reform).

To facilitate comparison with the U.S. evidence, we first estimate the effects of media coverage, using the same local projection as in (3).[11] Appendix Figure A.7 reports estimates that are consistent with the U.S. evidence: greater media coverage in France is associated with a higher probability of equity issuance and investment.

We then test whether news reports affect firms' outcomes, by focusing on the subset of firms that issued equity during the sample period, and estimating

$$\log k_{it+4} - \log k_{it} = \alpha_s + \beta S_t + \delta\theta_{it} + \gamma\theta_{it}S_t + \Gamma' Z_{it} + u_{it}, \tag{5}$$

where the dependent variable is firm i's cumulative investment a year after its equity issuance, α_s is a sector fixed effect; S_t is an indicator for media strikes in quarter t; θ_{it} denotes firm i's average news coverage in the year before the strike; and Z_{it} is a vector of controls including firm sales growth, size, current assets as a share of total assets, fiscal year end, real GDP growth, and inflation.[12]

The parameter of interest is γ. Among firms that issued equity during media strikes, γ measures the differential impact of a strike on a firm's investment, depending on the firm's reliance on media coverage. If the news media disseminates firm news to investors,

[10] We search Factiva for keywords containing (i) "strike" and "journalist," or (ii) "strike" and "broadcaster," as well as their French translations. Using Factiva's tagging, we restrict the region to France, the industry to Media/Entertainment, and the subject to Labor Dispute. We focus on national strikes and exclude strikes against individual newspapers. The 6 strike episodes are reported in Appendix Table A.2. They are concentrated in 5 quarters: 2005Q4, 2008Q1, 2008Q4, 2013Q1, and 2018Q2.

[11] For horizons $-4 \leq h \leq 12$, we estimate $\Delta_h y_{it+h} = \alpha_{st} + \alpha_i + \beta_h \nu_{it} + \Gamma' Z_{it} + u_{ith}$. As with the U.S. analysis, the dependent variables consist of cumulative changes in investment and equity issuance probabilities, and the explanatory variable, ν_{it}, measures firm coverage in the four major French newspapers and is demeaned at the firm level and standardized. α_i and α_{st} refer to the firm and sector-by-quarter fixed effects. We classify sectors using the 2-digit rather than the 4-digit NAICS levels because the French equity market is far smaller than the U.S. market (there are 959 unique publicly traded firms in our French sample compared to 13,207 firms in our U.S. sample). The vector Z_{it} controls for firms' sales growth, size (log real assets), and current assets as a share of total assets.

[12] We retrieve GDP (CLVMNACSCAB1GQFR) and inflation (CPHPTT01FRM659N) series from FRED.

Table 2: Equity issuance during media strikes and exposure to media coverage

	(1)	(2)	(3)	(4)	(5)
	Investment after issuance (1yr)				
Strike	-0.140*	-0.173	-0.132	-0.135	-0.170*
	(0.078)	(0.106)	(0.087)	(0.083)	(0.099)
Past coverage		0.004	0.004	0.005	0.005
		(0.004)	(0.005)	(0.005)	(0.005)
Strike × Past coverage		-0.042*	-0.043**	-0.045**	-0.044**
		(0.021)	(0.021)	(0.022)	(0.021)
Observations	1072	1024	1024	1007	1006
R^2	0.029	0.039	0.041	0.043	0.042
Industry FE	yes	yes	yes	yes	yes
Macro controls	no	no	yes	yes	yes
Firm controls	no	no	no	yes	yes
Remove common ownership	no	no	no	no	yes
Double-clustered SE	yes	yes	yes	yes	yes

Notes: This table reports the coefficient γ from estimating equation (5): $\log k_{it+4} - \log k_{it} = \alpha_j + \beta S_t + \delta\theta_{it} + \gamma\theta_{it}S_t + \Gamma' Z_{it} + u_{it}$, where t is the quarter in which a firm issues equity, the dependent variable $\log k_{it+4} - \log k_{it}$ is the cumulative investment 4 quarters after the equity issuance, α_j is a sector fixed effect, S_t is an indicator for media strikes, θ_{it} is the average media coverage of firm i 4 quarters before the strike at time t, and Z_{it} is a vector of controls containing sales growth, size, current assets as a share of total assets, real GDP growth, and inflation. * ($p < 0.10$), ** ($p < 0.05$), *** ($p < 0.01$).

firms that tend to receive more coverage are expected to suffer bigger impacts during strikes compared to their peers with little coverage to begin with. The specification in (5) allows for the possibility that strikes tend to happen in economic downturns, since the source of the variation in this regression is the cross-sectional variation in firms' exposure to the same strike.

Table 2 reports the results. Column 1 estimates the average effect of media strikes and finds that firms that issue equity during media strikes invest less in the subsequent year, compared to firms that issue equity during quarters without media strikes. Since the decision to strike can be related to broad economic conditions, Columns 2 through 5 further exploit the cross-sectional variation in firms' past news coverage to study the effects of the exposure to strikes. Column 2 reports the baseline estimates of (5) without any controls. Columns 3 and 4 add macro and firm controls iteratively. Column 5 excludes firms that share a common owner with a major newspaper, to account for a possible direct effect of the labor disputes behind the media strikes on the investments of the firms in our sample. Specifically, *Les Echos* and *Le Figaro* are owned by LVMH and the Dassault Group, respectively. These groups are also the parent companies of some of the non-media firms in our sample.[13] Strikes in newspapers can arise from disputes with their owners, which potentially affect the investment decisions of their non-media subsidiaries for reasons other than media coverage. We account for this possibility by removing these subsidiaries.

We focus our discussion on Column 5 in Table 2, which provides the most conservative estimates. Firms that issue equity during media strikes invest 17% less compared to firms that issue equity during non-strikes. Firms with higher historical coverage suffer more from a sudden loss of coverage. Compared to other firms that issue equity during strikes, a firm with a historical coverage that is one standard deviation higher invests 4% less after the equity issuance. The economic magnitude is one quarter of the average effects from the strikes. The results suggest that firms that rely more on media coverage to disseminate firm news have to reduce their investment because of the strikes, which is consistent with the interpretation that media reports can alleviate the information friction firms face and facilitate their financing and investment.

The evidence in this section suggests that news coverage has positive effects on firms' financing and investments. However, the large firms that news outlets focus on are the least responsive to this coverage. In the next section, we incorporate these features in a macro-finance model with a media sector to understand the aggregate importance of curated news reporting.

3. A Model of Corporate News Reporting

In this section, we construct a model of corporate news reporting to study its importance for corporate finance and firms' life cycles. We start with a model of firms' decisions under asymmetric information, building on Guo *et al.* (2024), which features firms with private information when raising equity from retail investors. We then incorporate a media sector into the model, where media outlets choose which firms to report on, subject to a space constraint. News reports can alleviate information asymmetry, and we use the model to

[13] In our sample, subsidiaries of the Dassault Group (parent of *Le Figaro*) include Dassault Aviation and Dassault Systems; and the subsidiaries of LVMH (parent of *Les Echos*) include Bulgari and Moet. *La Tribune* was owned by LVMH from 1993 to 2007 and is currently owned by individual investors. *Le Monde* belongs to Groupe Le Monde, which does not have other subsidiaries in our sample.

quantify the effects of corporate news reporting on firm dynamics and aggregate investment.

3.1. Environment

Time is discrete and there is no aggregate uncertainty. The economy consists of four groups of agents: firms, investors, forecasters, and news outlets.

3.1.1. Firms

There is a continuum of firms, indexed by $j \in [0, 1]$, that are heterogeneous in their capital quantity, k, productivity, z, and "capital quality" a. Capital quantity and productivity are public information for any agents in the economy, while capital quality is private information for individual firms.

At the beginning of each period, firm j inherits capital k_{jt} from the previous period. This firm also observes its idiosyncratic productivity, z_{jt}, which evolves according to

$$\log z_{jt} = \rho_z \cdot \log z_{jt-1} + \epsilon^z_{jt}, \quad \text{where } \epsilon^z_{jt} \overset{i.i.d}{\sim} \mathcal{N}(0, \sigma^2_z). \tag{6}$$

At this point, each firm receives an i.i.d. exit shock $\epsilon^{\text{exit}}_{jt} \sim \texttt{Bernoulli}(\xi)$. Firms that exit liquidate their assets and are replaced by an equal mass of firms drawn from the distribution $\mathcal{F}^{\text{entrant}}(k, z)$. Firms that remain in operation produce by using capital with the technology

$$y_{jt} = Z \cdot z_{jt} \cdot k_{jt}, \tag{7}$$

where Z denotes aggregate productivity.

After the production stage, a firm receives an i.i.d. capital quality shock, a_{jt},å to its assets in place and chooses its investment, x_{jt}. The i.i.d. assumption prevents investors from inferring a_{jt} by using observable information from previous periods. A firm's capital evolves according to

$$k_{j,t+1} = (1 - \delta) \cdot a_{jt} \cdot k_{jt} + x^\theta_{jt}, \quad \text{where } a_{jt} \overset{i.i.d}{\sim} \mathcal{G}(a). \tag{8}$$

Capital quality a_{jt} therefore affects the ability of a firm to transfer their assets-in-place to future periods (as in e.g., Bigio, 2015; Gertler, Kiyotaki and Prestipino, 2019).

A firm has access to external funds through an equity market. It allocates the proceeds from production and equity issuances between investment and dividend payouts. A firm's budget constraint is specified by

$$div_{jt} + x_{jt} = y_{jt} + e_{jt} - \phi^e \mathbb{1}_{e_{jt}>0}, \tag{9}$$

where e_{jt} denotes the funding raised from issuing new equity and ϕ^e denotes a fixed cost of issuing equity.

Firm managers maximize the net present value of the dividend payments to the existing shareholders. Under this objective, a firm's problem is given by

$$\mathrm{V}_t(k, z, a, m) = \max_{e \geq 0} \frac{\mathrm{P}_t(k, z, a, m, e)}{\mathrm{P}_t(k, z, a, m, e) + e} \cdot \mathrm{W}_t(k, z, a, e) \tag{10}$$

Firms take media reporting m as given, where m is an indicator variable which takes the value 1 if the firm is covered by the news media, and 0 otherwise. $\mathrm{W}_t(k, z, a, e)$, defined shortly below, denotes the firm's post-issuance value. $\mathrm{P}_t(k, z, a, m, e)$ denotes the firm's stock price, which is jointly determined by the firm's characteristics, (k, z, a), media-coverage status, m, and equity issuance choice, e. Normalizing the quantity of the existing shares to 1, a firm has to issue a further $\frac{e}{\mathrm{P}_t(k,z,a,m,e)}$ shares to external investors to raise funding e. Given this, the fraction $\frac{\mathrm{P}_t(k,z,a,m,e)}{\mathrm{P}_t(k,z,a,m,e)+e}$ is the fraction of the firm value accruing to its initial shareholders after any subsequent equity issuance.

$\mathrm{W}_t(\cdot)$ characterizes a firm's value after an equity issuance by incorporating the firm's optimal investment and dividend payment decisions, specified as

$$\mathrm{W}_t(k, z, a, e) = \max_{div \geq 0, x \geq 0} div + \beta \mathbb{E}_t \left[\xi \hat{\mathrm{V}}_{t+1}(k') + (1 - \xi) \mathrm{V}_{t+1}(k', z', a', \mathbf{m}_{t+1}(k', z', a', \kappa')) | z \right] \tag{11}$$

$$\text{s.t.} \qquad x = Z \cdot z \cdot k + e - \mathbb{1}_{e>0} \phi^e - div \tag{12}$$

$$k' = (1 - \delta) \cdot ak + x^\theta, \tag{13}$$

where $\hat{\mathrm{V}}_t(k) \equiv k$ denotes the firm's liquidation value and $\mathbf{m}_t(\cdot)$ denotes the aggregate media-reporting function, which we characterize in Section 3.1.3. In the remainder of the paper, we denote the firm's policy functions of equity issuances, dividend payments, and investments using bold letters as $\mathbf{e}_t(k,z,a)$, $\mathbf{div}_t(k,z,a)$, and $\mathbf{x}_t(k,z,a)$.

3.1.2. Investors

There is a continuum of risk-neutral retail investors who purchase firm equity to maximize their expected returns. Investors observe each firm's capital, k, and productivity, z, along with their equity issuance decisions, e. They cannot, however, observe a firm's capital quality, a, and must make inferences about it based on media reports and firm behavior.

When a firm is reported by media outlets, its asset quality is fully revealed. When a firm is not reported by the media, investors must instead form a posterior belief about that firm's asset quality, based on its equity issuance choice. Let $\mathcal{B}_t(a|k,z,e)$ denote the density function of investors' beliefs about a firm's asset quality when this firm is not reported. For equity issuance on the equilibrium path, investors' beliefs satisfy Bayes' rule

$$\mathcal{B}_t(a|k,z,e) = \frac{\mathcal{G}(a)\mathbb{1}_{\mathbf{e}_t(k,z,a,0)=e}}{\int \mathcal{G}(\tilde{a})\mathbb{1}_{\mathbf{e}_t(k,z,\tilde{a},0)=e}d\tilde{a}}, \tag{14}$$

and for equity issuances that are off the equilibrium path, investors' beliefs must satisfy the Divinity Criterion, as specified in Banks and Sobel (1987).[14] Given investors' beliefs about firms' asset qualities, firms' equity issuance prices must satisfy the break-even condition for investors; so that the expected return from purchasing the newly issued equity equals the risk-free interest rate. That is, for any equity issuance $e > 0$,

$$\frac{e}{\mathrm{P}_t(k,z,a,1,e)+e} \cdot \mathrm{W}_t(k,z,a,m,e) = e, \tag{15}$$

and

$$\frac{e}{\mathrm{P}_t(k,z,a,0,e)+e} \cdot \int \mathrm{W}_t(k,z,a,m,e) \cdot \mathcal{B}_t(\tilde{a}|k,z,e)d\tilde{a} = e. \tag{16}$$

[14] Strictly speaking, investors also update their posteriors after observing that the firm has not been reported, analogously to the mechanism in Nimark (2014). In practice, this is irrelevant in our case because we will show that the media equilibrium features reporting, which is independent of a. This implies that an editor's decision to not report on firm j provides investors with no information about a_{jt}. For notational simplicity, we therefore omit this aspect of posterior updating from the equations in the text.

The implied equity issuance price is

$$\mathrm{P}_t(k,z,a,m,e) = \begin{cases} \mathrm{W}_t(k,z,a,e) - e & \text{if } m = 1 \\ \int \mathrm{W}_t(k,z,a,e) \cdot \mathcal{B}_t(\tilde{a}|k,z,e)d\tilde{a} - e & \text{if } m = 0. \end{cases} \tag{17}$$

For firms issuing equity, their issuance price determines their stock market value. For firms not issuing equity, their stock market value is determined by the expected value of the firms. Therefore, firms' stock market valuations are determined by

$$\mathrm{MV}_t(k,z,a,m) = \begin{cases} \mathrm{P}_t(k,z,a,m,\mathbf{e}_t(k,z,a,m)) & \text{if } \mathbf{e}_t(k,z,a,m) > 0 \\ \frac{\int \mathrm{V}_t(k,z,\tilde{a},m)\mathbb{1}_{\mathbf{e}_t(k,z,\tilde{a},m)=0}\mathcal{G}(\tilde{a})d\tilde{a}}{\int \mathbb{1}_{\mathbf{e}_t(k,z,\tilde{a},m)=0}\mathcal{G}(\tilde{a})d\tilde{a}} & \text{if } \mathbf{e}_t(k,z,a,m) = 0. \end{cases} \tag{18}$$

3.1.3. Media

There is a continuum of media outlets, indexed by $i \in [0,1]$, that have full information on all firm fundamentals, including their asset qualities a_{jt}. Each outlet is owned by a corresponding forecaster, who reads the news in their outlet and not in other outlets. A media outlet selects the set of firms to report on to maximize its forecaster's expected utility.[15]

Let $m^o_{ijt} \in \{0,1\}$ denote the reporting decision of media outlet i of firm j. If $m^o_{ijt} = 1$, outlet i reports the exact a_{jt} to its associated forecaster in period t. If $m^o_{ijt} = 0$, outlet i does not report on firm j and transmits no information about a_{jt}. Throughout the paper, we differentiate between m^o_{ijt}—which denotes the reporting choices of an individual news outlet i—and m_{jt}, which denotes the aggregate news-reporting outcome for firm j, and is defined in equation (23) below.

When selecting firms to report on, outlets face constraints, such as physical newspaper space or limited forecaster attention capacity. As a result, they can only report on a fraction $r \in (0,1)$ of firms in each period:

$$\int_0^1 m^o_{ijt} dj = r. \tag{19}$$

Outlet i's decision problem is to choose firms to report on in order to maximize the

[15]See Armona, Gentzkow, Kamenica and Shapiro (2024) for an example of another model with this feature and a discussion of how such "direct maximization" incentives may arise.

expected utility of their forecaster, net of a firm and period-specific reporting cost $\kappa_{jt} \sim \mathcal{H}(\kappa)$, which is independent of firm j's fundamentals.[16] Their problem is given by

$$\max_{m^o_{ijt}} \mathbb{E} \int_0^1 \mathrm{U}_{it}(\mathcal{I}^{\text{news}}_{it}) dj - \int_0^1 \kappa_{jt} m^o_{ijt} dj \tag{20}$$

$$\text{s.t.} \qquad \mathcal{I}^{\text{news}}_{it} = \{a_{jt} : m^o_{ijt} = 1\} \tag{21}$$

$$r = \int_0^1 m^o_{ijt} dj \tag{22}$$

where $\mathrm{U}_{it}(\mathcal{I}^{\text{news}}_{it})$ denotes forecaster i's utility, which we specify in the next subsection, and $\mathcal{I}^{\text{news}}_{it}$ is the information set communicated to the forecaster by their outlet.

