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Publication Date
2023-03-18

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Journal of Monetary Economics xxx (xxxx) xxx

Contents lists available at ScienceDirect

Journal of Monetary Economics

journal homepage: www.elsevier.com/locate/jmoneco

Undisclosed material inflation risk☆

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ARTICLE INFO

Article history:
Received 11 November 2022
Revised 20 March 2023
Accepted 22 March 2023
Available online xxx

JEL classification:
D83
E31
E70
G10
M40

Keywords:
Inflation
Monetary policy
Risk exposure and disclosure
Capital markets
Securities class action lawsuits

ABSTRACT

We identify many major U.S. corporations that are highly exposed to inflation risk. Yet, although the SEC legally requires disclosing possible risk factors, more than 61% of the inflation-exposed corporations do not disclose inflation risk. However, after being sued in a securities class action lawsuit, while all firms increase the length of their reported risk factor texts, only inflation-exposed firms are more likely to begin disclosing inflation risk. Simulations using calibrated parameters from our models reveal that 2%–6% inflation shocks over the subsequent three years result in market cap damages of $0.9 to $2.8 trillion for shareholders of inflation-exposed firms that never disclosed this risk. The inadequate inflation risk disclosure holds after allowing risk to be time varying, controlling for firm/industry characteristics, and/or exploiting a quasi-natural experiment that identifies causal effects and controls for possible unobservable factors. The evidence is consistent with corporate managers paying inadequate attention to inflation risk. Our framework enables identification and evaluation of stock price drop damages, especially for firms with inadequate risk disclosures, possibly improving disclosure practices, inflation expectations, and monetary policy transmission.

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1. Introduction

Understanding inflation expectations and their implications for decision making by economic agents is one of the cornerstones of research in macroeconomics and related fields. This is because inflation expectations play a crucial role for choice in virtually all modern macroeconomic and applied microeconomic models of intertemporal choices.

In the corporate sector, managers' expectations about future inflation and the risk that inflation poses to their firms' fundamental performance and valuation affect managerial decisions. Such decisions include hiring, financing, setting wages, and the pricing of their firms' goods/services. In turn, these decisions affect the realization of inflation. Accordingly, understand-

☆ We thank an anonymous referee for several valuable comments and suggestions throughout the review process. We are also grateful for helpful comments and suggestions received from Yakov Amihud, Li An, Borağan Aruoba, Olivier Coibion, Francesco D'Acunto, Yuriy Gorodnichenko, Paul Griffin, Ann Harrison, David Hirshleifer, Scott Joslin, Ross Levine, Kai Li, Rich Lyons, Pavel Savor, Ron Siegel, Steve Tadelis, Siew Hong Teoh, Shiran Froymovich, Xi Wu, Young Yoon, and Biwen Zhang, as well as workshop participants at Google Research Series, University of California at Berkeley, J.P Morgan Chase, the Federal Reserve Bank of Cleveland, and the 2022 Society for Financial Studies Cavalcade Asia-Pacific. We thank Yanying Zhu for able research assistantship. Konchitchki acknowledges financial support from the University of California at Berkeley, and Xie acknowledges financial support from Peking University.

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https://doi.org/10.1016/j.jmoneco.2023.03.004
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Please cite this article as: Y. Konchitchki and J. Xie, Undisclosed material inflation risk, Journal of Monetary Economics, https://doi.org/10.1016/j.jmoneco.2023.03.004

ing managers' expectations about future inflation and the risk that inflation poses to firms' activities is critical for achieving the monetary policy's objective of price stability via targeting inflation. While U.S. firm managers' attitudes toward inflation dynamics and risk are important for determining firms' inflation expectations, and therefore their intertemporal choices, it is only recently that researchers have begun to focus on understanding firms' expectations. Indeed, recent research focuses on expectations about inflation dynamics based on eliciting such expectations mainly through surveys (e.g., Coibion et al., 2018; 2020). Further, even though inflation has substantial effects on firms, which vary cross-sectionally (e.g., Konchitchki, 2011; Xie, 2020), little is known about the prevalence of exposure to material inflation risk, managers' attention to such risk, and whether managers adequately disclose this risk as required in filings with the U.S. Securities and Exchange Commission (SEC).

In this paper, we examine firm managers' attitudes toward inflation risk by leveraging a highly incentivized setting that utilizes firm-level mandated financial reports to the SEC. Indeed, we complement recent work on managers' attitudes toward inflation dynamics that often rely on surveys of relatively small firms, by introducing the analysis of managerial expectations regarding inflation risk and leveraging financial reports of publicly listed corporations to elicit managerial expectations. Studying the behavior of firm managers is crucial because, while managers make fundamental choices (e.g., price setting, wage setting, investment, financing), prior research suggests that managers' beliefs and choices can deviate from the full-information rational expectations (FIRE) paradigm due to information frictions and/or limitations in processing information, such as cognitive constraints or non-Bayesian beliefs-updating processes.

To understand the prevalence of inflation risk and its disclosure by firm managers, we conduct a systematic analysis of disclosures to the SEC made by major U.S. corporations exposed to material inflation risk—the risk of a substantial reduction in shareholders' value in response to an inflation shock. We analyze disclosures made by all U.S.-headquartered firms that filed financial reports from January 1, 2005 through April 14, 2021, excluding firms with either a market value of equity lower than $10 million or a fiscal-year-end stock price lower than $1 at least once during the sample period. We gauge managerial attention to inflation risk through the lens of risk factor disclosure as a mitigating factor in securities lawsuits; that is, managers attuned to inflation risk should disclose such risk when necessary to invoke safe harbor protections, even if such risk is fully priced by the stock market.

Several factors might prevent managers from adequately disclosing inflation risk in their financial reports, despite (a) the substantial negative consequences that inflation can cause to firms and (b) the SEC's extended risk factor disclosure requirements mandating firms to discuss in their 10-Ks a variety of risk factors including market-wide risks (beginning in 2005; see SEC's Regulation S-K). First, inadequate managerial attention to macro conditions such as inflation may exist, as proposed in rational inattention models and tested empirically (e.g., Coibion et al., 2018; Candia et al., 2021).[1] Second, due to the modest inflation since the 1980s, today's managers lack recent experience of living through periods of high inflation (e.g., Malmendier and Nagel, 2011; 2016), which might contribute to their being not fully attuned to the risk that unexpected inflation poses to their firms.[2] Third, firm managers may learn about inflation risk from noisy signals, resulting in costly subjective errors (e.g., Sims, 2003), a lack of incentives to collect and process inflation information (e.g., Coibion et al., 2018), and/or limited cognitive abilities (e.g., D'Acunto et al., 2022).

Broadly, we investigate the following questions: (1) How pervasive is material inflation risk and does it vary in the cross-section of firms? (2) Do the managers of firms exposed to material inflation risk adequately disclose this risk in their financial reports? (3) Is there a triggering event that causes firms to disclose inflation risk? and (4) What is the shareholders' value destruction in response to simulated scenarios of future increases in inflation?

We conduct four main sets of analyses. First, we examine the prevalence and cross-sectional variation of firms' exposure to material inflation risk, and we test whether managers of firms exposed to such risk adequately disclose it in their financial reports. According to economic theory and evidence, there are various economic channels for inflation risk through which inflation shocks pose differential risks to firms' operations, profitability, and/or stock valuation. Such economic channels are firms' composition of their monetary versus nonmonetary assets and liabilities, earnings persistence, nominal price rigidities, leverage, and industry composition (e.g., Boudoukh et al., 1994; Konchitchki, 2011; 2013; Gorodnichenko and Weber, 2016; D'Acunto et al., 2018; Xie, 2020; Gu and Xie, 2021). For example, firms vary in their ability to increase prices in response to higher material costs. Regulation also generates different inflation effects on firms (e.g., utility firms cannot increase prices in response to increased costs without the regulator's approval). Inflation also affects firms differently in the cross-section of firms depending on their operating, investing, and financing activities as reflected in their financial reports (Konchitchki, 2011). Accordingly, to identify the extent to which inflation poses a material risk that varies cross-sectionally, we use a shareholder perspective and define inflation risk as the shareholders' value destruction in response to an inflation shock.

In the second set of analyses, we examine managers' actions toward inflation risk in response to different scenarios and evaluate the rational inattention explanation relative to alternative explanations. For example, building on rational inattention theories (e.g., Sims, 2003) and empirical works, such as Coibion et al. (2018) who suggest that much of the dispersion in beliefs can be explained by firms' incentives to collect and process information, we hypothesize that recently-sued firms have more incentives to collect and process information about risks caused by inflation. To test this hypothesis, we use secu-

[1] See also Sims (2003), Reis (2006), Mackowiak and Wiederholt (2009), Afrouzi (2020), and Yang (2022).

[2] As of 2019, the median age of a chief executive officer in the S&P 500 is 58 (e.g., "CEOs Under 50 Are a Rare Find in the S&P 500 "; *Wall Street Journal*, May 22, 2019).

rities class action lawsuits (filed by investors who suffer economic damages from firms' alleged misstatements or omissions) and compare changes in the likelihood of initiating inflation risk disclosure before and after such lawsuits, across exposed and unexposed firms.

In our third set of analyses, we evaluate possible damages for shareholders of firms that are exposed to inflation risk but never disclosed it throughout our sample period. We use parameters calibrated from our estimated models to simulate scenarios of potential inflation increases and calculate the shareholders' value destruction (in terms of market capitalization losses) in response to the inflation increase.

Fourth, we test whether possible inadequate inflation risk disclosures hold after allowing risk to be time varying, controlling for firm/industry characteristics, and/or exploiting a quasi-natural experiment that identifies causal effects and controls for possible unobservable factors.

We operationalize a firm's exposure to inflation risk by constructing a metric that focuses on the abnormal stock price impact in response to a shock to inflation expectations. We focus on refined, very short events that accurately capture the time when inflation news is announced to address an observation raised by Fama (1981) that inflation shocks can be correlated with business activities. That is, we measure short-window abnormal returns triggered by unexpected inflation announced during that short windows, where unexpected inflation in each window is actual inflation minus the most recent inflation expectation for that window that we obtain from the Fed's Survey of Professional Forecasters (SPF). We evaluate different options to gauge inflation expectations. We choose the SPF expectation for a number of reasons, including its extensive use in the literature as a high-quality measure of macroeconomic expectations (e.g., Ang et al., 2007; Konchitchki, 2013), its availability at no cost through the Philadelphia Fed's website, and its timing, which is aligned with our research design focusing on the surprise to the equity market when the Bureau of Labor Statistics (BLS) releases its periodic inflation realization. To extract the unexpected inflation component, we closely follow the SPF and BLS timelines for releasing macroeconomic data. In external validity analysis, we document that the cross-industry distribution of inflation risk exposure is consistent with expectations on how varying economic forces drive the inflation effect across industries.