Investors observe all of the information reported in all of the outlets.[17] Therefore, the investors' information set includes the *total* information reported in the media. We denote this total media information set as $\mathcal{I}^{\text{news}}_{t} = \{a_{jt} : m_{jt} = 1\}$, where the aggregate news-reporting indicator m_{jt} is defined as

$$m_{jt} = \begin{cases} 0 & \text{if } m^o_{ijt} = 0 \text{ for all } i \\ 1 & \text{otherwise.} \end{cases} \tag{23}$$

That is, if at least one outlet reports on firm j, then investors observe a_{jt}. In the remainder of the paper, we summarize the dependency of the aggregate media-reporting outcomes on firm characteristics through an aggregate media policy function, $\mathbf{m}_t(k_{jt}, z_{jt}, a_{jt}, \kappa_{jt}) = m_{jt}$.

3.1.4. Forecasters

Forecaster i observes the information communicated by outlet i, which is denoted $\mathcal{I}^{\text{news}}_{it} = \{a_{jt} : m^o_{ijt} = 1\}$, along with the observables k_{jt} and z_{jt}. Forecasters make forecasts of firms' market values before equity markets open each period and so cannot observe equity issuance

[16] These should be thought of as cognitive or effort costs, similar to the information processing costs in the rational inattention literature (surveyed by Maćkowiak, Matějka and Wiederholt, 2023). These costs arise from the media outlets and so are different from the attention capacity of readers used to motivate the space constraint (19). Equivalently, κ_{jt} could also capture the variation in the reporting preferences that are due to factors outside our model. These costs allow us to derive a continuous reporting probability function but are not essential.

[17] This assumption can be microfounded as follows: Since there is no noise in the market prices in this model (unlike e.g., Grossman and Stiglitz, 1980), the market prices perfectly aggregate the information. If even one investor reads the news published by outlet i, they use that information to trade and the market prices adjust to communicate that information to all other investors.

e_{jt}. We assume that forecasters are able to observe the reporting decisions of other outlets, $m^o_{i',j,t}$, but not the contents of those reports, $\mathcal{I}^{\text{news}}_{i',t}$. The former assumption implies that forecasters also observe the aggregate news-reporting outcome m_{jt}. The latter assumption implies that forecasters do not observe a_{jt} unless their own outlet reports on it.

Forecasters derive utility from making market value forecasts that are more accurate than their peers, as in the literature on forecaster incentives (reviewed by Marinovic, Ottaviani and Sorensen, 2013). As shown by (18), the market value is a function of firm fundamentals (k_{jt}, z_{jt}, a_{jt}) and the aggregate news-reporting indicator m_{jt}. Forecaster i's utility is therefore given by

$$\text{U}_{it}(\mathcal{I}^{\text{news}}_{it}) \equiv -\int_0^1 \left[\text{FE}_t(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}^{\text{news}}_{it}) - \overline{\text{FE}}_{-i,t}(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}^{\text{news}}_{-i,t})\right] dj. \quad (24)$$

The first component of equation (24) represents the realized forecast errors that forecaster i makes about firm j, defined as

$$\text{FE}_t(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}^{\text{news}}_{it}) \equiv \left[\mathcal{P}_t\left(k_{jt}, z_{jt}, m_{jt}, \mathcal{I}^{\text{news}}_{it}\right) - \text{MV}_t(k_{jt}, z_{jt}, a_{jt}, m_{jt})\right]^2, \quad (25)$$

where $\mathcal{P}_t(k_{jt}, z_{jt}, m_{jt}, \mathcal{I}^{\text{news}}_{it})$ denotes the associated prediction by forecaster i. The second component of equation (24) represents the realized average forecast error from forecasters other than i, defined as

$$\overline{\text{FE}}_{-i,t}(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}^{\text{news}}_{-i,t}) \equiv \int_{i' \neq i} \left[\mathcal{P}_t\left(k_{jt}, z_{jt}, m_{jt}, \mathcal{I}^{\text{news}}_{i',t}\right) - \text{MV}_t(k_{jt}, z_{jt}, a_{jt}, m_{jt})\right]^2 di'. \quad (26)$$

This formulation implies that a forecaster gains utility from having low average ex-post forecast errors, relative to the forecast errors made by other forecasters using news from other outlets. A forecaster sets the prediction $\mathcal{P}_t\left(k_{jt}, z_{jt}, m_{jt}, \mathcal{I}^{\text{news}}_{it}\right)$ to maximize the expected utility, where the expectation is formed conditional on the forecaster's restricted information set. Since the forecaster's choice has no effect on the realized market values, or the forecasts of others, this is equivalent to minimizing $\overline{\text{FE}}_i(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}^{\text{news}}_{it})$, which is achieved by each forecaster setting predictions equal to the rational expectation of each firm's value, given that forecaster's information set:

$$\mathcal{P}_t(k_{jt}, z_{jt}, m_{jt}, \mathcal{I}_{it}^{\text{news}}) = \mathbb{E}\left[\text{MV}_t(k_{jt}, z_{jt}, a_{jt}, m_{jt}) | k_{jt}, z_{jt}, m_{jt}, \mathcal{I}_{it}^{\text{news}}\right]. \tag{27}$$

3.2. Model assumptions and robustness

Before proceeding to the definition of equilibrium, we discuss our key assumptions regarding news reporting and examine the robustness of our model to altering our assumptions. First, our setup assumes that a forecaster gains utility from having low average ex-post forecast errors, relative to the forecast errors made by other forecasters using news from other outlets. While we take this objective as given, it is consistent with a model in which potential readers compare the quality of the news outlets as information sources by comparing their previous forecast performance (as in, e.g., the contest model of Ottaviani and Sørensen, 2006).

Moreover, Appendix D provides an alternative microfoundation of the media market, in which outlets respond to demand for news from investors. In this investor-led model of the media, we introduce *noise traders*, as in Grossman and Stiglitz (1980), which prevent asset prices from perfectly aggregating information. This implies there is a non-degenerate demand for news from investors.[18] We show that this distinct model of the media leads to the same equilibrium news-reporting function. Since solving this investor-led model of the media requires abstracting from much of the firm side of the model presented here, we keep to the forecaster model for our quantitative analysis.

Second, outlet i's objective function depends on the reporting of other outlets, through $\overline{FE}_{-i,t}(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}_{-i,t}^{\text{news}})$, and the realized market values. We assume that when choosing to report m_{ijt}^o, outlet i takes the reporting decisions of other outlets, $m_{-i,j,t}^o$, as given. This is a common assumption in media models, as strategic motives quickly make the model intractable. In our case, it is a simple consequence of the fact that we have a continuum of outlets, so each individual outlet is atomistic and has no impact on the mass of other outlets. The same setup features in, for example, Eliaz and Spiegler (2024), while others use monopoly media supply (Martineau and Mondria, 2022) or the restrictions on media demand (Gentzkow and Shapiro, 2010) to achieve the same removal of strategic reporting incentives. For an example, to see where strategic interactions do occur, refer to Perego and

[18]Without noise traders, prices aggregate investor information, so each individual investor can free-ride on the information acquisition of other investors and, therefore, does not demand news from the media.

Yuksel (2022).

Third, the media outlet's objective depends on the expectation of U_{it}, taken before the forecaster observes information and makes their prediction. The objective in (20) is, therefore, conditional on the information available to the forecaster when their reporting decisions are made. Appendix B.2 considers alternative assumptions on the media outlets' objective functions, including the case when the outlets maximize their *realized* utility. Under this assumption, the media outlets observe all firm state variables before choosing which firm to report on and therefore have more information available than their forecasters. Appendix B.2 shows that while such a change has an effect on the exact form of the outlets' equilibrium reporting decisions, the key qualitative characteristics of the reporting functions are robust to these alternative assumptions.

3.3. Equilibrium

The equilibrium consists of the paths for the firms' distributions $\mathcal{F}_t(k,z)$, aggregate media reporting $\mathbf{m}_t(k,z,a,\kappa)$, firms' value functions $\mathrm{V}_t(k,z,a,m)$, policy functions for equity issuances $\mathbf{e}_t(k,z,a,m)$, dividend payouts $\mathbf{div}_t(k,z,a,m)$, investments $\mathbf{x}_t(k,z,a,m)$, investor beliefs $\mathcal{B}_t(a|k,z,e)$, equity issuance prices $\mathrm{P}_t(k,z,a,m,e)$, and the firms' stock market values $\mathrm{MV}_t(k,z,a,m)$ that satisfy the following:

1. given the firm distribution $\mathcal{F}_t(k,z)$ and firms' stock market valuations $\mathrm{MV}_t(k,z,a,m)$, the media outlets determine their reporting choices $\{m^o_{ijt}\}$, which in turn determine the aggregate media reporting $\mathbf{m}_t(k,z,a,\kappa)$;

2. given the equity issuance price function $\mathrm{P}_t(k,z,a,m,e)$, the firms make their optimal choices of equity issuances $\mathbf{e}_t(k,z,a,m)$, dividend payouts $\mathbf{div}_t(k,z,a,m)$, and investments $\mathbf{x}_t(k,z,a,m)$;

3. given the media-reporting function $\mathbf{m}_t(k,z,a,\kappa)$ and the firms' equity issuance policies $\mathbf{e}_t(k,z,a,m)$, investors form their posterior beliefs $\mathcal{B}_t(a|k,z,e)$ on the asset quality of the unreported firms, which satisfies Bayes' rule for equity issuance e on the equilibrium path and the Divinity Criterion for equity issuance e off the equilibrium path;

4. given the posterior belief $\mathcal{B}_t(a|k,z,e)$ and firms' financing and investment policies, the equity prices satisfy the break-even conditions in the equity markets as specified by

(17);

5. given the firms' value functions $\mathrm{V}_t(k,z,a,m)$ and equity issuance price function $\mathrm{P}_t(k,z,a,m,e)$, the firms' stock market valuations $\mathrm{MV}_t(k,z,a,m)$ are specified by (18); and

6. the firms' distributions evolve according to

$$\mathcal{F}_{t+1}(k',z') = \xi \cdot \mathcal{F}^{\text{entrant}}(k',z') + (1-\xi) \cdot \int \Gamma^z(z'|z) \cdot \mathbb{1}_{\mathbf{k}'_t(k,z,a,\mathbf{m}_t(k,z,a,\kappa))=k'} \mathcal{F}_t(k,z,a)\mathcal{G}(a)dkdzda, \tag{28}$$

where $\Gamma^z(z'|z)$ denotes the transition probability of firms' idiosyncratic productivity and $\mathbf{k}'_t(k,z,a,m) \equiv (1-\delta)ak + \mathbf{x}_t(k,a,z,m)$.

3.3.1. Equilibrium equity issuance

When a firm is not reported by the media, investors make inferences about its capital quality, based on its equity issuance decision. Appendix B.3 characterizes the equity market equilibrium, in which firms' equity issuances are constrained by the "lemon threat" (Guo *et al.*, 2024): A low-quality firm has the incentive to mimic a high-quality firm's equity issuance so that investors would perceive the firm to be of higher asset quality and therefore price its equity issuance more favorably. This lemon threat leads a higher-quality firm to under-issue its equity in equilibrium, in order to credibly signal its asset quality to investors and to avoid being mimicked by its lower-quality peers.

When a firm is reported by media outlets, investors observe the firm's true capital quality and the firm can issue equity without facing the lemon threat. As a result, news reports can relieve a firm from making costly signaling efforts, thereby encouraging greater equity issuance and increasing investment, particularly among high-quality firms.

3.3.2. Equilibrium news-reporting function

We now characterize the reporting decisions of media outlets in equilibrium. We focus our analysis on symmetric equilibria in pure strategies for outlets,[19] where they all make the

[19]Importantly, since all forecasters are identical ex-ante, the motives for media specialization studied in Nimark and Pitschner (2019) and Perego and Yuksel (2022) (among others) are absent in our setting.

same reporting decisions, so that $m^o_{ijt} = m^o_{i',j,t} = m_{jt}$ for all outlets i, i' and all firms j.[20] Theorem 1 characterizes the media's equilibrium reporting decisions.

***Theorem* 1.** *There is a unique news-reporting policy that can be sustained in a symmetric equilibrium, which is given by*

$$m_{jt} = \mathbb{1}(\mathrm{N}_t(k_{jt}, z_{jt}, a_{jt}) - \kappa_{jt} \geq \mathrm{N}^*_t), \tag{29}$$

where the newsworthiness function $\mathrm{N}_t(k_{jt}, z_{jt})$ *is defined as*

$$\mathrm{N}_t(k_{jt}, z_{jt}, a_{jt}) = \mathbb{V}[\mathrm{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1)|k_{jt}, z_{jt}], , \tag{30}$$

and the threshold N^*_t *is determined by the space constraint (19):*

$$\int_0^1 \mathbb{1}(\mathrm{N}_t(k_{jt}, z_{jt}, a_{jt}) - \kappa_{jt} \geq \mathrm{N}^*_t)dj = r. \tag{31}$$

Proof. Appendix B.1.1 □

Appendix B.1.1 details the proof. To find a news-reporting policy, we begin by considering an arbitrary candidate reporting policy. We then show that there is a unique candidate reporting policy from which no outlet would find it optimal to deviate, since any deviation would lead to an increase in relative forecast errors.

Theorem 1 specifies the media's reporting behavior and equation (30) defines the equilibrium newsworthiness function that drives it. A firm is newsworthy if there is a large degree of uncertainty (i.e., high variance) about its market value after observing its capital stock and productivity. Equation (29) implies that the probability that firm j is reported in the news, denoted as $\mathrm{R}_t(k_{jt}, z_{jt}, a_{jt})$, is given by

$$\mathrm{R}_t(k_{jt}, z_{jt}, a_{jt}) = \Pr(\kappa_{jt} \leq \mathrm{N}_t(k_{jt}, z_{jt}, a_{jt}) - \mathrm{N}^*_t) = \int_0^{\mathrm{N}_t(k_{jt}, z_{jt}, a_{jt}) - \mathrm{N}^*_t} \mathcal{H}(\kappa)d\kappa. \tag{32}$$

By appropriately choosing the distribution of the reporting costs $\mathcal{H}(\kappa)$, we can calibrate the equilibrium reporting policy to the empirical facts documented in Section 2. In the

[20] Under pure strategy equilibria, m^o_{ijt} is entirely determined by firm j's state variables and there is no randomness in the outlet's reporting decisions. Armona *et al.* (2024) similarly focus on pure-strategy reporting equilibria, with applications to macroeconomic and non-economic news.

remainder of the paper, because (30) implies that a firm's newsworthiness is only determined by its publicly observable characteristics (k_{jt}, z_{jt}), we simplify the notation of the firm's newsworthiness and reporting probability functions to $\mathrm{N}_t(k, z)$ and $\mathrm{R}_t(k, z)$.

4. Quantitative Analysis

In this section, we study the quantitative importance of news reporting. Since there is no aggregate uncertainty in our model, our discussion will focus on the steady state of the economy. We first present our calibration of the model parameters, paying particular attention to how we use our data to discipline the media-reporting behavior in the model. Then, we use the calibrated model to examine how media-reporting affects firms' investments and financing and how the distribution of media reports shapes the macroeconomic effects of the media.

4.1. Calibration

We calibrate the model quarterly to match publicly traded firms between 1990 and 2021. We first set the discount rate to $\beta = 0.99$, which corresponds to a 4% annual real interest rate, and the exogenous exit probability to $\xi = \frac{7.7\%}{4}$, which is consistent with an average exit rate of 7.7% in the Compustat sample. Then, we calibrate the parameters listed in Table 3a to target the empirical moments in Table 3b. The construction of empirical moments is detailed in Appendix C.1.

The calibrated parameters are divided into five groups. The first three (cash flow, investment technology, and life-cycle dynamics) include standard parameters on firm dynamics, which we calibrate following existing approaches. The last two groups govern financial and information frictions in the economy. Given their importance for gauging the role of the media, we discuss their calibration in greater detail below.

4.1.1. Firm dynamics

Cash flow level and dynamics The aggregate productivity, Z, corresponds to the steady-state level of the average operating cash flow rate. Since the aggregate productivity determines firms' average level of internal financing, we calibrate it to match the average

Table 3: Model calibration

(a) Calibrated parameters

Parameter		Value
Cash flow		
Z	Level of aggregate productivity	2.25%
ρ_z	Idiosyncratic productivity, persistence	0.95
σ_z	—, innovation standard deviation	0.11
Investment technology		
δ	Depreciation rate	3.3%
θ	Return-to-scale of investment technology	0.81
Life-cycle dynamics		
$\mu^{\text{entrant}}_{\log z}$	Entrants, average (log) productivity	-0.175
$\mu^{\text{entrant}}_{\log k}$	—, average (log) size	-1.761
Information and financial friction		
σ_a	Dispersion of capital quality shock	0.18
ϕ^e	Fixed cost to issuing equity	0.06%
Selective media reporting		
λ_ξ	Curvature of reporting probability	3.35
$(\lambda_\alpha, \lambda_p)$	Location of reporting probability function	(0.8, 0.3)

(b) Targeted moments

Moment	Data	Model
Cash flow (annual, %)		
Operating cash flow rate, mean	10.23	10.98
Idiosyncratic TFP, persistence	0.78	0.70
–, std	0.38	0.39
Investment rate (annual, %)		
Mean	6.00	6.10
Std	5.53	5.58
Life-cycle dynamics		
Growth rate, young minus mature firms	-0.106	-0.105
Idiosyncratic TFP, –	0.075	0.075
Equity financing (%)		
Fraction of firms issuing equity, annual mean	17.90	18.09
Issuance fee ratio, mean	2.17	2.19
Selling concession ratio when issuing, mean	2.97	2.91
Media reporting		
Avg. reporting probability, top vs. bottom 20%	175	176

Notes: This table reports calibrated parameters and targeted moments. All moments are measured based on firms in the Compustat sample from 1990 and 2021, and the definition and measurement of target moments are detailed in Appendix C.1. In Panel (a), ϕ^e is normalized by the average annual profit of the firm population. In Panel (b), the operating cash flow rate and investment rate refer to firms' operating cash flow and investment normalized by their capital stock. The issuance fee ratio is defined as the fixed cost paid by the issuing firms, normalized by their issuance quantity. The selling concession when issuing equity is measured as the log-difference between a firm's stock price before and after revealing its equity issuance decision. Both moments related to equity issuance costs are from Lee and Masulis (2009). The average reporting probability between the top and bottom 20% is defined as the ratio between the average reporting probabilities of the firms in the top and bottom 20% of the market capitalization percentile.

operating cash flow rate in the data. The idiosyncratic productivity shock, z, is the source of the cash flow risk firms face, which shapes the firms' ex-post heterogeneity and the precautionary motives in their investment decisions. We calibrate the idiosyncratic productivity's persistence and volatility to match the empirical estimates from İmrohoroğlu and Tüzel (2014).

Investment technology and capital accumulation We calibrate the depreciation rate, δ, to match the average investment rate at which firms replenish their depreciated capital and grow. The return-to-scale of investment technology, θ, governs the sensitivity of firms' investments to their capital profitability. We set $\theta = 0.81$ to target the cross-sectional standard deviation of firms' investment rates.

Life-cycle dynamics The ex-post heterogeneity among firms is shaped by the dynamics of the firms' idiosyncratic productivity and the distribution of the entrants. Two parameters of the entrant distribution, $\{\mu^{\text{entrant}}_{\log z}, \mu^{\text{entrant}}_{\log k}\}$, govern the variation across firms in different age groups.[21] Therefore, we calibrate the entrant distribution parameters to match the differences in the growth rate and the measured idiosyncratic TFP between young firms (age ≤ 5) and matured firms (age > 25).

4.1.2. Financial and information frictions

Firms face two frictions for raising equity financing: a fixed cost of equity issuance and an implicit cost arising from asymmetric information. The fixed cost captures all of the explicit expenses related to the administrative and marketing activities necessary for issuing equity. We calibrate the fixed cost to match the average management and underwriting fee ratio reported by Lee and Masulis (2009). The friction caused by asymmetric information is captured by the dispersion of the capital quality shocks. We calibrate the dispersion to match the average selling concession of seasonal equity offerings as reported by Lee and Masulis (2009).[22] Based on our calibrated costs for equity issuance and capital quality dispersion, we further calibrate the media-reporting function to match the average probability of firms issuing equity and the cross-sectional distribution of the media coverage, as documented in Section 2.

Parameterization of the media-reporting policy Equation (32) implies that the probability of a firm being reported is an increasing function of its newsworthiness, $\mathrm{N}_t(k, z)$. Under this relationship, selecting a $\mathrm{R}_t(k, z)$ function is equivalent to selecting a cost distribution, $\mathcal{H}(\kappa)$. Therefore, we work directly with the reporting probability, parameterizing it using the generalized hazard function

$$\mathrm{R}_t(k, z) = \frac{\lambda_p}{\lambda_p + (1-\lambda_p)(\frac{\lambda_\alpha}{\mathcal{Q}_t(k,z)})^{\lambda_\xi}}, \tag{33}$$

[21] We parameterize the entrant distribution $\mathcal{F}^{\text{entrant}}(z, k)$ as a mixture of two independent normal distributions of the firms' log productivities and log sizes: $\log z \sim \mathcal{N}(\mu^{\text{entrant}}_{\log z}, 0.01)$ and $\log k \sim \mathcal{N}(\mu^{\text{entrant}}_{\log k}, 0.01)$. The standard deviation is set to be 0.01, which is a sufficiently small value to smooth the distribution without affecting the results.

[22] The selling concession represents the stock price reduction that issuing firms must offer investment banks to secure their guarantee for flotation. We measure the average price concession using the average stock price drop after the announcement of an equity issuance decision. The average selling concession rate (2.97%), reported in Lee and Masulis (2009), is within the range of the empirical estimates for the stock price drop associated with the stock issuance (2%∼3%), as documented in the literature. Appendix C.1 provides further details.

where $\lambda_\xi > 1$, $\lambda_\alpha \in (0,1)$, $\lambda_p \in (0,1)$, and $\mathcal{Q}_t(k,z)$ denotes the percentile location of the newsworthiness of a firm with the idiosyncratic observable state (k,z).

With this parameterization, the probability of being reported increases monotonically with firms' newsworthiness and lies between 0 and 1. As a result, there exists some distribution $\mathcal{H}(\kappa)$ that generates this reporting probability function in equation (32). Calibrating $\mathrm{R}_t(k,z)$ directly in this way provides a clearer match between the model and the data, compared to a calibration strategy based explicitly on $\mathcal{H}(\kappa)$.[23] Similarly, specifying equation (33) in terms of the percentile rank $\mathcal{Q}_t(k,z)$—itself a positive monotonic transformation of newsworthiness $\mathrm{N}_t(k,z)$—is consistent with our use of binned scatter plots and regression specifications in Section 2.

Each parameter of equation (33) captures a distinct aspect of how reporting probability depends on a firm's newsworthiness ranking. As shown in Figure 6a, $\{\lambda_\alpha, \lambda_p\}$ are the location parameters: a firm with a newsworthiness percentile of λ_α has a reporting probability of λ_p. Once the newsworthiness percentile exceeds λ_α, the probability of being reported increases rapidly. The rate of this increase is governed by the parameter λ_ξ: a higher λ_ξ implies a steeper increase in the reporting probability.

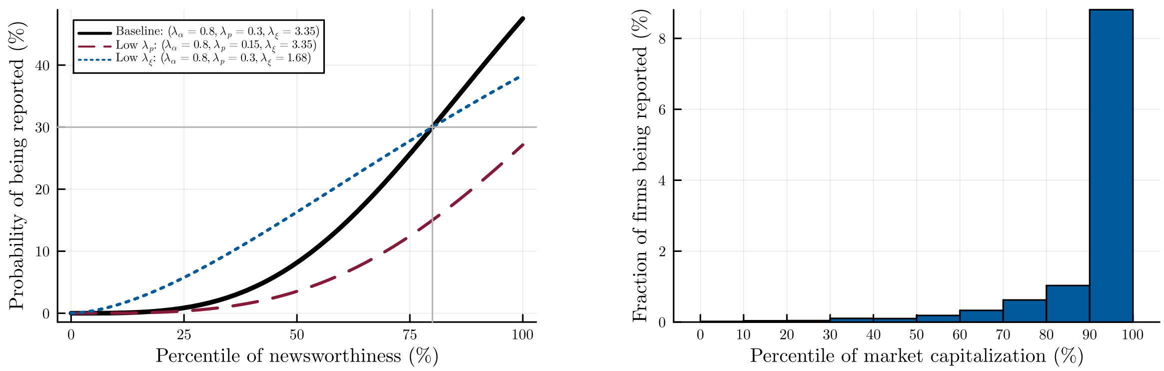
Calibration of the media-reporting policy The ideal empirical moments for disciplining media-reporting parameters would be the relationship between the probability of media coverage and a firm's newsworthiness. However, these moments are not directly observed, for three reasons. First, a firm's newsworthiness depends on the variance of the stock market value taken before the equity markets open, conditional on that firm being reported in the media (equation (30)), which is neither directly observed nor priced in options contracts. Second, we do not observe a firm's probability of being reported, only the realization of the reporting found in the data (i.e., whether a firm is reported or not reported). Finally, the three newspapers in our sample represent only a subset of the total news reporting. To address these measurement challenges, we take an alternative calibration approach, inferring the media-reporting function indirectly by targeting two groups of moments.

First, we calibrate λ_α and λ_ξ to match how the share of firms with newspaper coverage

[23] This approach of working directly with hazard functions, rather than the underlying cost distributions, is common in the literature on "lumpy adjustments" of prices, investment, and other firm choices (Caballero and Engel, 1999; Alvarez, Lippi and Oskolkov, 2022).

Figure 6: Calibration of the media-reporting policy

(a) Parameterization **(b)** Data moment



Notes: This figure provides details for the calibration of the media-reporting policy. Panel (a) reports how the media-reporting policy varies with the parameters of the generalized hazard function, (λ_α, λ_p, λ_ξ). Panel (b) reports how the average reporting probability varies by the market capitalization in the data. The data moments in Panel (b) are based on the Compustat sample between 1990 and 2021. Firms are sorted into deciles of market capitalization within quarters. For each decile of firms, we report the cross-time average of the share of firms being reported by the media.

varies across market-capitalization percentiles. Figure 6b reports the empirical distribution from the data introduced in Section 2. Firms below the 80th percentile receive minimal coverage, while coverage rises sharply at the 80% threshold. To capture this pattern, we set λ_α to 0.8 and calibrate λ_ξ to 3.35 to match the news-coverage ratio between firms in the top and bottom 20th percentiles of the stock market valuations. This approach uses the cross-sectional data patterns without focusing on the overall level of coverage, as our data provides a lower bound on the proportion of reported firms.

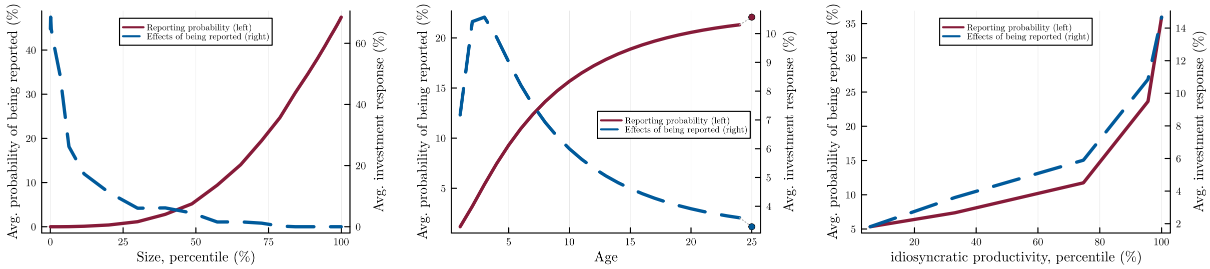
Second, we calibrate λ_p to match the average share of firms with equity issuances, since this parameter governs the average probability of firms being reported. With a given fixed cost of equity issuance and dispersion in the capital quality, a higher probability of media coverage reduces information frictions, making firms more likely to issue equity. Therefore, we use the average fraction of firms issuing equity as our target moment to calibrate λ_p. Under this calibration, the average probability of a firm being reported is 13.7% in each quarter.

4.2. Distribution of media coverage and the effects of media reports

Figure 7 presents the cross-sectional variation in the probability of media coverage under our calibration, shown as blue solid lines, along three dimensions: size, age, and idiosyncratic

Figure 7: Cross-sectional pattern of media reporting and its effects on firms' investments

(a) By size **(b)** By age **(c)** By idio. productivity



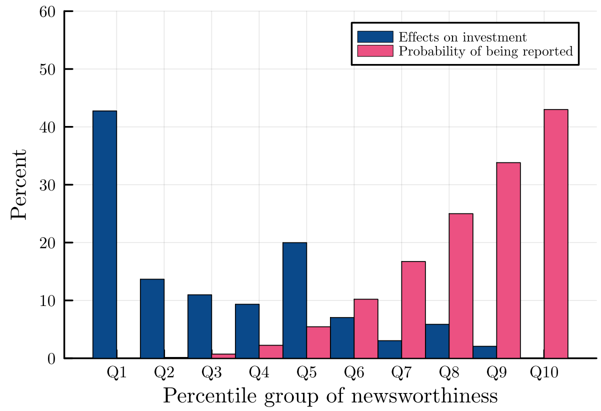
Notes: This figure plots the variation of the quarterly average probability of being reported (blue solid lines) and the effects of being reported (red dash lines) along size (capital stock), idiosyncratic productivity, and age. In this figure, the "effects of being reported" refers to the log-difference in a firm's investment between when it is reported and when it is not. The dots in Panel (b) represent firms aged ≥ 25.

productivity. Panels (a) and (b) indicate that larger and older firms are more likely to be reported, with the concentration being more pronounced along the size dimension. This pattern is consistent with the stylized facts documented in Figure 2. The model also predicts a higher likelihood of media coverage for firms with greater idiosyncratic productivity, as shown in Panel (c). These qualitative relationships follow from equation (30). Newsworthiness scales with firm size and productivity because both are positively correlated with market value. Since firms, on average, grow in size and productivity over time, the probability of media coverage also rises with firm age.

Figure 7 also reports the effect of media coverage on firms' investments across the same characteristics, shown as red dashed lines. We measure this effect as the log difference in a firm's investment between two scenarios: when it is reported and when it is not. The effect increases with firm productivity but decreases with firm size and age. This pattern arises because, as discussed in Section 3.3.1, media coverage can reduce information frictions related to equity issuances. The effects of media reports, therefore, depend on a firm's reliance on external funding. Smaller and younger firms, with less internal financing, rely more heavily on external equity markets, making their investment more sensitive to media reports. Similarly, more-productive firms, with greater investment needs, also depend more on external financing than less-productive firms of similar size.

These patterns imply a misalignment between the distribution of media reports and their impact on firm-level investment. To illustrate this misalignment more directly, Figure 8 plots the average investment responses to reporting alongside the probability of coverage across

Figure 8: Mis-allocation of media reporting



Notes: This figure reports the probability of media reporting and the effects of media reporting. The "effects on investment" refers to the log-difference in a firm's investment between two scenarios: when it is reported and when it is not. Firms are sorted into deciles of newsworthiness, with "Q1" representing the 10% least newsworthy firms and "Q10" representing the 10% most newsworthy firms. For each decile, we report the average probability of the firms being reported and the average effects, of media coverage, on their investment.

newsworthiness percentiles. Firms whose investment is most responsive to news reports are concentrated at the lower end of the newsworthiness distribution, receiving little coverage. In other words, the covariance term in the decomposition in equation (1) is strongly negative. This suggests that reallocating media coverage could generate a larger real effect on the economy. Building on this observation, the next subsection quantifies the magnitude of this distributional effect, using a counterfactual experiment.

4.3. Aggregate effects of media-coverage distribution

News reports affect firms' financing and investments by mitigating information asymmetries. To assess the aggregate relevance of media-coverage allocation, we first compare two counterfactual economies: one with no information asymmetry (symmetric-information economy) and another with information asymmetry but no media sector (no-media economy). The difference between the no-media economy and the symmetric-information economy captures the maximum potential loss from information asymmetry. We then consider an alternative media sector in which a portion of the space in media outlets is available for firms to purchase in a competitive news market. This allows us to evaluate the aggregate effect of reallocating media coverage towards firms that would benefit the most.

Limited role of the media in the baseline economy We first evaluate by how much the media alleviates the loss from asymmetric information in our baseline model. In Table 4, we measure the role of the media in a given economy by the relative reduction in the output loss from asymmetric information between this economy and the no-media economy. Without the media, asymmetric information depresses aggregate investment and capital accumulation, resulting in a 5.3% loss in output. While the media helps to alleviate this loss, its impact is modest, reducing the output loss by only 0.7 percentage points (equivalent to 13% of the output loss in no-media economy).

Table 4: Aggregate effects of information asymmetry (%)

	No-media	Baseline
Investment	-6.7	-5.9
Capital stock	-4.7	-4.2
Output	-5.3	-4.6

Notes: This table summarizes the effects of asymmetric information on aggregate investment, the capital stock, and output within the no-media economy and our baseline economy with selective-reporting media. To evaluate the effects of asymmetric information, we first solve a model that shares the same setup and calibration with the baseline model but features no information asymmetry. Then we compute the relative difference of the various aggregate quantities between each economy and the economy with symmetric information.

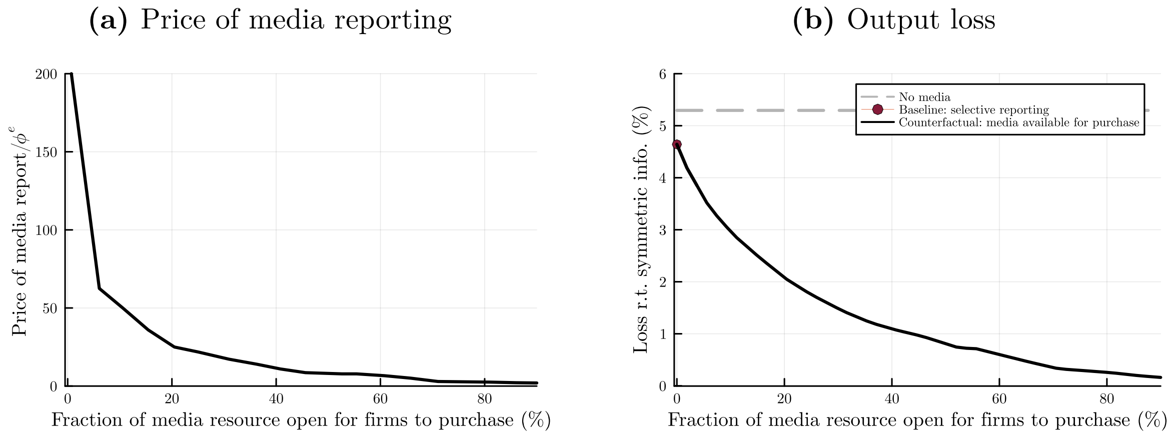
Quantifying the aggregate effects of media-coverage distribution. To understand the aggregate impact of the news-coverage distribution, we conduct a counterfactual experiment that reallocates a portion of the news coverage through a competitive news market while holding constant the number of firms that get reported.