We operationalize inflation disclosure as to whether a firm mentions inflation-related words in its 10-Ks. We collect 65,328 documents from the SEC's Analytics Suite database, which consists of complete textual disclosures, as reported on Item 1A "Risk Factors" in firms' 10-K reports. From each Item 1A, we use textual analysis techniques to extract sentences that could relate to disclosures of inflation-related matters. Indeed, for each firm, we identify all sentences that include one or more keywords related to inflation (e.g., "inflation," "hyperinflation").[3]

We find that inflation risk is material and pervasive among publicly listed firms in the United States. Yet, in contrast to the SEC's mandated disclosure of possible market risks, most exposed U.S. firms do not mention this type of risk in their 10-Ks. More specifically, our main findings can be summarized as follows: (a) 14%–18% of all sample firms, across almost all industries, are exposed to material inflation risk; (b) even though the SEC legally requires disclosing possible risk factors, 61%–81% of the high-inflation-risk firms never mentioned inflation or inflation-related words in the risk-disclosure section of their Form 10-Ks during our sample period (hereafter, we denote firms with material inflation risk that is undisclosed in the financial statements as exposed-nondisclosing); (c) exposed and unexposed firms are equally likely to initiate inflation, and inflation-related, risk disclosures; (d) immediately following a securities class action lawsuit, firms increase the length of their reported texts describing general risk factors, but only inflation-exposed firms are more likely to begin disclosing inflation risk; (e) the inadequate inflation risk disclosure holds after allowing risk to be time varying, controlling for firm/industry characteristics, and/or exploiting a quasi-natural experiment that identifies causal effects and controls for possible unobservable factors; (f) an array of tests reveal evidence consistent with managers paying inadequate attention to inflation risk, as opposed to possible alternative explanations that managers have strategic motives to withhold inflation risk information or that managers of inflation-exposed firms possibly disclose consequential risks that are correlated with inflation;[4] (g) exposed-nondisclosing firms possess substantial stock price damages to their shareholders in the case of future inflation increases, where calibrated parameters from our models to simulate stock price losses from 2% to 6% inflation shocks over the subsequent three years reveal a total market cap destruction of $0.9 trillion to $2.8 trillion for shareholders of inflation-exposed firms.

Our work contributes to research on inflation and monetary economics, corporate disclosure, risks and legal consequences, capital markets, and behavioral economics. The main takeaways are that several major U.S. public firms are exposed to material inflation risk, but their managers do not adequately disclose this risk even though they are legally required to do so. Although firms usually lengthen their risk factor discussion in their 10-Ks after being sued in a securities class action lawsuit, only inflation-exposed firms are significantly more likely to begin disclosing inflation risk. By providing evidence consistent with managers not being fully attuned to inflation risk, our work complements recent studies on managerial

[3] We also manually read the inflation-related sentences and exclude those that do not relate to any aspect of inflation risk. Because inflation can generate myriad consequences at both the macro and micro levels, resulting in disclosures not directly mentioning keywords such as "inflation" but can nonetheless be informative about the inflation impact on a firm, we also conduct topic modeling analyses and evaluate various inflation-related keywords/phrases including "monetary policy risk" and "oil and natural gas risk." We also recognize that firms can attempt to hedge inflation risk using derivative instruments, rendering it unnecessary for such firms to inform investors about their inflation risk exposure.

[4] For example, our findings that, subsequent to lawsuits, both exposed and unexposed firms expand their risk factor textual length (Item 1A of firms' 10-Ks) but only inflation-exposed firms disclose the particular risk of inflation, are consistent with managerial inattention. The findings also suggest that our inflation risk measure does not capture other, non-inflation-risk factors driving the risk factor section expansion in response to lawsuits. Also, these findings serve as an additional validity that our inflation risk exposure measure represents exposure to inflation risk.

inattention to inflation dynamics (e.g., Coibion et al., 2018), as well as prior studies on limited attention and information disclosure in capital markets (e.g., Hirshleifer et al., 2009).

We also provide evidence consistent with rational inattention in a highly incentivized setting. In contrast to surveys, corporate reports filed with the SEC require managers to truthfully report firm risks, including macro risks. An implication of our evidence is that, the U.S. central bank's communications and forward guidance may not be effective in managing firms' expectations about inflation risk, even when it is likely to cause managers to be aware of inflation. In addition, we develop a framework for identifying and evaluating stock price drop damages, especially in firms with inadequate risk disclosures.[5] Our study can help improve managers' disclosure practices and inflation risk expectations, resulting in enhanced monetary policy transmission.

Finally, this paper highlights the merits of corporate financial reports for various macroeconomic analyses. Whereas this source of granular, timely, and legally-binding corporate accounting data is freely available for a large sample of publicly listed firms, it has been widely overlooked in macroeconomics research.

Section 2 discusses background and related research. Section 3 presents the data. Section 4 discusses the measurement of material inflation risk. Section 5 reports the main analyses and results analyzing inflation risk disclosures. Section 6 provides extensions. Section 8 concludes.

2. Background and related literature

In 1997, the SEC issued the Securities Act Release No. 7386 that required firms to disclose certain quantitative and qualitative information about forward-looking market risk exposures, including risks arising from price changes and other market changes that may affect market-risk-sensitive instruments.[6] Beginning in 2005, the SEC extended the risk factor disclosure requirements by mandating firms to discuss, in their 10-K reports, a variety of risk factors making them speculative or risky (SEC, 2005, Final Rule, Release No. 33-8591 (FR-75)).[7]

Our study relates to research in economics and its neighboring disciplines, especially accounting and finance, in the areas of inflation and monetary economics, corporate disclosure, risks and legal consequences, capital markets, and behavioral economics. First, in a related work referenced above, Coibion et al. (2018) find that New Zealand firms do not perceive inflation as important to business decisions and devote few resources to collecting and processing inflation information. Coibion et al. (2020) find that providing publicly available information about recent inflation to firms leads them to significantly revise their beliefs, which leads them to increase prices and demand for credit, as well as reduce employment and capital. Savignac et al. (2021) find French CEOs/CFOs have significantly lower inflation expectations than others within the firm or with positions unrelated to finance.[8]

The importance of understanding U.S. managers' attitudes toward inflation—a key driver of firms' choices such as when to reset prices and wages or when to finance projects—is grounded in both macro and applied micro models of intertemporal choices. These models commonly ascribe a central role to firms' inflation expectations in deriving a Phillips curve, a predicted relation linking inflation to the real side of the economy conditional on firms' awareness of inflation (e.g., Friedman, 1968; Phelps, 1968; Lucas, 1972; Coibion, 2010). We complement the prior studies on firms' attitudes toward inflation dynamics (often relying on surveys of relatively small firms), by analyzing managerial attention to inflation risk and leveraging big datasets of disclosures by public firms.

Second, our work relates to financial economics research on limited attention and information disclosure in capital markets (e.g., Hirshleifer and Teoh, 2003), which mainly focuses on investor attention in the stock market. We identify another dimension of attention, managers' apparent disregard of inflation risk. Third, our study relates to research on the relation between inflation and asset prices (e.g., Fama and Schwert, 1977; Fama, 1981; Boudoukh and Richardson, 1993; Buraschi and Jiltsov, 2005), deflation risk (Fleckenstein and Lustig, 2017), the real effect of inflation through nominal liabilities (Gomes et al., 2016; Bhamra et al., 2023), personal inflation experience and financial-market decisions (Malmendier and Nagel, 2016), inflation expectation and intertemporal household choice (D'Acunto et al., 2022), and inflation and discount rate (Katz et al., 2017). Our short-window event study provides a novel measure for firm-level exposure to macro risks. Fourth, we advance the growing interdisciplinary research line on the interactions between macroeconomics, the corporate sector, and the stock

[5] For example, the inflation spike in 2021–2022 was associated with trillions of dollars in shareholders' market cap damages for major U.S. public firms, many of which have never disclosed this risk in their SEC reports.

[6] See SEC's Securities Act Release No. 7386.

[7] See also Rule 421 under the Securities Act of 1933 (SEC's Regulation S-K, Item 105 for periodic detailed disclosure, Item 503 for prospectus summary in registration statements—with follow-up updates until 2020). For more information on a relevant updated part of Regulation S-K, see SEC's Regulation S-K, Part 229. As additional institutional features providing the legal basis for financial disclosures, note that the SEC has two types of authority to mandate disclosure: those that fall under "Regulation S-X$_g$ (which are disclosures related to financial statements and footnotes; or Item 8 of the 10-K) and those that fall under "Regulation S-K$_g$ (which are 10-K disclosures that fall outside of Item 8). Item 1A disclosures, which constitute a specific "Item" within Regulation S-K, include the requirement to disclose "Risk Factors" in 10-K reports. As another institutional feature, note that there can be other risk-related disclosures in financial reports. For example, Item 305 of Regulation S-K requires quantitative and qualitative disclosures related to derivatives and exposures to market risk only from derivative financial instruments, other financial instruments, and certain derivative commodity instruments. First, note that other disclosure requirements may pertain only to a specific category (such as derivatives). Second, a firm must disclose its exposure to market risk in its Item 1A even if it theoretically discloses this risk in other ways. Accordingly, we focus on Item 1A disclosures.

[8] As an alternative approach to surveys, scholars also use structural models/indirect inferences to relate the degree of inattention to inflation (e.g., Maćkowiak et al., 2009; Bhattarai and Schoenle, 2014; Pasten and Schoenle, 2016), yielding results consistent with the evidence in firm surveys.

market (e.g., Konchitchki, 2011; Konchitchki and Patatoukas, 2014; Xie, 2020; Ball et al., 2022). Within this research line, although inflation has substantial effects on firm performance, valuation, and managerial decision making, with a few exceptions (e.g., Beaver et al., 1980; Konchitchki, 2011) there is a paucity of research focusing on such inflation effects. We contribute to this research by identifying a material inflation effect that is not adequately disclosed by many major U.S. firms, especially when there is a renewed interest in understanding the economic consequences of how inflation affects firms.

3. Data

Our sample consists of all U.S.-headquartered firms that filed financial reports from January 1, 2005 through April 14, 2021, excluding firms with either a market value of equity lower than $10 million or a fiscal-year-end stock price lower than $1 at least once during the sample period. We start the sample in 2005 because this is the first year for which the SEC extended its risk disclosure requirement such that firms are required to discuss the most significant factors that make the company speculative or risky in Item 1A of their 10-K reports. Given that we focus on major public firms and to refrain from possible biases, liquidity concerns, and other possible issues associated with small firms, we exclude firms with a market value of equity less than $10 million or with a fiscal-year-end stock price lower than $1 at least once over our sample period. For the risk factor regulatory disclosure analysis (Regulation S-K), we employ the five years before and after the risk factor regulation event, and thus that analysis employs a sample that starts in 2000.[9]

We calculate unexpected inflation as actual inflation minus the most recent inflation expectation for the period. In terms of actual inflation, we use the official BLS inflation figures. To extract the unexpected inflation component each period, we closely follow the timeline of macroeconomic data releases of actual inflation (by the BLS) and expected inflation (by the Fed). More specifically, the BLS releases its inflation realization for each month around the middle of the subsequent month (usually between the 10th and 14th). In terms of expected inflation, we obtain inflation expectations from the Fed's SPF (through the Philadelphia Fed's website), where its timing is aligned with our research design focusing on the surprise to the market when the BLS releases its actual inflation figures. The SPF has four surveys per year: first, second, third, and fourth quarter. The survey results are released between the middle to the end of the second month within each calendar quarter (see Federal Reserve Bank of Philadelphia, 2021, p. 8). To estimate unexpected inflation, we focus on the third month of each calendar quarter and employ the actual inflation announced in the subsequent month minus the most recent SPF expectation that was released in the middle to the end of the previous month. Figure A.1 of the Online Appendix shows the time series of actual and expected inflation, as well as forecast errors.

Our data also includes text-based measures of risk disclosures. To identify disclosures of inflation risk, we use textual analysis that extracts risk factor disclosures appearing in Item 1A of firms' 10-Ks. In particular, we first collect texts of 10-K reports using the SEC Analytic Suite database available through Wharton Research Data Services (WRDS). We extract reports filed from January 1, 2005 through April 14, 2021. Overall, our textual analysis results in a dataset consisting of 65,328 documents. Figure A.2 in the Online Appendix shows the first page of "Item 1A. Risk Factors" in the 10-K of Starbucks Corporation for 2019. Next, from each Item 1A we extract sentences that include at least one of the following keywords: "inflation," "deflation," "inflationary," "hyperinflation," and "hyperinflationary." We manually read all extracted sentences and exclude those that include our words of interest but do not have a tangible meaning for inflation risk (an example is "payments of approximately 109,000, to be adjusted for inflation in future years.") More specifically, as part of our textual analysis, we also consider keywords and terms such as "product price," "CPI," "consumer price index," "PPI," "producer price index," "output price," "sale price," "service price," "input price," "commodity price," "raw materials price," "purchase price," "supplier price," and "manufacturer price."[10] We then evaluate the validity of our keywords by randomly selecting examples from Form 10-K's Item 1A disclosures that include any specific keywords, and then manually reading the disclosures to determine whether the keywords capture content related to inflation risk. Figure 1 illustrates several examples of inflation risk factors disclosed by several well-known firms.

[9] In our main analysis, we focus on the sample period after the extended risk disclosure (Regulation S-K), which went into effect for fiscal years ending after December 1, 2005. We stratify our sample into pre- and post-mandate periods based on whether firms' 2005 fiscal year ended before or after December 1, 2005. Specifically, for firms with a fiscal year-end from December to May 2005, fiscal year 2005 is set as the first year in which Regulation S-K is binding; for firms with a fiscal year-end from June to November 2005, fiscal year 2006 is set as the first year.

[10] After checking the possible keywords, we reach a number of conclusions. First, most of the sentences containing "Consumer Price Index" or "Producer Price Index" simply introduce rate adjustments, indexing methodologies, and/or regulation of the Federal Energy Regulatory Commission (FERC) without mentioning how the fluctuation of prices could affect firms' operating or other risks. In addition, for sentences containing additional related keywords (e.g., "product price," "raw materials price," "commodity price"), our external validity analysis via eyeballing finds they do express concerns that changes in price levels would affect the firm's performance, but they do not often explain in the disclosure whether the price fluctuations stem from inflation. Thus, to ensure the accuracy of our textual analysis, we focus only on keywords that truly represent what they purport to represent—disclosure of inflation-related risk. Finally, on some occasions the keywords "CPI" and "PPI" have multiple meanings. For example, they might be abbreviations of firms' names (e.g., Corvus Pharmaceuticals, Inc.) or names of some products (e.g., OTC PPI products). Therefore, identifying which sentence in the market risk disclosure precisely discusses risk-related content driven by "CPI" or "PPI" is difficult. We adjust our keywords to ensure the accuracy of our procedure capturing risk-related content.

The examples below illustrate disclosures of inflation risk that we extract from Item 1A of 10-K reports.

1. Whether we can manage this risk effectively depends mainly on the following: Our ability to manage fluctuations in commodity prices, interest and foreign exchange rates and the effects of local governmental initiatives to manage national economic conditions such as consumer spending and *inflation rates.*

— McDonald's 10-K for the year ended December 31, 2008

2. General economic factors beyond our control, and changes in the global economic environment, including fluctuations in *inflation* and currency exchange rates, could result in lower revenues, higher costs and decreased margins and earnings.

— Nike Inc.'s 10-K for the year ended May 31, 2008

3. While our foreign operations represent significant opportunities to sell our services, a number of foreign countries where we operate have experienced unstable growth patterns, *high inflation*, currency devaluation, foreign exchange controls, instability in the banking sector and high unemployment.

— AT&T Inc.'s 10-K for the year ended December 31, 2019

4. Concerns about the *systemic impact of inflation*, the availability and cost of credit, energy costs and geopolitical issues, combined with continued changes in business activity levels and consumer confidence, increased unemployment and volatile oil prices, have in the past and may in the future contribute to volatility in the capital and credit markets.

— American Airlines Group's 10-K for the year ended December 31, 2015

5. We may experience additional volatility as a result of *inflationary pressures* and other macroeconomic factors in certain emerging market countries.

— Baxter International Inc.'s 10-K for the year ended December 31, 2016

6. A continued or further decline in economic conditions, or an increase in price levels generally due to *inflationary pressures*, could adversely affect demand for any of our products and services and have a negative impact on our results of operations.

— Comcast's 10-K for the year ended December 31, 2012

7. Higher interest rates, higher fuel and other energy costs, transportation costs, *inflation*, higher costs of labor, insurance and healthcare, foreign exchange rate fluctuations, ... adversely affect our domestic and international operations and our operating results.

— Walmart Stores Inc.'s 10-K for the year ended January 31, 2013

Fig. 1. Examples of Disclosures of Material Inflation Risk. The examples below illustrate disclosures of inflation risk that we extract from Item 1A of 10-K reports.

4. Material inflation risk: Measurement

For the period of 2005Q1–2020Q3, we use the following firm-by-firm regression to (a) identify whether each firm is exposed to inflation risk and (b) measure the extent to which the firm is exposed:

$$CAR_{i,t} = \alpha + \beta_i \times Unexpected\ Inflation_t + \epsilon_{i,t}, \quad (1)$$

where $CAR_{i,t}$ is the cumulative daily market-adjusted returns for firm i [−1, +1] days relative to the date on which BLS releases the preliminary consumer price index (CPI) corresponding to the third month of quarter t.[11] $Unexpected\ Inflation_t$ is the actual inflation minus the most recent inflation expectation from the SPF. Because $Unexpected\ Inflation_t$ is expressed in annualized terms but the stock market reacts to quarterly news about inflation, we multiple $\hat{\beta}$ estimated from Eq. (1) by a factor of 4. We require each firm to have nonmissing event returns for at least 20 events. We base our statistical inferences on Newey and West (1987) heteroskedasticity- and autocorrelation-consistent standard errors.[12]

Our approach to estimating the impact of unexpected inflation on shareholder value has a number of econometric merits. First, it captures the essence reflected from anecdotal evidence describing how unexpected inflation affects valuation.[13] In-

[11] Our results are robust to using abnormal returns adjusted by the market model, by Fama-French three factors, and by Fama-French/Carhart four factors.
[12] We use 8 lags for the Newey-West procedure. We also examine lags from 4 to 8 and find similar results.
[13] On May 11, 2021, for example, the Dow Jones Industrial Average fell by 2% as higher-than-expected inflation data triggered a massive sell-off.

deed, we measure the most direct effect of unexpected inflation on shareholders' value. Second, our research design focuses on a tight window for measuring the effect of unexpected inflation on a firm's valuation. Econometrically, the length of our event window involves trading off type I and type II errors. Whereas increasing the event window increases the possibility of adding confounding events, decreasing the event window increases the power of the examined signal—unexpected inflation—and the validity of unexpected inflation causing the change in firm value. We note that, even though measuring risk exposure over tight windows provides econometric merits, it may also introduce a type II error, namely, that a number of exposed firms are treated as unexposed, either because investors react too early due to predictable inflation forecast errors (e.g., Coibion and Gorodnichenko, 2012; 2015) or because investors react too late to inflation news (e.g., Katz et al., 2017). However, our research question concerns the disclosure practices of firms whose stock-price drops are unambiguously triggered by unexpected inflation. In addition, our approach overcomes challenges introduced by possible correlated omitted variables discussed in prior studies that attempt to estimate inflation effects using long windows (e.g., Fama, 1981).

Third, even though our research design choice operates against us finding more firms exposed to value drops during unexpected inflation episodes in the first and second month of each calendar quarter, we restrict the measurement of unexpected inflation to only focus on actual inflation announced after the end of each calendar quarter (and compared with the last SPF expectation for that quarter). In this research design, we prioritize using the most accurate measure of unexpected inflation rather than alternative expectations.

We next use the following rule to identify a firm's exposure to inflation risk:

$$\text{whether firm is exposed} = \begin{cases} \text{Yes} & \text{if, } \beta < 0, t-\text{statistic} < -1.96 \\ \text{No} & \text{otherwise.} \end{cases} \tag{2}$$

We look for negative coefficients that are significant at the 2.5% level, and we might expect to find about 150 firms misclassified by chance. To alleviate this concern, we also report main results by defining "inflation-exposed" firms if estimated βs in Eq. (1) are significant at the 1% level, and we arrive at the same conclusion.

We also estimate inflation risk exposure using time-varying analysis. In particular, following Boons et al. (2020), who find that inflation risk premia vary over time, we estimate inflation risk exposure on a rolling-window basis. For each firm i from quarter t-19 to t, we estimate the following regression model by extending the sample period to 1996Q1–2020Q3 so that the estimates are available for firms starting from 2005Q1:

$$CAR_{i,t} = \alpha + \beta_{i,t} \times Unexpected\ Inflation_t + \epsilon_{i,t}, \tag{3}$$

where $\beta_{i,t}$ is the estimated risk exposure. We identify whether a firm is exposed to material inflation risk as of year t by the following rule:

$$\text{whether firm is exposed in year } t = \begin{cases} \text{Yes} & \text{if } \beta_{i,t} < 0, t\text{-statistic} < -1.96 \\ \text{No} & \text{otherwise.} \end{cases} \tag{4}$$

We next describe the results from the static- and rolling-window estimations. The first three rows in Panel A of Table 1 provide descriptive statistics of our static estimates. First, the mean (median) of the estimated coefficients is −0.797 (−0.711) with associated mean (median) estimated t-statistics of −0.636 (−0.628). Also, based on the panel results, given that *InflationExposure* is defined as a dummy variable equal to 1 if the t-statistic is below −1.96, and 0 otherwise, its mean estimate of 0.177 for our sample of 6,289 firms indicates 1,114 firms exposed to material inflation risk during our sample period. The next three rows in Panel A of Table 1 provide descriptive statistics of the estimates from the rolling-window estimation, showing roughly similar distributional ranges and also consistent with our static estimates.

In addition, we conduct external validity and distributional analysis on the exposure estimates by examining the cross-industry distribution of inflation risk exposure and comparing to expectations from anecdotal evidence. Distributional results from both the static and the rolling window estimations, reported in Table A.1 of the Online Appendix, show substantial variation in exposure rates across Fama-French-48-industries and that the cross-industry distribution of inflation risk exposure is broadly consistent with anecdotal evidence.[14]

In untabulated results, we also examine the economic channels potentially driving the effects of inflation risk. We test whether the connections between firms' inflation risk exposure and a set of firm- or industry-level characteristics are in line with theoretical predictions on how unexpected inflation affects the wealth distribution between shareholders and contracting parties (e.g., creditors and consumers) through different mechanisms. Several important patterns emerge. First, firms with rigid output prices, facing more threats from competitors, and operating in the regulated utilities industry are more exposed to inflation risk (e.g., Afrouzi, 2020).[15] Second, firms with more maturing debt are less exposed, with negative estimated coefficients as we predict given that inflation erodes the maturing liabilities of firms (e.g., Gomes et al., 2016).

[14] For example, consider the first three columns of Table A.1. The three most exposed industries are healthcare (37.6%), agriculture (33.3%), and utilities (29.4%); the three least exposed industries are shipping containers (0%), tobacco products (0%), and aircraft (4.0%). Indeed, for consistency with anecdotal evidence, see, e.g., "Where Inflation Is Hitting Hardest: Prices of Groceries, Utilities, Rent Jump" (*Wall Street Journal*, February 10, 2022); "Farmers Feel the Squeeze of Inflation" (*Wall Street Journal*, February 15, 2022); "Inflation Gives Big Tobacco a Handy Drag" (*Reuters*, February 11, 2022).

[15] We thank Michael Weber for sharing his data covering sector-level frequencies of price adjustments.