In all of these counterfactuals, as in the baseline economy, 13.7% of firms are reported each quarter. Since 18.2% of firms will increase their investment after being reported, if the media allocated coverage exclusively to these "responsive firms," 75% would receive coverage.[24] In fact, in the baseline economy just 6% of the media coverage is allocated to these responsive firms, implying that 95% are not reported.

For the counterfactuals, we assume that the media outlets sell a portion (α_m) of their reporting resources to firms in a competitive market, allocating the remainder using the same

[24]Based on the variance decomposition $\mathbb{V}\left[\Delta x_{jt}\right] = \mathbb{E}\left[\mathbb{V}[\Delta x_{jt}|\mathbb{1}_{\Delta x_{jt}>0}]\right] + \mathbb{V}\left[\mathbb{E}[\Delta x_{jt}|\mathbb{1}_{\Delta x_{jt}>0}]\right]$, where $\Delta x_{jt} \equiv \frac{\partial \log x_{jt}}{\partial m_{jt}}$, the extensive margin responses explain 65% of the overall variation ($\frac{\mathbb{V}\left[\mathbb{E}[\Delta x_{jt}|\mathbb{1}_{\Delta x_{jt}>0}]\right]}{\mathbb{V}[\Delta x_{jt}]}$) in firms' investment responses to media coverage.

Figure 9: Aggregate relevance of media allocation



Notes: Panel (a) reports the equilibrium prices firms pay for media coverage in various counterfactual economies. In each counterfactual economy, we keep the total fraction of the reported firms at 13.7%, as in the baseline model, but allow a fraction of the media resource to be allocated through a competitive market. To facilitate the interpretation of the magnitude, we report the prices that are normalized by the fixed cost of issuing equity ϕ^e. Panel (b) shows the output loss in the counterfactual economies, measured by the relative difference in the aggregate output between each counterfactual economy and the economy with symmetric information.

news-reporting rule as in the baseline model. Firms not selected for coverage can purchase it before the equity market opens. The price of the media coverage is determined such that the total media coverage purchased by firms equals the coverage sold by the media in a competitive market. Appendix C.2 provides further details for this experiment.

Panel (a) of Figure 9 reports the price of the media reports across a series of counterfactual economies, characterized by different values of α_m. The horizontal axis represents α_m, the share of the media resource that is allocated through a competitive market out of the total media resources. The vertical axis represents the equilibrium price of the media reporting in each economy. Prices are high when the purchasable fraction of the media resources is small, with only the firms benefiting the most from news reporting willing to pay for being reported. As more media resources become purchasable, prices decline substantially.

Panel (b) shows how output loss varies with α_m. When $\alpha_m = 0$, all of the media resources are allocated following the baseline reporting policy, so the output loss coincides with the results of our baseline economy. While reallocating the media coverage cannot completely eliminate the output loss, because the total capacity of the media is insufficient to cover all constrained firms, it can substantially reduce this loss. Notably, reallocating just 5% of the media resources for firms to purchase doubles the media's effect in reducing the output loss. A 10% reallocation can already eliminate half of the overall output loss from information asymmetry.[25]

This substantial improvement from the media-reporting market stems from firms' self-selection. When media resources become available for purchase, firms that benefit the most from this coverage have the highest willingness to pay. Media reporting significantly boosts these firms' financing and investments, resulting in a considerable reduction in aggregate output loss.[26] Our counterfactual analysis shows that the aggregate effects of the media depend crucially on the distribution of the news coverage.

5. Conclusion

News outlets provide valuable information to their readers, but constraints on space and journalistic resources mean they have to make judgments on which firms are most newsworthy. We find that these judgments overwhelmingly favor reporting on the largest firms in the economy—firms that benefit the least from media coverage. This selectivity has important effects on firm dynamics and aggregate investment. Reallocating a small fraction of limited media reports away from large firms substantially increases the role the media can play in alleviating information frictions.

Both cross-time and cross-sectional variations in the media's production of firm news are endogenously determined. We showed that the way the media reports firms' news has important implications for the macroeconomy. Our findings suggest that large firms that dominate the market share, or "superstar" firms, (e.g., Covarrubias, Gutiérrez and Philippon, 2020; De Loecker, Eeckhout and Unger, 2020; Autor, Dorn, Katz, Patterson and Van Reenen, 2020) do so not only with better information technology (Kwon, Ma and Zimmermann, 2024) but also with superior media coverage. The interaction between information provision and corporate finance highlights an intangible form of market power enjoyed by these large firms, which warrants closer investigation in future studies.

[25] Figure C.1 in Appendix C.3 reports the results for investment and capital losses, which also show substantial improvements.

[26] In Appendix C.3, we also study the aggregate effects of a "uniform"-reporting media that simply allocates coverage resources equally among firms and reports all firms with the same probability. This alternative allocation only generates a minor improvement from the baseline, due to the absence of firms' self-selection.

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Online Appendices

A. Additional Details for the Empirical Analysis

A.1. Data construction

This section describes the firm-level financial variables used in the empirical analysis of the paper, based on the Compustat data. The definition follows standard practices in the literature (e.g., Kahle and Stulz, 2017; Ottonello and Winberry, 2020).

1. *Size*: the log of total real assets (`atq`), deflated using the BLS implicit price deflator.

2. *Age*: the number of years since the CRSP listing.

3. *Leverage*: the sum of the debt in current liabilities and the long-term debt (`dlttq+dlc`) over the sum of total assets and the market valuation minus the common equity (`atq-ceqq+cshoq*prccq`)

4. *Investment*: defined as $\Delta \log k_{it}$, where k_{it} denotes the capital stock of firm i at the end of quarter t. Following Ottonello and Winberry (2020), for each firm, we set the first value of k_{it} to be gross plant, property, and equipment (`ppegtq`) in the first period in which this variable is reported in Compustat and the subsequent value of k_{it} to be the changes in the net value of the plant, property, and equipment (`ppentq`). If a firm has a missing observation for `ppentq` located between two periods with non-missing observations, we estimate its value using a linear interpolation with the values of `ppentq`; if two or more consecutive observations are missing, we do not do any imputation.

5. *Equity issuance*: defined as the sale of common and preferred stock (`sstky` in the first fiscal quarter and changes in the `sstky` for the second to fourth fiscal quarters). Following McKeon (2015), we classify equity issuances that are smaller than 3% of a firm's market capitalization as zero issuances.

6. *Cumulative equity issuance probability*: an indicator variable that takes the value of one if a firm has issued new equity between quarters t and $t + h$ (i.e., the cumulative

equity issuance probability $E_{it+h} = 1$ if $e_{it-1} = 0$ and $\sum_{\tau=0,\cdots,h} e_{it+\tau} > 0$, where e_{it} denotes firm i's equity issuance in quarter t); and zero otherwise.

A.2. Additional tables and figures

Figure A.1: Distribution of corporate news coverage among firms with non-zero coverage

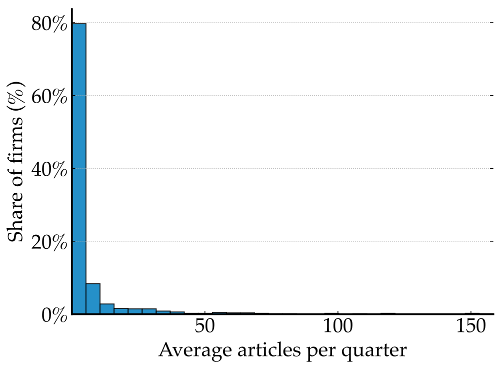
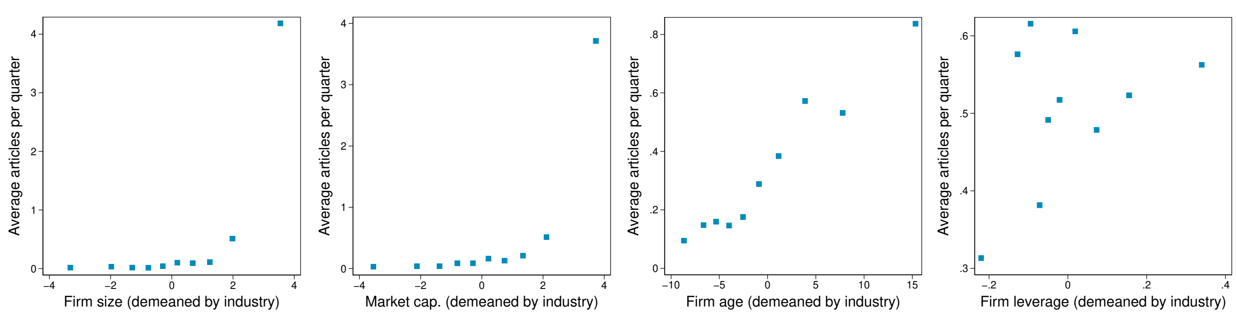


Table A.1: Top 20 firms ranked by total media coverage in the sample period

Rank	Firm	Articles	Rank	Firm	Articles
1	General Motors	18,380	11	Amazon	6,615
2	Microsoft	15,314	12	Bank of America	6,432
3	Apple	13,995	13	Merrill Lynch	6,169
4	Alphabet	10,402	14	Goldman Sachs	6,121
5	Citigroup	9,844	15	American Airlines	5,506
6	Boeing	8,965	16	HP	5,180
7	Time Warner	7,398	17	Delta Airlines	4,574
8	AT&T	7,244	18	US Airways	4,551
9	Walmart	6,887	19	Procter & Gamble	4,309
10	JPMorgan Chase	6,795	20	Altria Group	4,094
Total articles on top 20 firms					158,775
Total articles on remaining firms					216,852

Figure A.2: Media coverage and within-industry firm characteristics

(a) Size **(b)** Market cap. **(c)** Age **(d)** Leverage



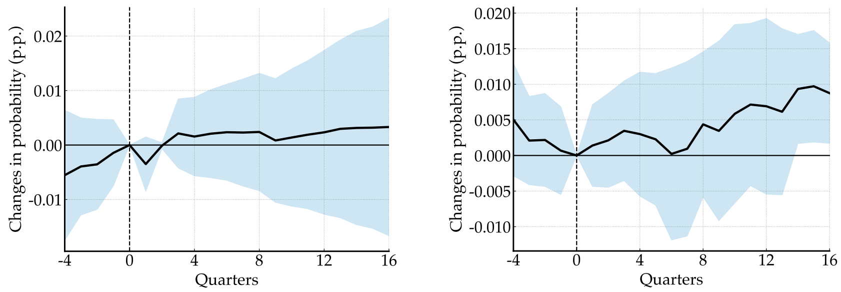
Notes: This figure reports binned scatterplots of average news articles per quarter. Each dot represents a decile of firms by firm characteristics relative to the industry (4-digit NAICS) average. The dashed lines represent quadratic fit lines. Panel (a) sorts firms by size, measured by log real assets. Panel (c) sorts firms by market capitalization. Panel (b) sorts firms by age, measured by years since their IPO. Panel (d) sorts firms by leverage, measured by their market leverage.

A.3. Specialized role of curated news

This subsection conducts additional analysis that provides evidence on the specialized role of curated news, in newspapers, for equity financing.

Figure A.3: News coverage and other forms of firm financing

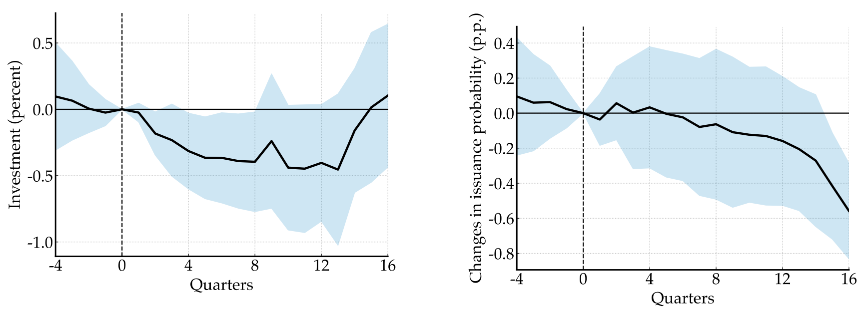
(a) Debt financing **(b)** Cash



Notes: This figure reports the results from estimating a variant of the baseline local projections in equation (3) for quarters $-4 \leq h \leq 16$: $y_{it+h} - y_{it} = \alpha_{st} + \alpha_i + \beta_h \nu_{it} + \Gamma' Z_{it-1} + u_{it+h}$, where α_{st} denotes sector-by-quarter fixed effects (with sectors defined at the 4-digit NAICS level); α_i denotes firm fixed effects; ν_{it} denotes the Twitter mentions of firm i in quarter t, demeaned at the firm level and standardized; and Z_{it-1} is a vector of firm controls including size, age, and real sales growth. The dependent variable y_{it} includes the investment rate ($\Delta \log k_{it}$) in panel (a), defined as the log change in the book value of the firm's tangible capital stock, and the cumulative probability of equity issuance (E_{it}) in panel (b), defined as an indicator variable that takes the value 1 if a firm issues new equity between quarters t and $t + h$, and zero otherwise. Standard errors are double clustered by firm and quarter. 90% confidence intervals are reported.

Figure A.4: Effects of Twitter coverage

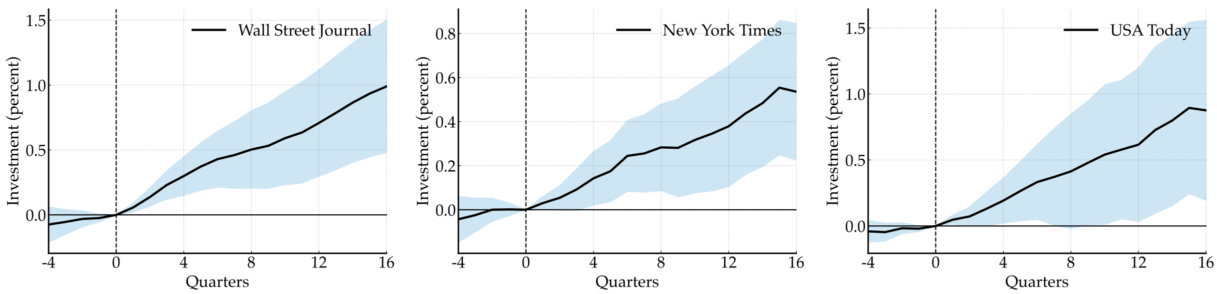
(a) Investment **(b)** Equity financing



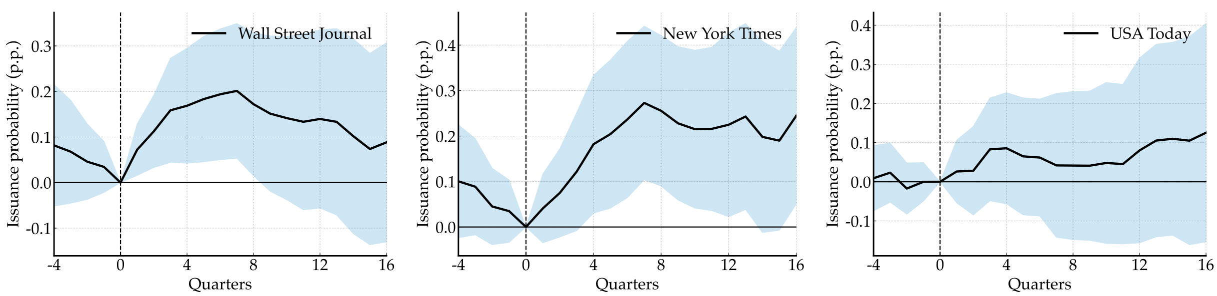
Notes: This figure reports the results from estimating the local projections in equation (3) for quarters $-4 \leq h \leq 16$: $y_{it+h} - y_{it} = \alpha_{st} + \alpha_i + \beta_h \nu_{it} + \Gamma' Z_{it} + u_{it+h}$, where α_{st} denotes the sector-by-quarter fixed effects (with sectors defined at the 4-digit NAICS level); α_i denotes the firm fixed effects; ν_{it} denotes the news coverage of firm i in major U.S. newspapers in quarter t, demeaned at the firm level and standardized; and Z_{it} is a vector of firm controls including size, age, and real sales growth. The dependent variable y_{it} includes the cumulative probability of debt financing, shown in panel (a), defined as an indicator variable that takes the value 1 if a firm raises its debt financing between quarters t and $t + h$, and zero otherwise, and the cumulative probability of increasing cash holdings in panel (b), defined as an indicator variable that takes the value 1 if a firm increases its cash holdings between quarters t and $t + h$, and zero otherwise. Standard errors are double clustered by firm and quarter. 90% confidence intervals are reported.

Figure A.5: Effects of coverage by newspapers

(a) Investment



(b) Equity issuance



Notes: This figure reports the results from estimating the variants of the baseline local projections in equation (3) for quarters $-4 \leq h \leq 16$: $y_{it+h} - y_{it} = \alpha_{st} + \alpha_i + \beta_h \nu_{it} + \Gamma' Z_{it} + u_{it+h}$, where α_{st} denotes the sector-by-quarter fixed effects (with the sectors defined at the 4-digit NAICS level); α_i denotes the firm fixed effects; ν_{it} denotes the news coverage of firm i in each newspaper in quarter t (The Wall Street Journal, The New York Times, or USA Today), demeaned at the firm level and standardized; and Z_{it} is a vector of firm controls including size, age, and real sales growth. The dependent variable y_{it} includes the investment rate ($\Delta \log k_{it}$), in panel (a), defined as the log change in the book value of the firm's tangible capital stock, and the cumulative probability of equity issuance (E_{it}), in panel (b), defined as an indicator variable that takes the value 1 if a firm issues new equity between quarters t and $t + h$, and zero otherwise. Standard errors are double clustered by firm and quarter. 90% confidence intervals are reported.