Table 1
Descriptive Statistics. Our sample consists of all U.S.-headquartered firms that filed financial reports from January 1, 2005 through April 14, 2021, excluding firms with either a market value of equity lower than $10 million or a fiscal-year-end stock price lower than $1 at least once during the sample period. Panel A reports statistics from estimating firms' exposure to material inflation risk, where Eqs. (1) and (3) describe the estimation procedure of the static and time-varying inflation risk exposure estimates, respectively. Panel B reports descriptive statistics of variables used in the empirical analysis. *CPI_D1(t+1)*, *CPI_D1(t+2)*, and *CPI_D1(t+3)* are forecast dispersion with quarterly horizons of t+1, t+2, and t+3, respectively. Dispersion is the 75th percentile minus the 25th percentile of the forecasts for levels of consumer price index (CPI). *LongTermDebt* is long-term debt over assets. *ShortTermMoney* is the short-term monetary position measured as the sum of cash and receivables minus current liabilities, scaled by assets. *Inventory* is total inventory over assets. *PPE* is the gross value of property, plant, and equipment over assets. *ProductSimilarity* is the 10-K-based similarity scores (divided by 1,000) used by Hoberg et al. (2014). *HHI* is the Herfindahl-Hirschman Index at the level of 4-digit SIC industry. *Profitability* is operating income before depreciation over averaged assets. *Ln(MarketCap)* is the logarithm of the end-of-fiscal-year market capitalization (in millions USD). *Book-to-Market* is total equity over market capitalization. *R&D* is the research and development expenditure over assets. Panel C reports descriptive statistics of dummy variables used in the empirical analysis. *InflationExposure* is a dummy variable equal to 1 if a firm is exposed to material inflation risk as identified by Eq. (4), and 0 otherwise. *InflationDisclosure* is a dummy variable equal to 1 if a firm discloses material inflation risk in Item 1A of the 10-K report in a given year, and 0 otherwise. *MonetaryDisclosure* is a dummy variable equal to 1 if a firm discloses monetary policy risk in Item 1A of the 10-K report in a given year, and 0 otherwise. *OilGasDisclosure* is a dummy variable equal to 1 if a firm discloses oil & gas risk in Item 1A of the 10-K report in a given year, and 0 otherwise. *FirstInflation* is a dummy variable equal to 1 if a firm mentions inflation for the first time in Item 1A of the 10-K report in a year, and 0 otherwise. *FirstMonetary* is a dummy variable equal to 1 if a firm mentions monetary policy for the first time in Item 1A of the 10-K report in a year, and 0 otherwise. *FirstOilGas* is a dummy variable equal to 1 if a firm mentions oil and natural gas for the first time in Item 1A of the 10-K report in a year, and 0 otherwise. *Derivative* is a dummy variable equal to 1 if a firm reports non-zero unrealized derivative gain or loss, and 0 otherwise. *Lawsuit* is a dummy variable equal to 1 if the firm is sued in a securities class action lawsuit either in the current or previous fiscal year, and 0 otherwise. *BlockHolder* is a dummy variable equal to 1 if a firm is held by at least one F13 institutional shareholder with more than 5% ownership, and 0 otherwise. *S&P 500* is a dummy variable equal to 1 if a firm is in the S&P 500 Index, and 0 otherwise. *Missing R&D* is a dummy variable equal to 1 if a firm report missing values for the the research and development expenditure, and 0 otherwise.

Panel A: Inflation risk exposure

	Mean	Std	p5	p10	p25	p50	p75	p90	p95	*N*
Static Inflation Risk Exposure										
Coefficient	−0.797	2.664	−4.814	−3.496	−1.933	−0.711	0.458	1.861	2.909	6,289
t-statistic	−0.636	1.619	−3.186	−2.530	−1.583	−0.628	0.370	1.276	1.932	6,289
Time-Varying Inflation Risk Exposure										
Coefficient	−0.562	4.798	−4.494	−3.250	−1.742	−0.491	0.733	2.164	3.362	49,342
t-statistic	−0.416	2.451	−2.939	−2.278	−1.323	−0.373	0.546	1.448	2.046	49,342

Panel B: Continuous variables used in empirical analysis

	Mean	Std	p5	p10	p25	p50	p75	p90	p95	*N*
CPI_D1(t+1)	0.831	0.354	0.330	0.480	0.560	0.740	0.970	1.170	1.900	32,739
CPI_D1(t+2)	0.745	0.280	0.420	0.450	0.500	0.690	0.930	1.000	1.550	32,739
CPI_D1(t+3)	0.656	0.243	0.330	0.400	0.480	0.590	0.900	1.030	1.100	32,739
LongTermDebt	0.198	0.219	0.000	0.000	0.013	0.129	0.315	0.493	0.622	32,575
ShortTermMoney	0.209	0.330	−0.161	−0.086	−0.002	0.117	0.408	0.730	0.811	32,475
Inventory	0.077	0.117	0.000	0.000	0.000	0.017	0.117	0.233	0.325	32,289
PPE	0.389	0.437	0.000	0.000	0.029	0.233	0.614	1.038	1.224	32,694
ProductSimilarity	0.104	0.184	0.010	0.010	0.011	0.019	0.068	0.431	0.582	32,461
HHI	0.204	0.203	0.018	0.031	0.070	0.142	0.257	0.478	0.630	32,739
Profitability	0.050	0.221	−0.329	−0.090	0.020	0.083	0.144	0.209	0.267	31,119
Ln(MarketCap)	6.496	2.166	2.964	3.665	4.962	6.514	7.982	9.289	10.084	30,997
Book-to-Market	0.587	0.955	0.013	0.111	0.272	0.510	0.832	1.252	1.667	30,973
R&D	0.045	0.118	0.000	0.000	0.000	0.000	0.031	0.131	0.240	32,739

Panel C: Dummy variables used in empirical analysis

	Mean	Std	*N*
InflationExposure (static)	0.166	0.372	32,739
InflationExposure (time-varying)	0.138	0.345	32,739
InflationDisclosure	0.222	0.415	32,739
MonetaryDisclosure	0.188	0.391	32,739
OilGasDisclosure	0.191	0.393	32,739
FirstInflation	0.033	0.178	32,739
FirstMonetary	0.031	0.172	32,739
FirstOilGas	0.020	0.141	32,739
Derivative	0.327	0.469	32,739
Lawsuit	0.121	0.327	32,739
BlockHolder	0.744	0.436	32,739
S&P 500	0.142	0.349	32,739
Missing R&D	0.497	0.500	32,739

However, even though the signs are negative as predicted, these effects are only weakly significant.[16] Third, exposure to inflation risk decreases with firm size. Fourth, we find that banks are less likely to be exposed because they have high leverage but, due to the so-called Regulation Q, banks do not change deposit rates often in response to monetary policy.

5. Disclosure of material inflation risk

This section reports the main analyses and results from examining inflation risk disclosures. It begins by describing the variables used in the analyses and continues by reporting results from a breakdown analysis of the disclosure practices of firms that are exposed versus unexposed to material inflation risk. Then, it provides various analyses of material inflation risk disclosures using regression models and Latent Dirichlet Allocation (LDA) techniques.

5.1. Variables used in empirical analysis

Panel B of Table 1 provides descriptive statistics of our independent variables and several sets of variables that we use in the regression analysis.[17] The first set is forecast dispersion with quarterly horizons of t+1, t+2, and t+3.[18] The second set is nominal assets and liabilities that often do not have inflation-adjustment clauses (e.g., French et al., 1983), such as long-term debt, short-term monetary position, property, plant, and equipment (PPE), and inventory. The third set relates to product-market competition, including a text-based measure of product similarity used by Hoberg et al. (2014), the Herfindahl-Hirschman Index (HHI), and firms' profitability (as a proxy for market power to pass inflation shocks to consumers e.g., Peress, 2010).[19] The fourth set accommodates firm-level characteristics that are associated with risk disclosures in general, including firm size, book-to-market ratio, R&D intensity, missing R&D reporting, the presence of institutional blockholders, and whether the firm is an S&P 500 constituent. Lastly, we include year fixed effects (γ_t) to absorb time-varying macro shocks, as well as fixed effects (γ_j) for industries based on the 48 Fama-French industry classification to absorb time-invariant unobservables. For example, price rigidity—firms' inability to reset product prices—is a persistent industry-level characteristic (e.g., D'Acunto et al., 2018; Nakamura et al., 2018; Xie, 2020; Gu and Xie, 2021).

5.2. Material inflation risk and its financial disclosure: Breakdown analysis

In Panel A of Table 2, we find that out of 6,289 firms, 1,114 (17.7%) are exposed to material inflation risk, but the remaining 5,175 (82.3%) are not. We also find that out of 1,114 exposed firms, 680 (61%) never mention inflation in Item 1A of their 10-Ks, whereas 434 (39%) mention inflation at least once. Out of 5,175 unexposed firms, 2,205 firms (42.6%) mention words/phrases about inflation risk in their financial reports at least once.[20]

In Panel B of Table 2, we find that out of 49,342 sample firm-year observations, 6,817 are exposed and 42,525 are unexposed. Out of the 6,817 exposed firm-year observations, only 1,287 (18.9%) exposed disclosed inflation risk as of quarter t, whereas 5,530 (81.1%) did not disclose. As for unexposed observations, 21% of them disclosed inflation risk. Untabulated results suggest that the difference in disclosing rates between exposed and unexposed is insignificantly different from zero.

Note that our finding of over-reporting of inflation risk, i.e., that managers of both exposed and unexposed firms report inflation risk disclosures at about the same likelihood (which we find in Table 2 and also repeatedly in other analyses below), is consistent with the notion of no strategic motives to withhold inflation risk information.

5.3. Regression analysis

We estimate the following regression model:

$$FirstInflation_{i,t} = \alpha + \beta_1 \times InflationExposure_{i,t} + X'_{i,t} \times \theta + \gamma_j + \gamma_t + \epsilon_{i,t}, \quad (5)$$

[16] To understand the insignificant effect of leverage on firms' exposure to inflation risk, we recognize that leverage has both principle and interest rates, which are affected differently by inflation. Although inflation redistributes wealth from debt holders to equity holders by eroding the principle amount, interest rates might hike as a result of monetary policy tightening. Indeed, most bank loans have floating rates mechanically tied to monetary policy rates (e.g., Ippolito et al., 2018).

[17] Note that the number of observations in this panel for the time-varying *InflationExposure* is reduced from 49,342 to 32,739 when compared with the associated number of observations in Panel A of Table 1. This reflects the exclusion of outlier short disclosures. In particular, to focus on meaningful disclosures and eliminate noisy ones with no actual substance, we exclude firm-year outlier observations with extremely few words—less than 200 words—in Item 1A of their 10-Ks. Also note that the average and median number of words included in an Item 1A during our sample period are 8,177 and 6,590, respectively, which further highlights the outlier nature of disclosures less than 200 words. As an empirical matter, we repeat our main analyses without imposing this restriction, and all our inferences remain the same.

[18] Dispersion is the 75th percentile minus the 25th percentile of the CPI forecasts. Forecast dispersion has been used as a direct measure of market-perceived inflation risk (e.g., Cukierman and Wachtel, 1979).

[19] Firms operating in industries with different levels of competition have different abilities/incentives to insulate profits from inflation shocks (e.g., Borenstein et al., 1997). Competition is also a key determinant of whether firm managers are informed about inflation (e.g., Coibion et al., 2018).

[20] The first column of Table A.2 of the Online Appendix presents a list of 30, of the largest exposed firms that have disclosed inflation risk at least once over the sample period of 2005–2020. The rank is based on market capitalization as of the end of fiscal year 2019. We observe several popular firm names (e.g., Comcast, IBM, T-Mobile, and United Parcel Service) operating in a wide variety of industries. The second column of Table Table A.2 lists the 30 largest exposed firms that have not included any inflation-related words in Item 1A by the end of 2020. Examples of such firms include AT&T, Verizon Communications, and CVS Health.