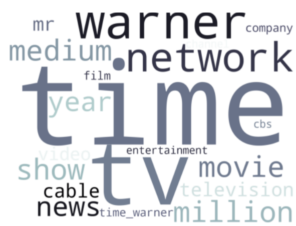
A.4. Topics in news articles

Figure A.6: Topics in firm news coverage

(a) Litigation

(b) Stock market

(c) Media sector

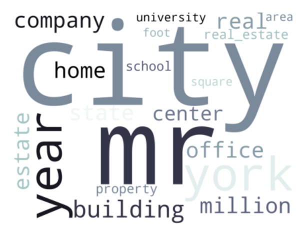


(d) China

(e) Investment

(f) Retail

(g) Real estate



(h) Financing (intl.)

(i) Earnings

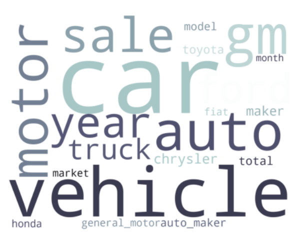
(j) Technology sector

(k) Airline sector

(l) Social media

(m) Energy sector

(n) Automobile sector



(o) Pharma. sector

(p) Financing

(q) Telecom sector

(r) Advertising sector

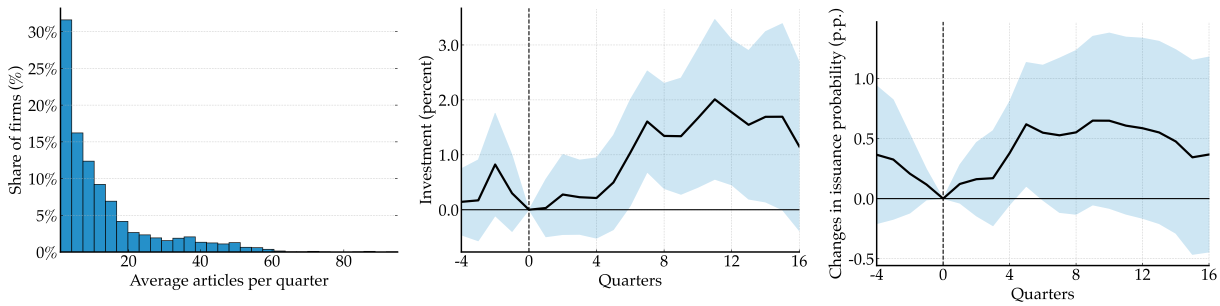
(s) Employees

(t) Executives

A.5. News coverage in France

Figure A.7: Media coverage and firm outcomes in France

(a) Distribution of news coverage **(b)** Investment responses after media coverage **(c)** Equity issuance responses after media coverage



Notes: Panel (a) reports the distribution of corporate news coverage in major French newspapers from 2005 to 2022, including *Les Echos*, *Le Monde*, *La Tribune*, and *Le Figaro.* Panels (b) and (c) report estimates from the local projections in equation (3) for quarters $-4 \leq h \leq 16$: $y_{it+h} - y_{it} = \alpha_{st} + \alpha_i + \beta_h \nu_{it} + \Gamma' Z_{it} + u_{it+h}$, where $\{\alpha_{st}, \alpha_i\}$ denote the sector-by-quarter and firm fixed effects; ν_{it} denotes the news coverage of firm i in major French newspapers in quarter t, demeaned at the firm level and standardized; and Z_{it} is a vector of firm controls including size, age, and real sales growth. The dependent variable y_{it} includes the investment rate ($\Delta \log k_{it}$) in panel (b), defined as the log change in capital expenditures, and the cumulative probability of equity issuance (E_{it}) in panel (c), defined as an indicator variable that takes the value 1 if a firm issues new equity between quarters t and $t+h$, and zero otherwise. Standard errors are double clustered by firm and quarter. 90% confidence intervals are reported.

Table A.2: National media strikes in France

Quarter	Date	Description
2005Q4	October 4, 2005	Unions of journalists and technicians in public broadcasting striked as part of a national day of action.
	October 20, 2005	The Agence France-Presse journalists' unions striked to oppose the announced closure of a regional office.
2008Q1	February 13, 2008	Workers in public broadcasting striked to protest President Nicolas Sarkozy's media reform.
2008Q4	November 25, 2008	Public broadcaster workers striked to protest bill passed reforming public broadcasting by President Sarkozy.
2013Q1	February 1, 2013	The Agence France Presse journalists' unions striked to call for the withdrawal of the "France Region" project.
2018Q2	April 1, 2018	National strikes, including by broadcasters, against President Emmanuel Macron's reforms to the public sector.

Notes: Information on national media strikes in France from 2005 to 2021 was found by searching Factiva using the search words "strike or grève" and "journalist or journaliste" or "strike or grève" and "broadcaster or diffuseur" and restricting the region to France, the industry to Media/Entertainment, the subject to Labor Dispute, and by excluding strikes against individual newspapers.

B. Additional Details for the Theoretical Analysis

B.1. Proofs

B.1.1. Proof of theorem 1

Proof. We show that there is a unique reporting policy that can be sustained as a symmetric equilibrium. To find this, we begin by considering an arbitrary candidate reporting policy. We then show that there is a unique candidate reporting policy from which no outlet would find it optimal to deviate.

The candidate reporting policy is characterized by a vector of reporting choices $\boldsymbol{m}_t = \{m_{jt}\}_{j=0}^{1}$, which satisfies the space constraint (19). Without loss of generality, assume that $\boldsymbol{m}_t$ involves all outlets reporting on firm j and all outlets not reporting on firm j'.

Optimal forecasts For a firm j that is reported on by outlet i, forecaster i can forecast the market value precisely as they observe all of that firm's state variables

$$\mathcal{P}_t(k_{jt}, z_{jt}, 1, \mathcal{I}_{it}^{\text{news}} | m_{ijt}^o = 1) = \text{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1). \tag{34}$$

Substituting this forecast into equation (25) reveals that when $m_{ijt}^o = 1$, forecaster i makes no forecast errors.

For a firm that is not reported by outlet i, the optimal forecast by forecaster i is given by

$$\mathcal{P}_t(k_{jt}, z_{jt}, m_{jt}, \mathcal{I}_{it}^{\text{news}} | m_{ijt}^o = 0) = \mathbb{E}\left[(\text{MV}_t(k_{jt}, z_{jt}, a_{jt}, m_{jt}) | k_{jt}, z_{jt}, m_{jt} \right]. \tag{35}$$

The forecast in (35) is uncertain because the forecaster is uncertain about a_{jt}. In general, this will lead forecaster i to make non-zero forecast errors when $m_{ijt}^o = 0$.[27]

[27] If $m_{jt} = 1$, forecaster i is aware that investors know a_{jt}, but they do not themselves observe this as their outlet did not report it. If instead $m_{jt} = 0$, forecaster i knows that no outlet reported a_{jt} and so it is not part of the investors' information set. However, there is still uncertainty in that case, because the realized a_{jt} can still affect the realized market value, indirectly, through firm j's equity issuance (see Section 3.3.1). Since forecasters make predictions before equity markets open, they cannot observe equity issuances. They do not therefore know what the investors' posteriors $g(a_{jt})$ will be and so cannot be certain about the realization of the market value.

Forecaster utility at equilibrium Since we consider a symmetric reporting policy, all outlets make the same reporting decisions. This means all forecasters have the same information set and make the same forecast errors. As a result,

$$\mathrm{FE}_t(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}_{it}^{\text{news}}) = \overline{\mathrm{FE}}_{-i,t}(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}_{-i,t}^{\text{news}}), \tag{36}$$

and thus $U_{it} = 0$.

Outlet deviations A minimal deviation from $\boldsymbol{m}_t$ consists of an outlet i ceasing to report on firm j and, instead, reporting on firm j'. $\boldsymbol{m}_t$ can only be sustained in equilibrium if no outlet finds it optimal to deviate in this way. Since in the absence of any deviation we have obtained that $U_{it} = 0$ with certainty, a sufficient condition for $\boldsymbol{m}_t$ to be an equilibrium is that

$$\mathbb{E}\,\hat{U}_{it}(j, j') + \kappa_{jt} - \kappa_{j',t} \leq 0, , \tag{37}$$

where $\hat{U}_{it}(j, j')$ is the utility of forecaster i if outlet i deviates. If this condition holds for all pairs of the reported and unreported firms, j, j', the news outlets never deviate and $\boldsymbol{m}_t$ is an equilibrium.

We now proceed to find an expression for $\mathbb{E}\,\hat{U}_{it}(j, j')$. First, notice that the deviation would have no effect on firms other than j and j'. From the definition of the forecaster's utility in equation (24), we therefore have

$$\begin{aligned}\mathbb{E}\,\hat{U}_{it}(j, j') = &- \mathbb{E}\left[\mathrm{FE}_t(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}_{it}^{\text{news}}) - \overline{\mathrm{FE}}_{-i,t}(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}_{-i,t}^{\text{news}})\right] \\ &- \mathbb{E}\left[\mathrm{FE}_t(k_{j',t}, z_{j',t}, a_{j',t}, m_{j',t}, \mathcal{I}_{it}^{\text{news}}) - \overline{\mathrm{FE}}_{-i,t}(k_{j',t}, z_{j',t}, a_{j',t}, m_{j',t}, \mathcal{I}_{-i,t}^{\text{news}})\right].\end{aligned} \tag{38}$$

The first two terms give the utility change from no longer reporting on firm j. Other forecasters are still reporting on j and so it remains the case that $m_{jt} = 1$ and the realized market value of firm j is unchanged. The average forecast error of the other forecasters $\bar{\mathrm{FE}}_{t-i}(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}_{-i,t}^{\text{news}})$, therefore, remains unchanged at 0. However, forecaster i's forecast does change, as their information set no longer contains a_{jt}. Specifically,

$$\text{FE}_t(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}_{it}^{\text{news}}) = \left[\mathcal{P}_t(k_{jt}, z_{jt}, 1, \mathcal{I}_{it}^{\text{news}} | m_{ijt}^o = 0) - \text{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1)\right]^2. \quad (39)$$

Substituting out for the optimal forecast using equation (27), and taking the expectations, we obtain

$$\begin{aligned}\mathbb{E}[\text{FE}_t(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}_{it}^{\text{news}})] = \mathbb{E}\,\big[\,&\mathbb{E}(\text{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1)|k_{jt}, z_{jt}, m_{jt} = 1) \\ &- \text{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1)\big]^2, \quad (40)\\ = \;& \mathbb{V}[\text{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1)|k_{jt}, z_{jt}], \quad (41)\end{aligned}$$

where $\mathbb{V}[.]$ denotes the variance with respect to a_{jt}.

The second two terms of equation (38) give the utility change due to reporting on firm j'. Recall that investors observe a firm's asset quality if at least one outlet reports it (equation (23)). Since outlet i has reported on firm j', that firm's asset quality $a_{j',t}$ is transmitted to investors and so $m_{j',t} = 1$. As a result, forecaster i observes all of the determinants of firm j''s market value and is able to make an accurate forecast (equation (34)). Forecaster i therefore makes no forecast error about firm j'.

However, although forecaster i makes no forecast error about j' under this deviation, the same is not true of the other forecasters. Their outlets have not reported on j' ($m_{i',j',t}^o = 0$) and so they do not have sufficient information to precisely infer that firm's market value. This generates a forecast error, given by

$$\overline{\text{FE}}_{-i,t}(k_{j',t}, z_{j',t}, a_{j't}, 1, \mathcal{I}_{-i,t}^{\text{news}}) = \int_{i' \neq i} \left[\mathcal{P}_t(k_{j',t}, z_{j',t}, \mathcal{I}_{i',t}^{\text{news}} | m_{i',j,t}^o = 0) - \text{MV}_t(k_{j',t}, z_{j',t}, a_{j',t}, 1)\right]^2 di' \quad (42)$$

All outlets, i', are identical, so when using the same steps as those used to derive equation (41), the expectation of this average forecast error becomes

$$\mathbb{E}\left[\overline{\text{FE}}_{-i,t}(k_{j',t}, z_{j',t}, a_{j't}, 1, \mathcal{I}_{-i,t}^{\text{news}})\right] = \mathbb{V}[\text{MV}_t(k_{j',t}, z_{j',t}, a_{j',t}, 1)|k_{j',t}, z_{j',t}]. \quad (43)$$

Substituting these results into equation (38), the utility of deviating in this way is

$$\mathbb{E}\,\hat{U}_{it}(j,j') = \mathbb{V}[\mathrm{MV}_t(k_{j',t}, z_{j',t}, a_{j',t}, 1)|k_{j',t}, z_{j',t}] - \mathbb{V}[\mathrm{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1)|k_{jt}, z_{jt}]. \tag{44}$$

Condition (37) is therefore satisfied, and the candidate, $\boldsymbol{m}_t$, can be sustained as a symmetric equilibrium, if and only if

$$\mathbb{V}[\mathrm{MV}_t(k_{j',t}, z_{j',t}, a_{j',t}, 1)|k_{j',t}, z_{j',t}] - \kappa_{j',t} \leq \mathbb{V}[\mathrm{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1)|k_{jt}, z_{jt}] - \kappa_{jt} \tag{45}$$

for all pairs of reported and unreported firms j, j'. The reporting policy for which this condition holds is the one described in equations (29)-(31).

□

B.2. Alternative assumptions on outlets and forecasters

We consider two plausible alternative assumptions to the media-reporting policy in Section 3.3.2. Even though the resulting newsworthiness function differs slightly from equation (30), the qualitative properties remain unchanged.

B.2.1. Outlet objective function

In Section 3, we assumed that the media outlets maximize the expected utility of their forecasters. However, the media outlets observe all realizations of a_{jt} and the reporting decisions of the other outlets. These outlets are therefore able to predict the *realized* utility of their forecasters when they make their reporting decisions. If we allow the outlet to maximize this realized utility, their problem is as in Section 3.1.3, except that the objective function changes to

$$\max_{m^o_{ijt}} - \int_0^1 \left[\mathrm{FE}_t(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}^{\text{news}}_{it}) - \overline{\mathrm{FE}}_{-i,t}(k_{jt}, z_{jt}, a_{jt}, m_{jt}, \mathcal{I}^{\text{news}}_{-i,t})\right] dj - \int_0^1 \kappa_{jt} m^o_{ijt} dj \tag{46}$$

subject to equations (21)-(22) and optimal predictions (27).

In this case, a vector $\boldsymbol{m}_t$ can be sustained as a symmetric reporting equilibrium in pure strategies if and only if

$$\hat{U}_{it}(j, j') + \kappa_{jt} - \kappa_{j',t} \leq 0 \tag{47}$$

for all pairs of reported and unreported firms j, j'. This differs from equation (37) in that there is no longer an expectation operator present.

The results on the realized forecast errors derived in Section 3.3.2 continue to hold, as nothing has changed in the forecaster's problem. $\hat{U}_{it}(j, j')$ is therefore given by

$$\begin{aligned}\hat{U}_{it}(j, j') =& \big[\mathbb{E}(\mathrm{MV}_t(k_{j',t}, z_{j',t}, a_{j',t}, 1) | k_{j',t}, z_{j',t}, m_{j',t} = 1) - \mathrm{MV}_t(k_{j',t}, z_{j',t}, a_{j',t}, 1)\big]^2 \\ &- \big[\mathbb{E}(\mathrm{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1) | k_{jt}, z_{jt}, m_{jt} = 1) - \mathrm{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1)\big]^2.\end{aligned} \tag{48}$$

The unique symmetric pure strategy reporting equilibrium is therefore as in Section 3.3.2, except that the newsworthiness function is modified to

$$\mathrm{N}_t(k_{jt}, z_{jt}, a_{jt}) = \big[\mathbb{E}(\mathrm{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1) | k_{jt}, z_{jt}, m_{jt} = 1) - \mathrm{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1)\big]^2. \tag{49}$$

Like the form in equation (30), this is increasing in the firm size. The key difference is that the newsworthiness function now also depends on the realized a_{jt}.

B.2.2. Forecaster information

In Section 3.1, we assumed that forecasters can observe the reporting decisions of outlets other than their own. This allowed for a simple characterization of the equilibrium reporting policy, but it is not essential for our results. In this subsection, we derive the equilibrium reporting policy under the alternative assumption that forecaster i does not observe the reporting decisions of other outlets, as in, for example, Nimark and Pitschner (2019). We continue to assume, as in the previous derivation, that the outlet maximizes the realized utility of their forecaster. The outlet problem is therefore unchanged: their objective is as in equation (46), and the constraints are as in equations (21)–(22). A vector $\boldsymbol{m}_t$ can be sustained as a symmetric pure strategy equilibrium if and only if condition (47) holds for all pairs of reported and unreported firms j, j'. The key way this alternative assumption changes the model is that forecasters no longer necessarily observe the aggregate media indicator m_{jt}.

As in Section 3.1, if outlet i reports on a firm, j, then $m_{jt} = 1$. Moreover, forecaster i can infer that $m_{jt} = 1$ for certain: they see that their outlet has reported on firm j, which is sufficient to imply $m_{jt} = 1$ (equation (23)). As in Appendix B.1.1, if an outlet deviates to report on firm j', while other outlets report on j, we therefore have

$$\text{FE}_t(k_{j',t}, z_{j',t}, a_{j',t}, m_{j',t} = 1, \mathcal{I}_{it}^{\text{news}}) = \bar{\text{FE}}_{t-i}(k_{jt}, z_{jt}, a_{jt}, m_{jt} = 1, \mathcal{I}_{-i,t}^{\text{news}}) = 0 \tag{50}$$

The utility change from deviating therefore reduces to

$$\begin{aligned}\hat{U}_{it}(j, j') =& \big[\,\mathbb{E}(\text{MV}_t(k_{j',t}, z_{j',t}, a_{j',t}, m_{j',t})|k_{j',t}, z_{j',t}, m_{i',j',t}^o = 0) - \text{MV}_t(k_{j',t}, z_{j',t}, a_{j',t}, 1)\big]^2 \\ & - \big[\,\mathbb{E}(\text{MV}_t(k_{jt}, z_{jt}, a_{jt}, m_{jt})|k_{jt}, z_{jt}, m_{ijt}^o = 0) - \text{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1)\big]^2.\end{aligned} \tag{51}$$

This differs from equation (48) because the expectations are formed without the knowledge of the true $m_{jt}, m_{j',t}$. In both cases, all the forecasters know is what their own outlets have published. In the first of the expectations, this is the expected market value of firm j' formed by forecasters other than forecaster i, whose outlet did not report on j' ($m_{i',j',t}^o = 0$). In the second expectation, the expected market value of firm j is formed by forecaster i, whose outlet has deviated and is not reporting on firm j ($m_{ijt}^o = 0$). In both cases, the true aggregate reporting indicator is $m_{jt} = m_{j',t} = 1$: outlet i reports on firm j', and all other outlets report on firm j. As the outlets can still observe each others' reporting choices, each outlet is aware of this fact; only the forecasters who are not.

The law of iterated expectations implies

$$\begin{aligned}&\mathbb{E}(\text{MV}_t(k_{jt}, z_{jt}, a_{jt}, m_{jt})|k_{jt}, z_{jt}, m_{ijt}^o = 0) \\ &\qquad = \Pr(m_{jt} = 1|k_{jt}, z_{jt}, m_{ijt}^o = 0)\,\mathbb{E}(\text{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1)|k_{jt}, z_{jt}, m_{ijt}^o = 0, m_{jt} = 1) \\ &+ (1 - \Pr(m_{jt} = 1|k_{jt}, z_{jt}, m_{ijt}^o = 0))\,\mathbb{E}(\text{MV}_t(k_{jt}, z_{jt}, a_{jt}, 0)|k_{jt}, z_{jt}, m_{ijt}^o = 0, m_{jt} = 0),\end{aligned} \tag{52}$$

where $\Pr(m_{jt} = 1|k_{jt}, z_{jt}, m_{ijt}^o = 0)$ is the perceived probability that forecaster i attaches to $m_{jt} = 1$, conditional on their observations.

The term $\Pr(m_{jt} = 1|k_{jt}, z_{jt}, m_{ijt}^o = 0)$ represents, for a forecaster observing that their outlet *did not* report on a firm, the probability that some other outlet *did* report on that firm during the period. Under rational expectations, although forecaster i does not observe the reporting decisions of the outlet belonging to forecaster i' (and vice versa), they are able to understand the policy function that is driving that other outlet's decisions and, thus, the process for determining m_{jt}.

Under rational expectations, forecasters also understand that they are in a symmetric media equilibrium, which implies

$$\Pr(m_{jt} = 1 | k_{jt}, z_{jt}, m^o_{ijt} = 0) = 0. \tag{53}$$

That is, when forecasters observe that their own outlet has not reported on a particular firm, they infer that no outlet has done so.

There is one nuance here that is noteworthy. Forecasters infer that $m_{jt} = m^o_{ijt}$ because they have rational expectations, so they have full knowledge of the equilibrium. In equilibrium, their inference on m_{jt} is therefore correct. However, in equation (51) we are considering a deviation from that equilibrium, implicitly assuming that if such a deviation were to happen, forecasters would not be able to identify that it had happened. As a result, they would continue to forecast $m_{jt} = m^o_{ijt}$ with certainty, even though this would have been incorrect under the deviation. This assumption is consistent with rational expectations: In any equilibrium, such a deviation is a probability-zero event, so it is rational to attach no weight to it. All the forecaster observes is k_{jt}, z_{jt} and m^o_{ijt}, and none of this reveals that a deviation is occurring. This is one key reason why deviations create forecast errors, as they lead forecasters to make errors about m_{jt}. The utility change from deviating in equation (51), therefore, becomes

$$\begin{aligned}\hat{U}_{it}(j, j') = & \big[\mathbb{E}(\mathrm{MV}_t(k_{j',t}, z_{j',t}, a_{j',t}, 0) | k_{j',t}, z_{j',t}) - \mathrm{MV}_t(k_{j',t}, z_{j',t}, a_{j',t}, 1)\big]^2 \\ & - \big[\mathbb{E}(\mathrm{MV}_t(k_{jt}, z_{jt}, a_{jt}, 0) | k_{jt}, z_{jt}) - \mathrm{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1)\big]^2 \end{aligned} \tag{54}$$

The unique symmetric pure strategy reporting equilibrium is the same as in Section 3.3.2, except that the newsworthiness function is modified to

$$\mathrm{N}_t(k_{jt}, z_{jt}, a_{jt}) = \big[\mathbb{E}(\mathrm{MV}_t(k_{jt}, z_{jt}, a_{jt}, 0) | k_{jt}, z_{jt}) - \mathrm{MV}_t(k_{jt}, z_{jt}, a_{jt}, 1)\big]^2. \tag{55}$$

A firm is more newsworthy if its news coverage would substantially alter the beliefs of forecasters and investors and would lead to a large change in market valuations. Newsworthiness is increasing in firm size (as in equation (30)) and depends on realizing a_{jt} (as in equation (49)).

B.3. Equity market equilibrium under asymmetric information

Given the equity issuance price specified by (17), the optimal equity issuance decision problem for firms being reported by the media is specified by

$$\mathrm{V}_t(k, z, a, 1) = \max_{e \geq 0} \mathrm{W}_t(k, z, a, e) - e, \tag{56}$$

The equity issuance price of an unreported firm is not determined by its asset quality but by its issuance, because the asset quality is unobservable by investors. Given this property, we can rewrite the equity issuance price function as $\mathrm{P}_t(k, z, e)$. For each set of firms with common observable characteristics (k, z), their equity issuance is determined by the equity market equilibrium characterized as follows.

For a given value function $\mathrm{W}_t(k, z, a, e)$ and a prior on firms' asset quality $\mathcal{G}(a)$: $\{a_1 < a_2 < \cdots < a_N\} \to (0, 1)$, the equilibrium is defined as a collection of the equity issuance policy function $\mathbf{e}_t(k, z, a)$, the equity issuance price function $\mathrm{P}_t(k, z, e)$, and the investors' beliefs $\mathcal{B}_t(a|k, z, e)$, such that

1. given the equity issuance price $\mathrm{P}_t(k, z, e)$, firms make their equity issuance decisions $\mathbf{e}_t(k, z, a)$ based on the optimization problem

$$\mathrm{V}_t(k, z, a) = \max_{e \geq 0} \frac{\mathrm{P}_t(k, z, e)}{\mathrm{P}_t(k, z, e) + e} \cdot \mathrm{W}_t(k, z, a, e); \tag{57}$$

2. given the firms' optimal equity issuance choices $\mathbf{e}_t(k, z, a)$, the investors' beliefs on the firms' asset quality must satisfy Bayes' rule

$$\mathcal{B}_t(a|k, z, e) = \frac{\mathcal{G}(a) \mathbb{1}_{\mathbf{e}_t(k,z,a)=e}}{\int \mathcal{G}(\tilde{a}) \mathbb{1}_{\mathbf{e}_t(k,z,\tilde{a})=e} d\tilde{a}} \tag{58}$$

for equity issuance e on equilibrium paths and the Divinity criteria as specified in Banks and Sobel (1987) for the issuance off the equilibrium path;

3. given the investors' beliefs $\mathcal{B}_t(a|k,z,e)$, the equity issuance price $\mathrm{P}_t(k,z,e)$ has to satisfy the investors' break-even condition:

$$\int \frac{e}{e+\mathrm{P}_t(k,z,e)} \mathrm{W}_t(k,z,a,e)\mathcal{B}_t(a|k,z,e)da = e, \ \forall e > 0. \tag{59}$$

Guo *et al.* (2024) show that whenever the value function $\mathrm{W}_t(k,z,a,n)$ satisfies $\frac{\partial \mathrm{W}_t(k,z,a,e)}{\partial e} > 0$, $\frac{\partial^2 \mathrm{W}_t(k,z,a,e)}{\partial e^2} < 0$ and $\frac{\partial^2 \mathrm{W}_t(k,z,a,e)}{\partial e \partial a} \leq 0$, a pooling equilibrium does not exist. The following theorem characterizes a separating equilibrium through a sequential algorithm. For notational simplicity, we abstract from the time subscript t in the equations below.

***Theorem* 2.** *The equilibrium issuance choices of firms that share the same publicly observable information (k,z) can be determined by the following sequential algorithm:*

0. *Denote the equity issuance of firms with quality a under symmetric information as $\mathbf{e}^*(k,z,a)$, that is, $\mathbf{e}^*(k,z,a) \equiv \arg\max_{e \geq 0} \mathrm{W}(k,z,a,e) - e$.*

1. *The optimal equity issuance of the firms with the lowest asset quality is $\mathbf{e}(k,z,a_1) = \mathbf{e}^*(k,z,a_1)$ and the associate equity issuance price is*

$$\mathrm{P}(k,z,\mathbf{e}(k,z,a_1)) = \mathrm{W}(k,z,a,\mathbf{e}(k,z,a_1)) - \mathbf{e}(k,z,a_1).$$

2. *Given the equity issuance of a firm with asset quality a_ι as $\mathbf{e}(k,z,a_\iota) > 0$ and its associated issuance price $P(k,z,\mathbf{e}(k,z,a_\iota))$, the upper bound of the equity issuance for firms with $a_{\iota+1}$, denoted as $\bar{e}_{\iota+1}$, such that lower-quality firms have no incentive to mimic, is solved by*

$$\mathrm{W}(k,z,a_\iota,\mathbf{e}(k,z,a_\iota)) - \mathbf{e}(k,z,a_\iota) = \mathrm{W}(k,z,a_\iota,\bar{e}_{\iota+1}) - \bar{e}_{\iota+1}\frac{\mathrm{W}(k,z,a_\iota,\bar{e}_{\iota+1})}{\mathrm{W}(k,z,a_{\iota+1},\bar{e}_{\iota+1})}. \tag{60}$$

   Then the equity issuance of firms with $a_{\iota+1}$ is

$$\mathbf{e}(k,z,a_{\iota+1}) = \begin{cases} \min\{\mathbf{e}^*(k,z,a_{\iota+1}),\ \bar{e}_{\iota+1}\} & \textit{if } \mathrm{W}(k,z,a_{\iota+1},\bar{e}_{\iota+1}) > \mathrm{W}(k,z,a_{\iota+1},0) \\ 0 & \textit{otherwise.} \end{cases}$$

When $\mathbf{e}(k,z,a_{\iota+1}) > 0$*, the associated equity issuance price is*

$$\mathrm{P}(k,z,\mathbf{e}(k,z,a_{\iota+1})) = \mathrm{W}(k,z,a,\mathbf{e}(k,z,a_{\iota+1})) - \mathbf{e}(k,z,a_{\iota+1}).$$

3. *If firms with asset quality* a_ι *choose not to issue equity, that is,* $\mathbf{e}(k,z,a_\iota) = 0$*, then all firms with asset quality* $a > a_\iota$ *will not issue equity either.*

The belief that supports support this equilibrium outcome is

$$\mathcal{B}(a|k,z,e) = \begin{cases} \mathbb{1}_{a=a_1} & \text{if } e > \mathbf{e}(k,z,a_2) \\ \mathbb{1}_{a=a_{\iota-1}} & \text{if } e \in (\mathbf{e}(k,z,a_\iota), \mathbf{e}(k,z,a_{\iota-1})] \\ \frac{\mathcal{G}(a)}{\int_{\tilde{a}:\{\mathbf{e}(k,z,\tilde{a})=0\}} \mathcal{G}(\tilde{a})d\tilde{a}} & \text{if } e \le \mathbf{e}(k,a,a_{\bar{\iota}}), \end{cases} \tag{61}$$

and the associated equity issuance price is

$$\mathrm{P}(k,z,e) = \begin{cases} \mathrm{W}(k,z,a_1,e) - e & \text{if } e > \mathbf{e}(k,z,a_2) \\ \mathrm{W}(k,z,a_{\iota-1},e) - e & \text{if } e \in (\mathbf{e}(k,z,a_\iota), \mathbf{e}(k,z,a_{\iota-1})] \\ \frac{\int_{\tilde{a}:\{\mathbf{e}(k,z,\tilde{a})=0\}} W(k,z,\tilde{a},e)\mathcal{G}(\tilde{a})d\tilde{a}}{\int_{\tilde{a}:\{\mathbf{e}(k,z,\tilde{a})=0\}} \mathcal{G}(\tilde{a})d\tilde{a}} - e & \text{if } e \le \mathbf{e}(k,a,a_{\bar{\iota}}), \end{cases}, \tag{62}$$

where $a_{\bar{\iota}}$ *denotes the highest asset quality of the firms that issue equity.*

Proof. Before proceeding, we state four helpful results:[28]

1. Under symmetric information, the optimal equity issuance of a firm is not smaller than that of the firms with higher qualities, that is, $\mathbf{e}^*(a) \ge \mathbf{e}^*(a')$ for any $a' > a$ if $\mathbf{e}^*(a') > 0$.

2. Under asymmetric information, the upper bound of the equity issuance for the type-$a_{\iota+1}$ firm $\bar{e}_{\iota+1}$ that is imposed by the lemon threat from type-a_ι and specified by (60) exists and this upper bound is decreasing with respect to the firms' capital quality, that is, $\bar{e}_{\iota'} < \bar{e}_\iota$ for any $\iota' > \iota$.

3. Under asymmetric information, the existing shareholders' value is increasing by the firms' capital quality, that is, $\mathrm{V}(a_\iota) < \mathrm{V}(a_{\iota+1})$ for any $\iota \in \{1,2,3,\ldots,n\}$.

[28] See Guo *et al.* (2024) for further details of the proof. Since the analysis is conditional on each pair of (k,z), for simplicity of notation, we omit these two publicly observable characteristics in the proof. We also express $\mathbf{e}^*(a_\iota)$ as e^*_ι.

4. There exists a unique $e_\iota \in (\mathbf{e}^*(a_\iota), \bar{e}_\iota)$ that satisfies $\frac{\mathrm{W}(\eta_\iota,\bar{e}_\iota)}{\mathrm{W}(\eta_\iota,e^*_\iota)-e^*_\iota} = \frac{\mathrm{W}(\eta_{\iota-1},\bar{e}_\iota)}{\mathrm{W}(\eta_{\iota-1},e^*_{\iota-1})-e^*_{\iota-1}}$, when $e^*_\iota < \bar{e}_\iota$.

Proving Theorem 2 requires showing three parts:

1. The equity issuance contract $P(e)$ specified in (62) is consistent with the belief $\mathcal{B}(a|e)$ specified in (61).

2. The firms' choices $\{e^*_\iota\}_{\iota=1}^n$ are the firms' optimal choices under the contract $P(e)$.

3. The belief $\mathcal{B}(a|e)$ is consistent with the firms' choices for the equilibrium outcomes of the issuances and satisfies the D1 criteria for the off-equilibrium outcomes of the issuances.

Consistency between $P(e)$ and $\mathcal{B}(a|e)$ Given the belief $\mathcal{B}(a|e)$, the conditional expectation of the firms' value is

$$\mathbb{E}[\mathrm{W}(a,e)|\mathcal{B}^*(a;e)] = \begin{cases} \mathrm{W}(a_1,e) & \text{if } e > \mathbf{e}(a_2) \\ \mathrm{W}(a_{\iota-1},e) & \text{if } e \in (\mathbf{e}(a_\iota), \mathbf{e}(a_{\iota-1})] \\ \frac{\sum_{\iota\geq\bar{\iota}} \mathrm{W}(a_\iota,e)\cdot\mathcal{G}(a_\iota)}{\sum_{\iota\geq\bar{\iota}}\mathcal{G}(a_\iota)} & \text{if } e \leq \mathbf{e}(a_{\bar{\iota}}), \end{cases},$$

which directly implies that $\frac{e}{\mathrm{P}(e)+e} \cdot \mathbb{E}[\mathrm{W}(a,e)|\mathcal{B}(a|e)] = e$ for any $e > 0$.

Optimality of $\{e^*_\iota\}_{\iota=1}^n$ We can show that e^*_ι is the optimal choice of firm type-a_ι under contract $\mathrm{P}(e)$, $\forall\iota = 1, 2, 3, \ldots, N$, in the following steps:

0. For notational simplicity, we use $e \succeq_a (\succ_a) e'$ to denote that equity issuance e dominates (strictly dominates) e' for type-a firms under the issuance contract $\mathrm{P}(e)$.

1. $e^*_\iota \succeq_{a_\iota} e$, $\forall e \in (\bar{e}_{\iota+1}, \bar{e}_\iota]$, that is, when a firm is priced based on its true type, it has no incentive to deviate.

2. $e^*_\iota \succeq_{a_\iota} e$, $\forall e \in (\bar{e}_{\iota+2}, \bar{e}_{\iota+1})$, that is, type-$a_\iota$ firms have no incentive to lower their equity issuance and, thus, to let the investors perceive them as type-$a_{\iota+1}$ firms under the contract $\mathrm{P}(e)$.

3. $e^*_\iota \succeq_{a_\iota} e$ $\forall e \leq \bar{e}_{\iota+1}$, that is, the type-$a_\iota$ firm has no incentive to issue less equity and let investors perceive it as a firm with higher capital quality under contract $\mathrm{P}(e)$.

4. Similarly, we can also prove that $e_\iota^* \succeq_{a_\iota} e \ \forall e \in (\bar{e}_\iota, \bar{e}_{\iota-1}]$, that is, type-$a_\iota$ firms have no incentive to increase their equity issuances and let investors perceive them as type-$a_{\iota-1}$ firms under contract $\mathrm{P}(e)$.