Table 2
Material Inflation Risk and its Financial Disclosure: Breakdown Analysis. This table reports results from a breakdown analysis that shows how observations are broken down into unexposed and exposed (in terms of number and frequency). Panel A (B) reports results for firms (firm-year observations) obtained from our static (time-varying) estimation of exposure to inflation risk. The sample consists of all U.S.-headquartered firms that filed financial reports from January 1, 2005 through April 14, 2021, excluding firms with either a market value of equity lower than $10 million or a fiscal-year-end stock price lower than $1 at least once during the sample period. In Panel A, disclosing firms are firms that disclosed material inflation risk at least once in Item 1A of the 10-K report over the sample period. Firms exposed to material inflation risk are identified by the rule in Eq. (2). In Panel B, disclosing firms are firms that disclosed material inflation risk at least once in Item 1A of the 10-K report in quarter t over the sample period. Firms exposed to material inflation risk are identified by the rule in Eq. (4). Section 4 provides detailed procedures for how we identify firms' exposure to material inflation risk.

Panel A: Static inflation risk exposure
Total Firms = 6,289
- Unexposed = 5,175 (82.3%), of which
* Disclosing firms = 2,205 (42.7%)
- Exposed = 1,114 (17.7%), of which
* Disclosing firms = 434 (39.0%)
Panel B: Time-varying inflation risk exposure
Total Obs = 49,342
- Unexposed = 42,525 (86.2%), of which
* Disclosing firms = 8,909 (21.0%)
- Exposed =6,817 (13.8%), of which
* Disclosing firms = 1,287 (18.9%)

where $FirstInflation_{i,t}$ is a dummy variable equal to 1 if firm i mentions inflation for the first time in Item 1A of their 10-K report of fiscal year t, and is 0 otherwise. Because of the boilerplate nature of risk factor disclosure (e.g., Campbell et al., 2014), as well as the time persistent feature of firm-level characteristics (e.g., Cohen et al., 2020), we focus on the determinant of firm i's initiation of inflation risk disclosure.[21] If firms are more likely to start to disclose inflation risk when they are more exposed, we expect the estimated β_1 to be positive.[22]

Column (1) of Table 3 reports our estimation results. First, note that, as expected, the number of observations in Table 3 is lower than that in Table 1 because of the restriction that we have available information for all the regressors used in estimating the models of this analysis. Turning to the estimation results, the sign of *InfaltionExposure* is negative but not statistically significant, and the economic magnitude is close to zero. As for our proposed sets of control variables, most of them fail to provide explanatory power for the likelihood of firms introducing an inflation risk factor into 10-K files. Exceptions are three-quarter-ahead dispersion of CPI forecasts (positive connection), product similarity (positive connection), R&D (negative connection), and missing R&D reporting (negative connection).[23]

We next examine the possibility that our text-based measure might omit some indirect inflation-related textual parts of Item 1A that are (a) related to macro-level risks caused by inflation but (b) do not use a word/phrase directly related to inflation. In other words, we address indirect keywords and phrases related to inflation risks.

We first consider monetary policy risk. When inflation increases above the U.S. central bank's target rate, the Federal Reserve increases interest rates to influence the real economy (e.g., Coibion, 2012). Because stock prices plummet in anticipation of monetary policy tightening, shareholders experience a loss of wealth.[24] The results in column (2) of Table 3 suggest that exposed firms do not omit Item 1A's inflation risk disclosure because they disclose monetary policy risk. We next consider oil and gas risk. Our *Unexpected Inflation* in Eq. (3) is the unexpected headline inflation that consists of two surprise components—unexpected changes in core inflation and energy cost (e.g., oil and natural gas). At the level of individual stocks, however, the negative stock-price reaction to unexpected inflation is likely driven by firms' exposure to energy-cost risk (e.g., Fang et al., 2022), and if exposed firms do disclose oil and gas risks, we cannot conclude that managers ignore inflation risks.[25] The results in column (3) of Table 3 suggest that there is little support for the notion that exposed firms disclose oil and gas risks in response to their inflation risk exposures.

[21] After the initiation, 80% of the firms in our sample never withdraw an inflation risk disclosure. Since the initiation, more than 90% of our sample firms have maintained the inflation risk disclosure over 75% of their Compustat life.

[22] Because inflation exposure is estimated from Eq. (4), we bootstrap the standard errors by resampling observations (with replacement) from the data in memory 200 times. We draw the cluster observations with replacement at the level of the Fama-French 48 industry classification.

[23] We repeat the same procedure as in Eq. (5) but estimate the effect of inflation risk exposure as of year t on disclosures in year t+1, t+2, and t+3, respectively, and give the results in Table A.3 of the Online Appendix. The results suggest that firms' inflation risk exposure predicts neither future disclosure of this risk nor future disclosures along other dimensions, which high inflation might draw attention to.

[24] We extract sentences from Item 1A consisting of at least one keyword from the keywords list including "monetary policy," "money (or monetary) supply," "fed," "federal reserve," "central bank," "federal funds rate," "federal open market committee," "fomc," "overnight (financing or funding or finance) rate," "london interbank offer rate," and "libor." Figure A.3 of the Online Appendix illustrates several examples of monetary-policy-risk-related risk factors.

[25] To check whether inflation-exposed firms disclose risk factors related to energy costs, we extract sentences from Item 1A consisting of at least one keyword from the keywords list including "price of oil," "price of crude oil," "oil price," "crude oil price," "price of natural gas," "natural gas price," "price of petroleum products," "petroleum price," "fossil gas price," "price(s) of fossil gas," "price(s) of fuel oil," and "fuel oil price." Figure A.4 of the Online Appendix illustrates several examples of oil and gas risk factors.

Table 3
Inflation Risk Exposure and Inflation-Risk-Related Disclosure. This table reports the results for the following linear equation:

$$Disclosure_{i,t} = \alpha + \beta_1 \times InflationExposure_{i,t} + X'_{i,t} \times \theta + \gamma_j + \gamma_t + \epsilon_{i,t},$$

where *Disclosure* refers to *FirstInflation* in column (1), *FirstMonetary* in column (2), *FirstOilGas* in column (3), and *Derivative* in column (4). $FirstInflation_{i,t}$ is a dummy variable equal to 1 if firm i mentions inflation for the first time in Item 1A of the 10-K report of fiscal year t, and 0 otherwise. $FirstMonetary_{i,t}$ is a dummy variable equal to 1 if firm i mentions monetary policy for the first time in Item 1A of the 10-K report of fiscal year t, and 0 otherwise. $FirstOilGas_{i,t}$ is a dummy variable equal to 1 if firm i mentions oil and natural gas for the first time in Item 1A of the 10-K report of fiscal year t, and 0 otherwise. $Derivative_{i,t}$ is a dummy variable equal to 1 if firm i reports non-zero unrealized derivative gain or loss in fiscal year t, and 0 otherwise. *InflationExposure* is a dummy variable equal to 1 if a firm is exposed to material inflation risk as identified by Eq. (4), and 0 otherwise. Table 1 provides definitions for other variables. Statistics are bootstrapped by resampling observations (with replacement) from the data in memory 200 times. Standard errors are clustered at the level of Fama-French 48 industries.

	FirstInflation (1)	*FirstMonetary* (2)	*FirstOilGas* (3)	*Derivative* (4)
InflationExposure	−0.004	0.000	−0.003	0.008
	(−1.43)	(0.09)	(−1.53)	(0.58)
CPI_D1(t+1)	0.014	−0.003	0.012	0.051***
	(1.50)	(−0.35)	(1.56)	(3.40)
CPI_D1(t+2)	−0.006	−0.016	0.009	−0.005
	(−0.60)	(−1.27)	(0.72)	(−0.16)
CPI_D1(t+3)	0.065***	0.026	0.050***	−0.024
	(3.93)	(1.19)	(2.80)	(−0.48)
LongTermDebt	0.003	0.024***	−0.001	0.256***
	(0.76)	(4.04)	(−0.11)	(4.19)
ShortTermMoney	−0.005	−0.011***	−0.008**	−0.127***
	(−0.93)	(−2.89)	(−2.17)	(−3.82)
Inventory	0.010	0.016*	0.005	0.124
	(1.29)	(1.85)	(0.45)	(1.07)
PPE	−0.002	−0.003	0.001	0.046*
	(−0.56)	(−0.99)	(0.21)	(1.85)
ProductSimilarity	0.057***	0.049**	−0.003	−0.057
	(3.43)	(2.14)	(−0.17)	(−0.38)
HHI	−0.004	0.006	−0.009*	0.027
	(−0.64)	(0.84)	(−1.72)	(0.58)
Profitability	−0.006	0.004	−0.004	−0.013
	(−1.20)	(0.78)	(−1.06)	(−0.41)
Ln(MarketCap)	0.001	−0.000	0.002***	0.065***
	(0.85)	(−0.02)	(2.79)	(14.29)
Book-to-Market	0.000	0.002**	0.000	0.020***
	(0.12)	(2.17)	(0.05)	(3.26)
BlockHolders	0.002	0.000	0.004*	0.015
	(0.58)	(0.07)	(1.88)	(1.09)
S&P 500	−0.001	0.005	−0.007***	0.140***
	(−0.15)	(1.11)	(−2.93)	(4.19)
R&D	−0.039***	−0.022**	−0.009	−0.160*
	(−3.90)	(−2.31)	(−0.63)	(−1.74)
Missing R&D	−0.007*	0.001	0.001	−0.000
	(−1.81)	(0.51)	(0.23)	(−0.02)
Constant	−0.022*	0.014	−0.040***	−0.212***
	(−1.73)	(1.17)	(−3.14)	(−4.09)
Industry FE	X	X	X	X
Year FE	X	X	X	X
N	29,130	29,130	29,130	29,130
R^2	0.01	0.01	0.02	0.24

t-statistics in parentheses
$*p < 0.10, **p < 0.05, ***p < 0.01$

Next, we examine whether exposed firms do not disclose inflation risk because they use financial derivatives to hedge against inflation risk. According to financial reporting rules, such firms should disclose hedging positions in their financial statements.[26] We therefore also examine the possibility that exposed firms do not disclose material inflation risk, because they have hedged against this risk via their use of financial instruments, such as derivatives. The results in column (4) of Table 3 confirm that exposed and unexposed firms are equally likely to report hedging activities in financial statements.

[26] Statement of Financial Accounting Standards No. 119 (SFAS 119; 1994) reads, "Disclosure about derivative financial instruments and fair value of financial instruments" requires disclosures of derivative financial-instruments-futures, forward, swap, and option contracts, and other instruments with similar characteristics.

Table 4
Size of Inflation Risk Exposure and Inflation-Risk-Related Disclosure. This table reports the results for the following linear equation. Eq. (4) provides detailed procedures for how we identify exposed firms:

$$FirstInflation_{i,t+n} = \alpha + \sum_{m=1}^{5} \beta_m \times ExposureRankm_{i,t} + X'_{i,t} \times \theta + \gamma_j + \gamma_t + \epsilon_{i,t},$$

where $FirstInflation_{i,t+n}$ refers to $FirstInflation_{i,t}$ in column (1), $FirstInflation_{i,t+1}$ in column (2), $FirstInflation_{i,t+2}$ in column (3), and $FirstInflation_{i,t+3}$ in column (4). $FirstInflation_{i,t+n}$ is a dummy variable equal to 1 if firm i mentions inflation for the first time in Item 1A of the 10-K report of fiscal year $t+n$ ($0 \le n \le 3$), and 0 otherwise. $ExposureRankm_{i,t}$ is a dummy variable equal to 1 if *SizeInflationExposure* for firm i in year t is the mth quantile of *SizeInflationExposure* ($0 \le 1 \le 5$), and 0 otherwise. *SizeInflationExposure* is the absolute value of coefficient estimated from Eq. (3). *SizeInflationExposure* is zero if firm is unexposed to inflation risk. Table 1 provides definitions for other variables. Statistics are bootstrapped by resampling observations (with replacement) from the data in memory 200 times. Standard errors are clustered at the level of Fama-French 48 industries.

	$FirstInflation_{i,t}$ (1)	$FirstInflation_{i,t+1}$ (2)	$FirstInflation_{i,t+2}$ (3)	$FirstInflation_{i,t+3}$ (4)
ExposureRank1	−0.002	0.001	−0.005	−0.003
	(−0.41)	(0.30)	(−1.27)	(−0.88)
ExposureRank2	−0.010*	0.003	0.004	0.006
	(−1.81)	(0.70)	(0.80)	(1.18)
ExposureRank3	0.004	0.005	0.003	0.008
	(0.81)	(1.20)	(0.44)	(1.44)
ExposureRank4	−0.006	−0.004	−0.002	0.002
	(−1.00)	(−1.05)	(−0.48)	(0.32)
ExposureRank5	−0.004	0.005	0.001	0.006
	(−0.68)	(0.91)	(0.15)	(1.17)
Controls	X	X	X	X
Industry FE	X	X	X	X
Year FE	X	X	X	X
N	29,130	27,082	24,180	21,323
R^2	0.01	0.01	0.01	0.01

t-statistics in parentheses.
$*p < 0.10, **p < 0.05, ***p < 0.01$.

5.4. Does exposure intensity explain risk disclosure intensity?

In this subsection, we check whether risk disclosure responds to the extent to which firms are exposed—the size of a stock-price drop for exposed firms that corresponds to a one-unit increase in unexpected inflation. We estimate the following regression model:

$$FirstInflation_{i,t+n} = \alpha + \sum_{m=1}^{5} \beta_m \times ExposureRankm_{i,t} + X'_{i,t} \times \theta + \gamma_j + \gamma_t + \epsilon_{i,t},$$

where $FirstInflation_{i,t+n}$ refers to $FirstInflation_{i,t}$ in column (1), $FirstInflation_{i,t+1}$ in column (2), $FirstInflation_{i,t+2}$ in column (3), and $FirstInflation_{i,t+3}$ in column (4), respectively. To prevent any nonlinearities in the way the intensive margin of inflation risk exposure is estimated, we divide the size of inflation risk exposure (*SizeInflationExposure*)—the absolute value of the coefficient estimated from Eq. (3) conditioning on inflation-exposed firms—into five quantiles. $ExposureRankm_{i,t}$ is a dummy variable equal to 1 if *SizeInflationExposure* for firm i in year t falls into the mth quantile of *SizeInflationExposure* ($0 \le 1 \le 5$), and 0 otherwise.

The results in column (1) of Table 4 suggest that the likelihood that exposed firms initiate the disclosure of the inflation risk factor as of year t does not increase with the extent to which firms are exposed to inflation risk. In addition, firms' future disclosure practices do not respond to the size of current risk exposure (see columns (2)–(5) of Table 4). These exposure intensity results reveal that the risk disclosure practices of inflation-exposed firms are insensitive to the intensity of the inflation risk exposure, which is inconsistent with a strategic motive explanation for managers' non-disclosure of inflation risk information.[27]

5.5. Disclosure of consequential risks

The managers of exposed-nondisclosing firms may disclose other firm-level risks that are related to inflation; we call these "consequential risks.g For example, inflation can increase firms' input costs or reduce consumer demand; managers may disclose such consequential risks rather than inflation risk. Although consequential risks do not move in lockstep with

[27] In addition, note that although managers may be more likely to disclose when exposure is high, the results from this analysis can be interpreted as having one or more of the following non-mutually exclusive reasons. First, managers may not pay attention because the benefit of paying attention to inflation is not sufficiently high to offset the cost of paying attention across the different exposure groups. Second, this test has a low statistical power. Third, this evidence is consistent with inattention caused by other reasons (e.g., limited cognitive abilities; lack of personal experience), in which managers do no pay attention to inflation risk regardless of the size of its exposure (e.g., because the range of sizes of stock price reactions in the sample might be too small to be salient to managers), even when there is no cost to fully incorporate inflation risk information.

Table 5
Inflation Risk Exposure and Consequential Risk Disclosure. Panel A of this table reports the results for the following linear equation:

$$ConDisclosure_{i,t} = \alpha + \beta_1 \times InflationExposure_{i,t} + X'_{i,t} \times \theta + \gamma_j + \gamma_t + \epsilon_{i,t},$$

where *ConDisclosure* refers to *FirstDemand* in column (1), *FirstInput* in column (2), *FirstWage* in column (3), and *FirstFinance* in column (4). $FirstDemand_{i,t}$ is a dummy variable equal to 1 if firm i mentions consumer demand risk for the first time in Item 1A of the 10-K report of fiscal year t, and 0 otherwise. $FirstInput_{i,t}$ is a dummy variable equal to 1 if firm i mentions input cost risk for the first time in Item 1A of the 10-K report of fiscal year t, and 0 otherwise. $FirstWage_{i,t}$ is a dummy variable equal to 1 if firm i mentions wage risk for the first time in Item 1A of the 10-K report of fiscal year t, and 0 otherwise. $FirstFinance_{i,t}$ is a dummy variable equal to 1 if firm i mentions financing risk for the first time in Item 1A of the 10-K report of fiscal year t, and 0 otherwise. *InflationExposure* is a dummy variable equal to 1 if a firm is exposed to material inflation risk as identified by Eq. (4), and 0 otherwise. Panel B of this table reports the results for the following linear equation:

$$ConDisclosure_{i,t} = \alpha + \beta_1 \times Exposed\ Disclosing_{i,t} + \beta_2 \times Exposed\ Nondisclosing_{i,t} + X'_{i,t} \times \theta + \gamma_j + \gamma_t + \epsilon_{i,t},$$

where $Exposed\ Disclosing_{i,t}$ is a dummy variable equal to 1 if firm i exposed to material inflation risk has mentioned inflation risk in Item 1A of the 10-K report as of fiscal year t, and 0 otherwise; $Exposed\ Nondisclosing_{i,t}$ is a dummy variable equal to 1 if firm i exposed to material inflation risk has not mentioned inflation risk in Item 1A of the 10-K report as of fiscal year t, and 0 otherwise. Equation (1) provides definitions for other variables. Statistics are bootstrapped by resampling observations (with replacement) from the data in memory 200 times. Standard errors are clustered at the level of Fama-French 48 industries.

	FirstDemand (1)	*FirstInput* (2)	*FirstWage* (3)	*FirstFinance* (4)
	Panel A: Not distinguishing disclosure status for exposed firms			
InflationExposure	−0.004	−0.002	−0.003	0.000
	(−1.63)	(−0.59)	(−1.05)	(0.06)
N	29,130	29,130	29,130	29,130
R^2	0.18	0.15	0.11	0.12
	Panel B: Distinguishing disclosure status for exposed firms			
Exposed Disclosing	−0.005	−0.001	0.007	0.001
	(−0.83)	(−0.09)	(0.78)	(0.08)
Exposed Nondisclosing	−0.003	−0.001	−0.005	0.001
	(−1.12)	(−0.39)	(−1.64)	(0.15)
N	29,130	29,130	29,130	29,130
R^2	0.16	0.13	0.10	0.11
Controls	X	X	X	X
Industry FE	X	X	X	X
Year FE	X	X	X	X

t-statistics in parentheses.
$*p < 0.10, **p < 0.05, ***p < 0.01$.

inflation, and managers' attention to consequential risks is not equivalent to their attention to inflation risk, we nevertheless examine whether, instead of exposed firms disclosing inflation risk, they disclose consequential risks correlated with inflation.

To select consequential risks from Item A1 of 10-K reports, we follow D'Acunto et al. (2021) to resort to the LDA developed by Blei et al. (2003). Specifically, we refer to 31-word clouds of the material risks listed in Figure A.5 of the Online Appendix to identify major topics indicating consequential risks related to inflation: consumer demand risk (14th topic), input cost risk (8th topic), wage risk (19th topic), and financing risk (4th topic). Accordingly, we use Eq. (5) to test whether inflation-exposed firms are more likely than unexposed firms to initiate the disclosure of consequential risks. Panel A of Table 5 shows that managers of exposed and unexposed firms are equally likely to initiate the disclosure of consequential risks.

Next, we examine whether exposed-nondisclosing firms are more likely than exposed-disclosing firms to disclose consequential risks. The results, reported in Panel B of Table 5, show that exposed firms are not more likely than unexposed firms to initiate the disclosure of consequential risks, further supporting our inference from our Panel A results. These LDA analyses to search firms' Item 1A for texts related to various æconsequential risksg (i.e., input-cost risk; demand risk; wage risk; financing risk) also help assess the economic mechanism. The result that inflation-exposed firms (including inflation-exposed-nondisclosing firms) are not more likely to disclose consequential risks compared with inflation-unexposed firms rejects the case that our non-disclosing firms disclose consequential risks in lieu of disclosing inflation risk.

6. Shocks to managerial attention to inflation risk

6.1. A quasi-natural experiment exploiting SEC's Regulation S-K

We conduct a quasi-natural experiment exploiting the SEC's initiation of risk factors disclosure requirement in firms' 10-Ks per Regulation S-K to examine (a) the effectiveness of the regulation and (b) robustness checks. The robustness checks focus on two theoretical possibilities. First, we examine whether both risk exposure and risk factor disclosure could be

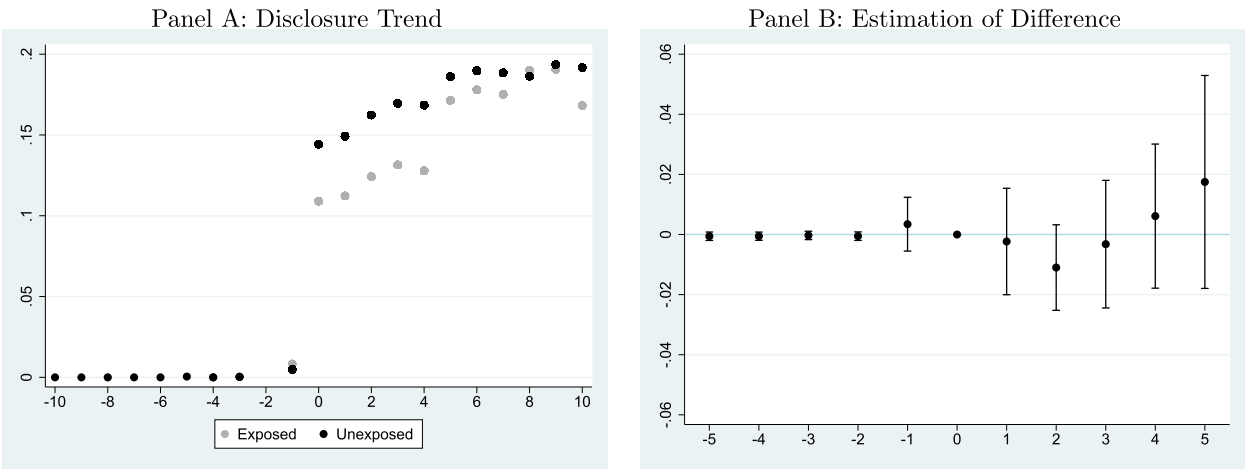

Fig. 2. Material Inflation Risk and Its Financial Disclosure: Exposed vs. Unexposed Firms around Regulation S-K. This figure shows the probabilities of firms initiating inflation risk disclosures following Regulation S-K between firms exposed and firms unexposed to material inflation risk (see Section 6.1). The y-axes are estimated probabilities of firms disclosing inflation risk. The x-axes are event years. For firms with a fiscal year-end from December 2005 to May 2006, fiscal year 2005 is set as year 0; for firms with a fiscal year-end from June 2005 to November 2005, fiscal year 2006 is set as year 0. We identify firms that are exposed to material inflation risk over the 1996 – 2005 sample period. In Panel A, we plot the likelihood of firms disclosing inflation risk over event years. In Panel B, we plot estimated $\hat{\beta}$ and confidence intervals at the 95% level from Eq. (6) (see Section 6.1). Standard errors are clustered at the level of Fama-French 48-industry classification.