5. Now, we can prove that $e_\iota^* \succeq_{a_\iota} e$, $\forall e > \bar{e}_\iota$, that is, the type-$a_\iota$ firm has no incentive to increase its issuance and let investors perceive it as a firm with lower capital quality under contract $\mathrm{P}(e)$.

6. Combining results 1, 3, and 5, e_ι^* is type-a_ι firms' optimal equity issuances under contracts $\mathrm{P}(e)$.

Consistency of belief $\mathcal{B}(a|e)$ Following the specification of the D1 criteria, we first prove that the firm type most likely to deviate to a signal $e \in (\bar{e}_{\iota+1}, \bar{e}_\iota)$ is a_ι. For a given signal e, we define $\bar{s}(a_\iota, e) \equiv \frac{\mathrm{W}(a_\iota, e)}{V(a_\iota)} - 1$ as the upper bound of the required number of new shares to be issued that can motivate type-a_ι firms to deviate from their equilibrium choices and choose to issue e. Then, we can prove the following results:

1. $\bar{s}(a_\iota, e) > \bar{s}(a_{\iota-1}, e)$ for any $e < \bar{e}_\iota$, that is, type-a_ι firms are more likely to deviate to $e < \bar{e}_\iota$, compared with type-$a_{\iota-1}$ firms.

2. $\bar{s}(a_\iota, e) > \bar{s}(a_{\iota+1}, e)$ for any $e > \bar{e}_{\iota+1}$, that is, type-a_ι firms are more likely to deviate to e, compared with type-$a_{\iota+1}$ firms.

3. $\bar{s}(a_\iota, e) > \bar{s}(a_{\iota'}, e)$ for any $e \in (\bar{e}_{\iota+1}, \bar{e}_\iota)$ if $\iota \neq \iota'$, that is, type-a_ι firms are more likely to deviate to $e \in (\bar{e}_{\iota+1}, \bar{e}_\iota)$ than any other type of firm. The second part of the proof for the belief $\mathcal{B}(a|e)$ satisfying the D1 criteria is straightforward, given the proved result that $V(a_\iota) = \max_{e \in (\bar{e}_{\iota+1}, \bar{e}_\iota]} \frac{e}{e + \mathrm{P}(e)} \cdot \mathrm{W}(a_\iota, e)$.

□

C. Additional Details for the Quantitative Analysis

C.1. Definitions and measurements of target moments

This section describes the construction of target moments reported in Table 3b, based on firms in the Compustat sample from 1990 and 2021.

1. Cash flow

    (a) *Operating cash flow*: defined as net cash flow, measured by the operating activities (`oancfy` in the first fiscal quarter and changes in `oancfy` for the second to fourth fiscal quarters

    (b) *Operating cash flow rate*: defined as operating cash flow normalized by capital stock (measured by lagged total assets `atq`).

    (c) *Idiosyncratic TFP*: defined as the log of revenue rate divided by its cross-firm average, where the revenue rate is measured by the total revenue (`saleq`) normalized by lagged total assets (`atq`).

2. Investment

    (a) *Investment*: defined as the capital expenditure (`capxy` in the first fiscal quarter and changes in `capxy` for the second to fourth fiscal quarters).

    (b) *Investment rate*: defined as the investment normalized by capital stock

    (c) *Measurement of investment rate dispersion*: Following Sterk *et al.* (2021), we measure the cross-sectional variation in firms' investment rates by first estimating

$$y_{jt} = \gamma_j + \gamma_{st} + \epsilon_{jt},$$

    where y_{jt} denotes investment rate of firm j in quarter t, and $\{\gamma_j, \gamma_{st}\}$ denote firm and sector-by-quarter fixed effects; and then computing the dispersion of investment rate as the standard deviation of ϵ_{jt}.

3. Life-cycle dynamics

    (a) *Age*: the number of years since the CRSP listing.

    (b) *Young and mature firms*: young firms are defined as firms aged less or equal to 5 years; mature firms are defined as firms aged more than 25 years.

    (c) *Growth rate*: the log-difference of the total assets (`atq`).

    (d) *Measurement of age group difference*: To compute the target moment for the life-cycle differences between mature (age $>$ 25) and young (age $\leq$ 5) firms, we use the coefficient β_5 estimated from

$$\begin{aligned} y_{jt} =& \gamma_j + \gamma_{st} + \beta_1 \cdot \mathbb{1}[5 < Age_{jt} \leq 10] + \beta_2 \cdot \mathbb{1}[10 < Age_{jt} \leq 15] \\ &+ \beta_3 \cdot \mathbb{1}[15 < Age_{jt} \leq 20] + \beta_4 \cdot \mathbb{1}[20 < Age_{jt} \leq 25] + \beta_5 \cdot \mathbb{1}[Age_{jt} > 25] + \epsilon_{jt}, \end{aligned}$$

where y_{jt} denotes growth rate or idiosyncratic TFP of firm j in quarter t, Age_{jt} denotes the age of firm j in quarter t, and $\{\gamma_j, \gamma_{st}\}$ denote firm and sector-by-quarter fixed effects.

4. Equity financing

   (a) *Equity issuance*: defined as the sale of common and preferred stock (`sstky` in the first fiscal quarter and changes in the `sstky` for the second to fourth fiscal quarters). Following McKeon (2015), we classify equity issuances that are smaller than 3% of a firm's market capitalization as zero issuances.

   (b) *Issuance fee ratio*: defined as the fixed issuance cost normalized by the issuance quantity. We use the reported mean in Table 4 of Lee and Masulis (2009) as our target moment.

   (c) *Selling concession ratio*: defined as the log difference between a firm's stock price before announcing its issuance decision and its post-issuance stock price. We use the reported mean in Table 4 of Lee and Masulis (2009) as our target moment.

5. Media reporting

   (a) *Reporting probability*: measured as the fraction of firms reported by media within each firm group of each quarter

C.2. Setup for the counterfactual studies

In this counterfactual, firms can purchase the option to be reported if they are not chosen by media to report. This induces two changes in these firms' problem. First, firms have one more choice to make, that is, whether to purchase the media coverage, $b(k, z, a) \in \{0, 1\}$.

When a firm is chosen by the media to report, its value function is

$$\mathrm{V}_t(k,z,a,1) = \max_{e\geq 0} \mathrm{W}_t(k,z,a,e) - e, \tag{63}$$

and when it is not chosen, its value function is

$$\begin{aligned}\mathrm{V}_t(k,z,a,0) = \max_{b\in\{0,1\}} \ & b\cdot\left(\max_{e\geq 0} \mathrm{W}_t(k,z,a,e-\phi^m) - e\right) \\ &+ (1-b)\cdot\left(\max_{e\geq 0} \frac{\mathrm{P}_t(k,z,a,0,e)}{\mathrm{P}_t(k,z,a,0,e)+e}\cdot \mathrm{W}_t(k,z,a,e)\right),\end{aligned} \tag{64}$$

where ϕ^m is the price of the media coverage. Second, the media allocate a fraction of their coverage resource based on their baseline news-reporting policy and allocate the rest for firms to purchase. The associated clearing condition for the media-coverage resource is

$$\begin{aligned}&\underbrace{\int \mathrm{R}_t^{\text{baseline}}(k,z)\mathcal{G}(a)\mathcal{F}_t^{\text{baseline}}(k,z)dkdzda}_{\text{Total capacity of media coverage}} \\ =&\underbrace{\int \mathbf{b}_t(k,z,a)\cdot(1-(1-\alpha_m)\mathrm{R}_t(k,z,a))\,\mathcal{G}(a)\mathcal{F}_t(k,z)dadkdz}_{\text{Total media coverage purchased by firms}} \\ +&\underbrace{(1-\alpha_m)\cdot\int \mathrm{R}_t(k,z,a)\mathcal{G}(a)\mathcal{F}_t(k,z)dkdzda}_{\text{The total media coverage allocated based on the baseline news-reporting policy}}\end{aligned} \tag{65}$$

This market clearing condition will determine the price of being reported by the media ϕ^m.

C.3. Additional quantitative results

Uniform reporting We evaluate the role of the media within a counterfactual economy with uniform media reporting, where the media allocates the total reporting resources equally and reports firm with equal probability. As summarized in Table C.1, compared with the selective-reporting baseline economy, equally allocating the media-coverage resource across firms can further alleviate the loss from asymmetric information. This improvement arises mainly because more firms that benefit from being reported receive media coverage under this allocation. However, the magnitude of this improvement is relatively small, because there is still a large fraction of the media-coverage resource allocated to financially unconstrained firms, which are unaffected by media reports.

Table C.1: Aggregate effects of information asymmetry (%)

	No-media	Baseline reporting	Uniform reporting
Investment	-6.7	-5.9	-.5.5
Capital stock	-4.7	-4.2	-3.9
Output	-5.3	-4.6	-4.4

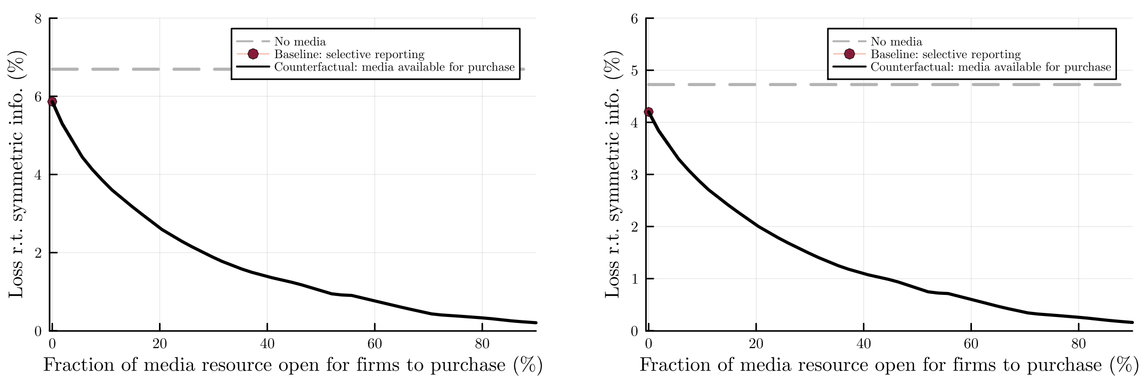
Notes: This table summarizes the effects of asymmetric information on aggregate investment, capital stock, and output within the no-media economy, our baseline economy with selective-reporting media, and a counterfactual economy with the media reporting every firm with equal probability. To evaluate the effects of asymmetric information, we first solve a model that shares the same setup and calibration with the baseline model but features no information asymmetry. Then we compute the relative difference of the various aggregate quantities between each economy and the symmetric-information economy.

Additional results for the aggregate relevance of the media-coverage allocation

In Section 4.3, we report the aggregate relevance of the media-coverage allocation measured by how much of the loss in aggregate output from asymmetric information is alleviated. In Figure C.1, we present the corresponding results measured by the aggregate capital and investment loss, which show a similar pattern as discussed in Section 4.3.

Figure C.1: Aggregate relevance of media allocation

(a) Investment loss **(b)** Capital



Notes: Panels (a) and (b) summarize the aggregate investment and capital loss in various counterfactual economies. In each counterfactual economy, we fix the total fraction of firms to be reported by the media but allow a fraction of the media resource to be allocated through a competitive market for firms to purchase the option to be reported by media. The investment (capital) loss is measured by the relative difference of aggregate investment (capital) between each counterfactual economy and the symmetric-information economy.

D. A Model with Investor-Led Media Demand

In this section, we provide an alternative microfoundation for the media's reporting policy. We incorporate a media sector in a variant of the static Grossman and Stiglitz (1980) model. Unlike our main quantitative model, noise traders prevent the perfect aggregation of information in asset prices. This causes investors to value information coming from the media. To solve this model, we abstract from the firm block of our quantitative model. Instead, a firm's equity generates a payoff that is independent of media decisions but initially unknown to investors.

D.1. Environment

Assets There is a risk-free asset with fixed return r and a price of 1 (the numeraire). There are N firms. The firms' equities consist of risky assets with payoffs given by the $N \times 1$ vector $f \sim N(\bar{f}, \Sigma_f)$, where Σ_f is diagonal (firm payoffs are independent). The prices of these risky assets are collected in the $N \times 1$ vector p. f is exogenous, but p will be determined in equilibrium by investors' behavior.

Media There is a representative media outlet, which observes the realization of f before the market opens. The outlet produces a publication in which they report the realized payoffs from a subset of firms' equities. As in Section 3, the outlet has a space constraint

$$\sum_{j=1}^{N} m_j \leq N_r \tag{66}$$

where m_j is an indicator equal to 1 if the outlet reports on firm j, and $N_r < N$. The outlet sells this publication to investors at a price $c > 0$.

Investors There is a unit mass of investors indexed by i, with exponential utility over final wealth, W_i, net of the costs of any information acquired, cL_i.

$$U_i = -\exp(-\rho(W_i - cL_i)), \tag{67}$$

where $\rho > 0$ governs the risk aversion and $L_i \in \{0, 1\}$ is an indicator for whether the investor purchased the media publication.

Each investor has an endowment of W_0 units of the risk-free asset. Let q_i be the $N \times 1$ vector of the quantities of each risky asset purchased by investor i. To buy this portfolio, they must sell $q_i'p$ units of the risk-free endowment. Their end-of-period wealth is therefore

$$W_i = (W_0 - q_i'p)r + q_i'f. \tag{68}$$

Investors can observe which firms are reported before they choose whether to purchase the media publication, but they can only see the information in the publication if they purchase it. If an investor purchases the publication, they can only process a limited amount of information from its contents. We model this fixed information capacity with the constraint

$$|\Sigma_i^{-1}| \leq e^{2K} |\Sigma_f^{-1}|, \tag{69}$$

where Σ_i is the variance-covariance matrix of investor i's beliefs after processing the information found in the publication, but before observing p. The constant $K > 0$ determines the investor's information capacity.[29]

Market clearing The supply of each risky asset is constant. The demand for risky assets comes from investors and noise traders, who add a random component x to the asset demand. Market clearing therefore requires

$$\int_0^1 q_i di + x = \bar{x}, \quad x \sim N(0, \sigma_x^2 I), \tag{70}$$

where $\bar{x}$ and x are $N \times 1$ vectors of the asset supplies and the noise trader shocks, respectively. The noise trader shocks have a common variance $\sigma_x^2 \geq 0$.

Timing The model consists of five stages:

1. f is realized. The media outlet observes this and chooses which firms to report.

[29] With Gaussian priors and posteriors (verified below), this constraint implies that the mutual information between the priors and the posteriors is $\leq K$, as is standard in rational inattention models (Maćkowiak *et al.*, 2023).

2. Investors decide whether they wish to purchase the publication and, (conditional on purchasing), how to allocate their information capacity.

3. Investors observe the realization of their chosen signals.

4. Asset markets open. Investors observe the asset prices and choose among the portfolios. Simultaneously, prices are determined as a function of investor demand.

5. Payoffs are realized.

D.2. Equilibrium with given information sets

We begin by solving for the asset demand and equilibrium for any given information set. In stage 4 of the model timing, equilibrium is a set of asset demands, q_i, and prices, p, such that

1. q_i maximizes investor i's expected utility, conditional on the information they processed and any information contained in p.

2. p is such that asset markets clear.

Portfolio choice When the asset market opens, investors observe p. We summarize any other information they may have obtained from the media in $\mathcal{I}_i$. Their expected utility at this point, after substituting out for W_i using the budget constraint (68) and simplifying, is

$$\mathbb{E}_i[U_i|p,\mathcal{I}_i] = -\exp(-\rho r W_0)\exp(\rho c L_i)\,\mathbb{E}_i[\exp(-\rho q_i'(f-pr))|p,\mathcal{I}_i]. \tag{71}$$

The first two exponential terms are known positive constants, so they do not affect the portfolio choice problem. Since f is normally distributed, $\exp(-\rho q_i'(f-pr))$ has a log-normal distribution. Assuming all signals from prices and purchased information preserve this distribution (we will verify later), the expectation in equation (71) can be written as

$$\mathbb{E}_i[U_i|p,\mathcal{I}_i] \propto -\mathbb{E}_i[\exp(-\rho q_i'(f-pr))|p,\mathcal{I}_i] = -\exp\left(-\rho q_i'(\mathbb{E}_i[f|p,\mathcal{I}_i]-pr)+\frac{\rho^2}{2}q_i'\mathbb{V}_i[f|p,\mathcal{I}_i]q_i\right) \tag{72}$$

where $\mathbb{V}_i[f|p,\mathcal{I}_i]$ is the $(N\times N)$ posterior variance of investor i's beliefs about f.

Maximizing this with respect to q_i gives the asset demand equation

$$q_i = \frac{1}{\rho}(\mathbb{V}_i[f|p, \mathcal{I}_i])^{-1}(\mathbb{E}_i[f|p, \mathcal{I}_i] - pr) \tag{73}$$

Prior information All investors know the distribution of f. If investors have paid for information, then they also observe a vector of noisy signals, before the markets open, of the form

$$s_i = f + \varepsilon_i, \quad \varepsilon_i \sim N(0, \Sigma_{\varepsilon i}), \tag{74}$$

where the noise ε_i is idiosyncratic to investor i and independent of f.

For simplicity we restrict our attention to cases where $\Sigma_{\varepsilon i}$ is diagonal (i.e., the signal noise is independent across assets). Incorporating these signals using Bayes' rule, investor i's beliefs about f before the market opens are normally distributed, with

$$\mathbb{V}_i[f|\mathcal{I}_i] \equiv \Sigma_i = (\Sigma_f^{-1} + \Sigma_{\varepsilon i}^{-1})^{-1} \tag{75}$$

$$\mathbb{E}_i[f|\mathcal{I}_i] \equiv \mu_i = \Sigma_i(\Sigma_f^{-1}\bar{f} + \Sigma_{\varepsilon i}^{-1} s_i). \tag{76}$$

If investor i does not purchase the (media) information, they do not observe the signals, so $\Sigma_{\varepsilon i}^{-1}$ is a matrix of 0s. If an asset j is not reported by the media, then the j, j'th element of $\Sigma_{\varepsilon i}^{-1}$ is 0 for all investors, as no one is able learn about asset j.