determined by the same unobservable factors. Second, although unlikely, it may be possible that risk exposure today could depend on investors' anticipation of future disclosure (i.e., reverse causality).[28]

We employ a difference-in-differences (DiD) design to compare inflation risk disclosures, before and after the initiation of Regulation S-K, across firms that were exposed and unexposed to inflation risk over the pre-Regulation-S-K period of 1996–2005. The design removes firm-level unobservable factors that might simultaneously influence inflation risk exposure and disclosure.[29] We estimate firms' exposure to inflation risk prior to Regulation S-K during the 1996–2005 period, where prior to 2005 Item 503(c) of Regulation S-K was not mandated and firms were unlikely to disclose any risk factor. Our estimates suggest that in 1996–2005, about 8.6% of sample firms were exposed to material inflation risk.[30]

In Panel A of Fig. 2, we compare the likelihoods of firms disclosing inflation risk before and after Regulation S-K, across exposed and unexposed firms. Panel A reveals that initiating the risk factor disclosure requirement in firms' 10-Ks per Regulation S-K is effective. Indeed, there is a remarkable shift in disclosure for both exposed and unexposed firms in response to the regulation. More specifically, about 10% of inflation-exposed firms and 14% of unexposed firms mention inflation in Item 1A of their 10-Ks in the first year after the regulation. Also, the two trends of disclosure frequencies converge until the fifth year and onward.

We next employ a DiD design to estimate firms' propensity to initiate inflation risk disclosure in response to their inflation risk exposures in 1996–2005. In Panel B of Fig. 2, we plot $\hat{\beta}$ and the 95% confidence interval estimated from the following regression model:

$$\begin{aligned} FirstInflation_{i,t} = \alpha + \textstyle\sum_{t=-5}^{5} \beta_t \times \underbrace{InflationExposure_i}_{1996-2005} + \delta \times \underbrace{InflationExposure_i}_{1996-2005} \\ + X_i' \times \theta + \gamma_t + \gamma_j + \epsilon_{i,t}, \end{aligned} \tag{6}$$

which estimates event-year-specific coefficients of $\underbrace{InflationExposure_i}_{1996-2005}$ for five years before and after the regulatory mandate.[31]

Panel B of Fig. 2 shows, unsurprisingly, that the pre-trend between the exposed and unexposed firms is parallel and those

[28] In fact, previous studies suggest that investors are uninformed about firm-specific exposures to systematic risk and, hence, risk factor disclosures may affect firms' expected returns (e.g., Heinle et al., 2018).

[29] Because no firm was mandated to disclose risk factors prior to the regulation, the identifying assumption (i.e., exposed and unexposed firms follow parallel trends in periods before the regulation) is satisfied. An additional benefit of using the above quasi-natural experiment is that, by estimating inflation risk exposure over the period when risk factor disclosure is absent, we exclude the possibility that risk disclosures might have real effects on stock returns surrounding the inflation announcements, which in turn can contaminate the measurement of inflation risk exposure.

[30] The results in Table A.4 of the Online Appendix suggest that the mean (median) of estimated coefficients is −0.153 (−0.102) and the mean (median) of estimated t-statistics is −0.159 (−0.183).

[31] We drop the interactions with event year 0, which serves as the base period. Thus, the estimated β coefficients represent the change in the difference between treatment (i.e., firms exposed to inflation risk over 1996 – 2005) and control (i.e., firms unexposed to inflation risk over 1996 – 2005) groups between the event year and the given period.

Table 6
Inflation Risk Exposure and Its Financial Disclosure: The Case of Securities Class Action Lawsuits. This table reports the results for the following linear equation:

$$FirstInflation_{i,t} = \alpha + \beta_1 \times InflationExposure_{i,t} + \beta_2 \times InflationExposure_{i,t} \times Lawsuit_{i,t} + \beta_3 \times Lawsuit_{i,t} + X'_{i,t} \times \theta + \gamma_j + \gamma_t + \epsilon_{i,t},$$

where $FirstInflation_{i,t}$ is a dummy variable equal to 1 if firm i mentions inflation for the first time in Item 1A of the 10-K report of fiscal year t, and 0 otherwise. $\Delta Length \geq 15\%_{i,t}$ is a dummy variable equal to 1 if firm i experiences more than a 15% change in Item 1A of the 10-K report from fiscal year $t-1$ to t, and 0 otherwise. *InflationExposure* is a dummy variable equal to 1 if a firm is exposed to material inflation risk as identified by Eq. (4), and 0 otherwise. $Lawsuit_{i,t}$ is a dummy variable equal to 1 if firm i is sued in a securities class action lawsuit either in the current or previous fiscal year, and 0 otherwise. Table 1 provides definitions for other variables. Statistics are bootstrapped by resampling observations (with replacement) from the data in memory 200 times. Standard errors are clustered at the level of Fama-French 48 industries.

	FirstInflation			*ΔLength ≥ 15%*		
	(1)	(2)	(3)	(4)	(5)	(6)
InflationExposure×Lawsuit	0.017**	0.017**	0.017**	−0.018	−0.003	0.003
	(2.12)	(2.11)	(2.10)	(−0.86)	(−0.15)	(0.10)
Lawsuit	−0.002	−0.003	−0.003	0.030***	0.035***	0.030***
	(−0.78)	(−1.22)	(−1.18)	(3.62)	(5.25)	(4.12)
InflationExposure	−0.005*	−0.005**	−0.005**	0.010	0.001	0.001
	(−1.92)	(−1.99)	(−2.13)	(1.00)	(0.20)	(0.16)
Controls	X	X	X	X	X	X
Year FE		X			X	
Industry FE						
Industry × Year FE			X			X
N	32,739	29,130	29,130	32,739	29,130	29,130
R^2	0.00	0.01	0.04	0.00	0.05	0.09

t-statistics in parentheses.
$*p < 0.10, **p < 0.05, ***p < 0.01$.

estimated $\hat{\beta}$s are virtually zero, because the entire risk factor section was introduced after Regulation S-K. However, $\hat{\beta}$ is not statistically different from zero even after the event year, suggesting that exposed and unexposed firms exhibit a similar tendency to initiate inflation risk disclosure after the regulation.

Overall, the results from our quasi-natural experiment exploiting the SEC's initiation of risk factors disclosure requirement in firms' 10-Ks per Regulation S-K are consistent with the observation that unobservable factors do not generate a significant effect on the exposed versus the unexposed groups. The results also reveal that the risk factor regulation is effective.[32]

6.2. Securities class action lawsuits

Building on Coibion et al. (2018), who suggest that much of the dispersion in beliefs can be explained by firms' incentives to collect and process information, we hypothesize that recently-sued firms have more incentives to collect and process information about inflation risk. To test this hypothesis, we examine whether managers of inflation-exposed firms begin to disclose inflation risk after their firms face a class action lawsuit.[33] We estimate the following regression:

$$FirstInflation_{i,t} = \alpha + \beta_1 \times InflationExposure_{i,t} + \beta_2 \times InflationExposure_{i,t} \times Lawsuits_{i,t} + \beta_3 \times Lawsuits_{i,t} + X'_{i,t} \times \theta + \gamma_j + \gamma_t + \epsilon_{i,t}, \quad (7)$$

where $Lawsuits_{i,t}$ is equal to 1 if firm i is sued in a securities class action lawsuit either during year t or year $t-1$, and is 0 otherwise.[34]

We compare inflation risk disclosures between exposed and unexposed firms after facing class action lawsuits, and report the results in columns (1)–(3) in Table 6. Strikingly, compared with unexposed firms, exposed firms are 1.2 percentage points more likely to initiate inflation risk disclosure in year t, and the economic magnitude is 37% of the sample mean. Our finding that, immediately following class action lawsuits, managers become more attentive to inflation risk, especially in exposed firms where managers have more incentives to collect and process inflation risk information, is consistent with the rational inattention model of Sims (2003) and with prior empirical research, such as Coibion et al. (2018, 2020).

One alternative hypothesis is that our estimates of inflation risk exposure might capture firms' exposure to other macro risks, and hence, for precaution, managers insert all related boilerplate paragraphs into Item A1 of their 10-Ks. We thus

[32] We also repeat the same analysis as for Fig. 2 but to compare the likelihoods of firms disclosing monetary policy risk, disclosing oil and gas risk, and engaging with hedging activities before and after Regulation S-K, across exposed and unexposed firms. The results are in Figure A.6, Figure A.7, and Figure A.8 of the Online Appendix. We reach a similar conclusion.

[33] A lawsuit filed by investors who bought a firm's publicly traded securities within a "class period" and suffered economic damages from security laws' violations.

[34] Data on securities class action lawsuits are from the Audit Analytics Legal case feed. In 1997–2020, 14,588 class actions were filed, and in 2005–2020, about 27% of sample firms were sued at least once.

examine whether changes in the length of Item A1 differ across exposed and unexposed firms. In columns (4)–(6), we provide the results of estimating Eq. (7) by replacing $FirstInflation_{i,t}$ with $\Delta Length \geq 15\%_{i,t}$, a dummy variable equal to 1 if firm i experiences more than a 15% change in Item 1A of their 10-K report from fiscal year $t-1$ to t, and is 0 otherwise.[35] As the results in columns (4)–(6) show, although Item A1 on average indeed grows in year t relative to $t-1$, exposed and unexposed firms experience the same likelihood of such growth, suggesting our results in columns (1)–(3) are not driven by managers boilerplating non-inflation-related sentences into Item A1.

To further examine an explanation involving consequential risks, we conduct an additional analysis employing the securities class action lawsuits and the LDA to probe whether it is possible that inflation-exposed firms initiate consequential risks (about consumer demand, input cost, wage, and financing cost) following such lawsuits. Table A.5 of the Online Appendix shows that inflation-exposed firms are not more likely than unexposed firms to initiate the disclosure of consequential risks in response to class action lawsuits. The results further support our inferences (a) of the rational inattention explanation in our setting as opposed to the alternative explanation that inflation-exposed-nondisclosing firms disclose consequential risks, and (b) that inflation risk is different from consequential risks.