Information in prices We solve for the prices, p, by guessing and verifying that they are a linear function of the payoffs and the shocks, where

$$p = A + Bf + Cx \tag{77}$$

for some diagonal $N \times N$ matrices A, B, C.

We split the assets into two groups, depending on whether or not they are reported in the media. Without loss of generality, we index the assets that are reported in the media by $n \in \{1, ..., N_r\}$ and those that are unreported by $n \in \{N_{r+1}, ..., N\}$.

(a) <u>Unreported firms</u>: Since no investors have information on the realized f_n for unreported firms, the prices are uninformative and the final $N - N_r$ rows and columns of B contain only 0s. As a result, the beliefs about f_n depend on the underlying payoff distribution only. The demand for the equity of an unreported firm is therefore identical across investors and is given by

$$q_{ni} = \frac{\bar{f}_n - rp_n}{\rho\sigma_{fn}^2}, \tag{78}$$

where σ_{fn}^2 is the nth diagonal element of Σ_f. Substituting this into the market clearing in equation (70) for firm n's equity and rearranging yields

$$p_n = \frac{\bar{f}_n - \rho\sigma_{fn}^2\bar{x}_n}{r} - \frac{\rho\Sigma_{fn}}{r}x_n \tag{79}$$

This is of the form in equation (77), with the nth diagonal element of B equal to 0.

(b) Reported firms: The asset prices of the reported firms contain some information. Let z_r denote a $1 \times N_r$ vector consisting of the first N_r elements of any vector z, that is, f_r denotes the payoffs of the reported assets; similarly, A_r, B_r, C_r, Σ_{rf}, and Σ_{ri} denote $N_r \times N_r$ matrices, consisting of the first N_r rows and columns of A, B, C, Σ_f, and Σ_i, respectively.

From the price law of motion, investors can construct an unbiased signal about f_r as

$$B_r^{-1}(p_r - A_r) = f_r + B_r^{-1}C_r x \sim N(f_r, \Sigma_{rp}), \tag{80}$$

$$\Sigma_{rp} \equiv \sigma_x^2 B_r^{-1}C_r(B_r^{-1}C_r)'. \tag{81}$$

After incorporating this signal, investors' posteriors are normally distributed, with

$$\mathbb{V}_i[f|p,\mathcal{I}_i] \equiv \hat{\Sigma}_{ri} = (\Sigma_{ri}^{-1} + \Sigma_{rp}^{-1})^{-1}, \tag{82}$$

$$\mathbb{E}_i[f|p,\mathcal{I}_i] \equiv \hat{\mu}_{ri} = \hat{\Sigma}_{ri}(\Sigma_{ri}^{-1}\mu_{ri} + \Sigma_{rp}^{-1}B_r^{-1}(p_r - A_r)). \tag{83}$$

Substituting $\hat{\mu}_{ri}$ and $\hat{\Sigma}_{ri}$ into equation (73) we obtain the asset demand

$$q_{ri} = \frac{1}{\rho}\Sigma_{ri}^{-1}\mu_{ri} + \frac{1}{\rho}(\Sigma_{rp}^{-1}(B_r^{-1} - rI_r) - r\Sigma_{ri}^{-1})p_r - \frac{1}{\rho}\Sigma_{rp}^{-1}B_r^{-1}A_r. \tag{84}$$

Substituting out for μ_{ri}, Σ_{ri} using equations (75) and (76) and aggregating across investors, the market clearing becomes

$$\frac{1}{\rho}(\Sigma_{rf}^{-1}\bar{f}_r - \Sigma_{rp}^{-1}B_r^{-1}A_r) + \frac{1}{\rho}\bar{\Sigma}_{r\epsilon}^{-1}f_r + \frac{1}{\rho}(\Sigma_{rp}^{-1}(B_r^{-1} - rI_r) - r\Sigma_{rf}^{-1} - r\bar{\Sigma}_{r\epsilon}^{-1})p + x_r = \bar{x}_r, \tag{85}$$

where $\bar{\Sigma}_{r\epsilon}^{-1} = \int_0^1 \Sigma_{r\epsilon i}^{-1} di$ is the average precision of the investors' signals. This rearranges to the form in equation (77), confirming our guess. Matching the coefficients yields solutions for A, B, C.

D.3. Information choice

We now go back a step and solve for the information choices, taking the edia reporting as given.

Indirect expected utility Equation (71) defines the expected utility conditional on observing $p, \mathcal{I}$. Substituting out for the expectation, using (72), and for q_i using (73), this becomes

$$\mathbb{E}_i[U_i|p, \mathcal{I}_i] = -\exp(-\rho r W_0)\exp(\rho c L_i)\left[\exp\left(-\frac{1}{2}(\mathbb{E}_i[f|p,\mathcal{I}_i] - pr)'\mathbb{V}_i[f|p,\mathcal{I}_i]^{-1}(\mathbb{E}_i[f|p,\mathcal{I}_i] - pr)\right)\right]. \tag{86}$$

When the investor makes their information choice, they have not yet observed $p, \mathcal{I}$. We therefore need to take the expectation of equation (86) over these objects, or equivalently over the posterior expectation $\mathbb{E}_i[f|p, \mathcal{I}_i]$.[30] This is an expectation of an exponential of a squared Gaussian distribution, which is given by (see Veldkamp, 2023, ch. 7.3)

$$\mathbb{E}_i[U_i] = -\exp(-\rho r W_0)\exp(\rho c L_i)\left(\frac{|\mathbb{V}_i[f|p,\mathcal{I}_i]|}{|\Sigma_f|}\right)^{\frac{1}{2}} \cdot \left[\exp\left(-\frac{1}{2}\mathbb{E}_i[\mathbb{E}_i[f|p,\mathcal{I}_i] - pr]'\Sigma_f^{-1}\mathbb{E}_i[\mathbb{E}_i[f|p,\mathcal{I}_i] - pr]\right)\right]. \tag{87}$$

The final bracketed term of this expression consists of investors' expectations of posterior

[30]The posterior variance $\mathbb{V}_i[f|p, \mathcal{I}_i]$ is unaffected by the realization of the signals or the prices. When they make that decision, investors know the $\mathbb{V}_i[f|p, \mathcal{I}_i]$ they will face with and without purchasing the information.

beliefs and prices. Investors know that information will make their beliefs more precise, but ex-ante they do not expect it to make their beliefs systematically more or less optimistic. Whether or not they purchase this information, this final term is therefore constant. As a result, only the terms in L_i and $(|\mathbb{V}_i[f|p,\mathcal{I}_i]|/|\Sigma_f|)^{-\frac{1}{2}}$ are affected by the information choice.

The expected utility for informed investors who purchase media and for uninformed investors who do not is therefore (respectively) proportional to

$$\mathbb{E}_i[U_i] \propto -e^{\rho c}\left(\frac{|\mathbb{V}_i[f|p,\mathcal{I}_i]|}{|\Sigma_f|}\right)^{\frac{1}{2}}, \quad \mathbb{E}_U[U_U] \propto -\left(\frac{|\mathbb{V}[f|p]|}{|\Sigma_f|}\right)^{\frac{1}{2}}, \tag{88}$$

where $\mathbb{V}_i[f|p,\mathcal{I}_i]$ may differ across informed investors, i, depending on how they choose to allocate their information capacity.

Information capacity allocation An investor who purchases the media publication chooses the properties of their noisy signals (74) to maximize their expected utility (87) subject to their capacity constraint (69). Since the priors are Gaussian, equation (74) is the optimal signal structure, and investors only have to choose the noise variance matrix $\Sigma_{\varepsilon i}$.

The important step here is to note, as shown in e.g., Veldkamp (2023), that the objective function is convex, implying there are gains to specialization. The optimal information capacity allocation is for the investor to devote all of their capacity to learning about a single firm's equity. In other words, the investor's signal is such that all elements of $\Sigma_{\varepsilon i}^{-1}$ are zero except for one. If an investor learns about firm n^*, the capacity constraint implies

$$\sigma_{\varepsilon i n^*}^{-2} = (e^{2K}-1)\sigma_{f n^*}^{-2}, \tag{89}$$

where $\sigma_{\varepsilon i n^*}^2, \sigma_{f n^*}^2$ are the n^*th diagonal elements of $\Sigma_{\varepsilon i}$ and Σ_f, respectively.

Since Σ_f and $\mathbb{V}_i[f|p,\mathcal{I}_i]$ are diagonal, $\mathbb{E}_i[U_i]$ from equation (88) can be written as

$$\mathbb{E}_i[U_i] \propto -e^{\rho c}\prod_{n=1}^{N}\left(\frac{\mathbb{V}_i[f_n|p_n,\mathcal{I}_i]}{\sigma_{fn}^2}\right)^{\frac{1}{2}} = -e^{\rho c}\prod_{n=1}^{N_r}\left(\frac{\sigma_{fn}^{-2}+\sigma_{\varepsilon in}^{-2}+\sigma_{pn}^{-2}}{\sigma_{fn}^{-2}}\right)^{-\frac{1}{2}} \tag{90}$$

$$= -e^{\rho c}\left(\frac{|\mathbb{V}[f|p]|}{|\Sigma_f|}\right)^{\frac{1}{2}}\left(\frac{\sigma_{fn^*}^{-2}e^{2K}+\sigma_{pn^*}^{-2}}{\sigma_{fn^*}^{-2}+\sigma_{pn^*}^{-2}}\right)^{-\frac{1}{2}}. \tag{91}$$

The first of these equalities uses the observation that for all unreported firms, $\mathbb{V}_i[f_n|p_n,\mathcal{I}_i] =$

σ^2_{fn}. The second uses the fact that investor i uses all of their information capacity to learn about a single firm, denoted n^*, with the information precision given in equation (89).

Investors therefore learn about the firm with the highest "learning index," $\mathcal{L}_n$, defined as

$$\mathcal{L}_n \equiv \frac{\sigma_{fn}^{-2} e^{2K} + \sigma_{pn}^{-2}}{\sigma_{fn}^{-2} + \sigma_{pn}^{-2}}. \tag{92}$$

This is strictly increasing in σ_{fn}^{-2} and strictly decreasing in the precision of the information contained in the prices, σ_{pn}^{-2}. We show below that if more investors learn about asset n, σ_{pn}^{-2} rises. Investors therefore prefer to learn about the assets that other investors are not learning about.

Mixed strategy equilibrium We follow Van Nieuwerburgh and Veldkamp (2010) and look for an equilibrium in mixed strategies. Since investors wish to learn about that assets that other investors are not learning about, ex-ante identical investors specialize by randomizing the use of their information capacity.

Suppose that conditional on buying the publication, investors devote their information capacity to learning about asset n with probability π_n. For such a strategy to be optimal, investors must be indifferent between learning about all firms in the publication, given all other investors are playing the same mixed strategy. From equation (91), this implies[31]

$$\mathcal{L}_n = \mathcal{L}_{n'} \quad \text{for all} \ \ (n, n') \ \text{such that} \ \ \pi_n, \pi_{n'} > 0. \tag{93}$$

Learning indices in equilibrium Let λ_n be the fraction of investors who process information about firm n, equal to π_n multiplied by the fraction of investors purchasing the media publication. The average precision of the investors' signals about firm n is then given by

$$\bar{\sigma}_{n\epsilon}^{-2} = \lambda_n (e^{2K} - 1)\sigma_{fn}^{-2}. \tag{94}$$

[31]This is exactly as in Van Nieuwerburgh and Veldkamp (2010), except for the extra constraint that investors can only learn about the assets that are reported in the media and only if they purchase the media publication.

Substituting this into row n of equation (85) and rearranging the leads to

$$p_n = (\sigma_{pn}^{-2}(b_n^{-1} - r) - r\sigma_{fn}^{-2}(1 + \lambda_n(e^{2K} - 1)))^{-1}\Big[(\rho\bar{x}_n + \sigma_{pn}^{-2}b_n^{-1}a_n - \sigma_{fn}^{-2}\bar{f}_n) - \lambda_n\sigma_{fn}^{-2}(e^{2K} - 1)f_n - \rho x_n\Big]. \quad (95)$$

Matching the coefficients between equations (77) and (95), we obtain

$$b_n = -\frac{\lambda_n\sigma_{fn}^{-2}(e^{2K} - 1)}{\sigma_{pn}^{-2}(b_n^{-1} - r) - r\sigma_{fn}^{-2}(1 + \lambda_n(e^{2K} - 1))} \quad (96)$$

$$c_n = b_n \cdot \frac{\rho}{\lambda_n\sigma_{fn}^{-2}(e^{2K} - 1)}. \quad (97)$$

Equation (81), combined with the fact that all of the matrices here are diagonal, implies that the variance of the noise in the price of asset n is

$$\sigma_{pn}^2 = \sigma_x^2(b_n^{-1}c_n)^2 = \frac{\rho^2\sigma_x^2\sigma_{fn}^4}{\lambda_n^2(e^{2K} - 1)^2}, \quad (98)$$

which confirms our earlier statement that σ_{pn}^{-2} is increasing in λ_n. Substituting this into equation (92) and simplifying, we can express the learning index as

$$\mathcal{L}_n = 1 + \frac{e^{2K} - 1}{1 + \lambda_n^2\sigma_{fn}^{-2}\sigma_x^{-2}\rho^{-2}(e^{2K} - 1)^2}. \quad (99)$$

Many of the elements of this formula for the learning index are common across assets. Condition (93) is therefore satisfied if and only if

$$\frac{\lambda_n^2}{\sigma_{fn}^2} = \frac{\lambda_{n'}^2}{\sigma_{fn'}^2} \quad \text{for all} \quad (n, n') \text{ such that } \lambda_n, \lambda_{n'} > 0. \quad (100)$$

This is the key indifference condition for the mixed strategy equilibrium. For two assets with the same prior variance, the fraction of the informed investors λ_n must be equal. Otherwise, the assets with greater prior uncertainty will have a greater proportion of informed investors.

A final implication of these results is that the investors learn about all of the firms that are included in the media publication, with positive probability. To see this, suppose that no investor learns about firm n_0, so $\lambda_{n_0} = 0$. In equation (99), that firm's learning index would be $\mathcal{L}_{n_0} = \exp(2K)$, which is strictly greater than the learning index for any firm with a positive λ_n. As a result, if $\lambda_{n_0} = 0$, then an investor could always increase their expected utility by deviating from the mixed strategy of the other investors and from learning about n_0 with probability 1. It is therefore not possible for a mixed strategy equilibrium to entirely exclude some reported firms.

Media purchase Using equations (88) and (91), the expected utility gain from purchasing the media publication is given by

$$\mathbb{E}_i[U_i] - \mathbb{E}_U[U_U] = \left(\frac{|\mathbb{V}[f|p]|}{|\Sigma_f|}\right)^{\frac{1}{2}} (1 - e^{\rho c}\mathcal{L}_{n^*}^{-\frac{1}{2}}), \tag{101}$$

where $\mathcal{L}_{n^*}$ is the learning index of any of the assets over which investors mix.

Investors purchase the information if the expected utility gain is positive. The proportion of the investors who purchase the publication is such that investors are indifferent between purchasing or not purchasing the information, which occurs at $\mathcal{L}_{n^*} = e^{2\rho c}$. Therefore, a given value of c pins down a unique learning index.

Media-reporting decision The media outlet chooses which firms to report on to maximize their profits. Let Q be the proportion of investors who purchase the outlet's publication, so the latter's profits are revenues, cQ, minus costs, which we assume are independent of the outlet's reporting decisions. We take c as given, so the outlet chooses reporting to maximize its readership, Q.

To find the optimal reporting strategy, it is helpful to note that condition (100) implies that λ_n can be expressed as

$$\lambda_n = \lambda_0 \sigma_{fn}, \tag{102}$$

where λ_0 is identical for all firms, n. Substituting this into equation (99), we find that λ_0 is uniquely determined by the parameters that are common to all n and by the learning index $\mathcal{L}_n$, which in turn is fixed by c. We can therefore treat λ_0 as fixed.

Recall that λ_n is the proportion of investors who process information about firm n, which is given by the proportion who buy the media publication, multiplied by the probability an informed investor devotes their information capacity to that firm: $\lambda_n \equiv Q\pi_n$. Summing over all reported firms and using the fact that $\sum_{n=1}^{N_r} \pi_n = 1$, we therefore have

$$Q \sum_{n=1}^{N_r} \pi_n = \sum_{n=1}^{N_r} \lambda_n \implies Q = \lambda_0 \sum_{n=1}^{N_r} \sigma_{fn}. \tag{103}$$

Since λ_0 is fixed by c, the outlet maximizes Q by reporting on the N_r firms with the most volatile payoffs, that is, those firms with the highest σ_{fn}.

Relationship to the quantitative model To solve this model, we abstracted from firms' decisions. The variance of the payoffs from holding equity of firm n is thus fixed at σ_{fn}^2. In the quantitative model, media reporting affects firms' decisions and so affects that variance.

The appropriate analogue to the reporting policy derived here is that media outlets report on the firms with large payoff variances *conditional* on being reported. To see why, consider an outlet choosing between reporting on firms j and j'. If the outlet reports on firm j, investors observe that and evaluate the benefits of purchasing the outlet's publication, based on the resulting variance of asset j's payoff. If the outlet does not report on j but instead reports on j', then the value of the publication, to investors, is determined by the variance of asset j', given that j' was reported. The appropriate comparison is therefore between the variances of the payoffs conditional on the firm being reported. This is exactly the reporting policy derived in Section 3.3.2 in the quantitative model.