6.3. Managerial conference call speech

We further examine whether managerial attention to inflation risk affects managers' actions by employing linguistic content available from transcripts of firms' earnings conference calls. We focus on testing whether managers of inflation-exposed firms communicate more inflation-related topics following class action lawsuits. Using conference call transcripts, we gauge managers' quantitative discussions of their firm's cost trends (e.g., "we anticipate a 5% increase" or "costs will decrease by $1.2 million"). We measure managerial discussions of future costs in a spirit similar to that in the Business Inflation Expectations survey of the Federal Reserve Bank of Atlanta, where respondents (i.e., firm managers) are asked about their firms' expected unit costs (for standard questions used by the Atlanta's Fed, see "Business Inflation Expectations (BIE) Frequently Asked Questions"). We select texts related to managers' outlook regarding their firms' input costs following a number of criteria.[36] Next, we estimate the following regression:

$$\begin{aligned} CostDiscussion_{i,n,t} = {} & \alpha + \beta_1 \times InflationExposure_{i,t} + \beta_2 \times InflationExposure_{i,t} \times \\ & Lawsuit_{i,t} + \beta_3 \times Lawsuit_{i,t} + X'_{i,t} \times \theta + \gamma_i + \gamma_t + \epsilon_{i,n,t}, \end{aligned} \tag{8}$$

where $CostDiscussion_{i,n,t}$ is equal to 1 if managers of firm i quantitatively discuss their firms' future input costs during the presentation session of the nth earnings conference call hosted by the firm in year-quarter t, and is 0 otherwise.[37] Table A.6 of the Online Appendix reports the descriptive statistics on the conference-call-transcript sample over the period of 2002–2016.

Columns (1)–(3) of Table 7 report estimates of the effect of class action lawsuits on the likelihood that managers quantitatively discuss their firm's future input costs. In column (1), the interaction term $InflationExposure \times Lawsuit$ is strongly positive and the economic magnitude is such that managers of exposed firms are 3.7 percentage points more likely to discuss future input costs. This number is about 22% of the sample mean. In column (2), we further control for industry-time fixed effects in the regression, and the estimates remain similar. In columns (3)–(4), we exclude the possibility that our results in columns (1)–(2) are driven by managers of inflation-exposed firms discussing more issues in general, which is measured by a change in the length of a presentation session.

To summarize, there are two takeaways from our analysis of 83,521 earnings call transcripts. First, our finding that managers of exposed firms are more likely to voluntary discuss certain input costs in earnings conference calls following class action lawsuits is consistent with managers' inattention. Second, inflation risk disclosure is important because such disclosure suggests that managers pay attention to input costs.

7. Value destruction analysis

Can our models be used to forecast stock price damages for shareholders of exposed-nondisclosing firms in response to future inflation increases? In this subsection, we assess the possible damages for shareholders of firms that are exposed to inflation risk but never disclosed it during our sample period. In particular, using parameters calibrated from our estimated models, we simulate scenarios of future possible inflation increases and calculate the shareholders' value destruction (in terms of market cap losses) in response to an inflation increase.

For firms exposed to material inflation risk that have not yet disclosed it by the fiscal end of 2020, we estimate the dollar amount of their aggregated value to be destructed by unexpected inflation over different horizons. We focus on a three-year horizon subsequent to our analysis, varying unexpected inflation from 2% to 6% per year (i.e., 0.5%–1.5% per quarter).

[35] This number is the 75th percentile of the sample distribution. Our results are similar with other cutoffs.

[36] First, the cost-related-word list includes "cost(s)," "expense(s)," "expenditure(s)," "spend," and "spending." Second, because we focus on managers' discussions about input costs, we exclude text indicating expenses related to "capital expenditure," "compensation," "mergers and acquisitions," and "pensions." Third, cost-related sentences are in future tense. Fourth, we require exact numbers to be paired with cost-related words. Figure A.9 of the Online Appendix lists 10 sentences, extracted from 10 distinct conference call transcripts, that satisfy our searching criteria.

[37] To prevent calls with unusual lengths from influencing our results, we exclude scripts with less than 500 words and scripts with more than 5,000 words. Our results are similar if we impose other cutoffs.

Table 7
Inflation Risk Exposure and Managerial Speech during Conference Calls. This table reports the results for the following linear equation:

$$CostDiscussion_{i,n,t} = \alpha + \beta_1 \times InflationExposure_{i,t} + \beta_2 \times InflationExposure_{i,t} \times Lawsuit_{i,t} + \beta_3 \times Lawsuit_{i,t} + X'_{i,t} \times \theta + \gamma_i + \gamma_t + \epsilon_{i,n,t},$$

where $CostDiscussion_{i,n,t}$ a dummy variable equal to 1 if managers of firm i quantitatively discuss about own company's future input/operating costs during the presentation session of the nth conference call hosted by the firm as of year-quarter t, and 0 otherwise. $Ln(Presentation)_{i,n,t}$ is the logarithm of the length of company i's presentation session (in words) in the nth conference call as of year-quarter t, and 0 otherwise. $Lawsuit_{i,t}$ is a dummy variable equal to 1 if firm i is sued in a securities class action lawsuit either in the current or previous fiscal year, and 0 otherwise. *InflationExposure* is a dummy variable equal to 1 if a firm is exposed to material inflation risk as identified by Eq. (4), and 0 otherwise. *Time* is a full set of year-quarter fixed effects. Table 1 provides definitions for other variables. Statistics are bootstrapped by resampling observations (with replacement) from the data in memory 200 times. Standard errors are clustered at the level of Fama-French 48 industries.

	CostDiscussion		*Ln(Presentation)*	
	(1)	(2)	(3)	(4)
InflationExposure×Lawsuit	0.037**	0.040**	−0.004	−0.002
	(2.26)	(2.36)	(−0.32)	(−0.12)
InflationExposure	−0.004	−0.009	−0.013*	−0.012
	(−0.47)	(−1.07)	(−1.79)	(−1.64)
Lawsuit	0.007	0.003	0.007	0.007
	(0.81)	(0.43)	(1.26)	(1.06)
Controls	X	X	X	X
Firm FE	X	X	X	X
Time FE	X		X	
Industry × Time FE		X		X
N	83,521	83,521	83,521	83,521
R^2	0.20	0.23	0.35	0.37

t-statistics in parentheses
$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 8
Value Destruction in Response to Future Unexpected Inflation. This table reports the value destruction in response to a hypothetical increase in future unexpected inflation for exposed non-disclosing firms and exposed disclosing firms. Firms exposed to material inflation risk are identified by the rule in Eq. (4). Disclosing firms are firms that disclosed inflation risk in Item 1A of the 10-K report in 2020, and 0 otherwise. We project the value destruction based on firms' market value as of December 31, 2020. The following example illustrates our calculation: an annual rate of a 2% increase in unexpected inflation reduces the market value of exposed non-disclosing firms by $312 billion (= 2% × −4.780 × 4017.47) within one year. In this example, −4.780 is the averaged size of inflation exposure for exposed-nondisclosing firms (see Eq. (1) for a detailed description) and 4017.47 (in billion USD) is the aggregated market capitalization of all exposed-nondisclosing firms as of December 31, 2020.

	Value Destruction in $ billion				
	Panel A: 1 year horizon				
Annual rate=	2%	3%	4%	5%	6%
Exposed non-disclosing firms	−312	−469	−625	−781	−937
Exposed disclosing firms	−42	−62	−83	−104	−125
	Panel B: 2 year horizon				
Annual rate=	2%	3%	4%	5%	6%
Exposed non-disclosing firms	−625	−937	−1,250	−1,562	−1,875
Exposed disclosing firms	−83	−125	−166	−208	−249
	Panel C: 3 year horizon				
Annual rate=	2%	3%	4%	5%	6%
Exposed non-disclosing firms	−937	−1,406	−1,875	−2,343	−2,812
Exposed disclosing firms	−125	−187	−249	−311	−374
Calibration Paramaters for Destruction Analysis					
	Exposure			Value ($B)	
Exposed non-disclosing firms	−4.780			4017.47	
Exposed disclosing firms	−4.156			499.30	

Table 8 shows the projected aggregate value destruction, calculated as the sum of firm-level market cap losses, in response to unexpected inflation shocks in different scenarios. For firms exposed to inflation risk in their last fiscal year covered by Compustat, we aggregate market value of equity (measured as of December 31, 2020) for portfolios of disclosing and nondisclosing firms. The column titled "Calibration Parameters for Destruction Analysis," shows that, as of December 31, 2020, the exposed nondisclosing and exposed disclosing portfolios are valued at $4,017 billion and $500 billion, respectively. Also, we average the stock-price-response coefficients to unexpected inflation (see Eq. (4)) across stocks within each portfolio. We find that a future 1% increase in unexpected inflation on average reduces value by 4.78% and 4.16%, respectively, for nondisclosing and disclosing portfolios. To illustrate our calculation: (i) a 2% increase in unexpected inflation is

tied to damages to shareholders of exposed-nondisclosing firms equal to \$384 billion (= 2% × −4.78 × 4,017) within one year, \$768 billion within two years, and \$1,152 billion within three years; (ii) a 6% increase in unexpected inflation is tied to damages to shareholders of exposed-nondisclosing firms equal to \$1,152 billion (= 6% × −4.78 × 4,017) within one year, \$2,304 billion within two years, and \$3,456 billion within three years. Overall, Table 8 shows that 2%–6% inflation shocks over the subsequent three years cause an aggregate damage of \$0.9-\$2.8 trillion for shareholders of exposed-nondisclosing firms.

8. Conclusion

We examine the prevalence of material inflation risk and whether managers of U.S. firms that are exposed to such risk disclose it, as legally required by the SEC, in their financial reports. Using a highly incentivized setting that employs big datasets of corporate reports filed with the SEC, we find that inflation risk, as measured by a stock price drop in response to unexpected inflation, is material and pervasive among major U.S. firms. Yet, we find that most of the exposed firms do not disclose this risk in the risk disclosure section of their annual reports. In addition, inflation-exposed firms are more likely to initiate inflation risk disclosures and pay more attention to the trend of input costs after being sued in a securities class action lawsuit.

We advance research on inflation, monetary policy, capital markets, behavioral economics, disclosure, and corporate risks. For example, we identify a new dimension of attention—inflation risk on the part of managers—complementing research on limited attention and information disclosure in capital markets (e.g., Hirshleifer et al., 2009). As another example, by analyzing managers' disclosure practices and attention regarding inflation risk, we complement research on managerial attention to inflation dynamics (e.g., Coibion et al., 2018). Our findings suggest that communication and forward guidance by central banks such as the Federal Reserve may not be effective in managing firms' inflation risk expectations. This issue has been increasingly important since the onset of the effective lower bound on policy interest rates, which spurs policymakers' and academics' interest in policies that operate through expectations channels.

To what extent is the economic story consistent with managers' inattention to inflation risk? Possible alternative explanations are that managers have strategic motives to withhold inflation risk information or that the managers of inflation-exposed firms possibly disclose consequential risks that are correlated with inflation. First, a managerial cost-benefit analysis supports rational inattention as a more likely explanation as exposed firms' managers do not appear to simply withhold inflation risk. This is likely because withholding inflation risk information from investors entails a high net cost: it possibly increases litigation risk cost (i.e., from shareholders' lawsuits) with a low to none benefit given that inflation risk exposure is calculated using public information. Second, we conduct several analyses to address alternative explanations, and our findings are consistent with managers' inattention to inflation risk.

Looking ahead, the framework that we develop for identifying and evaluating stock price drop damages, especially in firms with inadequate risk disclosures relative to what is mandated by the SEC, has the potential to improve managers' disclosure practices and inflation expectations, thereby enhancing monetary policy transmission. In addition, our work broadens the scope of research on inflation and inflation expectations by empirical microeconomists trained in the analysis of microdata to a realm such as firm-level decision making, by opening the black box of firm-level beliefs and expectations using viable and readily available data from firms' financial numbers and textual disclosures. Although the analysis of firm-level microdata is a growing area of high interest by empirical macroeconomists, this area is still in its infancy. Our paper represents a blueprint for scholars, worldwide, to study linkages between the risks/dynamics of inflation (or other macro constructs), firm-level decision making, aggregate outcomes, stock valuation, and/or monetary policies by using corporate financial reports rather than ad-hoc surveys or experiments that are often costly or impossible to set up and administer.

Supplementary material

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jmoneco.2023.03.004.

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